

The National Wealth of Denmark 1845-2013 in a European Perspective¹

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Summary: This article presents annual estimates on the national wealth of Denmark 1845-2013 and explores the long-term development of wealth-to-income ratios in two small open Scandinavian economies (Denmark and Sweden) and three large European economies (France, UK and Germany). Denmark seems to have followed the same U-shaped pattern as the larger European economies and had prior to World War I wealth-to-income ratios at the same level as those countries.

Keywords: National wealth; Economic history

JEL: E01; N33; N34

1. Introduction

The national wealth of a country is the sum of the value of its residents' non-financial assets and net claims on the rest of the world. During the last decade or so, there has been a renewed academic interest in national wealth compilations. Recently, Piketty (2014) published a comprehensive book aimed at a broad audience on the size of the total stock of national wealth in a number of countries seen in a long-term perspective. The book by Piketty, *op.cit.*, draws on a range of research

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projects in collaboration with other scholars (Alvaredo *et al.*, 2013; Piketty and Zucman, 2014a, 2014b).

For three large European countries – Germany, France and the UK – Piketty and Zucman, *op.cit.*, offered long-span annual national-wealth data going back to at least the last quarter of the 1800s. For all three countries they found that the ratio between national wealth and net national income (NNI) followed a U-shaped pattern over the long run. Furthermore, they found sharp declines in the wealth-to-income ratios around the two world wars.

This naturally raises the question whether similar trends can be found in other European countries. In recent works, Waldenström (2016a, 2016b) compiled national wealth-to-income ratios for Sweden since 1870. He found that Sweden prior to World War I had wealth-income ratios that were only about half of those in France and the UK.

Like Sweden, the industrial break though came rather late in Denmark and there are many other similarities regarding the economic-historical development of Sweden and Denmark. Both Scandinavian countries are small open economies, have a long tradition for political democracy, are relative homogenous in terms of culture and religion, have strong and deep-rooted labour-market organisations and have build-up large tax-financed universal welfare states during the 1900s (Christensen *et al.*, eds., 2006; Fellman *et al.*, eds., 2008). Sweden and Denmark have also persistently been able to maintain a position among the top-15 countries measured by purchasing-power-parity adjusted levels of gross domestic product (GDP) per capita during the last two centuries (Maddison, 2003; Bolt and van Zanden, 2014). It is therefore of interest to analyse whether developments in the national wealth-to-income ratio in Denmark also differ markedly from the large European economies.

In this paper, we compile annual time-series estimates on the stock of national wealth of Denmark 1845-2013 based on a broad range of contemporary and historical statistics as well as results from previous academic research. We then compare the long-span development in the Danish national wealth-to-income ratio with that of Sweden, UK, France and Germany.

We find no indications of a special common Scandinavian pattern in wealth-to-income ratios during the last couple of centuries. Denmark seems to have followed the same U-shaped pattern as the larger European economies and had prior to World War I wealth-to-income ratios at the same level as those countries. However, Denmark differs from the larger European economies in some areas. First, there were no sharp declines in the wealth-to-income ratio in Denmark around the two world wars as was the case in France and Germany, partly due to war-related destruction of the capital stock. Secondly, the wealth-to-income ratio in Denmark declined significantly from 1870 to 1913 whereas the ratios basically were stationary in France and UK during the same period. This partly reflects a faster growth in population and real GDP per capita in Denmark during this period, which saw the

first wave of industrialisation in Denmark as well as a significant transition towards a larger share of animal production within the Danish agricultural sector.

2. Earlier estimates on the national wealth of Denmark

In Denmark, there has been a long-standing tradition for estimating the size of the national wealth. Falbe-Hansen (1873) presented detailed estimates of the national wealth of Denmark in 1870 along with summary estimates for 1873. An estimate for 1884 was presented in Falbe-Hansen (1885), and a revised figure for 1884 along with some very rough “guesstimates” for 1848 and 1864 were offered in Falbe-Hansen (1891). In his calculation, Falbe-Hansen, *op.cit.*, included consumer durables such as furniture and clothes (based on information from insurance companies) as well as the capitalised value of taxes on land (measured at an interest rate of 4 per cent per annum). Furthermore, since the monetary system of Denmark at that time followed a metal standard he also included the value of silver and gold coins in circulation, which amounted to around 4 per cent of NNI in 1870. Finally, Falbe-Hansen, *op.cit.*, discussed a range of more conceptual issues in relation to national wealth compilations, including whether the capitalised value of taxes on land should be included in the wealth figures or not.

Warming (1913) presented a summary figure for the national wealth in 1909 and compared it with an estimate for 1899/1900 compiled by a Tax Commission. Figures for 1910 and 1916 followed in Warming (1920) and for 1927 in Warming (1930).

The Danish Ministry of Finance compiled figures for the national wealth in 1939 and 1945 in Finansministeriet (1945). The figure for 1945 included a claim on Germany reflecting the expenditures in Denmark by the German occupation forces during World War II compulsory financed via drawings on the Danish central bank (Danmarks Nationalbank). However, Germany never paid this debt.

