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Keywords: income distribution, relative income hypothesis, household debt, financial innovation, great depression

JEL Classification System: D31, D33, E21, E25, N12, N22, N32, N62

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There is a growing literature comparing the current financial crisis or *Great Recession* to the worst economic crisis of capitalism, the *Great Depression*. However, the role of rising income inequality, which has risen dramatically before both crises, is rarely discussed. In this paper we discuss the rise of top-end inequality and its effects on household consumption, saving, and debt for the 1920s by applying a non-standard theory of consumption, the relative income hypothesis, to the period of interest. We argue that income inequality is linked to the increase of household consumption and the simultaneous decline of household savings as well as rapidly increasing household debt. Thus, the rise of top-end inequality in connection with a broader institutional change, such as the deregulation of financial markets, has contributed to a build-up of financial and macroeconomic instability, in the period leading to the Great Depression.

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1 Introduction

“OF THE TENDENCIES THAT ARE HARMFUL TO SOUND ECONOMICS, THE MOST SEDUCTIVE, AND IN MY OPINION THE MOST POISONOUS, IS TO FOCUS ON QUESTIONS OF DISTRIBUTION.”(ROBERT E. LUCAS JR., 2004)

The view that income distribution may affect aggregate demand as well as macroeconomic stability, has received renewed interest by economists (e.g. Rajan 2010, Reich 2010 or Atkinson and Morelli 2011 and van Treeck and Storn 2012 for surveys on the topic). Rajan (2010) famously argued that income inequality can be identified as one underlying cause of the current financial and economic crisis. The political response, Rajan argues, “(...) was to expand lending to households, especially low-income ones. The benefits - growing consumption and more jobs - were immediate, whereas paying the inevitable bill could be postponed into the future. Cynical as it may seem, easy credit has been used as a palliative throughout history by governments that are unable to address the deeper anxieties of the middle class directly. (...) But when easy money pushed by a deep-pocketed government comes into contact with the profit motive of a sophisticated, competitive, and amoral financial sector, a deep fault line develops.”(Rajan, 2010, p. 9).

Turning to the Great Depression period, Galbraith (2009), for instance, described five fundamental weaknesses of the economic and financial system at that time and mentions the "bad distribution of income" as the first of all factors that contributed to the Great Depression. In a similar way, Marriner S. Eccles, the former chairman of the Federal Reserve Bank, wrote that “as in a poker game where the chips were concentrated in fewer and fewer hands, the other fellows could stay in the game only by borrowing. When their credit ran out, the game stopped ”(Eccles, 1951, p. 76).

Despite this anecdotal evidence, the mainstream of the economics profession exclusively studied either the onset of the Great Depression or the impact of economic policy on the recovery after 1933.¹ However, the influence of rising income inequality on household con-

¹See Cole and Ohanian (1999, 2000, 2004); Cole et al. (2005) for a standard neoclassical account, Friedman and Schwartz (1963) for a monetarist approach, Eggertson (2008, 2011), Romer (1993, 1992, 1990) as well as Bernanke (2000) for the New Keynesian school. Temin (1994, 1976*b*, 1989) as well as Kindleberger (1986) and Kindleberger and Aliber (2005) provide excellent accounts of the Great Depression and the international aspects. Temin (1976*a*) criticizes the monetarist approach where policy mistakes of the central bank caused the Depression of the 1930s.

