

Denmark¹

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Danmarks Nationalbank has not established any official projects on historical monetary and financial statistics. However, one of the bank's senior officials has, in relation to the work in the BIS Historical Monetary and Financial Statistics network, compiled a comprehensive spreadsheet database with break-adjusted composite economic-historical time series; see Abildgren (2017a). The core of the database draws mainly on previous research by the author published in various peer-reviewed journal articles. The database should therefore be seen as "academic data" and not as official statistics.

Denmark has a long-standing tradition for producing official statistics. The first official population census in Denmark was conducted in 1769. However, the figures were regarded as military secrets and were therefore not published at the time. A permanent official central bureau of statistics in Denmark (Statistics Denmark) was founded in 1850. It is therefore possible to reconstruct composite historical time series for Denmark within many areas back to the middle of the 19th century based on official statistics.

1. Background

Territorial changes

Denmark has experienced a number of territorial changes since the early 19th century; see eg Johansen (1991) and Jespersen (2011):

- Denmark and Norway were separated after the peace settlement in Kiel in 1814. However, Iceland, Greenland and the Faroe Islands remained attached to the Danish monarchy. In 1918, Iceland became a sovereign state in a personal union with Denmark, but the personal union ceased in 1944. The Faroe Islands obtained self-government in 1948. With the Danish constitution of 1953, Greenland became a Danish county, and Greenland obtained home rule in 1979 and self-government in 2009.
- Schleswig and Holstein became part of Germany after the Second Schleswig War in 1864 in accordance with the Treaty of Vienna. In 1868, Germany paid compensation to Denmark (corresponding to around 7% of Denmark's net national income) to cover Schleswig-Holstein's proportion of the former joint government debt of the Danish monarchy; see Abildgren (2016c). In June 1920, Sønderjylland (the northern part of the old Duchy of Schleswig with a population of 164,000) was reunited with Denmark after a referendum in accordance with

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the Treaty of Versailles. Denmark paid an amount to Germany (corresponding to around 1% of Denmark's net national income) as compensation for assets in Sønderjylland, when Sønderjylland was reunited with Denmark.

Most historical financial and economic statistics cover the Kingdom of Denmark (excluding Greenland and the Faroe Islands) since 1920 and the Kingdom of Denmark excluding Sønderjylland (the northern part of the old Duchy of Schleswig) prior to 1920.

The time series in Abildgren (2017a) have to the extent possible been adjusted for breaks relating to territorial changes in order to reflect economic activity within the current borders of the Kingdom of Denmark excluding Greenland and the Faroe Islands. This has typically been done by simple multiplicative or additive splicing of older and newer time series.

The population of the Kingdom of Denmark (excluding Greenland and the Faroe Islands) was around 1.1 million in 1815 and 5.9 million in 2021.

Structure of the state

In relation to statistics following national accounts definitions, the Danish general government sector comprises the central government, the local governments and some social security funds (mainly unemployment benefit societies and the Employees' Wage Guarantee Fund); see Abildgren (2006).

The central government accounts for the main part of the assets and liabilities of the general government. In some periods, local governments have been subject to legal borrowing constraints; see Abildgren (2009).

Currency unit

The Danish currency unit of account changed from "rigsdaler kurant" to "riksbankdaler" in 1813, from "riksbankdaler" to "rigsdaler" in 1854 and from "rigsdaler" to "kroner" (DKK, divided into 100 øre) in 1875 in accordance with the Coin Act of 1873.

The currency reform of 1813 came after a period with very high inflation during the Napoleonic Wars caused by massive deficits in the government budget; see Abildgren (2018a). The currency reform is often called the "state bankruptcy" since the central government had already in 1811–12 ceased to pay interest and repayments in silver on part of its debt. Instead, it was paying in banknotes not convertible to silver. The reform meant the exchange of existing banknotes in the old currency unit (kurantdaler) for new banknotes at an exchange rate of 6 kurantdaler to 1 rigsbankdaler. During the period of high inflation up to the reform, the kurantdaler's value had dropped markedly relative to silver. The exchange rate of 6:1 was intended to ensure that the substitution would essentially reflect the relationship between the silver value of banknotes in kurantdaler and rigsbankdaler, respectively. The currency reform contained a number of complicated provisions on the redemption of private debt raised in kurantdaler. The purpose was to ensure that the creditors were repaid amounts with the same value in silver as the debt at the time it was raised. For example, as a general rule, private debt in kurantdaler raised in 1808 was to be repaid with a larger number of rigsbankdaler than debt raised in 1812 for the same amount in kurantdaler. With the currency reform, government debt in kurantdaler was to be

converted at the same exchange rate as banknotes (6:1) if the creditor called in the debt immediately. If a creditor was willing to declare his government bonds as interminable and accept a temporary interest rate cut, the debt was converted 1:1.