Later, Milhøj (1961) presented national wealth figures for 1956, and the Chairmanship of the Danish Economic Council presented an estimate of the national wealth in 1965 in Det Økonomiske Råd (1966). Regarding the value of real property (excluding public infrastructures), Det Økonomiske Råd, *op. cit.*, mainly made use of tax assessments converted into market values via information on prices for properties sold in ordinary free trade. The value of public infrastructures such as railways, harbours, airports *etc.* was based on the compilation of stock data in a benchmark year (1947 based on assessments made in 1939 and 1945), which subsequently were used as the basis for deriving the capital stock for other years via net investment flows (the so-called “perpetual inventory method”). The value of machinery and equipment also followed the perpetual inventory method using stock figures from a benchmark year (1951) based on information on insurance values from the Industrial Production Statistics. The value of transport equipment in the form of motor vehicles (including motor vehicles owned by households) was based on the

number of car registrations *etc.* inflated by depreciated replacement prices. The value other transport equipment (such as railway rolling stock, ships and aircraft), agricultural breeding stocks and the net foreign asset position of Denmark was based on special calculations and separate statistics.

The weekly Danish financial magazine *Finanstidende* published in 1964, 1971, 1974 and 1979 a range of articles with national wealth calculations. The most recent estimates by *Finanstidende* covered the period 1950-1978 (Thiberg, ed., 1979a, 1979b, 1979c, 1979d, 1979e). These are until now the longest consistent time-series estimates on the total national wealth at current market prices available for Denmark. The national wealth calculations by *Finanstidende* in 1971 and later followed the same main principle as those applied by Det Økonomiske Råd, *op. cit.*, although the value of all consumer durables was included in the calculations by *Finanstidende*. The value of consumer durables – excluding motor vehicles owned by households – was based on the perpetual inventory method. Bjerke (1974) offers a detailed discussion on the figures from Det Økonomiske Råd, *op. cit.*, and *Finanstidende*.

The Inland Revenue Department published an estimate of the national wealth in 1985 in Skattedepartementet (1988). The compilations by Skattedepartementet, *op. cit.*, also followed the main principle of Det Økonomiske Råd, *op. cit.*

Finally, Kærgård (1991a, 1992) reviewed a range of previous estimates mentioned above. Kærgård (1992) also discussed more conceptual issues in relation to national wealth compilations, including calculations in constant prices and whether human capital and the capitalised value of taxes on land and cars should be included in the figures. He estimated the capitalised value of land taxes *etc.* to an amount corresponding to around 54 per cent of NNI in 1985.

3. Estimates on the national wealth of Denmark 1845-2013

For the analysis in this article we compiled annual estimates of Denmark's national wealth for the period 1845-2013 based on a broad range of contemporary and historical statistics as well as results from some of the previous studies mentioned above.

Like Piketty and Zucman, *op.cit.*, and Waldenström, *op.cit.*, the coverage of our national wealth concept is broadly in line with most the recent international national-accounts guidelines, i.e. the System of National Accounts 2008 (SNA 2008), cf. European Communities *et al.* (2009). According to §13.4 in SNA 2008, the national wealth is defined as the “sum of non-financial assets and net claims on the rest of the world”. §2.34 of SNA 2008 states that the “coverage of assets is limited to those assets which are subject to ownership rights and from which economic benefits may be derived by their owners by holding them or using them in an economic activity as defined in the SNA”. Furthermore, §2.34 of SNA 2008 mentions

that “Consumer durables, human capital and those natural resources that are not capable of bringing economic benefits to their owners are outside the scope of assets in the SNA”. The SNA constitutes a useful framework for organising and analysing national-wealth data – even when data sources are somewhat fragmented and sparse, which is often the case in relation to historical statistics on national wealth.

Our calculations were due to data availability divided into three parts covering respectively the periods 1845-1875, 1875-1950 and 1950-2013. The series for the three sub-periods were subsequently linked together to the overall series. The breakdown of our wealth figures into sub-items in the three sub-periods is shown in Table 1. As recommended in §3.47 in SNA 2008, we did not include consumer durables in our national wealth figures. However, for the period 1950-2013 we offer the value of as consumer durables a memorandum item to our wealth data.

Table 1: Breakdown of the Danish national wealth figures into sub-items

| | 1845-1875 | 1875-1950 | 1950-2013 |
|---|-----------|-----------|-----------|
| Machinery and equipment | | | x |
| + Transport equipment | | | x |
| + Dwellings (excluding farmhouses) | | | x |
| + Non-residential buildings and structures | | | x |
| + Intellectual property products | | | x |
| = Total produced assets excluding farmhouses, agricultural breeding stocks and inventories | | x | x |
| + Agricultural breeding stocks | | x | x |
| + Inventories | | | x |
| = Total produced assets excluding farmhouses | x | x | x |
| + Agricultural land and farmhouses | x | x | x |
| + Oil and gas reserves | NA | NA | x |
| + Net foreign assets | x | x | x |
| = Total national wealth | x | x | x |
| Memorandum item: | | | |
| Consumer durables (including transport equipment owned by households) | | | x |

Source: See the main text.