sumption behavior in the 1920s has never been studied. This may be due to the standard representative-agent model, which rules out any effect of rising inequality on other households' consumption. Post-Keynesian economists such as Kaldor (1966) and Kalecki (1954), on the other hand, have long studied the effects of rising income inequality (although exclusively the functional income distribution) on aggregate demand and growth but never applied their abstract theory to the Great Depression era. In its essence, the argument of Keynes (1936) was that an upward redistribution of income or a decline in labor's share of total income has a dampening effect on aggregate consumption due to a higher propensity to save of higher income groups. This view continues to be the conventional wisdom among Post-Keynesian economists, although some authors have recently incorporated inter-household income distribution into theoretical models (e.g. Kapeller and Schütz 2012, 2014, Palley 2010, or Belabed et al. 2013). Obviously, this expected decline in consumption did not materialize in the U.S. as there was a consumption boom accompanied by a housing boom and a stock market boom during the 1920s. The distinction between functional and personal income distribution is, therefore, particularly important for the analysis of the effects on aggregate demand. During the 1920s, the wage share has been rather constant, whereas top income shares have increased considerably during this period. Theories based on the functional distribution of income, such as under-consumption theories in the tradition of Hobson (1909) and Malthus (1820), predict stagnating aggregate consumption expenditures. According to these authors, the propensity to save of workers is negligible whereas capitalists save a substantial fraction of their income. Hence, the argument is that a falling share of labor's income leads to insufficient aggregate demand and over-saving.² However, this is clearly at odds with empirical evidence from the 1920s. It will be argued here that the pattern of household consumption of the 1920s, in particular consumer durable goods, can hardly be explained without a close look on the distribution of incomes between households. Another important issue concerns the institutional environment such as financial market innovation and deregulation. There is evidence that financial deregulation and innovation has taken place in the 1920s, which enabled households to purchase durable goods or invest in housing by making use of consumer credit or mortgages. Furthermore, changes in societal attitudes towards consumer credit changed considerably as did advertising and marketing techniques (Olney 1991). The effect of the former was an increased demand for credit, whereas the latter dramatically expanded the

²For a neat and comprehensive account of under-consumption theories (and theorists) the reader is referred to Bleaney (1976)

circle of peers with which households were able to compare themselves, which is the central feature of the relative income hypothesis.

The remainder of the paper is structured as follows. Section 2 reviews the relevant literature. Section 3 presents data on rising inequality in the 1920s, followed by Section 4 which presents stylized facts on the structure of consumption expenditures as well as household saving and debt. Section 5 presents descriptive evidence on financial innovation and the change of institutions during the 1920s. Section 6 concludes.

2 Review of the literature

There is a large body of literature on the Great Depression which renders any attempt to present a representative picture an ambitious endeavor. Of the more recent attempts, some studies highlight the parallels between the Great Recession and the Great Depression. For instance, Almunia et al. (2010), provide a comprehensive account of parallels between the two crises with particular importance given to the international scope of both crises and to the effectiveness of policy responses in the 1930s. Bordo and James (2009) examine three analogies between the two crises. Firstly, they discuss macroeconomic analogies with an exclusive focus on monetary policy. Secondly, micro-economic issues such as bank regulation and the reorganization of banking. Finally, global issues such as imbalances in trade and capital flows between countries. However, the most striking parallel is almost never mentioned in these studies. The rise of income inequality in the period preceding each crisis. This seems to be a serious shortcoming as the literature neglects important information on how macroeconomic instability is built up.

One of the most influential contributions of that time was the "debt-deflation theory" of Fisher (1933). He argued that the downturn of a normal business cycle can turn into a depression if over-indebtedness and deflation are simultaneously involved. By 1933, efforts to liquidate debt, which reduced the nominal value by about 20 percent, were more than offset by an increase of the dollar of 75 percent such that "(...) real debt, that is the debt measured in terms of commodities, was increased about 40 percent (...)." (Fisher, 1933, p. 346). Hence, all efforts to liquidate debt have merely resulted in raising the real levels of debt, which led to further liquidation of debt and so on. Fisher's theory is a convincing explanation for how a recession can turn into a depression, but it is not an explanation for why household indebtedness increases to unprecedented levels in the first

place. Consequently, his policy prescriptions focus predominantly on reflating the price level to avoid a debt-deflation spiral and not on preventing the build up of private credit bubbles.

