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Abstract

We document the evolution of the aggregate household wealth in the Netherlands from 1854 until 2019 by reconstructing historical household balance sheets, using the three most frequently used methods in the literature: (i.) historical national accounts; (ii.) the estate multiplier methods; and (iii.) lognormal extrapolation from wealth tax data. In addition, we estimate the composition of household wealth, and track top-wealth shares. Our results show that the household wealth-income ratio followed the familiar U-shaped pattern over the 20th century. The Netherlands, however, experienced larger peaks and troughs than any country on record, with a peak in the wealth-income ratio in excess of 1,100% before the World Wars, and a trough of around 200% in the 1970s. Our analysis of wealth tax and inheritance data confirms that top wealth shares also follow a U-shaped pattern. In terms of wealth composition, the role of land has declined, and the importance of housing and pension wealth has dramatically increased in the second half of the 20th century.

JEL Classification: D3 E2, G5
Keywords: Wealth inequality; wealth distribution; household wealth.

1 Introduction

We document the dynamics of household wealth in the Netherlands from 1854 until 2019 by providing the first series of historical household balance sheets, consistent with existing balance sheets in the System of National Accounts. In addition, we decompose these balance sheets into wealth components, tracking the relative importance of asset classes such as real estate, equity, bonds, liabilities and pension wealth from 1880. Finally, we track top wealth shares from 1894 onward, arriving at a comprehensive picture of the dynamics of household wealth over more than 125 years.

Our data reveal striking patterns, especially in the development of aggregate wealth. Like existing studies, we gauge the importance of household wealth using the ratio of household wealth to national income (Piketty and Zucman 2014; Artola Blanco, Bauluz, and Martínez-Toledano 2020). We find that the wealth-income ratio followed the familiar U-shaped pattern observed in earlier studies, with a peak in the early 20th century, a subsequent decline until the 1970s, and an increase in recent decades. However, we find that the magnitude of the trough and peaks is substantially larger than those identified in other countries (Waldenström 2021). Specifically, we document that the wealth-income ratio peaked in excess of 1,100% at the turn of the 20th century, and declined to almost 200% in the 1970s. Likewise, the top 1% share of household wealth peaked at close to 60% in the early 20th century, which was followed by a precipitous decline to as little as 10% in the 1970s and a subsequent increase to about 30% by the early 2010s. We discuss various interpretations of these trends, and contrast them to the available international evidence.

The period covered saw the Netherlands transition from a largely agrarian economy, through industrialization, to a service- and trade-based economy. Coupled with these structural transformations came the consolidation and subsequent dissolution of a large colonial empire, the calamity of the World Wars, the construction of a large welfare state with a uniquely well-funded pension system, the discovery of large natural gas reserves in the 1960s and the subsequent 'Dutch disease', as well as the modern era of globalization and financialization. Consistent with these developments, we find that major shifts occurred in the composition of household wealth, with semi-private wealth (including pension wealth and life-insurance) becoming increasingly important after World War II.

The Dutch setting is particularly fruitful due to the availability of rich historical data that allows us to reconstruct household balance sheets using three distinct methodologies: (i) historical national accounts; (ii) estate multiplier methods; (iii) lognormal extrapolation from wealth tax data. The first method, which we use as the benchmark, is the method used in most of the contemporary literature, including the seminal work by Piketty and Zucman (2014). The second method takes the well known estate multiplier approach (e.g. Kopczuk and Saez 2004), and applies it to the aggregate stock of household wealth. This method was common for historical estimates of aggregate wealth and can be traced back to at least the late 19th century (e.g., Boissevain 1891). The third method assumes that wealth is reasonably approximated by a lognormal distribution, and then extrapolates based on the upper tail observed in wealth tax records to estimate the total wealth. This is the approach by Wilterdink (1984), for instance, who provided the first – and, until our study, only – estimates for Dutch household wealth from 1894 until 1974. By combining all three methods, we can be more certain about the accuracy of the overall estimates and further refine their results, and observe individual strengths and weaknesses. Hence, besides our empirical contribution, we also provide methodological insights that can be used in other settings where constructing historical wealth series.

Figure 1 summarizes our main results for aggregate wealth. In this figure, we have combined results from our distinct methods; specifically, we report the estate multiplier method prior to 1938, and historical national accounts method after 1938. We see that the wealth-income ratio follows the familiar U-shaped

Figure 1: The Wealth-Income Ratio and the Top 1% Wealth Share, 1854–2019
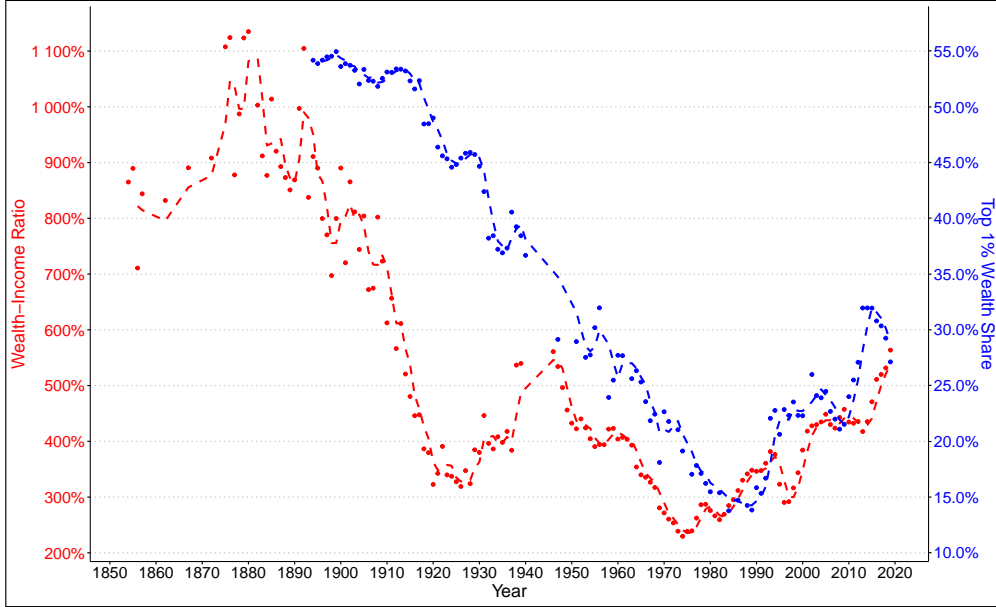
Note: Figure depicts the ratio of aggregate household wealth to net national income (red dots, left axis), and the top 1% wealth share (blue dots, right axis). The dashed trend lines for both series represent a three-year moving average.

pattern over the 20th century, with a small peak from the 1930s until after the start of World War II. This small peak is a robust feature of the data regardless of the method we use, suggesting that the shape might be closer to a W than a U.

Once we have a stock of household wealth, we have a denominator for top wealth shares. Since the numerator is readily available – either through wealth tax records or death duties – we reconstruct top wealth shares since 1894. We should note that the quality of the wealth tax records declines from the 1960s, resulting in a likely underestimation of top wealth shares. After 1993, we have access to tabulated data on the full wealth distribution, which gives us greater confidence in the top wealth shares for this timeframe.

Our findings for top wealth shares largely echo those for total household wealth, with a clear U-shaped pattern. This is summarized by the green series in Figure 1, which depicts the top 1% wealth share from 1894 until 2019. We observe a steady decline from over 50% around the turn of the 20th century until a nadir of approximately 15% of private wealth in the 1980s, and afterwards a gradual increase until around 30% in 2019. Part of this decline will be driven by the aforementioned deterioration of the wealth tax records' quality; nevertheless, the overall pattern points to a strong increase in wealth concentration since the 1990s.

Our historical National Accounts also allow for the decomposition of aggregate wealth into wealth components. Grouping assets and liabilities in broad classes to ensure comparability over the full period, we find a stark decline in the importance of real estate (including land) prior to WW2, which only picked up again after the 1970s. After WW2, moreover, the Dutch pension system – which we term semi-private wealth – rapidly became a dominant asset class for households, being worth 40% of the household portfolio in 2019. We zoom in on these composition changes for subperiods where the data allow for more granular asset classes; this allows us to identify, for instance, the rapid decline of land prior to WW2 and the rise of deposits.

Our study is related to the following two sets of literature. First, we contribute to the small number of

studies concerned with estimating aggregate household wealth. The seminal work in this series is Piketty and Zucman (2014), who estimate historical wealth-income ratios for eight large economies. We introduce data for the Netherlands which has so far been absent. Historical estimates for Dutch household wealth do exist, including Boissevain (1891), and most notably Wilterdink (1984, 2015). Compared to these studies, we add a longer-run perspective (Wilterdink's series runs from 1894 until 1974), as well as a decomposition of aggregate wealth, we provide an international comparison, and we operationalize all three main methods for household balance sheet reconstruction.

Second, we contribute to the literature on top wealth shares. The addition of the Netherlands to this literature provides fruitful ground for comparison. Moreover, compared to existing studies focusing on top wealth shares in the Netherlands (notably Wilterdink 1984 for 1894–1974 and Salverda 2019 for 1993–2000 and 2006–2014), we add a longer and uninterrupted timeframe (1894–2019), provide a consistent treatment of household wealth as corresponding to the National Accounts, and employ a more flexible estimation method than strict Pareto interpolation, namely generalized Pareto interpolation (Blanchet, Fournier, and Piketty 2021).

The rest of our paper is structured as follows. Section 2 discusses existing work on the dynamics of wealth in other countries and in the Netherlands. In Section 3, we discuss our definitions of household wealth, analyzing the distinct role of pension wealth in greater detail. Moreover, we introduce the three methods we use to reconstruct aggregate household wealth, as well as the mapping from aggregate wealth to wealth shares. Section 4 presents the results, both for aggregates and wealth shares. In Section 5 we discuss our results in international perspective, and in 6, we analyze these trends in context of socio-economic developments in the Netherlands. Section 7 concludes.

2 Literature Review

Studies on long-term wealth dynamics, including the share of top wealth, are relatively new. At least in part, this is because this type of research relies heavily on national stock accounts, instead of flow accounts; these are data which national statistical institutes only began to compile from the early 1990s onward.

The past few years have seen a notable resurgence of interest in the long-term evolution of size, composition and distributional patterns of private wealth mostly across the Western world, along with India and China. Seminal studies include Davies et al. (2011) and the work by Piketty (2014) and Piketty and Zucman (2014). The latter work sparked a growing number of researchers to explore whether the U-shaped pattern observed by Piketty and Zucman (2014) also applied to countries with notable different institutional set-ups. Such studies include Waldenström (2017) for Sweden; Orthofer, Du Plessis, and Reid (2019) for South Africa; Piketty, Yang, and Zucman (2019) for China, Kumar (2019) for India; and most recently Artola Blanco, Bauluz, and Martínez-Toledano (2020) for Spain. In parallel, there is also a growing literature on top wealth shares. Key examples of this strand of research includes Saez and Zucman (2016) for the United States[1]; Garbinti, Goupille-Lebret, and Piketty (2020) for France; Alvaredo, Atkinson, and Morelli (2018) for the United Kingdom; Albers, Bartels, and Schularick (2020) for Germany; and Roine and Waldenström (2009) for Sweden.

For the Netherlands, studies on wealth dynamics are part of a once vibrant, but until relatively recently, almost entirely neglected scholarly tradition. The earliest studies on these matters can be traced back to

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1. However, see the discussion of their capitalization method and underlying assumptions (Kopczuk 2015; Smith, Zidar, and Zwick 2019; Saez and Zucman 2020).

at least the mid 19th century. Pareau (1864) for example was one of the first scholars which attempted to explore changing wealth patterns across several decades, comparing total private wealth in the 1830s and the 1860s to the respective size of the Dutch population. He argued that there has been a per capita decrease in national wealth throughout this period. Gleichman (1879) and Vissering (1879) a few years later, set out to estimate the total value of financial assets held by Dutch households. Boissevain (1883, 1884, 1891) and Stuart (1888) were the first to provide somewhat reliable estimations of aggregate wealth for the 1880s and 1890s by relying on the estate multiplier method.

Following the events of the first World War, Bonger (1923) set out to measure total private wealth for the period between 1915 and 1920. His work criticizes the aforementioned method by Boissevain and Stuart, instead relying on an approach that is more akin to a reconstruction of the national accounts. His work was continued by Smeets (1931) and a few years later by Van der Wijk (1939).

In contrast to earlier decades, the period following the second World War until the 1980s was characterized by a notable absence of studies on long-term wealth dynamics. A major stimulus in increasing interest arose from the work by Wilterdink (1984) who documented and analysed long-term patterns of wealth dynamics based on wealth tax records from the 1890s until the 1970s, and provided a breakdown of top wealth shares. In his footsteps, the literature examining the Netherlands grew steadily, mostly focusing on periods that preceded Wilterdink's analysis. Verstegen (1996) for instance looked at national wealth and income in the Netherlands between 1805 and 1910, whereas Bos (1990) sketched the capital holdings and status of the wealthiest members of society in the 19th century Netherlands. Recent contributions include Wilterdink (2015) who reflect on the decades after the 1980s, which were not covered yet by his previous work. The most recent noteworthy contribution to the study of the top wealth shares in the Netherlands was made by Salverda (2019) covering many of the years after 1993.

Van Bavel and Frankema (2017) argue that Wilterdink's estimates for the 1970s only constitute roughly 85 percent of NNI, which based on our findings is an underestimation by a factor of two and a half; this is a point also reiterated more recently by Coenen (2017). Building on all these existing studies for the Netherlands, we set out to take the next step forward and provide the first comprehensive data set on Dutch wealth since the 1850s, which is –in addition– implemented within a framework consistent with recent international studies.

3 Concepts, Sources, and Methods

3.1 Aggregate Wealth: With and Without Pensions

Our measures of household wealth follow the definition spelled out in the System of National Accounts, which is the total market value of assets minus liabilities. Assets include all financial and non-financial assets over which ownership rights can be enforced and which provide economic benefits to their owners. This definition includes most major wealth components, including housing, real estate, savings accounts, stocks and bonds, which can be accessed and capitalized by their households.

An important wealth component which may or may not be covered by this definition is pension wealth and life insurance claims, which we refer to as semi-private wealth (Wilterdink 1984). The Dutch pension system consists of three 'pillars': (i.) universal retirement payouts, funded as a PAYGO scheme (*Algemene Ouderdomswet* or *AOW*); (ii.) employer-based pension funds, which every employee is required to contribute to; and (iii.) personal pension accounts. Component (i.) is not considered wealth. The main discussion re-

volves around the inclusion of pillars (ii.) and (iii.). Standard DINA guidelines prescribe that the capitalized values of these pension contributions should be included as wealth, reasoning from a life-cycle perspective. All existing Dutch data sources, on the other hand, have so far excluded pension wealth from wealth distribution statistics. The commonly given reason is that these pension assets are not freely disposable, are not bequeatheable and hence are more akin to claims on future income streams, like Social Security benefits (Van Bavel and Frankema 2017). Other authors disagree with this assessment, pointing to the important substitution effects pension wealth has with regular savings (Caminada, Goudswaard, and Knoef 2014). The inclusion of pension wealth is not a trivial matter: Dutch pension funds are among the best funded internationally, with total capitalized contributions in excess of 200% of national income in recent years, as we show in Figure 2. Since pension contributions tend to be distributed more equally than other financial assets, including pension wealth also has profound effects on estimates of wealth inequality. The size of employer-mandated pension wealth relative to other assets makes the Netherlands a unique case in this regard.