All the national wealth figures presented in this article are in current prices and are as far as possible stated at market prices end of year. Below we outline the main sources and methods used to construct the dataset. A more comprehensive documentation can be found in a background paper (Abildgren, 2015), and the dataset is available from the author on request in an electronic form.

3.1. Compilation approach 1950-2013

Machinery and transport equipment are for the period 1950-1977 based on the national wealth calculations in current prices by Thiberg (ed.) (1979a, 1979c). Since 1977, the figures are based on the net capital stock figures for the same items in Statistics Denmark's annual National Account Statistics in current prices. The net capital stock figures from Statistics Denmark are based on the perpetual inventory method and valued at depreciated replacement cost.

The market value of dwellings (including site values) in current prices is for the period 1980-2005 based on Olesen and Pedersen (2006). For the period since 2005 and the period 1977-1979, the figures are based on the development in the net capital stock figures for dwellings in constant prices from Statistics Denmark's annual National Account Statistics inflated by the development in the cash price index for sale of one-family houses in ordinary free trade. The market values of dwellings in current prices prior to 1977 are based on Thiberg (ed.) (1979b).

Non-residential buildings and structures are for the period 1950-1977 based on the figures in current prices in Thiberg (ed.) (1979a, 1979b). From 1977, we base the figures on the development in the sum of the net capital stock figures in current prices for "structures" from Statistics Denmark's annual National Account Statistics and the net capital stock figures in constant prices for "buildings other than dwellings" from Statistics Denmark's annual National Account Statistics inflated by the cash price index for sale of commercial real estate in ordinary free trade.

The value of intellectual property products is for the period since 1965 based on the net capital stock figures in current prices from Statistics Denmark's annual National Account Statistics. Prior to 1965 the item is assumed to follow the development in the accumulated stock of patents issued by the Danish Directorate of Patent- and Trade Mark Service with Denmark as the home country of the patentee inflated by the implied GDP-deflator.

Agricultural breeding stocks are for the period since 1965 based on the net capital stock figures in current prices for this item in Statistics Denmark's annual National Account Statistics. Prior to 1965, the figures are based on the development in current prices in Thiberg (ed.) (1979a).

The value of inventories is for the period since 1977 based on Statistics Denmark's Accounts Statistics for agriculture and non-agricultural industries combined with changes in inventories in current prices from Statistics Denmark's annual National Accounts Statistics. Prior to 1977, the figures are based on the national wealth calculations in current prices in Thiberg (ed.) (1979a).

The first reserves of oil and gas in Denmark were discovered in 1966. For the period 1990-2008, the values of the stock of oil and gas reserves in current prices are based on Statistics Denmark's Environmental Accounts. For the period prior to 1990 and since 2008, the figures are based on information from the Danish Energy Agency on the development in the physical reserves of oil and gas (converted into oil equivalents) inflated by the oil price.

The market value of agricultural land (including forestry) and farmhouses is for the period 1950-1977 based on the national wealth figures in current prices compiled by Thiberg (ed.) (1979b). The figures are for the period since 1977 based on the development in the arable agricultural area inflated by the price index for sales of farms.

The net foreign assets figures 1950-2013 in current prices are based on Abildgren (2008) and statistical information from Danmarks Nationalbank.

The memorandum item "consumer durables" is for the period 1950-1977 based on the national wealth calculations in current prices presented by Thiberg (ed.) (1979a, 1979c). For the period since 1977, the figures are based on net capital stock figures in current prices compiled by Statistics Denmark.

3.2. Compilation approach 1875-1950

Annual data for the value of total produced assets excluding farmhouses, agricultural breeding stocks and inventories in current prices is for the period 1875-1950 based on the development in the physical capital stock figures in current prices compiled by Kærgård (1991a, 1991b) in relation to his empirical growth model, CLEO. Kærgård, *op. cit.*, compiled his physical capital stock data in constant prices based on the perpetual inventory method and stock figures for a benchmark year. He made use of investment flow data in constant prices from Hansen (1974) combined with an assumption of depreciation rates of 0.08 for machinery and 0.005 for buildings and sites. This corresponded to an implied assumption of a service life of 14 years for machinery, 75 years for buildings and a perpetual life for sites. He converted the stock figures for the benchmark year (1875) from current to constant prices via the consumption deflator, so we used this deflator to arrive at the figures in current prices. This approach might be subject to criticism. However, Kærgård, *op. cit.*, notes that the divergence between non-financial asset prices and consumer prices only occurred after 1960.

The value of agricultural breeding stocks and inventories in current prices is for the period 1875-1950 also based on the development in the physical capital stock figures in current prices in Kærgård (1991a).