Another line of argument stresses the importance of changes in household balance sheets. Mishkin (1978) argued convincingly that conventional explanations of the Great Depression do not take into account changes in the household balance sheets and are, thus, not appropriate in explaining the sharp drop in aggregate demand, especially for durable consumption goods and residential housing, after 1929. Households have built up unprecedented amounts of debt prior to the Depression to finance the purchase of durable consumption goods. The real value of household liabilities has, in the wake of the slump of 1929, increased by 20 percent from 1929 to 1930. During times of serious financial distress, households want to reduce their debt by delveraging. However, imperfect capital markets for tangible assets renders the possibility to turn these assets into cash (to service debt) or borrow against them almost impossible unless households accept significant losses when trying to liquidize assets. In Mishkin's words, "the opportunity cost of holding tangible assets, such as consumer durables or housing, increases substantially when a consumer gets into financial trouble. Therefore, as the probability of financial distress increases for the consumer, he will lower his demand for tangible assets."(Mishkin 1978, p. 925).³ Koo (2009), essentially, argues in the same direction but focuses on the firm and banking sector. His analysis highlights the problem of insufficient credit demand due to a change in the firms' sector behavior from profit-maximizing to debt-minimizing. As important as these contributions are to understanding the course of the Depression from 1929 onwards, they do not explain the driving factors behind the observed balance sheet problems. In particular, no role is given to the unprecedented rise in income inequality before the Great Depression let alone possible systematic interconnections between inequality, consumption, saving and debt.

Exactly this point was taken up recently by Kumhof and Ranciere (2010) and Kumhof et al. (2013) in two innovative contributions. In both papers financial crises can arise endogenously as a result of a sharp increase in income inequality in the periods preceding the current financial and economic crisis and the Great Depression of the 1930s. In their models, an upward redistribution of income leads to an increased supply of credit to bottom-

³Olney (1999) argued in a similar direction by pointing out that households in financial distress postpone spending on durable consumer goods in order to avoid default.

and middle-income households, which readily increase their indebtedness to finance consumption expenditures in periods of stagnating, or even falling, wages. Given the nature of their model, the developments in household debt are supply-side determined, which is not entirely convincing. The narrative developed here suggests that there is a reason to believe that households' demand for credit changed once the implications from the relative income hypothesis are seriously taken into account. Societal attitudes towards credit, as Olney (1991) argued, may have reinforced the demand for credit to finance additional consumption expenditures.

Another important contribution is Frank et al. (2010) who develop an "expenditure cascades model" based on the relative income hypothesis to explain the co-emergence of declining savings rates and rising top-end income inequality. In their model, households include preferences over consumption habits of their social peers. As a result of upward-looking status comparisons, it follows that the optimal saving rate of each household is decreasing in total consumption of neighbors and increasing in own income, as households face a trade-off between a painful loss of status if they do not increase their consumption expenditures correspondingly.⁴ However, there is no need to assume that this concerns only luxury goods, as one example, drawn from Frank et al. (2010), may clarify. Because the quality of schools in the U.S. depends on local property taxes, which in turn depend on real estate prices, households may opt to move to more expensive neighborhoods in order to avoid sending their offspring to below-average schools. The results will be twofold. Firstly, households draw down their savings and, secondly, they use credit to engage in deficit spending if their own income is not sufficiently high enough to cover additional expenses.⁵ As we argue in this paper, households in the 1920s behaved in the way described by the example mentioned above. To finance additional expenditures for goods such as cars, TV and radio sets or housing, households drew on savings and increased debt. .

Some studies, exceptionally, have argued in favor of the income inequality view of the Great Depression. For instance, Brown (1997) studies the effects of consumer credit on the propensity to consume of a society. Not surprisingly, an increased availability of demand for

⁴For empirical evidence on upward-looking status comparisons and the effect on household consumption, see Drechsel-Grau and Schmid (2014), Bertrand and Morse (2013) and Christen and Morgan (2005).