The change of the currency unit from "riksbankdaler" to "rigsdaler" in 1854 was just a pure change of name. Shortly after the eruption of the First Schleswig War in 1848, the newly established Schleswigian government abolished the rigsbankdaler as legal tender. In November 1853 – a couple of years after the end of the war – the Danish minister of finance introduced a bill to the Parliament to restore monetary unity within the Danish monarchy and by regulation of 1854 the name of the Danish currency changed from "riksbankdaler" to "rigsdaler". The omission of "bank" from the name was, according to Sørensen (2013), an attempt to counter local resistance to the currency in Schleswig-Holstein.

The Coinage Act of 1873 introduced a new currency unit, the krone, replacing the rigsdaler. The exchange rate was 1 rigsdaler to 2 kroner. At the same time, the Coinage Act of 1873 introduced a shift from a silver to a gold standard; see below.

In the database by Abildgren (2017a), figures stated in Danish kroner prior to 1875 have been converted using the following official conversion rates: 6 rigsdaler kurant = 1 rigsbankdaler = 1 rigsdaler = 2 DKK.

Monetary regimes

The currency reform of 1813 included the establishment of a new central bank, Rigsbanken. It was replaced by Danmarks Nationalbank (the current central bank of Denmark) in 1818. The Nationalbank continued Rigsbanken's work of reducing the circulation of banknotes to enable a price increase up to the official silver value of the banknotes. The instrument applied was a restrictive lending policy. This meant that the banknotes received as repayment of loans were not paid out again as new loans. Furthermore, the Nationalbank's earnings were used to reduce the circulation of banknotes. The currency reform and the cancellation of banknotes succeeded in combating the high inflation, and the price of rigsbankdaler reached the official silver value in 1838. But before that, prices had been falling for many years. In 1845, the Nationalbank's stock of silver became large enough to allow conversion of banknotes to silver coins. It had not been possible to convert Danish banknotes to silver since 1757.

Since the middle of the 19th century, Denmark has had an almost unbroken tradition for basing its monetary policy on an exchange rate target. Denmark followed a silver standard from 1845 and until the mid-1870s. A gold standard was adopted with the Coin Act of 1873, and Denmark participated in the pre-World War I Classical Gold Standard (within the framework of the Scandinavian Currency Union).

The international gold standard system was suspended at the outbreak of World War I in 1914, and Danmarks Nationalbank was also exempted from the obligation to convert its banknotes into gold coins. In 1927, Denmark returned to the gold standard with the same gold content in a krone as in 1913. However, Danmarks Nationalbank was obliged only to exchange banknotes for amounts of gold equal to the value of one or more whole gold bars (a gold bar standard). The Danish krone left the gold standard together with the British pound in 1931, and was then stabilised against the British pound. When World War II broke out, the krone was pegged to the US dollar instead of the pound.

In the first decades after the Second World War, Denmark participated in the dollar-based fixed exchange rate system established under the auspices of the International Monetary Fund, the Bretton Woods system. This system broke down in the early 1970s. Subsequently the Danish krone has been linked to various European exchange rate systems, initially the “Snake” and since 1979 the Exchange Rate Mechanisms (ERM I and II). Denmark is not part of the euro area.

The period from the mid-1970s to early 1980s represents a notable and not very successful deviation from Denmark’s long tradition for a fixed exchange rate policy. From 1976 to 1982, the central rate of the krone against the German D-mark was devalued by more than 30%. It contributed to increasing inflation and generated expectations of further devaluation of the krone. Combined with large government budget deficits, this resulted in massive upward pressure on long-term interest rates, which reached more than 20% p.a. in the early 1980s; see Abildgren et al (2010).

Today, all parts of the Danish Monarchy – Denmark, the Faroe Islands and Greenland – share the same currency, the Danish krone, and Danmarks Nationalbank supplies the Faroe Islands and Greenland with banknotes. The coins in the Faroe Islands are the same as in Denmark, but since 1951, the Faroe Islands have had their own banknotes with Faroese motifs. Danish banknotes and coins are used in Greenland.

Cross-border capital restrictions

The degree of restrictions on cross-border capital mobility might influence the interpretation of development in credit and interest rates.

The Gold Standard system was in general characterised by free movements of capital (including free private import and export of gold in coins and bars). Like many other countries, Denmark introduced a comprehensive set of foreign exchange restrictions in the 1930s; see Abildgren and Nørskov (1992) and Abildgren (2005).