The value of agricultural land and farmhouses is for the period 1875-1950 based on the figure for 1884 in Falbe-Hansen (1885) and the development in the arable agricultural area (adjusted to reflect current borders) inflated by the price index for sales of farms.

The figures for net foreign assets figures 1875-1950 in current prices are based on Abildgren (2008).

3.3. Compilation approach 1845-1875

For the period prior to 1875, the figures for the value of total produced assets excluding farmhouses in current prices are based on the development in the total physical capital stock (excluding farmhouses) in current prices in Kærgård (1991a).

The value of agricultural land and farmhouses in current prices is for the period prior to 1875 based on the figure for 1870 in Falbe-Hansen (1873) and the development in the arable agricultural area (adjusted to reflect current borders) inflated by the price index for sales of farms.

The figures for net foreign assets figures prior to 1875 in current prices are based on Hansen and Svendsen (1968) and Hansen (1970).

3.4. Net national income 1845-2013

The net national income (NNI) figures are based on data from Statistics Denmark and the author's calculations on the basis of Bjerke and Ussing (1958), Hansen (1974), Hansen and Henriksen (1984a, 1984b) and Abildgren (2008).

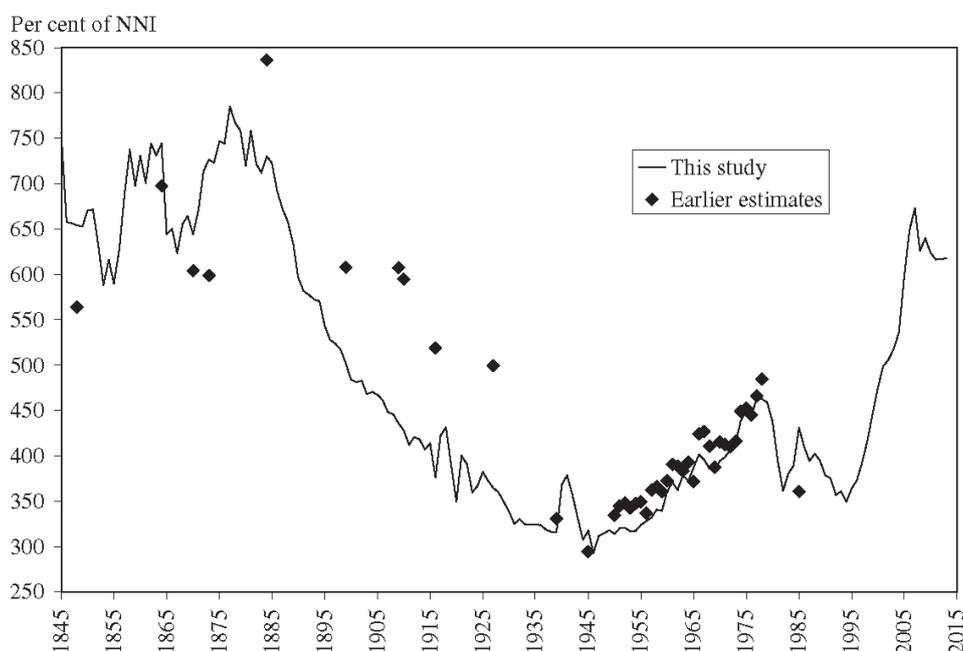
4. Uncertainties related to national wealth figures

Some of the main uncertainties in relation to national wealth calculations are connected to the proper valuation of non-financial assets when no statistics on market prices is available. As outlined in Section 3, we have in several cases had to rely on figures based on the perpetual inventory method. Recent research on Swedish data by Andersson and Lindmark (2016) indicates that there can be substantial differences between national wealth figures based on market values and figures based on the perpetual inventory method.

There might also be uncertainties related to the figures for net claims on the rest of the world stated at market values, even for more recent time periods. In 1994, Danmarks Nationalbank made for instance a downward revision of Denmark's net foreign assets position in 1991 by 60 billion Danish kroner (corresponding to around 8 per cent of NNI), cf. Danmarks Nationalbank (1994). In 2010, there was an upward revision of Denmark's net foreign assets position in the third quarter of 2009 by around 80 billion Danish kroner (around 6 per cent of NNI), cf. Danmarks Nationalbank (2010).

In Figure 1, we compare our new estimates of the stock of Denmark's national wealth with a range of the earlier estimates referred to in Section 2. The Figure serves as a reminder of the uncertainties related to such calculations due to differences in data sources, compilation methods and the choice of items included in the wealth figures. However, in both the new as well as the earlier estimates the

wealth-to-income ratio in Denmark seems to have followed a clear U-shaped pattern over the long run. In the period 1845-1885 the national wealth fluctuated around a level of 700 per cent of NNI. The ratio declined to around 300 per cent of NNI in 1950, but has since increased significantly again. In 2013, the national wealth of Denmark was around 600 per cent of NNI.