⁵To be precise, Reich (2010) mentions labor supply as a third coping mechanism with which households may react to stagnating or decreasing incomes. Households can either choose to work longer hours or another member of the household, typically women, starts participating in the labor market. However, to analyze whether this was the case during the 1920s is beyond the scope of this paper.

credit relaxes the household budget constraint and, as Brown argues, “reacts on the propensity to consume in much the same way as a (downward) redistribution of income would - that is, by raising the spending power of low- and moderate-income households”(Brown, 1997, p. 622).⁶ Via unsustainable indebtedness of low- and moderate-income households, the increased use of credit to finance consumption expenditures creates the seed for financial and macroeconomic instability. However, widened credit availability does not necessarily mean an increased demand for credit by households. Another point missing in Brown (1997) is the households’ saving behavior. As was argued before, Keynesian consumption theory cannot explain the decline in the households’ saving rate in the context of rising inequality. It follows that if households finance consumption expenditures by drawing on savings and engage in deficit spending, it would be interesting to know why they do so. The application of the relative income hypothesis provides a convincing explanation for household behavior in the 1920s. And this is exactly what distinguishes this paper from the studies of Brown

In order to make sense of what happened to household consumption, saving and debt during the 1920s, this paper argues in favor of the relative income hypothesis of Duesenberry (1949), which predicts that consumption of households will be positively related to the consumption of a social reference group. Under upward-looking status comparisons and a specific institutional environment such as financial market innovation, rising top-end inequality gives rise to "expenditure cascades" and a fall in the aggregate saving rate (Frank et al., 2010) eventually accompanied by a rise in household debt. Summarizing, rising inequality may have contributed to macroeconomic instability in the following way: In the United States during the 1920s, the functional income distribution has remained rather stable, whereas top-end inequality has increased dramatically. Given relative income concerns and upward-looking status comparisons, this has triggered expenditure cascades from the top of the income distribution to the bottom. Debt-financed consumption emulation was made possible by financial market deregulation and financial innovation. Securitization of

⁶The underlying consumption theory is based on Keynes (1936) and states that an upward redistribution of income exerts downward pressure on aggregate demand as consumption is likely to fall due to smaller propensity to consume out of income of the higher echelons in the income distribution. Keynes (1939), in a clarifying comment, famously argued that “[s]ince I regard the individual propensity to consume as being (normally) such as to leave a wider gap between income and consumption as income increases, it naturally follows that the collective propensity for a community as a whole may depend (inter alia) on the distribution of income within it.”(p. 129).

installment credit or mortgages was at the forefront of financial innovation.

Precisely this mechanism was formally modeled by Belabed et al. (2013) for the period preceding the current financial and economic crisis and confirmed by Behringer and van Treeck (2013) using panel econometric estimations for the G7-countries and a larger sample of 20 countries, controlling for a standard set of explanatory variables.

3 The rise of income inequality in the 1920s

The following section discusses evidence on both dimensions of income inequality, the personal and functional distribution of income, in the decade prior to the Great Depression. We argue that the rise in income inequality observed in the period of interest and the decline of household saving rates and indebtedness is consistent with the expenditure cascade model of Frank et al. (2010). The theoretical link between income inequality and increased financial fragility, measured by household indebtedness, is the relative income hypothesis of Duesenberry (1949), which states that household preferences over consumption are interdependent such that an increase in consumption of the very top households in the income distribution translates into a desire for higher consumption of the households just below the very top and so on (see section 4.2).⁷

Figure 1 presents the growth of selected top income shares for ten years preceding the Great Depression and the current financial and economic crisis for the U.S. Despite a general trend of rising income inequality in both periods, two striking features stand out. First, the growth of top income shares was more pronounced the further up the income distribution one looks, so that growth cascades are observable. The second striking feature