The establishment of the European Payment Union (EPU) in 1950 ensured a high degree of de facto internal current account convertibility among the participating European currencies – including the Danish kroner. Deregulation of the restrictions on capital account transactions was a much slower and gradual process. 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,

The post-1971 period saw a gradual process of deregulation of the remaining Danish restrictions on capital account transactions. From December 1974, non-residents were given free access to buy Danish krone-denominated exchange-listed bonds (with an original maturity of more than two years). In February 1979, free access was again abolished, but it was reintroduced in May 1983.

The last restrictions on capital account transactions – mainly concerning money market papers, Danish banks’ foreign-exchange loans to residents, loans in kroner to residents from Danish banks’ foreign units, private individuals’ loans abroad and private individuals’ access to open accounts in foreign banks – were removed only in 1988.

Banking and financial system

The central bank of Denmark, Danmarks Nationalbank, was, as mentioned above, founded in 1818. Like its predecessors, it had a monopoly right to issue banknotes. For many years after its establishment, Danmarks Nationalbank conducted retail banking operations alongside its role as central bank. This meant that it counted private individuals and especially traders and merchants among its customers. In step with the development of a private credit market, the Nationalbank gradually switched away from direct lending to private business firms towards a function as banker to the banks; see Abildgren (2017b).

From the earliest times in Danish history, the King (and later the central government) had a monopoly on issuing coins. In 1975, the Royal Mint was transferred from the central government to Danmarks Nationalbank. The outstanding amount of coins has therefore only been on the liability side of the balance sheets of the Nationalbank since 1975.

The first savings bank in Denmark was founded in 1810, and the first deposit-taking commercial bank followed in 1846. The first bond-funded mortgage bank in Denmark was established in 1797; see Abildgren (2017c). Besides commercial banks and savings banks, the Danish deposit-banking sector comprises cooperative banks. They entered into the Danish financial system rather late. The first one was established only in 1915. Originally the cooperative banks were based on receiving deposits from and granting loans to members. However, the cooperative banks never played any major role as lenders in the Danish economy; see Guinnane and Henriksen (1998).

The early introduction of a tax-funded old age pension scheme in Denmark (in 1891) originally reduced the potential size of the private pension sector. But recent decades have seen the build-up of contribution-based labour market pensions, as reflected in strong growth in the assets managed by pension funds.

Collective investments in Denmark can be traced back to the late 1920s, but real investment mutual funds emerged only in the late 1960s. The lifting of restrictions on cross-border portfolio investments in the 1970s and 1980s produced an increase in the volume of assets managed by investment mutual funds. But the balance sheets of investment mutual funds did not begin to grow in earnest until the second half of the 1990s.

The Copenhagen Stock Exchange (CSE) was originally established in 1624 as a commodity exchange. Trading in government bonds on the CSE can be dated back to the first decade of the 19th century. The expansion of the bond-financed mortgage-bank system for the financing of real property in Denmark after 1850 laid the foundation for the development of a large and liquid market for mortgage bonds.

The outstanding amount of government bonds was relatively small compared with the mortgage-bond market from the last decades of the 19th century and until the mid-1980s. Long-term callable annuity mortgage-bonds served therefore as the market "benchmark" until the early 1990s when this role was taken over by 10-year government bullet bonds.

The outstanding amount of exchange-listed bonds issued directly by the Danish non-financial corporate sector has always been relatively small. However, this should be viewed in the light of the large bond-financed mortgage-bank sector that also finances buildings acquired by Danish firms (including agricultural properties).

The Danish financial system is therefore to a high degree “indirectly” market-based due to the large bond-financed mortgage-bank sector.

Banking regulation

The first Savings Bank Act was implemented in 1880. The Act included certain provisions on capital adequacy, auditing and valuation of assets as well as on presentation and publication of accounts. The Act also established a Saving Bank Supervisory Office; see Hansen, S (1996), Hansen (2001) and Abildgren (2019a). Commercial banks became subject to regulation and supervision by the Commercial Bank Act of 1919 (effective from 1920). The Commercial Bank Act imposed minimum capital and liquidity requirements on the commercial banks and included provisions on publication of accounts and auditing; see Hansen (1994).