Figure 2: Value of Pension and Life-Insurance Wealth
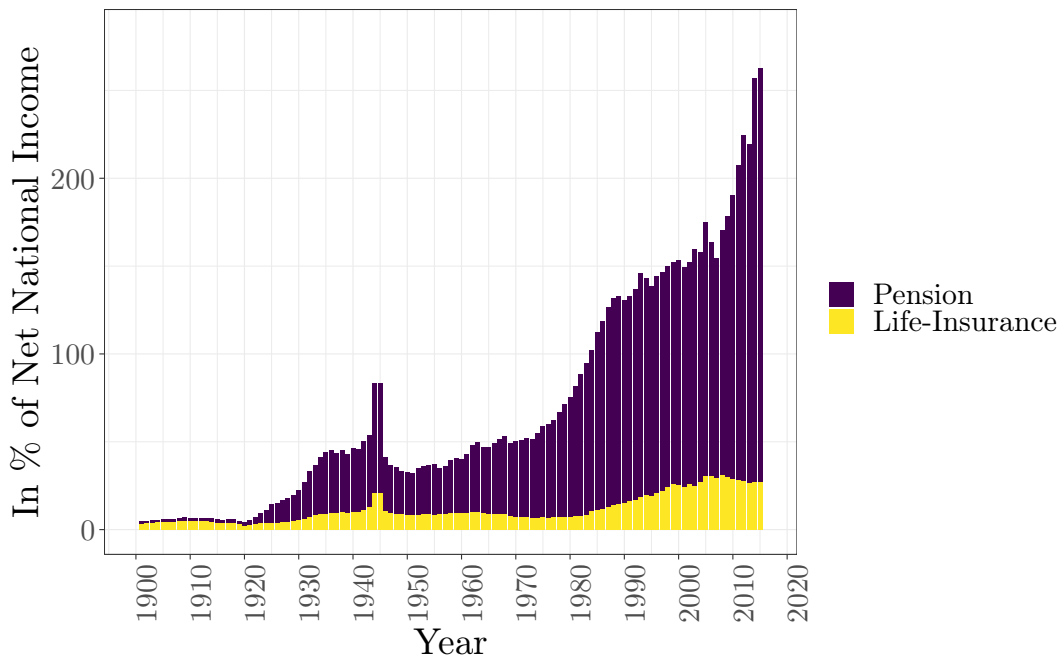
Note: Figure shows the evolution of capitalized pension claims and life insurance as a percentage of net national income, from 1900–2019. Data on life insurance and pension reserves from the Dutch Central Bank, data on net national income from Statistics Netherlands.

In this paper, we address the issue of pension wealth by defining it as semi-private wealth and by presenting two series of aggregate wealth, one with and one without pension wealth; our top wealth shares series will be defined net of pension wealth. In our view, this gives the most transparent treatment of capitalized pension wealth, is consistent with international practice, and makes long-run series more meaningful, since the distribution of pension wealth has failed to be documented for the virtual entirety of our time frame.

3.2 Aggregate Wealth Methods

We now turn to the discussion of the three distinct methods we employ to reconstruct aggregate wealth: (i.) historical national accounts, (ii.) the estate multiplier method, and (iii.) lognormal extrapolation on wealth tax data. We describe each of these methods in turn, and briefly discuss the data sources we use for each method. We follow this with a discussion of our methods to construct top wealth shares. A full description of all data sources and methodological details can be found in the Appendix.

3.2.1 Historical National Accounts

Our benchmark series reconstructs household balance sheets, with the aim of producing a series that is as consistent as possible with the current System of National Accounts. For the post-1995 period, we can directly use the System of National Accounts' household balance sheets. Pre-1995, no official balance sheets exist; but an estimate compiled by the Netherlands Bureau of Economic Analysis (CPB) provides balance sheets since 1970, which we augment with wealth components not covered in these estimates. Pre-1970, we manually reconstruct household balance sheets; from 1880 through 1938 we use a variety of sources to build full balance sheets, whilst for 1947 to 1969 we have to interpolate stocks of wealth based on observed saving flows and estimated capital gains. Hence, we break this series into four specific chunks: (i.) 1880–1938; (ii.) 1947–1969; (iii.) 1970–1994; and (iv.) 1995–2019. [2]

For 1880–1938, we use a variety of sources to manually reconstruct household balance sheets. Here it is important to distinguish between sources that were used to reconstruct the value of non-financial assets on the one hand and financial assets on the other hand. To estimate the value of non-financial assets in the Netherlands for this period we relied first and foremost on property tax assessments. For buildings and (agricultural) land - the principal component of non-financial assets - yearly taxable income was published in the Annual Statistics for the Netherlands (*Jaarcijfers voor Nederland)* published by the Central Bureau of Statistics (CBS 1880-1938). We then applied a tax-to-market value ratio, based on an estimation from 1880 in which the total value of all real estate was estimated. Another important element of non-financial assets, consisted of livestock (including horses). For completeness's sake durable consumer goods, including cars and bicycles, were also included in the calculations of non-financial private household stock.

Following the System of National Accounts, financial assets include deposits and currency, shares and mutual funds, bonds, individual pension, and insurance savings. The principal sources material used to estimate the value of these asset classes are (i.) the Statistical Publication by the Dutch Central Bank, which reported on the balance sheet information of commercial banking institutions as well as saving banks and cooperatives banks from 1900 onwards (DNB 1987, 2000); and (ii.) the previously mentioned Annual Statistics for the Netherlands. [3] The total value of shares, mutual funds and bonds held by private individuals was based on estimations made by contemporary researchers (Boissevain 1891), and on information on the total value of newly listed stocks and bonds on the Amsterdam Stock Exchange, which were reported on a yearly basis in the Annual Statistics for the Netherlands. Finally, funded occupational pension entitlements and private insurance savings are based on the technical reserves as recorded by the Dutch Central Bank. This gives us estimated household balance sheets from 1880 until 1937. For the year 1938, we have an official

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2. We provide more detailed discussions for each sub-period in Appendix A.1.

3. More specifically, data on bank notes and coins in circulation are taken from the Annual Statistics. It is assumed that practically all of these bank notes and coins were in the hands of households. Data for deposits was taken from the statistical publication by the Dutch Central Bank (1987, 2000). Here an effort was made to distinguish between deposits held by households and those held by companies (i.e., current accounts).

household balance sheet from Statistics Netherlands, which we use to calibrate the estimates for the years prior to 1938.

After 1938, the earliest reliable year we can recover is 1947, when Statistics Netherlands also published a balance sheet for the household sector in its National Accounts. From this year on through 1969, we do not have the sources to reconstruct stocks of wealth, which only begin again in 1970. However, since we do observe savings flows of wealth for the entire period, as well as an estimate of total private wealth in 1947 and in 1970, we can interpolate stocks of wealth for the intervening years. Specifically, we can think of the accumulation equation of wealth W going from period t to period $t+1$ as being determined by both savings s and capital gains q:

$$W_{t+1} = (1 + q_{t+1})(1 + s_t)W_t. \tag{1}$$

We observe the initial wealth stock, W_{1947}, annual saving flows s_t, and a final wealth stock W_{1970}. Hence, we can residually estimate an average capital gains rate $q_t = q$ using a recursive estimation process (cf. Piketty and Zucman 2014, Online Appendix K). Once we have total stocks of wealth, we can estimate wealth composition for these years using available individual series on stocks of housing wealth, financial assets, and pension wealth to arrive at plausible estimates of the unavailable wealth components.[4]

From 1970, we have an estimate of household balance sheets by the Netherlands Bureau of Economic Analysis (CPB). In Appendix A.1.3, we compare all wealth components in these balance sheets with external sources, finding that they are remarkably similar for the most part. We augment the balance sheet with life insurance wealth, which is missing.

Finally, from 1995 until 2019, we simply use the most recent version of the System of National Accounts (the 2015 revision), maintained by Statistics Netherlands. Consistent with DINA guidelines, we use the simple average of beginning-of-year and end-of-year values for each annual estimate.

3.2.2 Estate Multiplier Method

The succession tax was introduced in the Netherlands in 1818, and until 1877 only indirect heirs with an estate value higher than 300 guilders were taxed. From 1879, the tax widened in scope to include all estates. The tax threshold for direct accession was then set at 1,000 guilders, 300 for indirect accession.[5]

Dutch statistical agencies produced and published inheritance tax returns records in aggregate form since the mid-1850s. In the literature, the usual caveat regarding this kind of data is that the threshold for including an estate in the inheritance tax returns records is typically relatively high. However, this does not hold in the case of the Netherlands since the threshold approximates the annual earnings of an unskilled worker, therefore covering a broader range of the full wealth distribution, instead of a high upper tail. Table 1 demonstrates this from 1880–1980, which can be contrasted with the typical 1–3% coverage found in the literature (e.g., Kopczuk and Saez 2004). During the 1854–1878 period we do not have data on how many filers are included in the reported aggregate wealth totals. But for the years 1878–1910 we have the data split between direct and indirect heirs, so we can extrapolate backward and approximate the number of (indirect heir) filers for the 1854–1878 period, as shown in table 1 assuming that the ratio of indirect heir filers is equal to that from 1880 (and therefore the coverage remains fixed at 5.27%). The data from 1878 onward are available in tabulated form, with more granular thresholds, as shown in table A.2 (in the appendix).

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4. The year 1969 is missing from the National Accounts, and is hence linearly interpolated from the values for 1968 and 1970.

5. More changes were introduced with later legislation, which are summarized in Table A.1.

Table 1: Coverage of the death duties tax in the Netherlands 1850-1980 from selected years (1850-1870 estimation, see text for details).

Year	Total Deceased	Filers	Coverage
1850	69,377	*3,656*	*5.27%*
1860	84,382	*4,447*	*5.27%*
1870	95,289	*5,022*	*5.27%*
1880	95,282	9,508	9.98%
1890	93,246	10,090	10.82%
1900	92,043	11,101	12.06%
1910	79,984	10,712	13.39%
1920	81,525	13,623	16.71%
1930	71,682	14,382	20.06%
1940	87,722	18,251	20.81%
1948	72,459	19,602	27.05%
1956	85,000	37,119	43.67%
1963	96,000	35,874	37.37%
1970	110,000	38,167	34.70%
1975	114,000	48,398	42.45%
1980	114,000	43,410	38.08%

The idea behind the estate multiplier method is to use the available wealth totals from the inheritance tax (i.e. the sample), which is then extrapolated to the entire population. This extrapolation works by multiplying the total wealth captured by the inheritance tax with the ratio of the deceased individuals covered by this tax over the surviving population in that particular year. Given that the sample in the annual inheritance tax returns, and the entire population, have different age-wise mortality rates, a correction needs to be applied in the form of adjusted mortality rates. Typically age-wise mortality rates for the entire population are available from the national statistical agencies. Subsequently, we need additional data to estimate the mortality rates for the individuals in the inheritance tax records. One solution is to turn to companies that keep records of life insurance holders, and their respective mortality rates (e.g. Lampman (1962)). Other researchers have used social class mortality multipliers based on occupational classes (Alvaredo, Atkinson, and Morelli (2018) and Atkinson and Harrison (1978)). In our approach we use mortality rates estimated based on the detailed data from the Tafel V-bis annual ledger for 1921 (detailed in the appendix), which has been made available by Gelderblom, Jonker, Peeters, and de Vicq (2021). A limitation of this approach is that it is using the same multiplier for all the years, but this is not unique in the literature (e.g. Lampman (1962)). For the years before 1878, when only indirect heirs are taxed and registered, we work in two steps: first, we use one multiplier from the years 1878–1910 for which we have the data split between direct and indirect heirs, to bring the indirect-only data to a comparable level with the post-1878 period; second, we multiply by the same mortality rate multiplier as we do for all other years.

3.2.3 Wealth Tax Method

The wealth tax was instituted in 1893. The first collections of statistics appeared for the fiscal year 1894, and the data series continues until 1993. These statistics appeared in the Annual Statistics for the Netherlands. Initially, the wealth tax only applied to fortunes with a value over 13,000 guilders, a threshold that was

sporadically changed in the later years.[6] Households above these thresholds typically comprised about 5-7% of the population. As a product of time, a decrease in tax morale also caused increases in tax avoidance and evasion, further weakening the informative value of the statistics, particularly for the very top wealth holders (Wilterdink 2015; Van Bavel and Frankema 2017). This led to the replacement of the wealth tax in 2001 by the current tax system, which taxes – at least ostensibly – capital income rather than net wealth. The historical wealth tax did not apply to households, but to natural persons, making direct comparisons with later tax statistics slightly difficult. Married couples were treated as a single natural person for tax purposes. The tax basis covered financial assets, deposits and cash, real estate, items of transport such as horse-carts and cars, claims to life insurance, and from 1918 onward also jewels and precious metals. It did not cover pension claims, artworks, or consumer durables.

We have tabulated wealth tax data from 1894–1993, with a few interruptions, particularly around the second World War. In the Dutch literature on national wealth the key reference is Wilterdink (1984), for which Potharst (2022) has developed a method for estimating μ and σ of lognormal distributions from censored datasets. The basic assumption they use is that the distribution does behave lognormally, $W_t \sim \log \mathcal{N}(\mu_t, \sigma_t^2)$. This assumption is relaxed when estimating total wealth by replacing the fitted values above the threshold with the actual value from the data. The issue is to estimate μ_t and σ_t^2 using the available information on the top brackets from the wealth tax. Each data point takes the form of a triple (k, n_k, μ_k), where k is the lower threshold of the bracket (e.g., 1,000 guilders), n_k is the number of individuals in that bracket, and μ_k is the bracket average wealth. We obtain our estimate for μ and σ^2 by minimizing the distance between a lognormal distribution and the parameters of the low threshold of each bracket and the frequencies of observations per bracket (see section A.3).

3.3 Wealth Shares

Once we have estimates for aggregate household wealth, we have a denominator for top wealth shares. For the numerator – i.e., total wealth per percentile – we rely on wealth tax statistics for 1894–1993, and for the wealth distribution statistics by Statistics Netherlands from 1993 onward. The wealth tax statistics were published in tabulated form in *Jaarcijfers voor Nederland*; we can therefore easily employ the semiparametric interpolation method developed by Blanchet, Fournier, and Piketty (2021) to estimate top wealth shares. This method, known as generalized Pareto interpolation, takes as inputs for each bracket k a bracket lower threshold q_k, its corresponding percentile p_k and the bracket average μ_k. It then interpolates the entire distribution based on the given inputs and the (known) mean population wealth $\overline{\mu}$. Since we do not possess information about the distribution below the lowest threshold of the wealth tax – usually the bottom 95% or so – we hesitate to report the interpolation results for anything but the upper 5% of the distribution[7]. To avoid wealth shares being mechanically biased downwards by our concept of aggregate wealth, we scale up the total wealth in each bracket by the average ratio between the historical national accounts method and the lognormal extrapolation. The lognormal extrapolation, which is based on the wealth tax statistics, may then be viewed as an estimate of aggregate taxable wealth; by scaling up wealth in each bracket, we implicitly assume that the wealth that is not captured in the wealth tax statistics is spread relatively uniformly across the distribution. Although this is not an entirely appealing assumption, it is the best possible solution to the fact that distributional statistics in historical data are scarcely available.