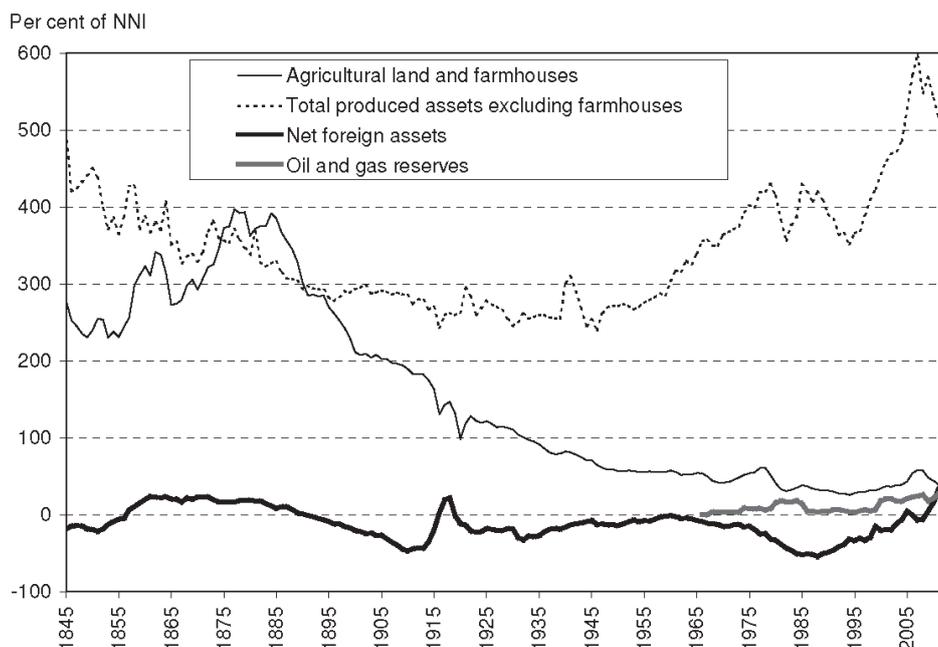
Notes: Current prices. The alternative estimates are from Falbe-Hansen (1873, 1885, 1891), Warming (1913, 1920, 1930), Det Økonomiske Råd (1966), Thiberg, ed. (1979a) and Skattedepartementet (1988). Averages in those cases where different authors have estimates for the same year.

Source: See the main text.

Figure 1. A comparison with earlier estimates of the national wealth in Denmark

5. The composition the national wealth of Denmark

Figure 2 shows a decomposition of Denmark's national wealth since 1845. The Figure clearly illustrates that the importance of natural capital (mainly agricultural land) has declined over time whereas the role played by produced capital has increased.



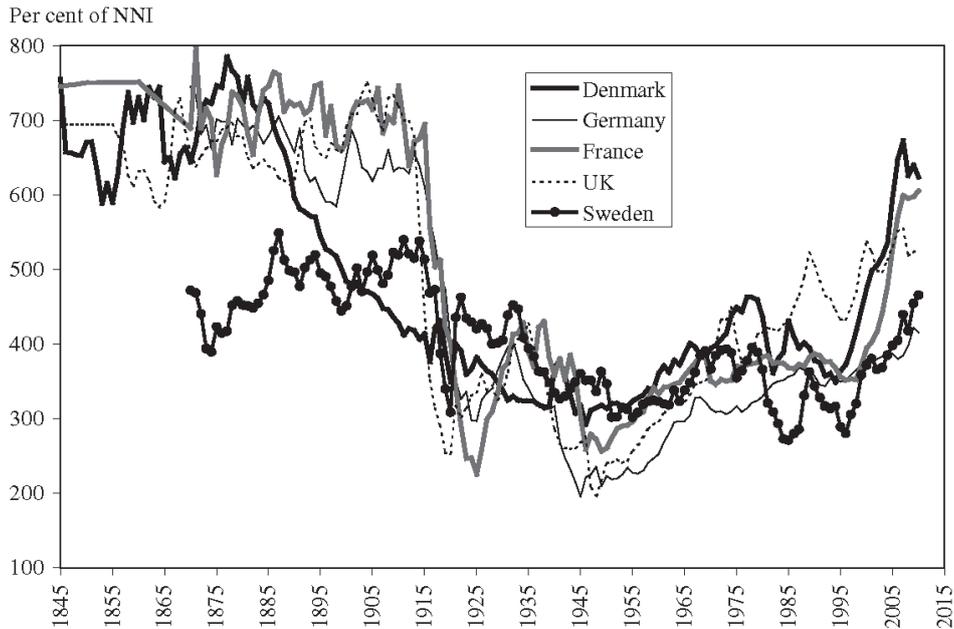
Notes: Current prices.
Source: See the main text.

Figure 2. The components of Denmark's national wealth 1845-2013.

The net foreign asset position has in some periods been positive and in other periods negative. However, net foreign assets have only accounted for a relative small proportion of the total national wealth during the entire period since 1845.