There are, however, statistics on savings banks and commercial banks available for the pre-regulation period. In 1969, Statistics Denmark published bank-level time series information on the balance sheets of all Danish commercial banks since the foundation of the first commercial bank in 1846 and until 1920. This information was collected in the 1960s by Statistics Denmark from published accounts and material from the Danish National Business Archives supplemented by inquiries to the archives of individual banks; see Hansen (1969). The asset side of the balance sheets showed a breakdown on cash in hand, domestic bills of exchange, foreign bills of exchange and foreign correspondents, other loans, holdings of bonds and shares, claims on domestic correspondents and sundry assets and debtors. The liability side of the balance sheets showed a breakdown on deposits, sundry creditors and capital and reserves. The publication by Hansen (1969) also included time series information on total deposits in savings banks since the foundation of the first savings bank in 1810 based on contemporary statistics published by Statistics Denmark in the second half of the 19th century and early 20th century, supplemented by the pre-1847 figures in Hansen (1960).

The Commercial Bank and Savings Bank Act of 1974 (effective from January 1975) removed the legal boundaries between the business activity of commercial banks and savings banks, whereby the savings banks were allowed to carry out the same business activities as commercial banks. Savings banks were now able to discount bills of exchange, issue guarantees, trade in equities and bonds for their own account, participate in share issues and trade in foreign exchange. At the same time, savings banks also became subject to the same capital requirements as commercial banks; see Mikkelsen (1993). In 1989, the savings banks were allowed to transform their businesses from self-governing institutions into limited liability companies so that they could raise capital in the equity market. This removed the last legal differences between commercial banks and savings banks.

The bond-financed mortgage-banking sector was first regulated with the Mortgage Credit Act of 1850; see Abildgren (2012a). The act allowed mortgage banks to provide fixed rate loans against a first-ranking mortgage on real property up to 60% of the property value. The mortgage banks had to comply with the so-called balance principle requiring a balance between the payments received from the borrowers and the payments made to the bondholders via the bonds financing the loans. The mortgage banks also became subject to supervision and had to publish their accounts.

In the 1890s, the first second-mortgage banks were established. They granted loans against a second-ranking mortgage on real property of up to 75% of the property value. In the late 1950s, they were followed by mortgage banks that offered third-ranking mortgages on real property. The 1970 Mortgage Credit Act entailed a shift from a three-tier to a two-tier system. All mortgage banks were now allowed to offer both first mortgages (general credit) and second mortgages (special credit) so that borrowers no longer had to raise loans from several types of institution. This soon led to numerous mergers within the sector.

The Danish mortgage credit system has undergone major changes since 1970. The two-tier system for private owner-occupied dwellings was replaced by a single mortgaging system in 1980, and in 1989 the mortgage banks were allowed to transform their legal status from associations to limited liability companies.

Since the mid-1990s, the mortgage credit sector has seen intensive product development, which has given borrowers more choices. Until the mid-1990s, long-term fixed rate loans dominated the home financing market in Denmark. In 1996, adjustable rate mortgages were (re)introduced, and especially loans with annual refinancing rapidly became popular. After the turn of the century, capped variable rate loans and deferred amortisation loans (interest-only loans) were introduced. However, the basic idea in the Danish mortgage credit system – to offer loans against mortgages on real property by issuing negotiable bonds – remains the same.

The publication by Hansen (1969) also contained summary information on credit granted by Danish mortgage banks since the foundation of the first mortgage bank in 1797. This information was based on contemporary statistics published by Statistics Denmark in the second half of the 19th century and during the 20th century, supplemented by a broad range of other information, including reporting to the Ministry of the Interior, anniversary publications and secondary literature; see Hansen (1969) for details.

Banking and financial crises

The past 150 years or so have witnessed several banking and financial crises in Denmark. The monetary crisis of 1857–58 was the first one and was followed by banking and financial crises in 1876–78, 1885, 1907–09, 1920–33, 1984–85, 1987–93 and 2007–13; see Abildgren (2014).

The dating of periods with banking and financial crises above follows Danmarks Nationalbank's "Monetary History of Denmark". There seems to be a difference between the list of crises above and the banking-crises chronology for Denmark in Reinhart and Rogoff (2009). On page 359 in Reinhart and Rogoff, op cit, it is thus mentioned that there was also a banking crisis in February 1902. Such a crisis is mentioned neither in Danmarks Nationalbank's "Monetary History of Denmark" nor in the annual reports of Danmarks Nationalbank from 1901–02 and 1902–03. Reinhart and Rogoff, op cit, refer to Conant (1915) as the source for this information. However, Conant, op cit, does not mention any case of a banking crisis in Denmark in 1902. The exposition in Conant, op cit, is fully in line with the banking crises chronologies in the Danish economic-historical literature; see for instance pages 77 ff in Rubow (1920), pages 365 ff in Cohn (1958), pages 368 ff in Hansen and Svendsen (1968), pages 34 ff in Hansen (1996) and pages 101 ff in Hansen and Mørch (1997).