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6. This threshold was later set to 15,000 in 1915, then dropped to 10,000 in 1947, to subsequently be increased to 50,000 in 1957, 100,000 in 1970, and 200,000 guilders in 1983.

7. This concern is noted by Blanchet, Fournier, and Piketty (2021) as well, who caution that the interpolation works best if at least some lower quantiles are also covered.

Post-1993, Statistics Netherlands starts reporting tabulated data for the full wealth distribution. These data are taken from a variety of fiscal sources, including the wealth tax, wealth surveys, and in recent years also mandatory disclosures of deposits by banks and other financial institutions. These data serve as basis for the contemporary Distributional Financial Accounts, as detailed in a separate paper (Toussaint 2021). In this paper, we only report the upper percentiles of these Distributional Accounts, to preserve consistency with the historical series.

It is well-known that the post-1993 data, while significantly better than the wealth tax records that preceded it, significantly increase in quality from 2011 onward, when Statistics Netherlands started drawing on the universe of tax filers and received automatic disclosure of various wealth components. A major wealth component that is likely to be understated in earlier periods is closely held business wealth (*aanmerkelijk belang*), which is predominantly held by the richest 1% (Toussaint, van Bavel, Salverda, and Teulings 2020); this used to be understated in the 2006–2019 period as well, until a major data revision in May 2021. We therefore adjust the historical proportions of closely held business wealth based on the average ratios in the 2006–2019 revision.

4   Results

4.1   Aggregate Wealth

Figure 3 presents the ratio of household wealth to national income for the period 1854–2019. For the estate multiplier method and the log-normal extrapolation on wealth tax data, panel (a) includes pension wealth, whereas panel (b) does not. The results using the historical national accounts method always include claims on pensions.

By contrasting the reconstructed national accounts with the two other methods, we find that, for the period where the three methods can be used concurrently – that is, from 1894 until the 1980s – there are significant differences between the outcome of the three methods. From the 1880s until the 1950s, the historical national account and estate multiplier methods are remarkably similar, and diverge afterwards. The wealth tax method results in lower wealth-income ratios in the same period, as noted before by Van Bavel and Frankema (2017). After the 1950s the estate multiplier and the wealth tax methods give very similar estimates which are well below the historical national account method. This is likely due to the increasing importance of pension claims (see figure 2), which are covered in the historical national accounts but not in the other two methods. Another reason often identified is the increased unreliability of both wealth tax records and estate tax records (Wilterdink 1984; Van Bavel and Frankema 2017), which might bias results based on those sources downwards.

The first lesson we can draw from this comparison is that while the three methods differ in their estimated levels, they point toward the same direction overall. The important note here is that one has to correct for the lack of pensions in the estate multiplier and the wealth tax methods, in order for the trends to be in the same order of magnitude during the recent period as well.

A second conclusion is that, once pensions are accounted for, the estate multiplier method is highly similar to the historical national accounts prior to World War 2, which makes it a useful substitute for countries or years where historical national accounts sources may be unavailable.

One interesting trend in the data is the increase in the wealth-income ratio between 1930 and 1950 across all three series. This trend is most prominent in the historical national accounts, and is unlikely to be driven

Figure 3: Wealth-Income Ratios for Each Method, With and Without Pensions
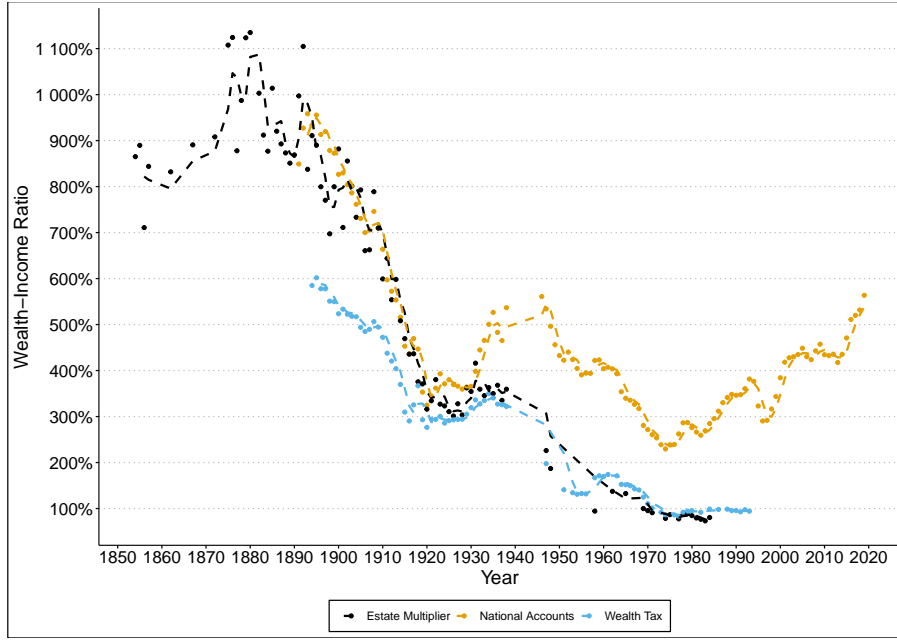
(a)
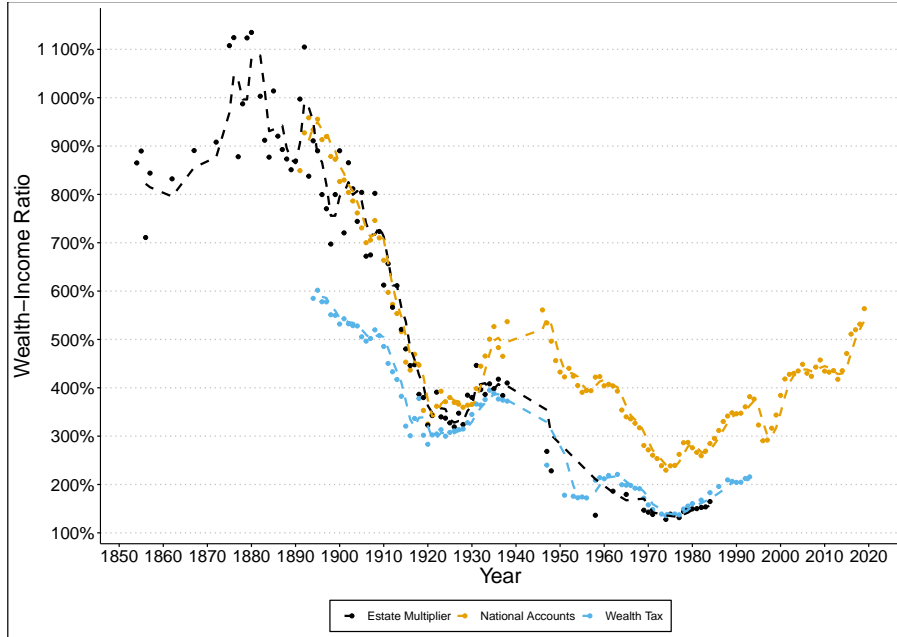
(b)

Note: Figure shows the ratio of private wealth to net national income. The left panel includes pension wealth in the historical national accounts method (orange), but excludes pension wealth from the estate multiplier method (purple) and the lognormal extrapolation method (blue); the right panel includes pension wealth in all three series.

by measurement error, since we have an official balance sheet both for 1938 and 1947, which indeed show that household wealth almost doubled in the intervening decade. The increase in the wealth-income ratio prior to 1938 is because national income declined in the aftermath of the Great Depression and World War II, whereas private wealth declined relatively less.

After World War II, aggregate wealth grew less rapidly than national income, resulting in the familiar decline in the wealth-income ratio observed elsewhere (Piketty and Zucman 2014. Similar to other countries, the trough occurs somewhere in the 1970s, at a depth of almost 200% of national income. Afterwards, private wealth grew in importance again relative to national income, speeding up in the 1990s and reaching a peak of 560% in 2019. In the next section (4.2), we decompose household wealth to analyze the underlying trends.

4.2 Wealth Composition

Figure 4 illustrates the decomposition of private wealth from 1880 until today, where all asset classes are expressed as percentage of total assets. We are able to distinguish (i.) liabilities; (ii.) movables (including deposits); (iii.) real estate; (iv.) securities; (v.) semi-private wealth consistently throughout this period.[8]

The period between 1880 and 1938 is first and foremost characterised by a sharp decline in the relative value of real estate compared to net national income. While it remained the principal component of private wealth all throughout this period, it did lose out in importance compared to financial assets, most notably equity, cash and checking deposits (M2). Secondly, whereas the first World War had a devastating effect on private wealth, the relative value of each asset component did not shifted significantly. This observed pattern also applies to the post World War recovery. Finally, in accordance with the literature on the limited impact of the Great Depression on the Dutch capital markets, the relative value of deposits and equity did decrease in the 1930s, but not substantially ('t Hart, Jonker and van Zanden, 1997).

For the period between 1947 and 1970, we use the same sources that we use to reconstruct the National Accounts after 1970 which are available, which include sources on deposits, real estate, semi-private wealth, and liabilities. The remainder, which we term Securities in Figure 4), is estimated as a residual: since we know W_t and we know all components that constitute W_t except one, the remaining component can be easily estimated. As a robustness check, we use data on the wealth composition from Dutch wealth statistics, which were published in separate publications for selected years.[9]; the results of this alternative method are reported in Figure A.7, and can be seen to give highly similar results.

From 1970–1994, we can again directly use our historical national accounts data. After 1995, we simply use the System of National Accounts. The variety in sources results in a slight trendbreak, most notably around 1970 and 1995. Nevertheless, the overall patterns seem clear.

The period between 1947 and 1970 looks remarkably different from the pre-war era or the years after. Housing wealth is much less significant as a source of wealth, which, combined with the loss of colonial land, are likely to be two major factors that explain the enormous decline in real estate values between 1938 and 1947. Conversely, financial assets, broadly defined, constitute the bulk of household wealth until the end of the 1960s. This wealth component mostly consists of domestic stocks and shares in unincorporated businesses. Liabilities are rather stable during the 1950s, only to rapidly increase during the 1960s. Given that the balance sheets from the 1970s onward record much lower liability shares, this increase seems to be to some extent spurious; however, two different sources (Jordà, Schularick, and Taylor (2017) as well

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8. To ensure consistency for the entire period, we do not further divide these asset classes into more granular components in this Figure; in Section 6, we will dive deeper into these decompositions for the periods where the data allow us to be more granular (1880–1947 and 1995–2019).

9. We interpolate missing years.

Figure 4: Composition of wealth as a percentage, 1880–2019.
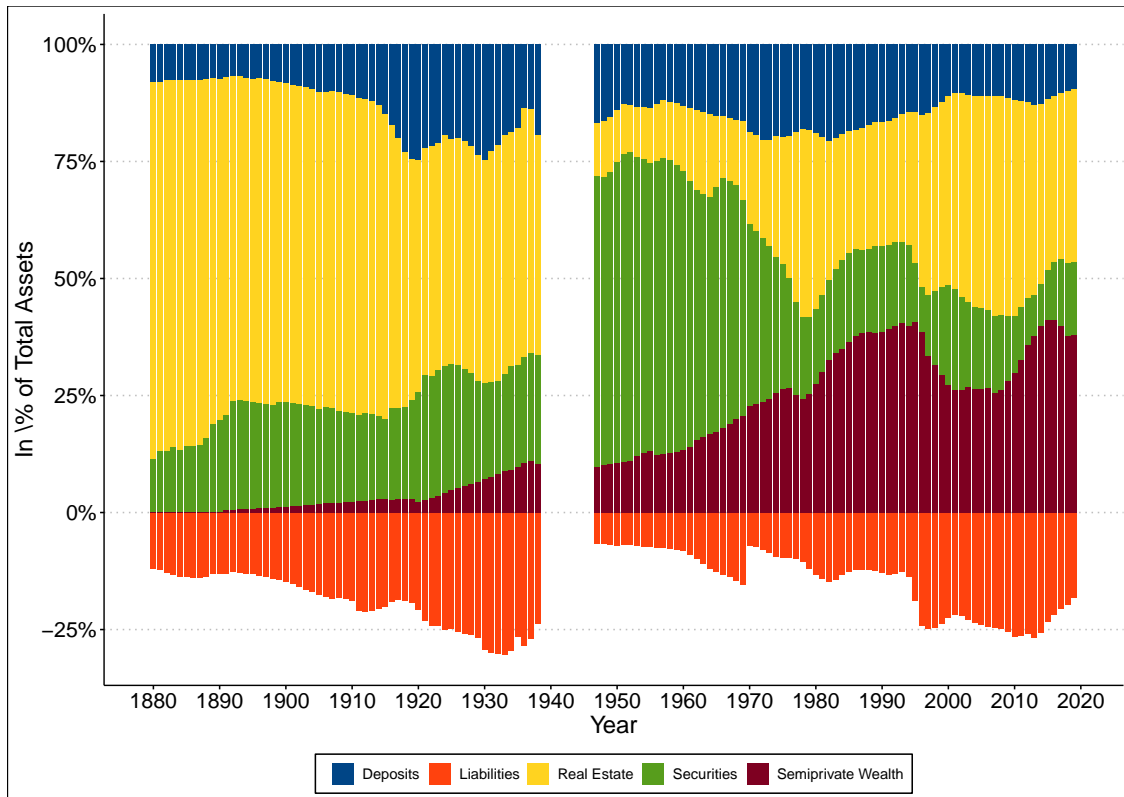
as Statistics Netherlands) both show this strong increase during the 1960s; hence, it is also possible that liabilities during the 1970s are underestimated in the CPB balance sheets.

One of the most striking trends in the post 1970s period is the dynamic in the relative value of private real estate. Starting from a precipitous decline in relative value in the early 1980s, the value of real estate then continued to grow almost uninterrupted until the mid-2010s. This increase in the value of private real estate was mirrored by a sharp increase in home mortgages; which, as a percentage of net national income, nearly quadrupled throughout this period, reflecting the growing financialization of the Dutch economy. To a lesser extent this is also reflected in the stock market. While the holdings of both domestic and foreign securities decreased because of the subsequent oil crises in the 1970s, it started to increase substantially in the following years. This growth came to a standstill due to the Dot-com bubble in the early-2000s and more recently the Global Financial Crisis of 2007-2008. The relative value of other asset categories, most notably deposits and bonds, seem notably stagnant throughout this period, which is similar to most of the 1880–1938 period.