6. Long-run trends in European national wealth-to-income ratios

The figures on Denmark's national wealth to income since 1845 seem to a very high degree to match the recent findings for other European countries, cf. Figure 3. The total national wealth in per cent of NNI was around 700-750 in Britain and France in 1845 and in Germany in 1870, and the ratios have since followed a U-shaped pattern over time. For Britain and France the national wealth-to-income ratio increased from around 250 in 1950 to around 500-600 in 2010, whereas the ratio in Germany increased from around 225 in 1950 to 400 in 2010. Only Sweden stands out with a relative low level of national wealth-to-income ratio prior to World War I.



Note: Current prices. France (prior to 1870) and UK (prior to 1855) partly based on interpolations.

Source: For Denmark: See the main text. For other countries: Piketty and Zucman (2013) and Waldenström (2015).

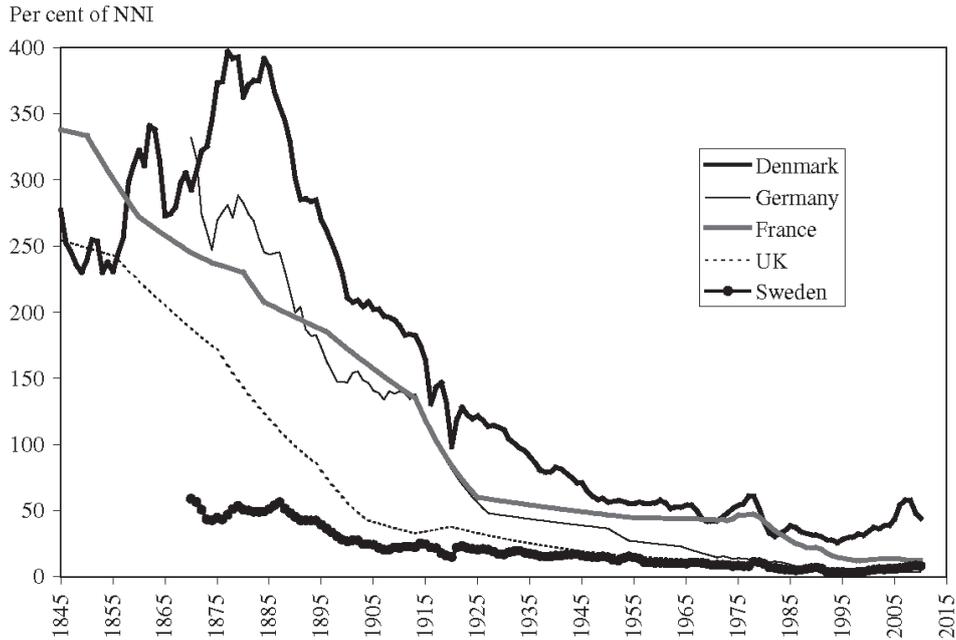
Figure 3: National wealth in European countries 1845-2010.

Denmark seems thus to have followed the same overall trend as the larger European economies and had prior to World War I wealth-to-income ratios at the same level as those countries. There seems thus not to have been a special common Scandinavian pattern in wealth-to-income ratios during the last couple of centuries. It should also be mentioned that Andersson and Lindmark (2016) in a recent study find a significant higher level of Swedish national wealth to income prior to World War I than Waldenström (2016a, 2016b). Again, this highlights the uncertainties related to national wealth estimates.

Piketty and Zucman (2014a) and Waldenström (2016a, 2016b) explain partly the increase in wealth-to-income ratios seen in many countries during the most recent decades with capital gains from rising asset prices. The same has been the case in Denmark, which has seen a strong upward trend in real property prices but also some large price fluctuations in the post-World War II period (Abildgren, 2009; Laursen *et al.*, 2013).

In Figure 3 one might notice the sharp declines in the wealth-to-income ratio in Germany, France and UK during the two world wars, which according to Piketty and Zucman, *op. cit.*, partly reflects war-related destruction of the capital stock, especially in France and Germany. The same shocks are not visible for Denmark, which was a neutral country during World War I and subject to German occupation during World War II. Sweden – a neutral country during the two World Wars – experienced a significant decline in the wealth-to-income ratio around World War I but not around World War II. However, it should be noted that the Danish pre-1950 figures for the value of total produced assets excluding farmhouses *etc.* are based on sources following the “perpetual inventory method” whereas the figures for Germany, France, UK and Sweden are based on the market value of equities in corporations. The different choices of compilation method might explain some of the differences around the two world wars.