Payment instruments

Danmarks Nationalbank's first banknotes had very high denominations. The highest denomination in the 1819 banknote series was 100 rigsbankdaler. That was equivalent to around half the annual salary of a banknote counter at Danmarks Nationalbank or an entire year's pay for a manual labourer in Odense; see Abildgren (2018a). In other words, a 100-rigsbankdaler note had a very high face value. The background was that, since very few banks existed in 1819, and cheques only were introduced much later (in 1857), banknotes were used by households and firms for large financial transactions, for settlement of credit purchases and as saving instruments in line with large silver and later gold coins. Even the value of the smallest banknote in the 1819 series – 1 rigsbankdaler – was equivalent to a few days' pay. That is why households used coins for most of their daily purchases. Not until 1952 did the smallest banknote denomination approach the value of one hour's pay.

During the 1960s, employers, employees and deposit banks concluded agreements on the use of salary accounts, and households' use of cheques rose markedly during the 1970s. This meant a simultaneous decrease in the use of cash. Since then, the use of cash has declined further, while electronic payment solutions (automatic credit transfers, electronic payment cards, apps on a mobile telephone, etc) offered by banks have gained ground. In 2015, only around one tenth of private consumption was paid for in cash.

Sending money by letter has always been associated with certain risks. In 1851, the state-owned postal service introduced the money order where the payer paid a cash amount at the post office to execute the payment. The payee could then withdraw the amount at another post office upon presentation of personal identification and the money order received by letter. The post office giro was introduced in 1920. It was now possible to open a post office giro account and use the deposit in this account to pay bills to payees who also had post office giro accounts. Those without a giro account could pay their bills ("giro in-payment forms") by paying cash at the post office. In this way, the postal service had established an alternative to bank-based cheque payments. The postal service had a wide-ranging network of post giro offices all over Denmark, and the spread of giro payments was strengthened by the central and local governments' decisions to use post office giro accounts extensively for both in-payments and disbursements. In the early 1980s, giro transactions were on a par with cheque turnover in terms of amount. In order to avoid distortion of competition relative to the banks, the postal service was not allowed to grant loans. As a result, customers were not allowed to overdraw their post office giro accounts in connection with payments. Not until 1991, when the post office giro system was separated from the postal service and privatised, were credit facilities introduced.

For much of the 19th century, bills of exchange (drafts) with a short maturity were also used as means of payment for large transactions in the same way as the Nationalbank's banknotes; see Cohn (1957). However, no statistics on the turnover of bills of exchange are available.

Documentation of data and link to the Abildgren (2017a) database

The database by Abildgren (2017a) is available in a spreadsheet format (XLS) at the following link:

<https://sites.google.com/view/kim-abildgren/historical-statistics>

The database contains in total around 325 time series divided into 17 major topics (Demography; Economic growth; Business cycle indicators; Monetary and financial sector; Financial stability indicators; Interest rates; Asset prices; Foreign exchange rates; Prices and wages; Labour market; Public finance; Foreign trade and balance of payments; National wealth; Income distribution; Political system; Climate and energy; and Education). Most of the time series end in 2021 or later, and Abildgren (2017a) contains around 140 charts based on the time series in the database.

The spreadsheet database includes a substantial range of “composite series”, where the time series from the original research works have been updated with more recent and revised figures. In several cases, they have also been extended further backwards in time.

When the updating of a time series in the database requires compilations based on several background series (or the conversion of higher-frequency background series), the detailed background calculations (or conversion procedures) are shown in separate update sheets with all the attributes of the background series. This makes it easy for users to update the historical series with more recent contemporary statistical releases.

The spreadsheet database contains metadata with brief descriptions of the methods used for the compilation of the time series. More comprehensive documentation can be found in the sources stated in the spreadsheet in relation to each time series. The sources often contain references to more technical details in related working papers etc.

There is also a database with a collection of Danish historical microdata available at the link referred to above. This database contains bank-level data on commercial banks’ balance sheets prior to 1920 based on data from Hansen (1969) and data modelling, digitisation and coding by Abildgren (2017c, 2019a). Furthermore, the database contains household-level data from the household budget surveys 1931 and 1955 based on data from Statistics Denmark published in Det Statistiske Departement (1936) and Jørgensen (1965) and data modelling, digitisation and coding by Abildgren (2016a, 2018b, 2019b).

2. Credit

Credit across different lending sectors

Credit from Danmarks Nationalbank

Contemporary annual figures on domestic credit from Danmarks Nationalbank are available in Danmarks Nationalbank’s “Report and Accounts”. This publication is available in pdf-format on Danmarks Nationalbank’s website (www.nationalbanken.dk/en).