⁷In fact, the idea that household consumption depends on consumption expenditures of other households goes back to Veblen (1899): “[T]he standard of expenditure which commonly guides our efforts is not the average, ordinary expenditure already achieved; it is an ideal of consumption that lies just beyond our reach, or to reach which requires some strain. The motive is emulation - the stimulus of an invidious comparison which prompts us to outdo those with whom we are in the habit of classing ourselves. (...) [O]ur standard of decency in expenditure (...) is set by the usage of those next above us in reputability (...).”(p. 71). In some way, Veblen even anticipated expenditure cascades when noting that “[t]he leisure class stands at the head of the social structure in point of reputability; and its manner of life and its standards of worth therefore afford the norm of reputability for the community. (...) In modern civilized communities the lines of demarcation between social classes have grown vague and transient, and wherever this happens the norm of reputability imposed by the upper class extends its coercive influence with but slight hindrance down through the social structure to the lowest strata.”(p. 59).

is that the rise of top-end income inequality was stronger through all income groups during the 1920s. For instance, the share of income going to the very affluent, the 0.01 percent of the population, increased by 200 percent in the 1920s whereas it increased "only" by 54 percent between 1998 and 2007. By comparison, the income share of the top decile increased by 19.7 percent in the 1920s whereas the income share of the top decile increased by 9.6 percent ten years before the current crisis. However, there are large differences between growth rates of top income shares when subtracting capital gains. More than half of the increase of the 0.01 percent's share of income is attributable to capital gains for the 1920s. The difference for the same income group before the current crisis, however, amounts to a mere 7.6 percent, which means that capital gains played a larger role during the 1920s. Whatever measure one takes into account, including capital gains or not, it is quite obvious that the growth of top income shares across all quantiles was stronger in the period preceding the Great Depression.

Figure 2 shows the top income shares and household debt in percent of GDP for the twelve years before the Great Depression. Top income shares increased significantly in this rather short period and peaked just before the onset of the Depression. In 1928, the top ten percent of the population, earned almost half of total income. The top five percent took home a still relatively large 40 percent of total household income, and the top one percent earned almost a quarter of all household income. One possible reason for the observed increase of income inequality is the decrease of top marginal tax rates for income and inheritances. The top marginal income tax rate decreased from 73 percent in 1919 to 24 percent in 1929. Additionally, during the same period, top marginal inheritance tax rate decreased from 25 percent to 20 percent (with a short-lived increase to 40 percent in 1926).⁸ This is particularly interesting because, as Piketty (2014) mentions, the wage share of the top decile increased from 26.7 percent in 1919 to 29.2 percent in 1929. In addition the wage share of the top percentile rose from 7.4 percent to 8.7 percent during the same period. Historical data of the Internal Revenue Service (IRS) also reveals that although reported total income has increased from 19.8 billion dollars to 26.7 billion dollars between 1919 and 1929, total tax liability decreased from 1.3 billion dollars to one billion dollars (the trough of total tax liability was reached in 1923 with a mere 662 million dollars).

⁸All data is taken from Piketty (2014), available here: <http://piketty.pse.ens.fr/en/capital21c2>. Take note that the top inheritance tax rate in 2013 is a whopping 35 percent compared to 1929, and the top marginal income tax rate, as of 2013, is still 40 percent.

Concomitantly, household debt as a share of GDP peaked in 1928 around 65 percent of GDP, an unprecedented level of household indebtedness.

At the same time, the wage share, measured here as employment compensation and disposable personal income in percent of GDP, have remained essentially flat during the 1920s, as Figure 3 shows. Between 1920 and 1929, wages as a share of GDP have not moved at all, which is rather puzzling, as we would expect wages to rise during boom times. Simultaneously, disposable personal income remained flat as well. It is now obvious that the consumption boom of the 1920s cannot be attributed to rising wages or disposable income as a share of GDP.⁹ In addition, average weekly earnings in manufacturing, for instance, have not grown considerably between 1920 and 1929. Year on year growth rates oscillate around the zero percent line.¹⁰

Thus, the analysis of both dimensions of income distribution becomes particularly important in the context of a constant wage share and a pronounced consumption boom as a stagnating wage share leaves us with the question of why households increased their consumption expenditures when wages did not rise accordingly. Thus, the question to be answered in the next sections is whether traditional consumption theories can account for the surge in household debt or the decline in household saving rates during times of rising inequality.