Our findings regarding the value of agricultural land in Denmark seem also to match the results for major European countries, cf. Figure 4. The second half of the 1800s saw a significant expansion of the share of arable land in Denmark, mainly due to heath cultivation (Bjørn, 1974). Since then, the value of agricultural land has declined significantly relative to NNI. In France and UK the value of agricultural land declined from around 250-350 per cent of NNI in 1845 to 50 per cent or less in 1950. In contrast, Sweden had a relative low value of agricultural land relative to NNI prior to World War I. As noted by Waldenström, *op. cit.*, this might be related to Sweden having a small population on a large and partly uncultivated land mass. The population density in Sweden in the late 1800s and early 1900s was much lower than in the UK, France, Germany and Denmark.



Note: Current prices. Denmark: Including the value of farm houses. Germany, France and UK prior to 1970 partly based on interpolations.
 Source: For Denmark: See the main text. For other countries: Piketty and Zucman (2013) and Waldenström (2015).

Figure 4. Value of agricultural land in European countries 1845-2010.

In Figure 3 one might also notice that the wealth-to-income ratio in Denmark declined by more than 225 per cent of NNI from 1870 to 1913. In contrast the wealth-to-income ratios in France and UK were basically stationary during the same period. As shown in Table 2 this partly reflects a much faster increase in the nominal NNI in Denmark during this period caused by faster growth in population and real GDP per capita than was the case in France and UK.

The last quarter of the 1800s and the first decade of the 1900s is usually considered to be the period where the first wave of industrialisation came to Denmark (Christensen, 1989; Kristensen, 1989; Hyldtoft, 1996; Hyldtoft and Johansen, 2005; Boje, 1997).

Furthermore, in the last quarter of the 1800s and the first quarter of the 1900s, Europe experienced a gradual change in the relative prices of vegetable and animal agricultural products in step with increasing overseas grain export to Europe (the so-called “grain invasion”). This caused an upward trend in the price of agricultural livestock products relative to crop products. In response, the Danish agricul-

tural sector made a significant transition towards a larger share of animal production. This also implied a switch from grain exports towards exports of animal products (especially to the UK), and Denmark became a net importer of corn (Henriksen and O'Rourke, 2005). The restructuring of Danish agriculture was facilitated by fairly liberal Danish Tariff Acts (Vibæk, 1938; Lampe and Sharp, 2011). The change towards animal production was also supported by the spread of agricultural cooperatives such as dairies, fodder purchase associations and slaughterhouses. The cooperatives allowed many small suppliers to make efficient use of new technology – such as the centrifugal cream separator invented in Denmark in 1878 – and benefit from economy of scale in production and marketing (Henriksen *et al.*, 2011).

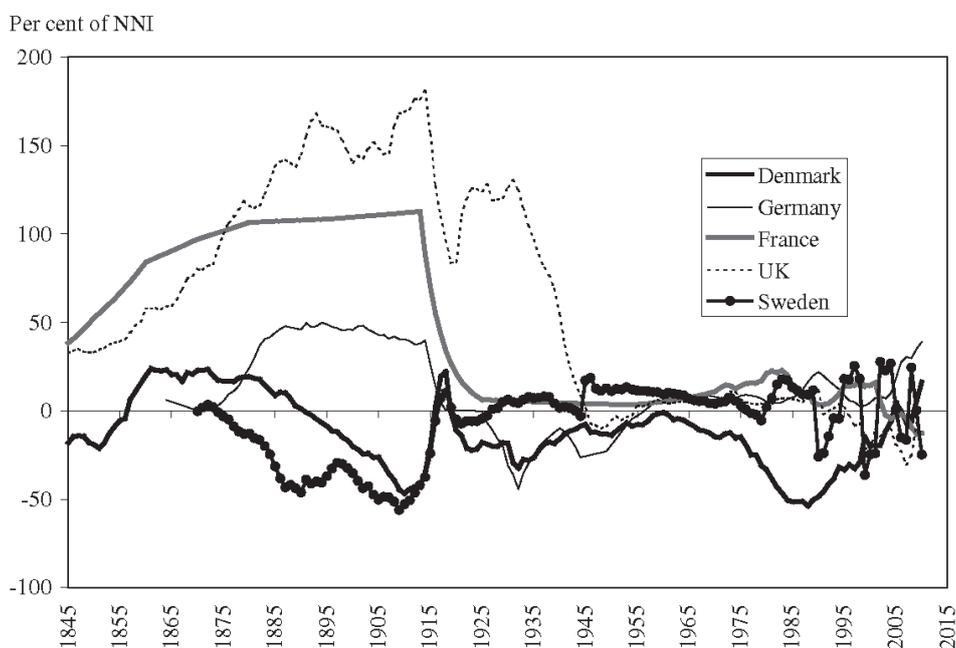
Table 2. Development in income and wealth in European countries 1870-1913