The spreadsheet database by Abildgren (2017a) includes an annual time series on domestic credit from Danmarks Nationalbank since 1839 based on various issues of Danmarks Nationalbank's annual Report and Accounts and the study by Abildgren (2017b). The latter is based on various issues of Danmarks Nationalbank's annual "Report and Accounts" supplemented with information in books published by Danmarks Nationalbank in relation to its 100th and 150th anniversary (Rubow (1918, 1920) and Mordhorst (1968)). Those books are based partly on archival records and internal material from Danmarks Nationalbank.

No complete consolidated balance sheets are available for Danmarks Nationalbank prior to 1839; see Johansen (1985), p 248.

Credit from deposit banks

Contemporary monthly figures on total domestic non-bank credit (all currencies) extended by resident deposit banks are available in the statistical database from Danmarks Nationalbank (<https://nationalbanken.statbank.dk>; Table DNPUD) since January 2003.

The spreadsheet database by Abildgren (2017a) extends this series backward to Q1 1921 on a quarterly frequency and 1856 on an annual frequency based on Abildgren (2012a, 2014, 2016b). The latter are based on various publications from Danmarks Nationalbank and Statistics Denmark supplemented with information in Hansen (1969) (see the section on "Banking regulation" in the paper at hand), Hansen and Svendsen (1968) (based on data from Statistics Denmark), Hoffmeyer (1960) (based on data from Statistics Denmark) and Abildgren (2012b) (based on data from Danmarks Nationalbank).

Credit from mortgage banks

Contemporary monthly figures on total domestic non-bank credit (all currencies) extended by resident mortgage banks are available in the statistical database from Danmarks Nationalbank (<https://nationalbanken.statbank.dk>; Table DNMUDL) since January 2003.

The spreadsheet database by Abildgren (2017a) extends this series backward to Q1 1928 on a quarterly frequency and 1798 on an annual frequency based on Hansen (1969) (see the section on "Banking regulation" in the paper at hand), Abildgren et al (2013) (based on Hansen (1969)), Abildgren (2014) (based on Hansen (1969)) and Abildgren (2012a). The latter is based on various publications from Danmarks Nationalbank and Statistics Denmark supplemented with information in Abildgren (2012b) (based on data from Danmarks Nationalbank).

Credit across different borrowing sectors

Credit to private individuals

Contemporary monthly figures on domestic credit (all currencies) to private individuals extended by resident deposit banks are available in the statistical database from Danmarks Nationalbank (<https://nationalbanken.statbank.dk>; DNMUDL) since January 2003. Private individuals cover wage earners and pensioners, etc, but not self-employed persons.

The spreadsheet database by Abildgren (2017a) extends this series backward to 1951 on an annual frequency based on Abildgren (2009). The latter is based mainly

on various publications from Danmarks Nationalbank and Statistics Denmark supplemented with information in Winding (1958) and Hoffmeyer (1960). Danmarks Nationalbank and Statistics Denmark has published figures on domestic lending by sector and industry extended by resident deposit banks for the period since 1978. For the period 1951–77, Danmarks Nationalbank has released figures for commercial banks but no official statistics are available for savings banks prior to 1978. Abildgren (2009) has therefore estimated the pre-1978 data on credit to private individuals from savings banks on the basis of loan type supplemented with information from the special surveys covering loans from savings banks by sector and industry in 1955 and 1959 found in Winding (1958) and Hoffmeyer (1960). Further computational details are available in Abildgren (2009).

Contemporary monthly figures on domestic credit (all currencies) to private individuals extended by resident mortgage banks are available in the statistical database from Danmarks Nationalbank (<https://nationalbanken.statbank.dk;DNMUDL>) since January 2003.

The spreadsheet database by Abildgren (2017a) extends this series backward to 1951 on an annual frequency based on Abildgren (2009). The latter is based mainly on various publications from Danmarks Nationalbank and the Danish Financial Supervisory Authorities. No official statistics on credit by sector and industry extended by resident mortgage banks are available prior to 2003. Abildgren (2009) has therefore estimated the pre-2003 data based on the type of collateral (with private lending defined as loans secured by owner-occupied dwellings). Further computational details are available in Abildgren (2009).

Credit to non-bank firms

Domestic credit (all currencies) to non-bank firms (including sole proprietorship and local governments) from resident deposit banks and mortgage banks follows on a residual basis from the time series described above, ie as the difference between total domestic non-bank credit and domestic credit to private individuals.