4 Household consumption, saving and debt

4.1 Some stylized facts

The 1920s have been one of the most innovative periods in the twentieth century. Main innovations include radio sets, dynamic loudspeakers, TV systems, commercial air travel and, probably less important, the first 3D-movie (Feinstein et al., 2008, p. 75). Consumer

⁹The simultaneous rise of top income shares and flat wage shares is one of the most striking parallels between the Great Depression and the Great Recession, see Belabed et al. (2013). One of the potential explanations for this phenomenon is the so called "Winner-take-all"-hypothesis (Frank and Cook 2010). According to this explanation relatively small differences in skills can lead to extraordinary large gains in income. The result is a stabilization of the wage share despite significant wage losses of middle- and lower income groups.

¹⁰Notwithstanding the facts mentioned above, in some industries, the income share of labor may have increased (see, for instance, Keller 1973).

durable goods have been made available to millions of households through increased automatization of the production process and the rise of the credit industry. Consumption expenditures for durable goods have increased significantly during the 1920s, as can be seen in Figure 4. While consumption expenditures for perishable goods declined significantly after the war, expenditures for durable goods such as cars, refrigerators, TV- and radio sets increased during the 1920s. For instance, the index of production of durable goods provided by FRB of St. Louis, rose from 82 points in 1919 to 119 points in 1929. Factory sales of passenger cars increased from 1.6 million cars to 4.5 million cars between 1919 and 1929.¹¹ Towards the end of the decade, households spent almost seven percent of disposable personal income on major durable goods, more than 13 percent on semi-durable goods, around four percent on minor durable goods and almost 40 percent on services. Expenditures on perishable goods, however, declined from around 40 percent around the end of the 19th century to less than 35 percent at the end of the 1920s. At the same time the saving rate of households declined dramatically from around seven percent before the war to 1.2 percent at the end of the 1920s. This constitutes the most significant decline in household saving since the start of the series in 1869. Furthermore, household saving, as a share of disposable income, has not been as low for the next 75 years.

Simultaneously, consumer debt has increased at a remarkable pace during the 1920s, in absolute terms and as a share of disposable income. Although consumer debt outstanding has shown an upward trend before the 1920s, it is obvious from Figure 6 that the pace of debt accumulation has increased during the period of interest. Outstanding consumer debt doubled between 1920 and 1929 and peaked around 7.6 billion dollars in 1929 which constitutes an unprecedented rise in consumer debt. Even more impressive is the increase of the consumer debt-income ratio which also doubled between 1920 (4.6 percent) and 1929 (9.3 percent). Though the levels of consumer debt and debt-income ratios seem negligible from today's point of view it is important to note two aspects. Firstly, major institutional changes have taken place in the 1920s, so that even relatively moderate levels of consumer debt may have contributed to financial fragility. Secondly, consumer debt is only one measure of household debt. The other one is mortgage debt. During the 1920s

¹¹Carter et al. (2006, Table Df343-346). As impressive the number of sold cars is by itself, the spread of passenger cars to almost every household had far-reaching effects. Urbanization would not be possible without widely available private transport opportunities which, in turn, led to increasing demand for housing in the suburbs of the cities. Certainly, other industries, such as rubber, tires, oil or road construction benefited from the car boom as well.