Notably for the Netherlands, it is important to point out the rapid growth of semi-private wealth from the 1920s onward; a trend to which we alluded to already earlier in this paper (Figure 2). Pension wealth in particular expanded exponentially after the Second World War and continued to boom in the post-1960s. Whereas it was once all but a minor component of private wealth, it now slightly exceeds real estate as the most important asset of households.
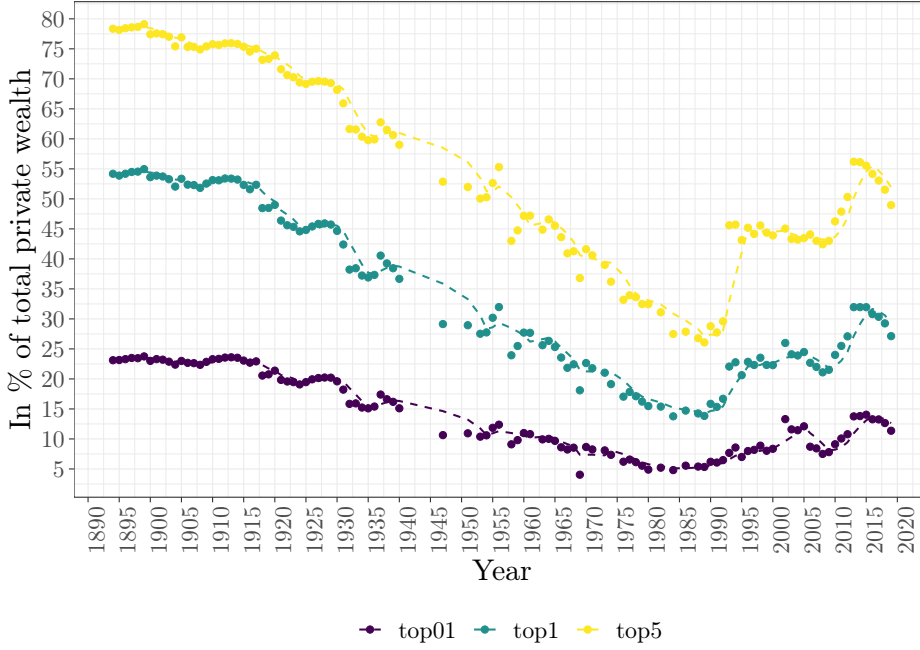
4.3   Wealth Shares

We now turn to our results for top wealth shares. Figure 5 shows the evolution of the top 5%, 1%, and 0.1% share from 1894–2019. As noted before, the data for this series are drawn from the wealth tax records and the results are estimated using generalized Pareto interpolation (Blanchet, Fournier, and Piketty 2021). The individual data points are connected by a three-year moving average trend line. Since the distribution of pension wealth is historically unavailable, this wealth component is excluded in these figures.

We observe a familiar U-shaped pattern in top wealth shares over the 20th century. The top 1% share peaked at close to 60% around 1900, before declining to as little as 15% by the end of the 1970s. From the late 1980s, the top shares start increasing again, peaking at a 1% share of around 35% in 2015. Several caveats about this trend should be noted. First, a lack of data availability of the full distribution before 1993 precludes robust conclusions about the evolving role of lower percentiles, which makes it difficult to verify the trends observed in these top wealth shares. Second, it is generally accepted that the wealth tax records become increasingly uninformative from the 1970s onward (Wilterdink 1984; Van Bavel and Frankema 2017). This is due to several factors, including increased thresholds (up to 200,000 guilders by the late 1970s), increased exemptions of business capital from the 1980s onward, as well as a weakening of tax morale. These factors are difficult to quantify precisely; however, the marked jump in top wealth shares around 1993 – the first year for which Statistics Netherlands is able to recover the full distribution with some confidence – is striking, particularly for the 5% share. The unavailability of reliable sources before 1993 makes it difficult to determine which part of the decline in wealth shares prior to 1993 is due to worsening data quality and which part is a true decline in wealth concentration[10].

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10. Two auxiliary sources exist from 1987: the household survey *Sociaal Economisch Panelonderzoek* and the *Forbes List of Billionaires*. Since surveys have difficulty including the upper tail of the wealth distribution, Vermeulen (2018) proposes merging them with rich lists and interpolating the missing tail. A preliminary analysis using that method for the years from 1987 reveals much larger top wealth shares than the wealth tax records allow (Toussaint 2020).

Figure 5: Evolution of Top Wealth Shares, 1894–2019

Note: Wealth shares calculated using generalized Pareto interpolation and the wealth tax records. Three-year moving average shown in dashed lines.

Data availability vastly improves after 1993, allowing us to reconstruct the full distribution of wealth with far higher confidence than before; as a result, the wealth shares series features a discontinuity between 1992 (the last year for which we base our results on the wealth tax) and 1993 (the first year that tabulated data for the full distribution are available). Nevertheless, despite this slight break in the series, the overall trajectory pre- and post-1993 is clear, with a clear upward trend that continues to this day, interrupted by a contraction in top wealth shares after the recessions in 2001 and 2008. After the peak in wealth concentration in 2015, the top 1% share fell somewhat until 2019. As we analyze in Section 6, this is likely explained by the strong increase in housing prices; as housing is the middle class's most important asset, this increases their wealth relative to the wealthiest 1% whose wealth is mainly in closely held business equity and financial assets. This mechanical contraction in top wealth shares resembles the "race between the housing market and the stock market" analyzed in the United States by Kuhn, Schularick, and Steins (2020).

5   International Comparison

In this section we compare our findings with international estimates. Figure 9 looks at private wealth-income ratios for several western countries for which such long-run evidence exists: the United Kingdom, France, Germany, Sweden and the United States. A main take-away from this picture, first observed by Piketty and Zucman (2014); Waldenström (2017), is that the observed patterns are notably similar across all these countries. The Netherlands, however, is a notable outlier in the 19th century, with a wealth-income ratio that is higher than most of its neighbouring countries, including the United Kingdom; reaching an apex of more than 1,100 percent of national income compared to roughly 700 percent for the United Kingdom throughout

the 1870s and early 1880s. Sweden, on the other hand, stands out for it consistently low wealth-income ratios for the entire 19th and 20th century.

Figure 6: Wealth-income Ratio, International Comparison
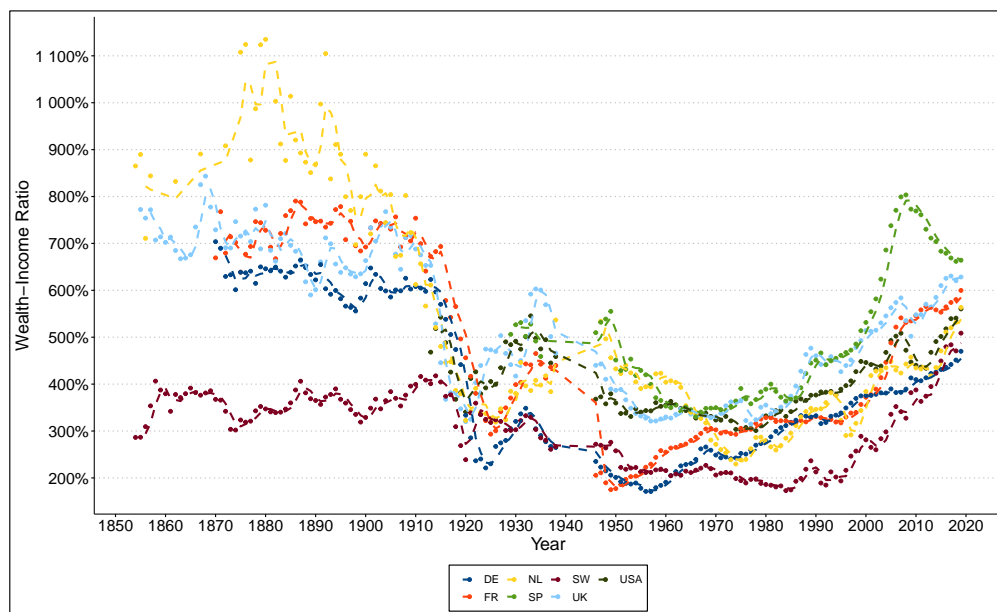
Note: Figure shows the evolution of the ratio of private wealth to net national income for Germany, France, the Netherlands, the UK and the US. All data are from the World Inequality Database. The figure for the Netherlands includes pension wealth.

In the early 20th century, the private wealth-income ratio for all European countries – except for Sweden, which has a smaller ratio throughout – starts to converge. In the period between 1900 up until the first World War, the ratio for France, the United Kingdom, Germany and the Netherlands, is neigh identical, hovering around 600 percent. The War and the hyperinflation that followed the armistice affected countries to a varying degree. The main belligerents, most notably France and Germany, experienced a severe reduction in the private wealth-income ratio, whereas other countries such as the Netherlands were less affected by these events.

In the following decades private wealth-income ratios converged once more, floating between 300 and 400 percent up until the late 1930s. The United States and the Netherlands diverged from this pattern and were characterized by a ratio of over 500 percent. For the latter country this especially held true for the period just before the second World War. For all countries, ratios continued to decrease after the second World War until the 1980s, when all countries experienced a sharp increase from about 300 percent in 1970 to about 400–600 percent today. This general trend obscures country-specific variation. In Europe, the trajectories for France and the United Kingdom are comparable: the private wealth – income ration rose from about 300 percent in 1970 to about 550 percent in recent times. In Germany and Sweden, the increase was more notable, but private wealth remained lower overall, never exceeding 400 percent up until the early 2000s. In the last decade, Sweden however was marked with a remarkable increase with the private wealth – income now exceeding 650 percent (Piketty and Zucman 2014: 1277-1279; Waldenström 2017: 291-293). Focusing on how the Netherlands fared compared with the other countries, two findings stand out. First, the Netherlands' wealth-income ratios are low compared to all other countries from roughly the mid 1960s

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until the mid 1980s, always hovering around 300 percent. A second finding is that the Netherlands appears to follow a similar trend of a sharply increasing ratio in recent decades, most similar to the patterns observed for Germany and Sweden.

In sum, comparing the main trends for the Netherlands with other countries for which long-term series on private wealth-income ratios are available shows first and foremost that the patterns are relatively similar. Nevertheless, somewhat provocatively one could label the Netherlands as the land of the extremes. It is characterized by both the highest ratio from the mid 19th century until the early 20th century, as well as one of the lowest ratios from the mid 1960s until the mid 1980s.

Next, we turn to the international comparison of top wealth shares. Figure 7 shows the long-run evolution of the top 1% share in France, the Netherlands, the United Kingdom, and the United States. We observe that the trends for the top 1% share are much more similar across all countries. The United States notably diverges in recent decades, with higher top wealth shares than the other countries. Note, however, that the Netherlands approaches U.S. in recent years, both hovering between 30 and 40%, although the trends in recent years are diverging with Netherlands demonstrating a decrease.

Figure 7: Top 1% Wealth Share, International Comparison
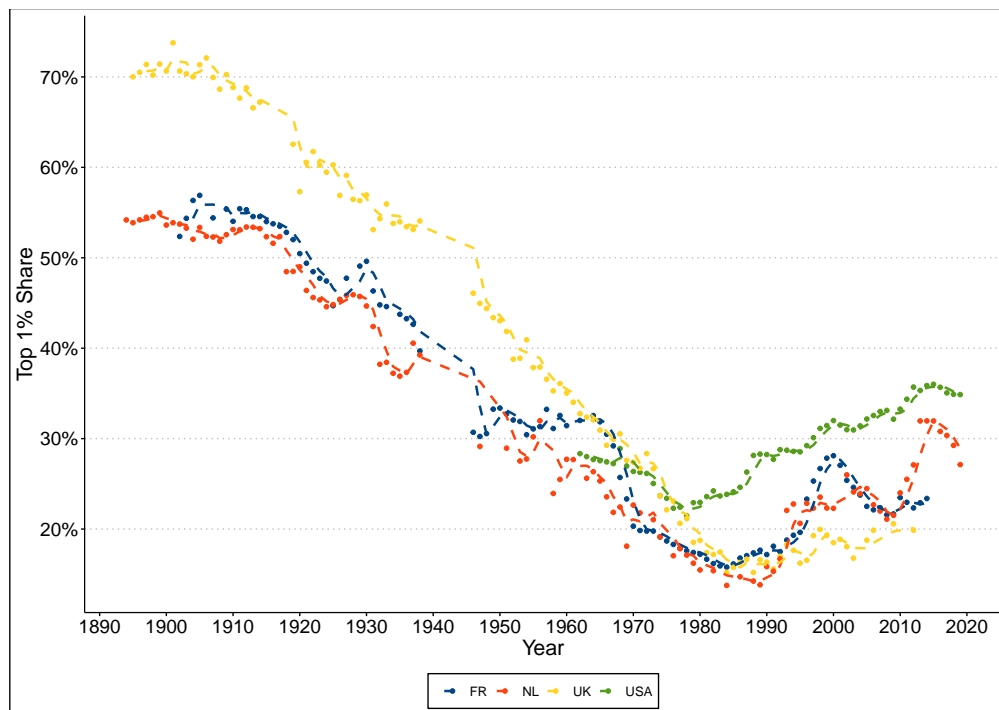
Note: Figure shows the wealth share of the top 1% for France, the Netherlands, the UK, and the US. Data are from the World Inequality Database.

Since the underlying data for top wealth shares are more fragile than those for aggregate wealth, we view that conclusions from these long-run trends should be drawn sparingly. However, it is clear that top wealth shares have increased since the 1980s, reaching levels not previously seen since the 1950s.

6   Analysis

How can we explain the trends in wealth-income ratios, top wealth shares, and wealth composition seen in the previous sections? In this section, we will dive deeper into the results, by decomposing wealth and income, and looking at real growth rates over time. We begin with a standard decomposition of real wealth growth into a savings and a capital gains component. Recall from Equation 1 that we can express wealth W_t as the product of a capital gains rate q_t, a savings rate s_t, and previous wealth W_{t-1}. To compute real wealth growth, we first express household wealth in real terms; we use historical PCI rates to express all our estimates in constant 2015 EUR. Next, we apply the decomposition exercise by Piketty and Zucman (2014) to show the relative contributions of savings and capital gains to average wealth growth. We can do so from 1921, when the first estimates of private saving are available[11]. The results are reported in Table 2. We observe that real wealth grew on average at a rate of about 3.6% between 1921 and 2019. This is almost entirely due to savings; these account for 97% of the observed average growth. Capital gains, on the other hand, seem to matter very little.

Once we move to specific subperiods and decadal averages, this conclusion becomes even starker. For the entire post-World War 2 period, capital gains were on average negative in real terms; without capital gains or losses, real wealth growth would have been almost 4.2% instead of 3.6%. This pattern holds for most decades after World War 2, beginning in the 1960s and continuing until the 2010s, with the sole exception of the 2000s. It is unclear to which extent this result is driven by measurement error in total wealth and hence wealth growth; some evidence in favor of this hypothesis can be seen from the average growth for 1995–2019, where all our data are directly from National Accounts. This period sees small but positive capital gains in real terms; at the same time, the 2010s did see real capital losses.