Abildgren (2017a) includes a further drill-down of commercial credit from resident deposit banks by industry (agriculture, industry and non-bank services). There is also a series on credit to the domestic non-bank sector extended by non-resident banks. These series are available on an annual frequency back to 1951; see the spreadsheet database for references to sources and documentation.

Credit to the central government

Contemporary annual figures on total central government net debt with a split into krone-denominated net debt and foreign currency-denominated gross debt (nominal values) are available in Danmarks Nationalbank's publication "Danish Government Borrowing and Debt". This publication is available in pdf format on Danmarks Nationalbank's website (www.nationalbanken.dk/en). Total central government net debt covers krone-denominated notes, bonds and treasury bills, foreign currency-denominated debt, currency swaps, and bank debt etc (including on a net basis the central government's account with Danmarks Nationalbank and the central government's holdings of bonds in various funds etc).

The spreadsheet database by Abildgren (2017a) takes these series back to 1834 based on various issues of Danmarks Nationalbank's publication "Danish Government Borrowing and Debt", Hansen (1969) (based on central government's annual accounts and secondary literature; see Hansen (1969) for details) and the material presented in

Abildgren (2008a). The latter is based on various issues of Danmarks Nationalbank's and the Ministry of Finance's publication "Danish Government Borrowing and Debt" supplemented with information in Hansen (1969) and Johansen (1985) (based on the central government's annual accounts).

Denmark was occupied by Germany during World War II. During the war, the Danish legation in the United States had access to Danmarks Nationalbank's gold depository in New York, and gold was sold during the war years from the depository in New York to cover interest payments on the Danish central government's dollar debt; see Abildgren (2021).

Credit rationing

In relation to the interpretation of time series on credit, it should be noted that credit rationing (and exchange controls) served as important economic policy instruments in the 1960s and 1970s; see Abildgren (2009).

In the years 1965–71, loan offers from the mortgage banks were subject to a quota system imposed by the monetary authorities after negotiations with the mortgage banks' organisation (the "Mortgage Credit Board"). During the same period, Danmarks Nationalbank also made use of deposits agreements with the organisations of deposit banks as a means of regulating bank lending.

In 1969, the Nationalbank issued guidelines for the amount of lending commitments extended by the deposit banking sector, and in 1970 a direct ceiling on lending commitments from individual deposit banks was imposed.

At the beginning, the ceiling on lending commitments covered only around 20 major commercial banks (with a market share of around 85–90% of the total lending by commercial banks) and 50 major savings banks (covering around 80% of the total lending by savings banks). However, in 1973 the credit ceiling was extended to cover most deposit banks.

In 1975, Danmarks Nationalbank and the Mortgage Credit Board entered into an agreement on a ceiling of the mortgage banks total loan offers.

The ceilings on deposit banks' lending were dismantled in 1980 and the ceiling of the mortgage banks' loan offers was gradually lifted during the late 1970s and early 1980s.

Where information is scarce

Throughout most of the 1700s, no deposit banks or mortgage banks existed in Denmark. Credit was granted mainly on a bilateral basis between individuals. For example, the owner of an estate could raise a loan against a registered mortgage on the property, a firm could obtain credit by issuing a debt instrument (bill of exchange) or a private individual could pawn possessions such as furniture. There were a few royal loan funds and some predecessors of Danmarks Nationalbank that lent money, but credit was granted mainly without financial institutions as intermediaries. As the economy developed, the need for credit intermediation and access to savings products increased. That paved the way for the various private sector financial institutions we know today.

There is no quantitative information available on the extent of non-intermediated (non-institutionalised) credit in Denmark, which might have been particularly important prior to the mid-19th century; see Jensen (1950) and Hansen (1982).

3. Interest rates

Government bond yields

There is very little freely available data in the public domain regarding yields on Danish Government Securities. Statistics Denmark and Danmarks Nationalbank no longer publish statistics on the yields on Danish Government Securities – this is an area covered by private data vendors.

The European Central Bank releases a monthly time series on the yield on 10-years Danish government bonds (the long-term interest rate for convergence purposes; see <https://db.nomics.world/ECB/IRS/M.DK.LL40.CI.0000.DKK.N.Z>). The spreadsheet database by Abildgren (2017a) takes this time series back to January 1960 on a monthly frequency and the second quarter of 1813 on a quarterly frequency based on publications from Statistics Denmark and Danmarks Nationalbank supplemented with the information presented in Hansen (1969) (based on information in Danish newspapers etc; see Hansen (1969) for details) and Abildgren (2014) (based on publications from Danmarks Nationalbank and Hansen (1969)). Since July 1983, this time series covers yield-to-maturity on 10-year non-callable krone-denominated central government bonds. Prior to this, it covers yield to maturity on long non-callable krone-denominated central government bonds.