there was a pronounced housing bubble which peaked around 1925. Figure 5 presents data on privately owned, nonfarm housing units started and nominal home prices indexed with 1915. Housing units started increased by a factor of nine between 1918 (the trough) and 1925 (the peak). From the beginning of the series in 1915, the increase is still remarkable, housing units started more than doubled in only ten years. At the same time, nominal home prices increased by 50% between 1915 and 1925. The real estate bubble of the 1920s was highly debt-financed, which in turn was securitized and sold on newly emerging markets for these papers.¹² Figure 7 presents total non-farm residential mortgage debt in absolute values and as a share of total wealth. Similar to the trends in consumer debt, non-farm residential mortgage debt did increase before the 1920s, albeit at a much slower pace. Between 1920 and 1929, mortgage debt increased threefold from 9.1 billion dollars to 27 billion dollars. Simultaneously, mortgage debt-wealth ratio almost tripled between 1920 (10.2 percent) and 1929 (27.2 percent) so the expansion of mortgage debt was even larger than the residential construction boom itself.

4.2 Reconciling the facts - a theoretical perspective

The following section attempts to reconcile the stylized facts from the section above by arguing for an application of the relative income hypothesis. Furthermore, the effects on macroeconomic stability will be discussed. According to the relative income hypothesis, households' consumption preferences are interdependent which is the key innovation compared to the Keynesian consumption theory or more orthodox theories of consumption (e.g. Friedman 1957 and Modigliani and Brumberg 1954).¹³ This means that in addition to standard explanatory variables for consumption such as (permanent) income or (net) wealth, consumption of the household's reference group co-determines the desired level of consumption. Following behavioral insight that status comparisons are predominantly

¹²Due to limitations this paper does not attempt to give a full picture of the 1920s housing bubble, except for debt-related aspects. For a more detailed description of the housing bubble, especially its causes, see White (2009). He also discusses various weaknesses of standard housing price index such as the Case-Shiller-Index which, in White's point of view, underestimates housing prices during the 1920s to a significant extent.

¹³Note that from a methodological point of view, Duesenberry's theory of consumption behavior is grounded in neoclassical economics, i.e. utility maximization under constraints. However, this is not a necessary condition. For a Keynesian interpretation see Belabed et al. (2013), where a stock-flow consistent macroeconomic model capturing key insights from the relative income hypothesis is modeled.

upward-looking, a household's reference group is defined as the next highest household in the income distribution. Whether this desired level of consumption will be realized is not clear a priori. For instance, banks and other lending institutions may refuse to give out loans if the household cannot meet the standards of the lender and the decline of household saving is naturally constrained by the level of income. However, it is safe to assume that lending standards have been relaxed during the 1920s (see Section 5.1).

As was mentioned before, the rise of income inequality was almost entirely due to developments in the distribution of income between households. Furthermore, the growth of income shares was more pronounced towards the upper end of the income distribution. Imagine a household in the ninth decile, i.e. belonging to the households just below the very top ten percent of the population. If income is redistributed upward, especially from lower (and lowest) income groups to the very top, we can safely assume that households in the top decile will increase their consumption, albeit to a lower extent than the additional income. Due to demonstration effects it is, furthermore, also safe to assume that the top decile will consume more positional goods which reveal their economic and social status. The result is that for lower income groups, especially the group just below the group who experienced a rise in income, the choice is between increasing their consumption expenditures or face a painful loss of relative status. Increasing consumption expenditures to reach the (higher) level of desired consumption can be done through various coping mechanisms (Reich 2010). Households may choose to decrease their savings, increase their demand for credit, increase working hours or increase labor market participation of other household members or a combination of these. Obviously, households have opted for drawing on their saving, which is perfectly compatible with the relative income hypothesis, not with Keynesian consumption theory. Remember that in a purely Keynesian world, an upward redistribution of income should, *ceteris paribus*, lead to an increase in savings due to the lower marginal propensity to consume of high-income households and, therefore, to weak aggregate demand. Furthermore, households were increasingly able and willing to finance consumption expenditures through consumer or mortgage debt (see Figures 6 and 7). Indeed, the 1920s have been an exceptional period with respect to private debt. Fackler and Parker (2005) argue “that the 1920s is *the* [emphasis in original] leading candidate for a period of nominal over-indebtedness (...)”(p. 70). Furthermore, none of the following decades (until 1975) neither had a higher debt-income ratio at the start nor at the end of each decade. And none of them has seen higher growth rates than the 1920s (Fackler and

Parker 2005).