We now interpret this real wealth growth and the corresponding real income growth per sub-period.

6.1   1854–1938

As noted before, the Netherlands are marked with a notably high wealth-income ratio from the mid-19th until the early 20th century. Figure 8 decomposes this increase into real wealth growth and real income growth. We clearly see that the increase in the wealth-income ratio is almost entirely driven by a real increase in wealth; income grew at much slower rates for the entire second half of the 19th century. This striking pattern can best be explained by path-dependency and can be seen as a direct result of the countries past. Starting in the 15th century, the Netherlands – especially its Western regions - were already highly urbanized, with an economy focusing primarily on trade. Unlike most of its neighbouring countries, the most influential class at the time consisted of merchants, the so-called "Regents", and not landowners. Trade allowed the merchant class to accumulate massive amounts of wealth, which they used to consolidate their political power (Wilterdink 2015).

Indeed, much of their wealth was allocated to foreign investment opportunities, facilitated due to Amsterdam's distinctive position as an international trade centre, but also in state obligations. Investing in government bonds linked Regent's private benefits to their public pursuits in a most direct way (Wilterdink 2015; 't Hart, 1997). This political-economic setup allowed for fiscal and financial structures, which further entrenched the beneficiary position of merchants: (i.) the customs rates were low; furthermore, (ii.) taxes were mostly levied on consumption and property rather than trade and direct investments ('t Hart, 1997).

Following the end of The Dutch Golden Age in the 18th century, the Netherlands increasingly started to

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11. See Appendix A.5 for data sources.

Table 2: Decomposition of Real Wealth Growth

| Period	W-I Beginning	W-I End	Wealth growth rate	Savings-induced	Capital gains-induced
1921–2019	3.43	5.64	3.6%	3.5% 97%	0.1% 3%
1921–1938	3.43	5.37	5.5%	2.4% 44%	3.0% 56%
1947–2019	5.34	5.64	3.6%	4.2% 116%	-0.6% -16%
1970–2019	2.72	5.64	3.7%	4.6% 122%	-0.8% -22%
1995–2019	3.23	5.64	4.0%	3.9% 99%	0.1% 1%
1921–1929	3.43	3.85	7.4%	3.3% 46%	3.9% 54%
1930–1938	3.80	5.37	4.3%	1.7% 41%	2.5% 59%
1947–1959	5.34	4.23	4.1%	2.6% 64%	1.4% 36%
1960–1969	4.04	2.81	3.0%	5.0% 161%	-1.9% -61%
1970–1979	2.72	2.87	4.3%	6.7% 151%	-2.3% -51%
1980–1989	2.76	3.48	3.5%	5.6% 154%	-2.0% -54%
1990–1999	3.46	3.44	3.9%	5.3% 133%	-1.3% -33%
2000–2009	3.84	4.57	4.8%	3.6% 75%	1.2% 25%
2010–2019	4.34	5.64	3.8%	4.0% 103%	-0.1% -3%

Figure 8: Real Wealth and Income Growth, 1854–1938
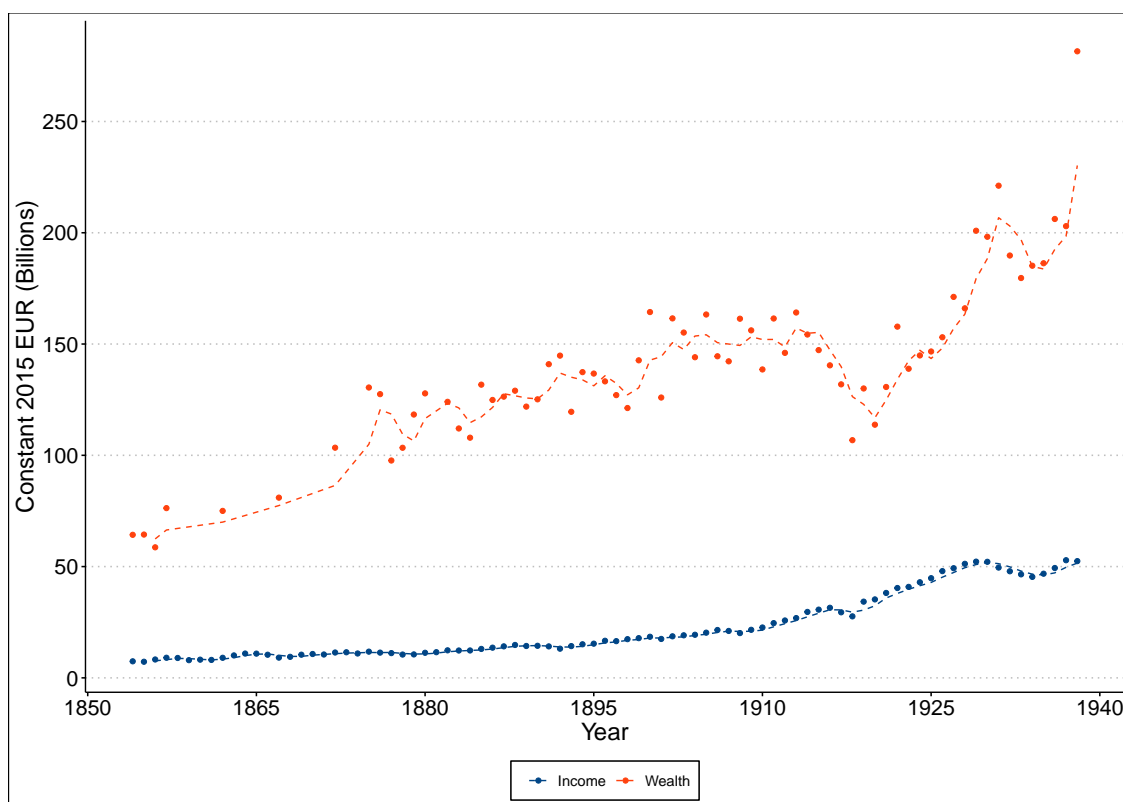
Note: Figure shows the evolution of household wealth and national income, from 1854–1938. Both wealth and income are expressed in constant 2015 EUR.

play second fiddle compared to France and especially Great Britain, which had become the prime mercantile nation, supported by an ever-expanding colonial empire. By then, the initial advantages of the Dutch Republic, most notable its urbanization and its well developed financial and commercial system, would no longer outweigh its inherent disadvantages such as its limited area, population, and relatively fragmented political system. Throughout the 18th century, national income tended to stagnate while national private wealth expanded steadily. These geopolitical developments did not prevent the further development of the city of Amsterdam into one of the leading financial markets of the time. Dutch capital penetrated far into European countries and their colonies (Dehing and 't Hart, 1997).

Figure 9: Detailed Wealth Composition, 1880–1947
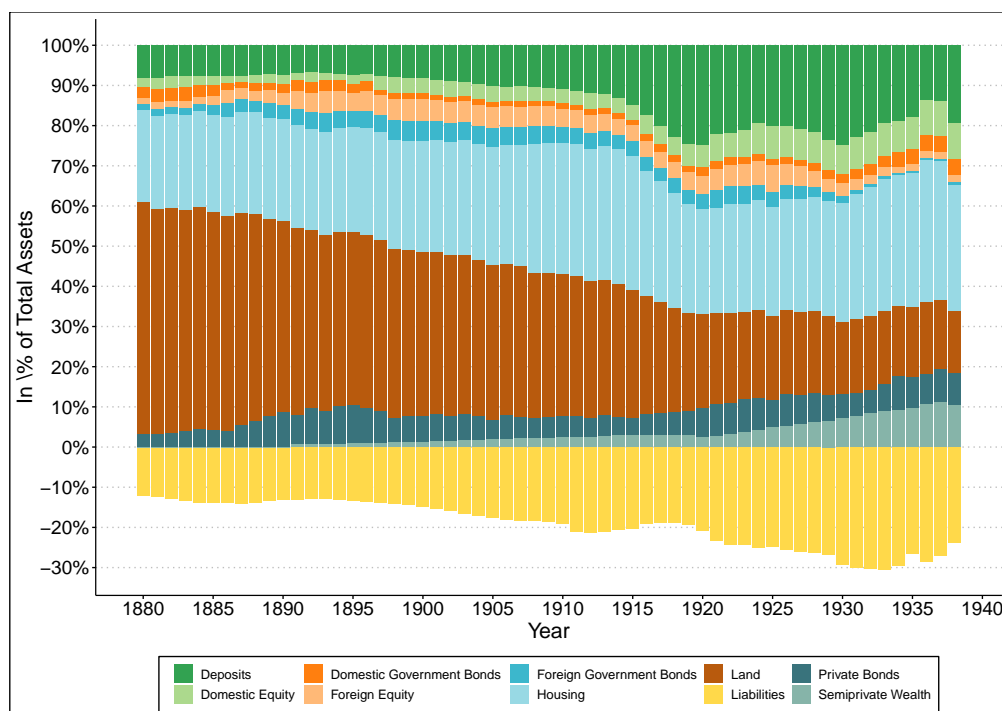
Note: Figure shows a detailed decomposition of household wealth, using historical national accounts data. Movables includes deposits and money.

Due to the enormous reserve of accumulated funds, the Dutch elite managed to safeguard – or even strengthen - their privileges throughout the 19th century. Relying on their strong capital basis, they successfully responded to the geopolitical trends by shifting their business from merchants to bankers, commissioners in bills of exchange, insurers, and stockbrokers. Per these political-economic changes, a further shift was noted from mercantile finance to investments in foreign equity and bonds (Jonker, 1995). This can be seen from the detailed decomposition of household wealth presented in Figure 9. The climate for a thriving capital market remained highly profitable, and private wealth continued to grow faster than national income (Wilterdink 2015).

By the 1860s, the Netherlands started to industrialize, a few decades after its southern neighbour Belgium and most other surrounding countries. The reasons for this comparatively laggard development are still widely debated. So are the reasons why it took off by the middle of the 19th century. Even on the exact timing of the Dutch industrialization, there appears to be no real consensus (van Zanden and van Riel 2004;

Philips 2020).

Sketching the outlines of this debate takes us far beyond the purpose of this article. However, what is of importance here is that the take-off of Dutch industrialization was fully underway by the late 18th and early 19th century. Simply looking at the nearly exponential rate in which the number of joint-stock companies (i.e., in 1850 there were only 137 joint-stock companies, by 1894 this had risen to over 1,700) rose throughout this period is exemplary for this trend.

The industrial expansion of the Dutch economy also allowed for new manners in which to accumulate riches. Consequently, a new class of industrialists joined the ranks of the Dutch elite, while the existing elite managed to preserve their wealth by expanding their mostly foreign investment portfolio with new domestic investment opportunities (Wilterdink 2015). The growing number of wealthy industrialists had a clear impact on the wealth-income ratio, which continued to grow in the decades following the 1860s; reaching an apex of more than 1,100 percent of national income by the dawn of the 20th century.

Like in most countries, the First World War evened the playing-field and led to a sharp decrease in wealth-income ratios. Various political and socio-economic factors converged to cause this outcome. Mass mobilization led to an increase in the demand for labour, lowering the skill premium. Returns of investments fell sharply as international capital markets were interrupted. Physical assets were often destroyed or confiscated to support the ever-increasing war efforts. High marginal tax rates diminished the incomes and wealth of the elite. In capitalist countries, the war was followed by greater government interventions, eventually leading to the formation of the welfare state with active policies to promote greater equality (Scheidel, 2017, 2018 and 2019). From Figure 8, we observe that the drastic decline in the wealth-income ratio in the 1910s is mostly due to a sharp decline in real wealth. Note that the Netherlands was a neutral party in the First World War; nevertheless, the various socio-economic factors mentioned above still mattered enormously.

For the Netherlands in specific, the negative experience of Dutch investors with Russian government bonds following the Russian Revolution of 1917 and the bubble in US railroad stocks led to a significant shift in their asset allocation. Whereas the Dutch elite had traditionally held most of their equity and bonds in foreign businesses and governments, they would now shift their investments to primarily domestic securities.

The decline of its colonial empire further amplified this trend. It was mainly during the Second World War and the decolonization following the armistice that the Netherlands lost much of its colonial proprietorship (Van Zanden, 1997; Barendregt and Visser, 1997). At the end of 1938, the value of these colonial assets was estimated to be over 8 billion guilders. About 4 billion was invested in the Dutch East Indies. At the end of 1950, however, the overall value of these possessions had dropped to 2.8 billion guilders (i.e., slightly above 1 billion in 1938 guilders): a decrease in real value with a factor of eight (Tinbergen, 1948). It is difficult to map the colonial parts of Dutch houehold wealth to the wealth components reported in Figure 9, since the value of many individuals' tax claims – on which our historical national accounts are based – would be significantly influenced by their investments in colonial property, colonial land, and colonial business; nevertheless, the "colonial" parts of, say, real estate, do not show up in historical documents. If we take the estimates of 8 billion guilders by Tinbergen (1948) at face value, this would imply that colonial wealth accounted for about a quarter of all wealth at 1938. Since colonial investments greatly declined in value in the decades prior to 1938 (Wilterdink 2015), it is plausible that colonial wealth mattered even more prior to the 1930s; hence, it is a plausible explanation of the uniquely high wealth-income ratio observed at the end of the 19th century, together with the aforementioned path-dependency from the Dutch Republic.

6.2 1947–2019

After World War 2, a large expansion of domestic investments contributed to the continuous growth of the Dutch economy, characterized by an average annual increase of nearly 3 to 4 percent in national income in the 1950s and 1960s. This is seen in Figure 10, which shows real wealth and income growth from 1947 until 1980. Comparing the increase of national income across this period to the nominal growth in wealth of the upper classes, it becomes apparent that the growth of the wealth has lagged considerably behind. Further contributing to this trend was the noteworthy shift from private wealth to so-called semi-private wealth detailed earlier (Wilterdink, 2015). Because of all these reinforcing factors, the Netherlands experienced its equivalent of The Great Compression (Goldin and Margo, 1992). Between the 1950s and the 1970s, the wealth-income ratio dropped to unprecedented levels, with an all-time low of approximately 200 percent in the early 1970s.