| | | Denmark | Germany | France | UK | Sweden |
|-----------------------------------|--------|---------|---------|--------|-----|--------|
| National wealth, per cent of NNI | 1870 | 644 | 745 | 689 | 656 | 472 |
| | 1913 | 418 | 656 | 671 | 679 | 515 |
| | Change | -226 | -89 | -18 | 23 | 43 |
| Nominal national wealth, 1870=100 | 1870 | 100 | 100 | 100 | 100 | 100 |
| | 1913 | 211 | 356 | 213 | 250 | 387 |
| Nominal NNI, 1870=100 | 1870 | 100 | 100 | 100 | 100 | 100 |
| | 1913 | 325 | 405 | 218 | 241 | 355 |
| Real GDP per capita, 1870=100 | 1870 | 100 | 100 | 100 | 100 | 100 |
| | 1913 | 195 | 200 | 186 | 154 | 186 |
| Population, 1870=100 | 1870 | 100 | 100 | 100 | 100 | 100 |
| | 1913 | 158 | 166 | 108 | 145 | 135 |
| Consumer price index, 1870=100 | 1870 | 100 | 100 | 100 | 100 | 100 |
| | 1913 | 90 | 131 | 106 | 93 | 123 |

Source: For Danish national wealth and NNI: See the main text. For national wealth and NNI for other countries: Piketty and Zucman (2013) and Waldenström (2015). For real GDP per capita, population and CPI: Maddison (1991, 2001).

Figure 5 shows the five countries' net foreign asset position (international investment position) relative to NNI. During most of the period, Denmark has been a debtor nation on a net basis. However, Denmark had large net credit positions vis-

à-vis foreign residents during the period 1857-1890 and during World War I, and has again become a net creditor since the late 2000s. The Danish net creditor position during the period 1857-1890 partly reflected the compensation received from the abolition of the Sound Dues in 1857 (around 13 per cent of NNI). In addition came the compensation (around 7 per cent of NNI) paid by Germany in 1868 for Denmark's taking over Schleswig-Holstein's proportion of the former joint national debt of the Danish monarchy (Schleswig-Holstein became part of Germany after the Second Schleswig War in 1864). The Danish net creditor position during World War I reflects the large balance of payment surplus during this period. In contrast, the large Danish balance of payment surplus during World War II – reflecting the expenditures in Denmark by the German forces during the occupation – did not imply a corresponding increase in Denmark's net foreign asset position. These expenditures (amounting to around 69 per cent of NNI in total) were compulsory financed by drawings at Danmarks Nationalbank against a guarantee from the Danish central government and were as mentioned never paid by Germany. In our national wealth figures these claims on Germany are therefore treated as instantaneous debt write-off by the Danish central government.



Note: Current prices. Germany (prior to 1870), France (prior to 1970) and UK (prior to 1855) partly based on interpolations.
Source: For Denmark: See the main text. For other countries: Piketty and Zucman (2013) and Waldenström (2015).

Figure 5. Net foreign assets in European countries 1845-2010.

Sweden was a net debtor nation in the last part of the 1800s and the first part of the 1900s whereas Germany was a net creditor nation during the same period. However, except for France prior to World War I and the UK prior to World War II, the net foreign asset positions have in all countries only accounted for a relative modest proportion of the total national wealth during the last couple of centuries. In relation to the previously mentioned declines in the wealth-to-income ratio in France and the UK around World War I is worth to notice the large drops in the net foreign assets of the two countries during this period.

7. Applications of national wealth data and scope for further research

The national wealth can be seen as an integrated part of a broader system of national accounts that provides a coherent picture of flow data such as income, consumption, savings, capital gains and losses *etc.* as well as stock data such as non-financial assets and net foreign assets.

Aggregated figures on total national wealth are crucial for the study of wealth accumulation in a country. Furthermore, many sub-components of the national wealth are of interest in relation to various macroeconomic issues. Real property serves for instance often as collateral pledged by the debtor in connection with loan contracts. The ratio between the outstanding amount of credit relative to the value of real property can therefore be of interest in relation to studies on financial cycles and financial stability. As another example it can be mentioned that the size and development of the net foreign asset position of a country is crucial in analyses of the sustainability of persistent deficits on the current accounts of the balance of payments.

The paper at hand has presented a first effort to construct annual time series estimates on the total stock of national wealth in Denmark since 1845. However, we have only compiled the figures on a rather aggregated level. It could be an interesting future research project to disaggregate the national wealth series by institutional sectors (e.g. general government, financial sector, non-financial business sector and households). This would allow for analyses of for instance the long-run dynamics of public and private debt.

As with all kinds of macroeconomic statistics, aggregated figures for the national wealth and its main components clearly have their limitations. Many interesting research questions relates to the distribution of wealth across households and generations, especially viewed against the background of the strong upward trend in real property prices in the post-World War II period. Two recent papers have explored the long-span developments in the personal wealth distribution in Denmark based on historical statistics on taxable wealth combined with household

microdata for the most recent decades, cf. Roine and Waldenström (2015) and Atkinson and Sogaard (2013). The results from these studies indicate that the top-one percentile share of the net wealth distribution declined significantly from around 1910 to 1980 followed by a modest increase. In contrast, the United States has seen a relative sharp increase in wealth inequality during the most recent decades (Jones, 2015; Kaymak and Poschke, 2016).

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