In relation to the analysis of yields on Danish government bonds, it might be relevant to take into consideration the presence of restrictions on capital account transactions; see the section on “Cross-border capital restrictions” in the paper at hand. It should also be mentioned that the Danish monetary authorities in some historical periods, especially during the 1960s, made use of interventions in the bond market in order to influence bond yields.

Short-term interest rates

The monetary policy instruments and operating procedures of Danmarks Nationalbank (and the related interest rates) have changed over time; see the various issues of Danmarks Nationalbank’s “Report and Accounts”. However, since its establishment in 1818, Danmarks Nationalbank has consistently quoted a “discount rate” and a “lending rate”.

Danmarks Nationalbank ceased to discount bills vis-à-vis non-bank commercial firms on 1 October 1967 and vis-à-vis banks on 1 May 1975; see Mikkelsen (1993). Prior to the middle of the 1970s, the discount rate represented a lending rate of the Nationalbank. For most of the period since then, the discount rate has been a signal rate indicating the overall level of the monetary-policy interest rates. In the period 18 September 1861 to 2 March 1911, the Nationalbank quoted two discount rates – the lower rate was applied vis-à-vis banks while the higher rate was applied vis-à-vis non-bank commercial firms.

The lending rate has been Danmarks Nationalbank's marginal lending rate against collateral for most of the period since 1818.

Monthly data from August 1818 on Danmarks Nationalbank's lending rate and discount rate are available in the spreadsheet database by Abildgren (2017a) based on various publications from Danmarks Nationalbank, Rubow (1918, 1920) and Abildgren (2005, 2012a, 2014) (based on various publications from Danmarks Nationalbank and Rubow (1918, 1920)). For the period where two discount rates were quoted, the lower of the two rates has been selected.

There is very little freely available data in the public domain regarding money market rates (interbank rates). This is also an area covered by private data vendors. Currently, Danmarks Nationalbank only publishes DESTRA (Denmark Short Term Rate), which was launched in April 2022 and is a reference rate based on unsecured overnight deposit transactions.

A modern-style krone-denominated interbank market was established in Denmark only in the late 1960s, and it took a more organised form in 1970 when a British money-market broker began his activity in Denmark through a branch office. Prior to 1970, commercial banks' rate of discount for commercial bills of exchange might serve as an indicator of money market rates; see Abildgren (2005).

The spreadsheet database by Abildgren (2017a) includes a monthly time series on three-month uncollateralised inter-bank interest rates back to January 1970 based on various publications from Danmarks Nationalbank, Eurostat and Abildgren (2008b) (based on information from Danmarks Nationalbank and Hoffmeyer (1993), which is also based on information from Danmarks Nationalbank). The spreadsheet database by Abildgren (2017a) also includes a monthly time series on three-month collateralised inter-bank interest rates back to January 1992; see the spreadsheet database for sources and compilation methods.

4. Housing prices

Contemporary quarterly data on house prices (one-family houses, nationwide) are available in the statistical database from Statistics Denmark (www.statbank.dk; Table: EJ55) since Q1 1992. This index covers the cash-price development (relative to tax assessment value, ie the Sales Price to Appraisals Ratio method) for one-family houses in ordinary free trade. The data behind the index come from the land registration system via the Tax Authorities.

The spreadsheet database by Abildgren (2017a) extends this series backward to Q1 1950 on a quarterly frequency and 1860 on an annual frequency based on publications from Statistics Denmark and Abildgren (2012b, 2014) (based on publications from Statistics Denmark, Økonomiministeriet (1966) and Thygesen (1971), which is based on data from Statistics Denmark). From 1938, the figures cover the cash-price development (relative to tax assessment value, ie the Sales Price to Appraisals Ratio method) for one-family houses in ordinary free trade. Prior to 1938, they are based on the cash-price development (per unit of land valuation based on estimated productivity) for smallholdings in ordinary free trade.

The spreadsheet database by Abildgren (2017a) also includes regional house price indices (Copenhagen City and Copenhagen Suburban) for single-family houses in ordinary free trade following the Sales Price to Appraisals Ratio method on an

annual basis from 1938. These time series are based on publications from Statistics Denmark and Abildgren (2018a) (based on data from Statistics Denmark, the Tax Authorities and Økonomiministeriet (1966)).

A recent study by Andersen (2019) offers regional house price indices with a more disaggregated geographical breakdown for the period since 1950 (based on data from Statistics Denmark and the Tax Authorities).

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