Figure 10: Real Wealth and Income Growth, 1947–1980
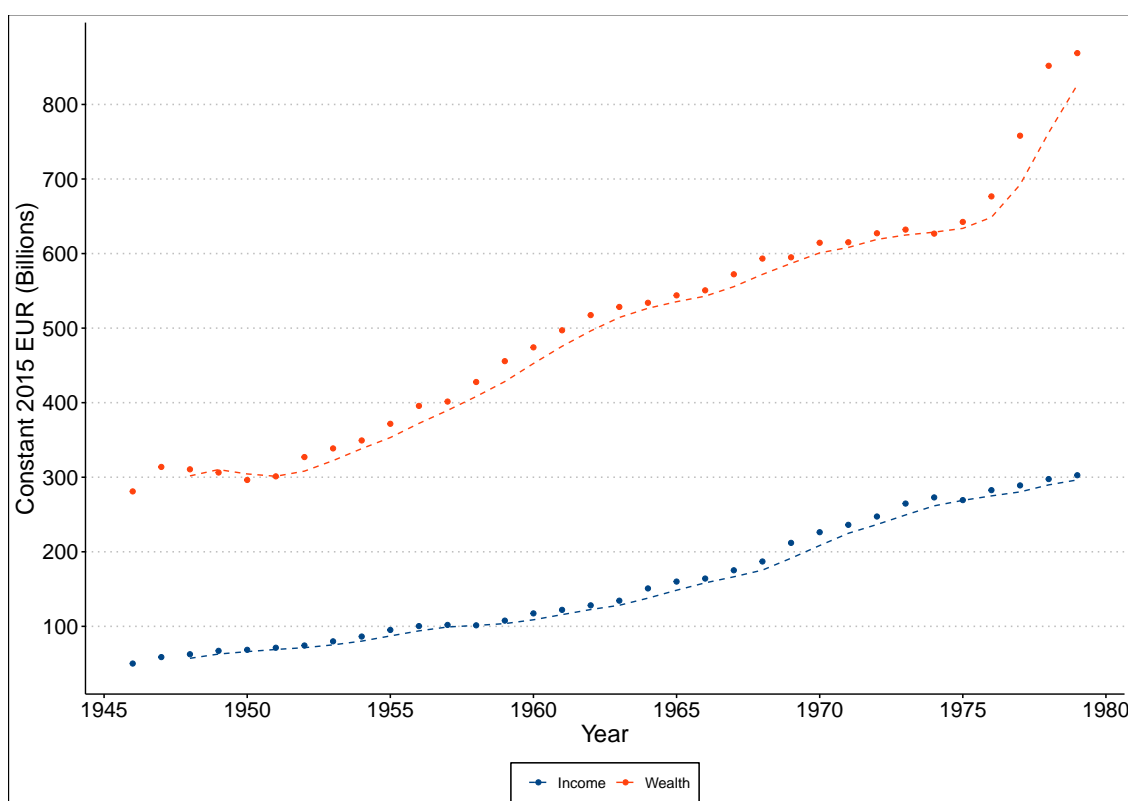
Note: Figure shows the evolution of household wealth and national income, from 1947–1980. Both wealth and income are expressed in constant 2015 EUR.

While the effects of the World Wars as the great levellers lingered for several decades, things started to change by the 1980s (Scheidel, 2017). This is clearly seen in Figure 11, where we observe that real wealth skyrockets, whereas real income grows at much slower rates and even seems to stagnate since the beginning of the 21st century. More so than for other periods, the factors explaining the rapidly increasing wealth-income ratio in the most recent decades in the Netherlands do not differ much from those identified for other countries (Piketty and Zucman, 2014). These factors range from economic to social and political and include, first and foremost, the growing levels of globalization. The impact of these developments on
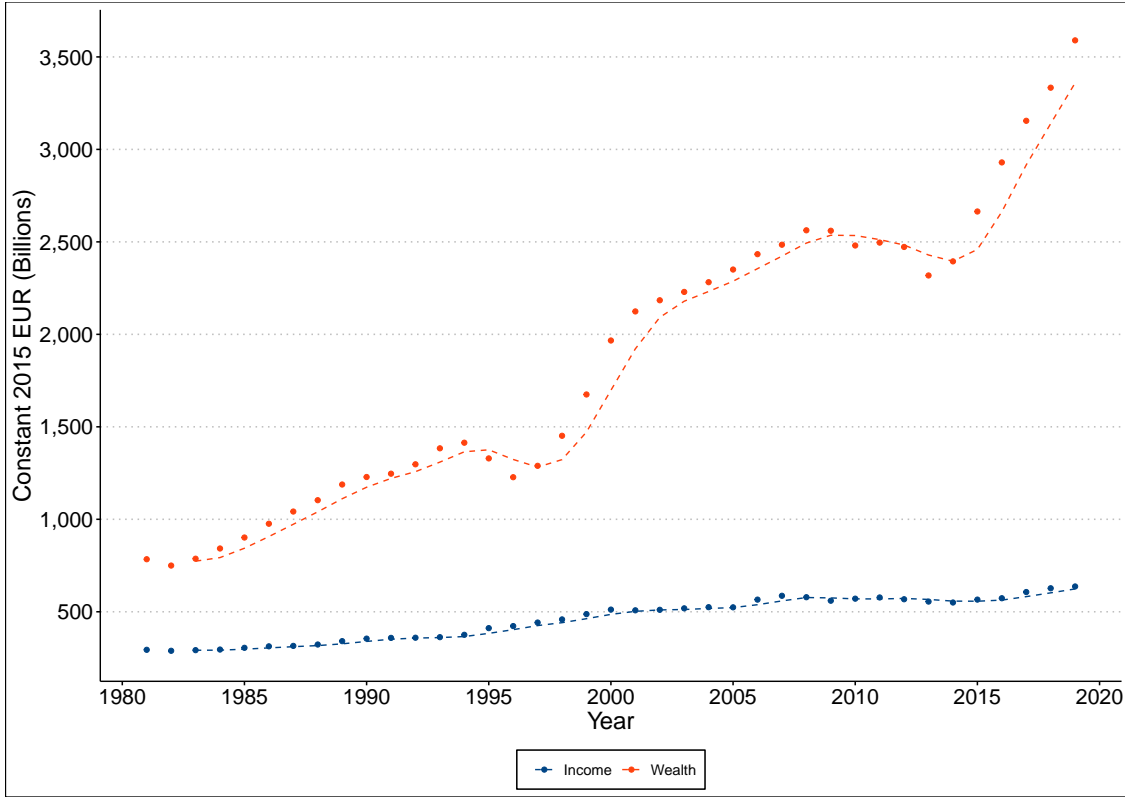
Figure 11: Real Wealth and Income Growth, 1980–2019

Note: Figure shows the evolution of household wealth and national income, from 1980–2019. Both wealth and income are expressed in constant 2015 EUR.

technology, information, trade and investments are legion. Just as it has in the past, technology made high-skilled workers even more valuable and led to a higher skill premium. It also contributed to a shift in the balance between labour vis-à-vis capital, entrenching the position of the owners of capital, such as entrepreneurs, and weakening the position of their employees. These effects are further reinforced by the changing role of the state, with a general trend towards policies that have a less redistributive effect, or toward political ideologies that encouraged deunionisation and privatization. Other trends such as the increasing financialization, and a move to reduce regulation, have also amplified growing inequalities. The two-pronged economic crises in 2007-2008 and 2010-2011 and the recent worldwide pandemic have seemingly only reinforced these tendencies.

7 Conclusion

Following the seminal work by Piketty and Zucman (2014), this study analysed the historical development of aggregate wealth-income ratios for the Netherlands from 1854 until 2019; a country that was notably missing in their analysis. In addition, we decompose total private wealth into various components, tracking the relative value of financial and non-financial asset categories for 140 years (from 1880 until 2019). Finally, we track top wealth shares from 1894 onward.

The main empirical contribution of this paper is to expand the existing evidence on long-term wealth

dynamics for large, at times closed, economies with evidence on a small and very open economy. This addition was made possible by making use of three distinct methodologies, exploiting the rich availability of data sources: (i) historical national accounts; (ii) estate multiplier methods; (iii) lognormal extrapolation from wealth tax data. Combining all three methods allowed us to estimate and refine the results. Hence, besides our empirical contribution, we also provide methodological insights that other researchers can draw on when constructing their own historical wealth series.

Methodologically, we find that historical balance sheets and the estate multiplier produce remarkably similar results, particularly for the 19th century and early 20th century. Hence, the estate multiplier is likely to be a reasonable method to employ in settings where the data to reconstruct historical balance sheets are unavailable. The wealth tax extrapolation method performs less satisfactorily, and is sensitive to the information content of the wealth tax returns. However, even these figures produce figures within the same order of magnitude as the other two once pension wealth is manually added to this series.

By placing our findings in an international perspective, we argue somewhat provocatively that the Netherlands can be defined as the land of the extremes, characterised by a period of notable wealth equality as well as periods of extreme wealth inequality. While the private wealth-income ratio in the Netherlands followed the familiar U-shaped pattern observed in earlier studies, the highs and low were more outspoken compared to other countries for which such long-term evidence is available. In comparison with other industrialised countries, the Netherlands, experienced periods with the highest as well as the lowest private wealth-income ratio: from a ratio in excess of 1,000% at the turn of the 20th century, to a ratio as low as 200% in the 1970s. Likewise, the top 1% share of household wealth peaked at about 55% in the early 20th century, which was followed by a precipitous decline to about 15% in the 1980s and a subsequent increase to about 30% by the early 2010s.

Our findings can inform policymakers about the level of wealth concentration, by placing recent figures in a historical perspective. Moreover, our decompositions of aggregate wealth highlight the important institutional determinants of household portfolio choice. Policy choices since the 1980s aimed at stimulating homeownership, like the mortgage interest deduction, are likely to have contributed to the rise in mortgage debt and housing prices; likewise, the tax-exempt treatment of pension wealth will have contributed to its rise to dominance. These results show the importance of careful policy design to stimulate household private saving while also not encouraging a reliance on debt. Policy choices on the composition and distribution of household wealth also matter for macroeconomic stability, the level of the interest rate, and other key macroeconomic variables, and therefore the findings presented here are relevant regardless of preferences for redistribution.

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A Data and Sources

A.1 Historical National Accounts

A.1.1 1880 − 1938

A.1.2 1947–1969

We have balance sheets for the years 1946–1952, available in the National Accounts of 1954, which we show in Figure . These balance sheets also show the single estimate for 1938, which we use to calibrate our manual reconstruction of the national accounts from 1880–1938, detailed in the previous section. These balance sheets, although they do not decompose total wealth into components, do include estimates for total household wealth.

After 1952, the National Accounts no longer feature balance sheets regularly. Two exceptions exist: For 1958, we have a breakdown of national wealth, from which we can subtract the value of government assets to arrive at private wealth; and 1960, where the total size of national wealth is mentioned. We assume that government wealth is the same proportion of national wealth in 1960 as in 1958, and subtract this estimated government wealth to arrive at household wealth for 1960. In sum, we have estimates from National Accounts for household wealth for 1946–1952, 1958, and 1960. As discussed in the main text and in the next section, we also have estimates of balance sheets from 1970 onward. We then interpolate all missing years using the multiplicative decomposition (1), where we residually estimate an average capital gains rate q such that the known endpoints (1958, 1960, and 1970, respectively) are reached. We define private savings as the sum of household, corporation, and financial institution saving. After having estimated the endpoints of each year using this method, we average W_{t-1} and W_t to reach middle-of-year estimates, as is consistent with DINA practice. This means that we have to disregard the data point for 1946, as its value is subsumed in the averaged value for 1947.

A.1.3 1970–1994

The main source for our balance sheets are the balance sheets constructed by the CPB Netherlands Bureau of Economics Analysis, which they published as an appendix to their 2013 *Macro Economische Verkenningen* (Macroeconomic Explorations, MEV). These balance sheets include financial assets, deposits, housing, other real estate, business wealth, and pension claims. We verify that all estimates of these wealth components correspond closely with estimates from other sources, such as various series by Statistics Netherlands and De Nederlandsche Bank. Figure A.2 compares the growth of deposits with sources from Statistics Netherlands; Figure A.3 does the same for liabilities; Figure A.4 does the same for pension claims. All Figures mentioned so far match very closely with National Accounts totals. Stocks and bonds are a bit noisier, but the results are still very comparable.

We compare housing assets in the CPB data to the following capitalization approach: We define housing assets in year t, HW_t, as the product of the average housing price P_t, the housing stock HS_t and the share of owner-occupied housing DS_t. The average housing price is equal to

$$P_t = \mathrm{PI}_t \cdot \left(\frac{\mathrm{HW}_{2011}}{\mathrm{HS}_{2011}} \cdot \frac{1}{\mathrm{DS}_{2011}} \right), \tag{2}$$

where PI_t is a price index equalling 1 in 2011 and the expression in brackets is the average house price in

Figure A.1: Household Wealth Estimates in National Accounts, 1938 and 1946–1952

96

P.   NATIONALE REKENINGEN
159.   Nationale Balans, 31 December [1])

	1938	1946	1947	1948	1949	1950	1951	1952
	× mld gld.							
Activa								
Bedrijven en banken:								
Kapitaalgoederen	20,5	44,9	48,3	52,3	57,6	62,8	77,9	78,6
Buitenland:								
Buitenlands saldo	8,5	8,1	5,9	5,5	4,2	4,8	6,6	8,9
Nationaal vermogen	29,0	53,0	54,2	57,8	61,8	67,6	84,5	87,5
	× mld gld.							
Passiva								
Verzekeringsfondsen:								
Potentiëel privaatvermogen .	3,5	6,1	6,5	7,0	7,6	8,3	9,1	10,0
Verbruikers:								
Particulier vermogen	29,9	63,7	65,2	66,9	71,6	74,6	88,3	88,6
Overheid:								
Overheidsvermogen [2])	− 4,4	− 16,8	− 17,5	− 16,1	− 17,4	− 15,3	− 12,9	− 11,1
Nationaal vermogen	29,0	53,0	54,2	57,8	61,8	67,6	84,5	87,5

[1]) Zie voor toelichting „Statistische en econometrische onderzoekingen" jrg. 9, no. 1 en de daarin genoemde publicaties.   [2]) Deze negatieve bedragen representeren het verschil tussen activa en passiva van de Overheid.

160.   Nationaal vermogen per 31 December [1])

	1938	1946	1947	1948	1949	1950	1951	1952
	× mld gld.							
Grond	4,6	11,0	11,5	12,0	12,7	13,5	16,0	16,1
Voorraden	2,6	0,7	1,4	2,1	2,8	4,5	6,8	5,5
Overige kapitaalgoederen	13,3	33,2	35,4	38,2	42,1	44,8	55,1	57,0
Buitenlands saldo	8,5	8,1	5,9	5,5	4,2	4,8	6,6	8,9
Nationaal vermogen	29,0	53,0	54,2	57,8	61,8	67,6	84,5	87,5

[1]) Zie noot 1 bij tabel 159.

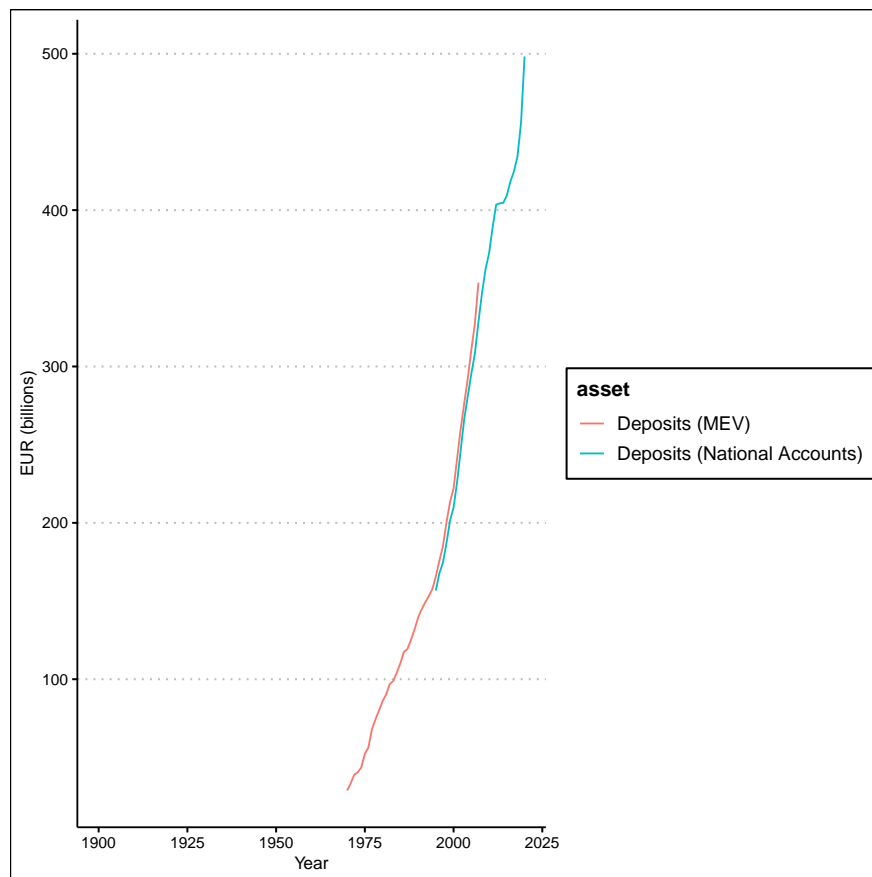Figure A.2: Deposits, MEV balance sheet and National Accounts

Figure A.3: Liabilities, MEV balance sheet and National Accounts
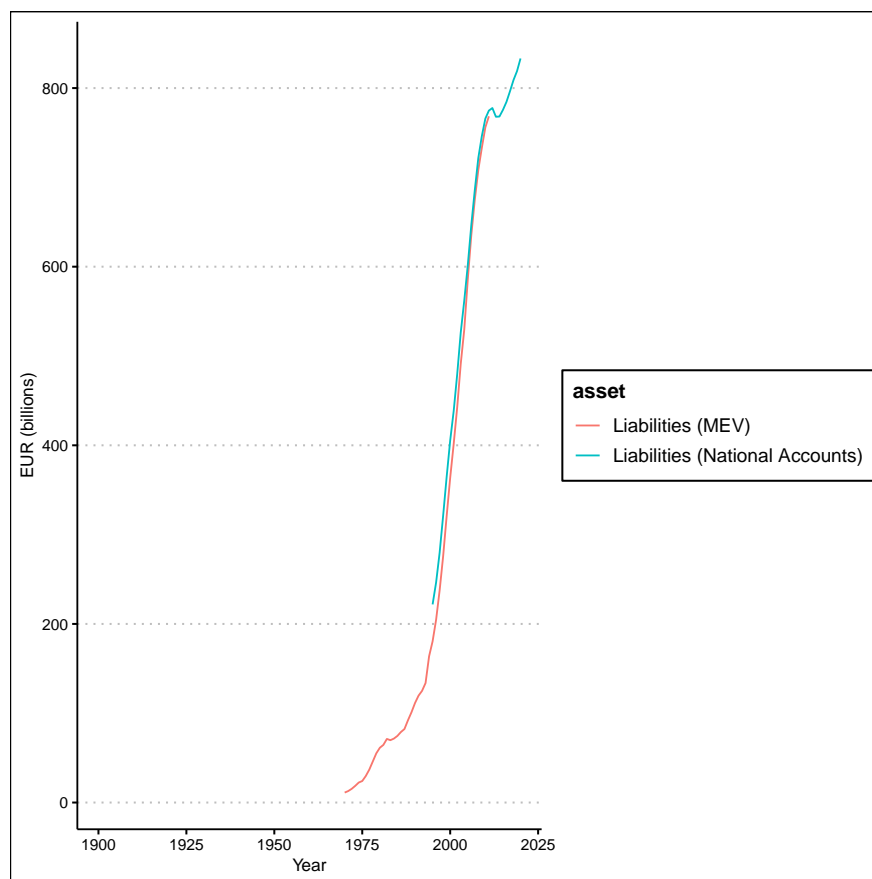
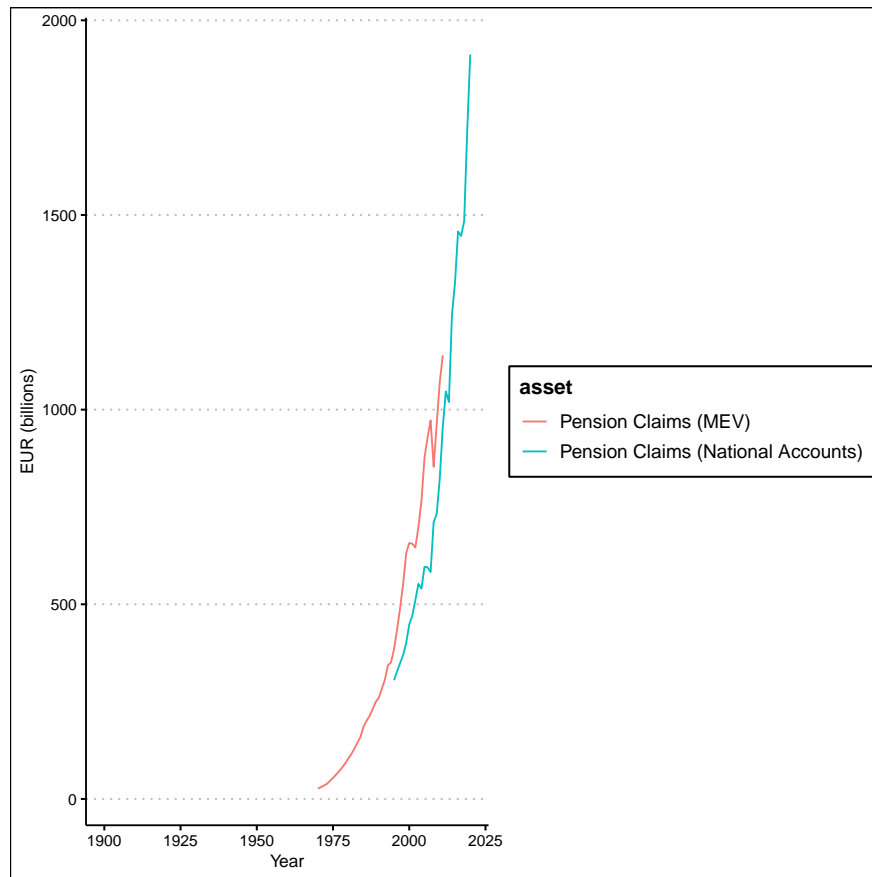Figure A.4: Pension claims, MEV balance sheet and National Accounts

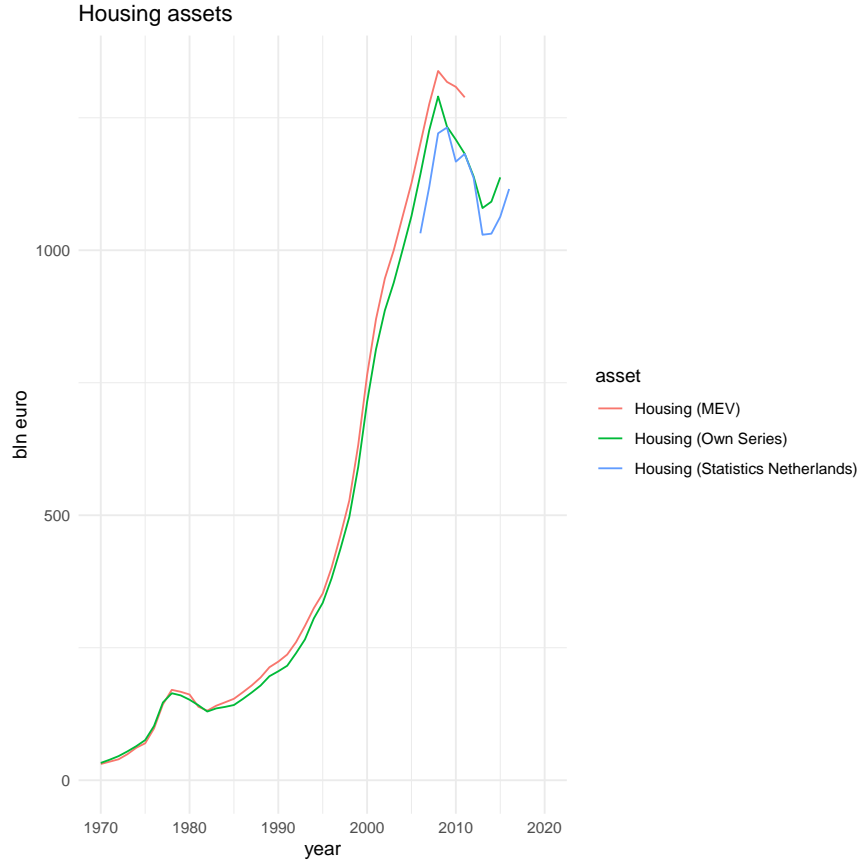Figure A.5: Housing, MEV balance sheet and own estimates

Housing assets

2011. Data on the housing stock comes from Statistics Netherlands, the share of owner occupied housing from Haffner, Hoekstra, Oxley, and van der Heijden (2009), and the housing price index from Jordà, Schularick, and Taylor (2017) and Jordà et al. (2019). The value of housing assets in 2011 is taken from Statistics Netherlands. Figure A.5 shows that these two series are very comparable.

The largest difficulty with the 1970–1994 balance sheets lies in life insurance, which is not included in the MEV balance sheets. There are three sources: Long-run data from DNB on life insurers' technical reserves, data from Statistics Netherlands on life insurers' technical reserves, and the data from the National Accounts. The first source is the only one available for the entire period, but is also one that diverges widely from the other two (see Fig. A.6a). Hence, we opt for the following approach: For 1970–1974, we adjust the DNB series such that it merges perfectly with the Statistics Netherlands series in 1975, which we use until 1994. This adjustment is depicted in Figure A.6b. This adjustment ensures that the life insurance series do not counterfactually exceed the values reported by Statistics Netherlands or the National Accounts, which ensures consistency.

A.1.4   1995–2019

We use the balance sheet for the household sector published in the System of National Accounts by Statistics Netherlands, in the 2015 SNA vintage. As explained in the main text, we average beginning-of-year and end-of-year values. Balance sheets excluding non-profits serving the household sector are only available from

Figure A.6: Life insurance, unadjusted and adjusted values
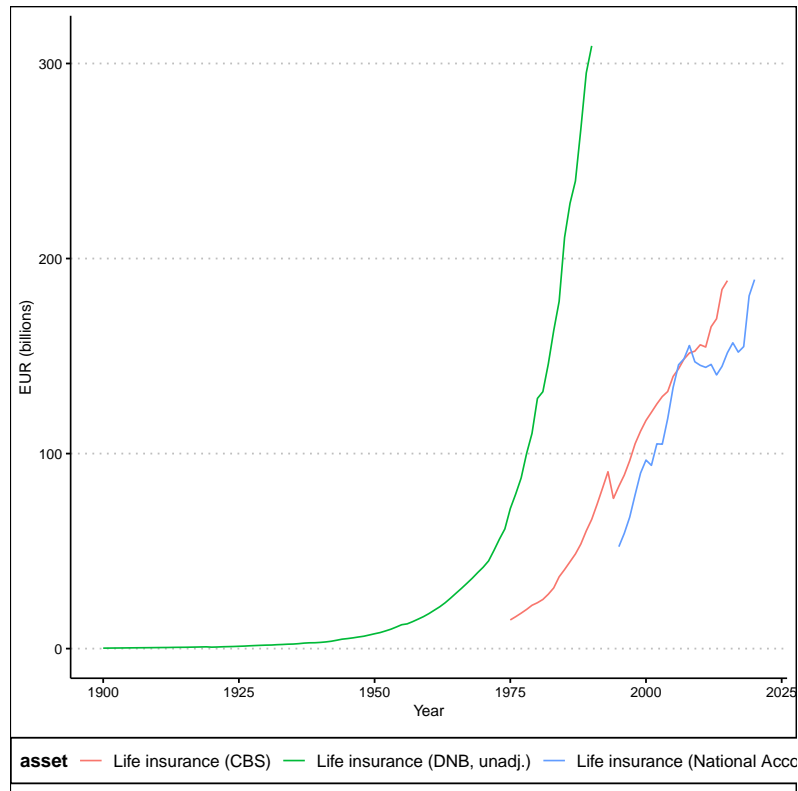
(a) Life insurance, unadjusted
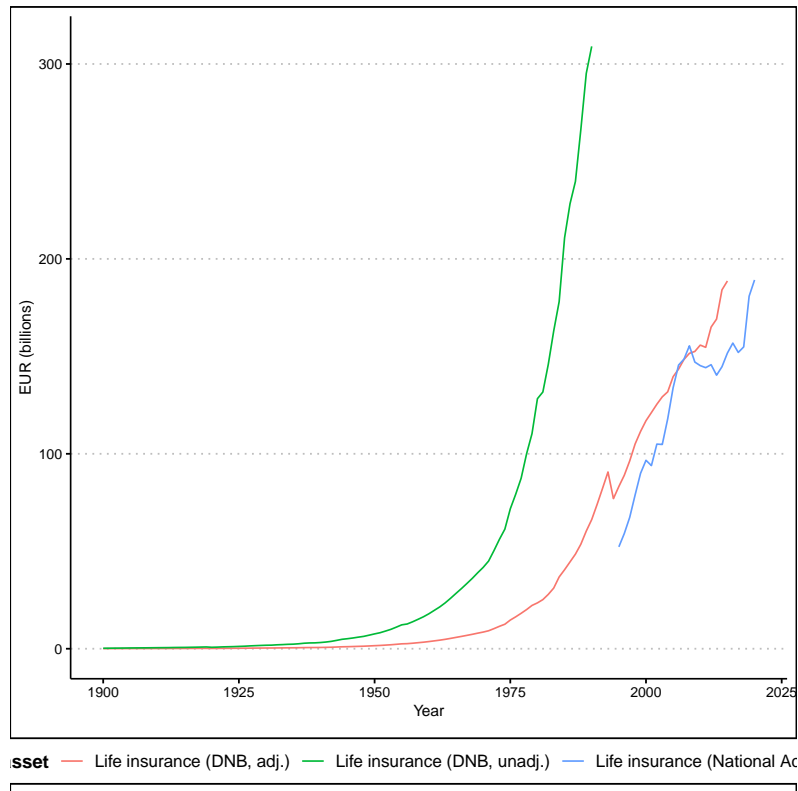
(b) Life insurance, adjusted

2011; for consistency, we work with the series that includes nonprofits throughout this period[12].

A.2 Estate Multiplier Methods

Table A.1: Exemptions for the succession tax in the Netherlands since 1818

Period	Direct accession line	Indirect accession line
<1878	Exempt	Exempt when below 300 guilders
1878–1896	Exempt when below 1,000 guilders	Exempt when below 300 guilders
1897–1910	Exempt when below 1,500 guilders	Exempt when below 500 guilders
>1911	Exempt when below 1,000 guilders	Exempt when below 300 guilders

Note: Table shows the exemptions that applied to the inheritance tax in various years. 'Direct accession line' refers to direct family of the decedent; 'indirect accession line' refers to other family.

If after a formal application by the successors of the estates, it was found that the estate's net worth was likely higher than the appropriate threshold, then a detailed evaluation called "Memorie van Successie" was drawn up. The net worth of those estates – along with the all other deceased individuals with net worth lower than the threshold – were listed alphabetically in Tafel V-bis, which functioned as an annual ledger for the more detailed "Memorie van Successie". To ensure a high tax morale the authorities maintained "[p]enalties for fraud and evasion were about twice the due tax plus any costs" (Gelderblom, Jonker, Peeters, and de Vicq (2021)). Several crosschecks where in the disposal of the tax inspectors. The actual value of the estate's land, deposits, and other investments where relatively easy to be verified. In contrast, various types of debt where significantly more difficult to validate (Gelderblom, Jonker, Peeters, and de Vicq (2021)).

Table A.2: Succession tax data thresholds for different periods (for 1900-1910 the data are available in two publications with different brackets/threshold).

Period	# Brackets	Thresholds
1882–1910	20	300; 500; 1,000; 1,500; 2,000; 3,000; 5,000; 7,500; 10,000; 15,000; 20,000; 25,000; 30,000; 40,000; 50,000; 75,000; 100,000; 150,000; 200,000; 300,000; 500,000; >500,000
1900–1955	8	100; 1,000; 2,000; 5,000; 10,000; 25,000; 50,000; 200,000; >200,000
1956–1984	10 (12)	(<0; 0;) 100; 1,000; 2,000; 5,000; 10,000; 25,000; 50,000; 100,000; 200,000; 500,000; >500,000

Given the availability of detailed wealth and age data on the individual level for 1921 from Gelderblom, Jonker, Peeters, and de Vicq 2021, we will use them to estimate the aggregate multiplier. Our problem, however, is that for 1921, although we have the population that died at various wealth and age groupings, we do not know what is the corresponding size of each of those groupings in the general population. E.g. we do know that in 1921, there are say 1080 50-60 years olds with wealth more than 10K who died, but we do not know in 1920 how many were the living 50-60 years old with wealth more than 10K. Therefore, we do not have a proper denominator to estimate the mortality rates for each group. To address that we work as follows: we have the wealth tax data from 1920 (which is the reference year for the death rates of 1921). We have the tax wealth data from the entire population, but in wealth buckets, and we have no information

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12. Since the non-profit balance sheet is tiny compared to the household sector, this is unlikely to significantly affect our results.

with respect to their age. We, therefore, combine that information with the 1921 data in the following way: for each of the wealth bucket we can get the age distribution from the 1921 data. Doing so for all buckets we get the age wealth distribution for 1920, which is the denominator for the 1921 death rates. We re-structure the 1921 data to get an estimate of the 1920 age structure of the wealth tax data and we also re-structure the 1920 buckets when there aren't enough individuals in (like the >10 million guilders bucket). The next problem is that the mortality rate we estimate in this manner is fixed across the board. We need the ratio of mortality of a synthetic population drawn from the general population to be used as a correction factor for the rich over the mortality rates of the general population. Since we can only estimate the average mortality rate of the rich, we will also need to estimate the average mortality rate of the non-rich and which would correspond to column 3 in Table 19 in Lampman (1962), and we use that ratio in the inverse manner from Lampman; that is to go from the general population to the adjusted mortality rates by a linear shift. So, the corresponding population would have the same overall size as the rich, and the same mix of population groups as in the rich. To do that we get the population from the rich and divide each group with the mortality rate of that group from the entire population. Finally, we take the ratio of the total to the initial population.

A.3   Wealth Tax

We use the tabulated figures produced in *Jaarcijfers voor Nederland*, which became its English equivalent *Statistical Yearbook* in the 1970s and which provide values from 1894–1993. The following Table A.3 reports the structure of brackets over the years.

Table A.3: Wealth tax data thresholds for different periods.

Period	# Brackets	Thresholds (in 1,000 NLG)
1894–1914	18	13; 15; 20; 30; 40; 50; 75; 100; 150; 200; 300; 500; 750; 1,000; 1,500; 2,000; 5,000; 10,000; >10,000
1915–1924	17	15; 20; 30; 40; 50; 75; 100; 150; 200; 300; 500; 750; 1,000; 1,500; 2,000; 5,000; 10,000; >10,000
1925–1941	9	16; 30; 50; 100; 200; 300; 500; 1,000; >1,000
1942–1956	11	<10; 10; 15; 20; 30; 50; 100; 200; 300; 500; 1,000; >1,000
1957–1969	7	<50; 100; 200; 300; 500; 1,000; >1,000
1970–1973	16	100; 150; 200; 300; 400; 500; 600; 700; 800; 900; 1,000; 1,500; 2,000; 3,000; 5,000; 10,000; >10,000
1974–1975	10	100; 150; 200; 300; 500; 1,000; 1,500; 2,000; 5,000; 10,000; >10,000
1976–1982	6	100; 150; 200; 300; 500; 1,000; >1,000
1983–1993	6	200; 300; 400; 500; 750; 1,000; >1,000

The method applied by Wilterdink (1984) and developed by Potharst (2022) uses information on the thresholds of each wealth bracket to estimate a lognormal distribution. Essentially, the method estimates the overall mean μ and variance σ^2 by minimizing the squared distance between the observed percentile-bracket average pairs of each bracket, and the theoretical lognormal distribution. Once we have an estimated mean and variance, we can integrate over the density to arrive at an estimate of total wealth. We refer the reader to Potharst (2022) for further details.

A.4 Wealth Decomposition

Figure 4 relies on the sames sources used for the Historical National Accounts, which are all detailed in Appendix A.1. For the period 1947–1969, we can take two approaches. One approach, which we use in the main text, is to use the series that are shown to be very comparable to the 1970–1994 balance sheets for the 1947–1969 years. Specifically, we use pension wealth, adjusted life insurance wealth, and real estate wealth estimated using equation 2. To these sources, we add data on deposits and liabilities from Statistics Netherlands. The only wealth component that is missing is financial capital, broadly defined. Since we have total wealth estimated using the interpolations, we derive this wealth component as residual.

The other approach uses wealth tax breakdowns, which are available for specific years between 1950 and 1960. These breakdowns show the relative shares of all wealth components except semi-private wealth (pensions and life insurance). The total wealth reported on these wealth tax records does not come close to our estimates. Hence, for this alternative method we subtract semiprivate wealth from our estimated total wealth, to arrive at "taxable total wealth". Then, we scale up each wealth component using the shares reported in the wealth tax statistics. Adding semiprivate wealth again, we arrive at Figure A.7. Years in between the years for which we have breakdowns are linearly interpolated.
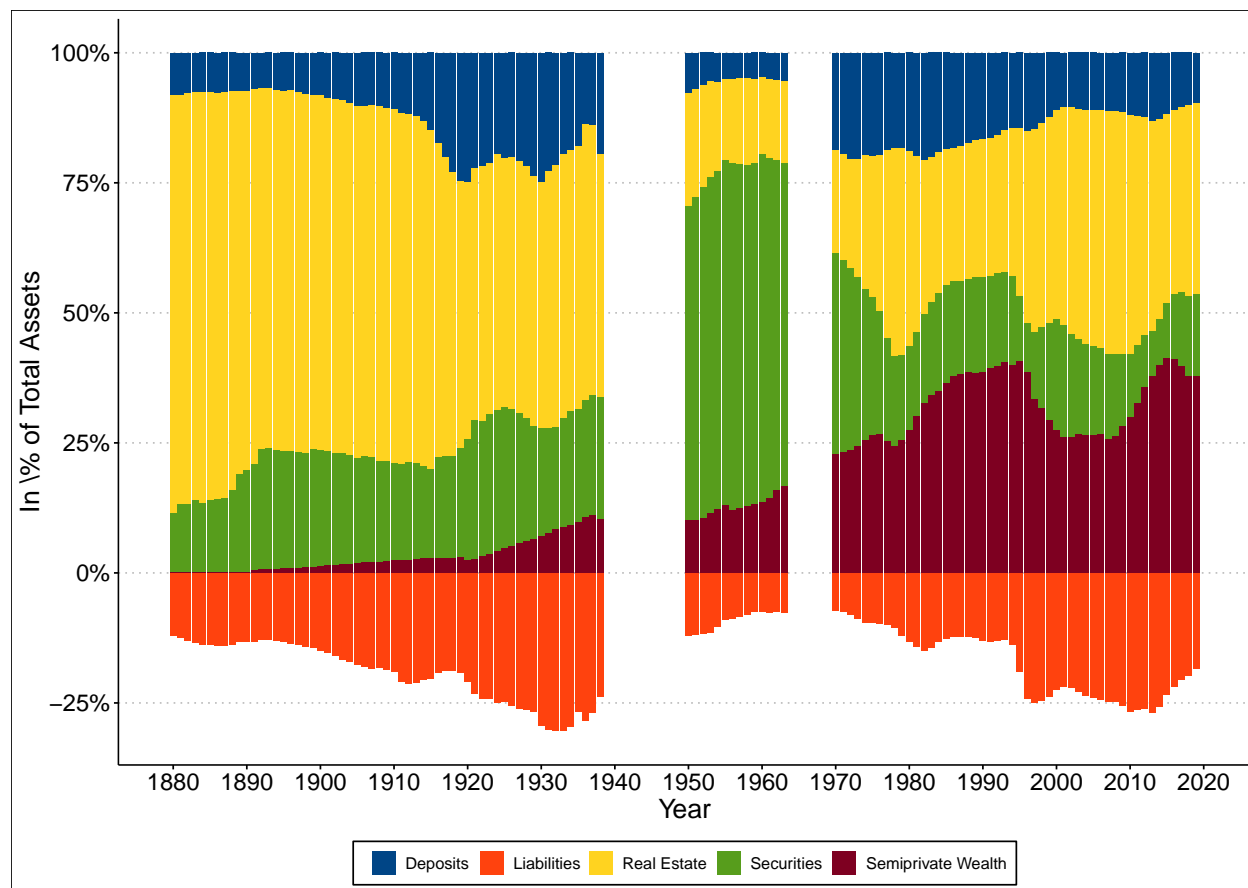
Figure A.7: Wealth Composition, 1880–2019 using wealth tax statistics for 1950–1963

A.5 Additional Data Sources

Income: We measure net disposable national income at market prices. Data are from Statistics Netherlands, *200 Jaar in Tijdreeksen.*

Savings: For 1921–1939, we have data on savings from Den Bakker (2021). From 1947 onward, we use savings rates reported by the National Accounts. We define private savings as the sum of household, corporate and financial institution savings.

B Additional Figures and Tables

Table B.4: Comparisons with Historical Estimates of Household Wealth

Year	HNA	Estate	Wealth Tax	Historical	Source
1854-1857				5,723	Stuart, Ons Maatschappelijk Vermogen, 1888
1855				3,800	Verstegen, National Wealth and Income
1865				5,150	Verstegen, National Wealth and Income
1872				5,260	*Ons Nationaal Vermogen, 1875*
1875 - 1877				3,021	Gleichman, Memorie van Toelichting, 1879
1879				11,166	Vissering, Memorie van Toelichting, 1879
1880	8,208			10,280	Boissevain, De Omvang, 1883
1879-1883	8,283			9,822	Boissevain, De Omvang, 1884
1879-1882	8,208			8,397	Fabricant & Maarschalk, International capital, 1952
1879-1882	8,208			8,262	Van Zanden, Income and wealth inequality, 1995
1879-1882	8,208			8,702	Verstegen, National Wealth and Income, 1996
1888-1890	8,551			11,902	Boissevain, De Omvang, 1891
1879-1882	8,208			11,318	Stuart, Ons Maatschappelijk Vermogen, 1888
1883-1886	8,284			10,992	Stuart, Ons Maatschappelijk Vermogen, 1888
1908-1912	11,407			12,120	Derksen, Berekening van het nationaal vermogen, 1934
1908-1912	11,407			11,558	Fabricant & Maarschalk, International capital, 1952
1908-1912	11,407			11,240	Van Zanden, Income and wealth inequality, 1995
1908-1912	11,407			12,860	Verstegen, National Wealth and Income, 1996
1915	12,369			7,453	Bonger, Vermogen en Inkomen, 1923
1916	13,919			7,995	Bonger, Vermogen en Inkomen, 1923
1917	14,873			9,058	Bonger, Vermogen en Inkomen, 1923
1918	15,839			11,602	Bonger, Vermogen en Inkomen, 1923
1919	17,147			12,711	Bonger, Vermogen en Inkomen, 1923
1920	18,407			13,855	Bonger, Vermogen en Inkomen, 1923
1927	21,288			14,073	Subcommisie, 1927

Note: All values in millions of nominal NLG. Columns 2–4 give our estimates, respectively using Historical National Accounts, the Estate Tax multiplier, and the Wealth Tax extrapolation. Column 5 notes historical estimates, and column 6 gives their source. For historical estimates that cover a range, we use our midpoint estimate for that year (e.g., the year 1881 for 1879–1883).

Table B.5: Additive Decomposition of Real Wealth Growth, Various Periods

Period	W-I Beginning	W-I End	Initial Wealth Effect	Savings-induced	Capital gains-induced
1921–2019	3.43	5.64	343%	574%	-352.72%
			61%	102%	-63%
1921–1938	3.43	5.37	343%	137%	56.86%
			64%	26%	11%
1947–2019	5.34	5.64	534%	562%	-532.98%
			95%	100%	-95%
1970–2019	2.72	5.64	272%	506%	-213.50%
			48%	90%	-38%
1921–1929	3.43	3.85	343%	82%	-40.07%
			89%	21%	-10%
1930–1938	3.80	5.37	380%	55%	101.25%
			71%	10%	19%
1947–1959	5.34	4.23	534%	109%	-220.21%
			126%	26%	-52%
1960–1969	4.04	2.81	404%	116%	-238.94%
			144%	41%	-85%
1970–1979	2.72	2.87	272%	134%	-118.43%
			95%	47%	-41%
1980–1989	2.76	3.48	276%	135%	-62.89%
			79%	39%	-18%
1990–1999	3.46	3.44	346%	180%	-182.39%
			101%	52%	-53%
2000–2009	3.84	4.57	384%	133%	-59.88%
			84%	29%	-13%
2010–2019	4.34	5.64	434%	152%	-23.29%
			77%	27%	-4%