At the household level, the inflation of asset prices such as houses, land or securities improves the balance sheet of households which allows for increasing the liabilities side of their balance sheet. However, as soon as the value of assets declines, the balance sheet of households deteriorates as the value of liabilities (and the contractual debt service obligations) remains unchanged in the balance sheet. Households and other economic actors in this situation will turn into debt minimizers, using all remaining cash flows to restore their balance sheet (Koo 2009 and Mishkin 1978). The effects of this debt-deleveraging process become more pronounced the more households are indebted and if other sectors, such as the corporate sector or the banking sector have gone into debt as well. One crucial ingredient for a crisis like the Great Depression, however, is rapid and comprehensive innovation and deregulation of financial markets and broad institutional change.

5 Institutional change

5.1 Financial innovation

The change of institutions, whether societal or particular market institutions is a crucial determinant of whether a debt-financed consumption-driven growth regime evolves. Deregulation of financial markets and the subsequent surge in financial innovation enabled households to take out loans to finance increased expenditure for (durable) goods or residential real estate. Without any doubt, the 1920s have been an unprecedented era of financial innovation and structural change, e.g. when commercial banks increasingly assumed fiduciary functions and transformed themselves into investment banks (Krooss and Blyn 1971).¹⁴ The transformation into investment banks was, in part, inspired by corporations increasingly issuing equity to finance new investment instead of traditional external financing, i.e. loans from banks. Figure 8 shows the stocks sold on the New York Stock Exchange, the major financial hub of the U.S., then and now. Between 1919 and 1929

¹⁴It was exactly this transformation of commercial banks into investment banks which later inspired the passage of the Banking Act of 1933, better known as the Glass-Steagall Act. It required banks to separate their usual business of deposits and loans from trading with securities. Glass-Steagall was repealed in 1999, effectively contributing to the second transformation of commercial banks and insurances into some kind of investment banks.

the number of shares sold more than quadrupled. Moreover, whereas the housing boom stopped around 1925, the stock market boom gained pace towards the end of the decade. Between 1927 and 1929 alone, the number of shares sold almost doubled. In order to offset the losses of the credit business with firms, commercial banks began doing business in the stock market and, later on, in even riskier security markets. This was undoubtedly accentuated by the public's increasing mania for securities towards the end of the 1920s (Krooss and Blyn 1971).

With respect to institutional changes in the credit market for households and consumers we focus on three key aspects. First, the rise of consumer installment selling, which is a special form of consumer credit and the emergence of sales finance agencies which largely took over the installment credit business from sellers and manufacturers. Second, the rise of mortgage financing and the evolution of markets for mortgage securitization. Third, the evolution of brokers' loans which helped finance the stock market boom at the end of the 1920s.

The 1920s mark the advent of installment credit and the evolution of sales finance agencies. For Seligman (1927), installment credit is defined as a transfer of wealth for which the payment is deferred (at least partly) to the future.¹⁵ Usually, households pay down a percentage of the good's price and pay the rest in monthly (or other regular) installments. For the producer, installment selling was a crucial innovation for market expansion as it enabled him to reach consumers who were not able to either pay the full price cash down or a lump sum after a reasonable period of time. For the consumer, installment selling cleared the way to purchasing goods which have not been affordable such as cars, refrigerators, TV-sets and so on. Installment selling, however, was not only restricted to the sales of goods to individuals. It was also used to acquire real estates and, to a lesser extent, for production purposes. The focus here is on installment selling to households. Nominal installment debt was 1.8 million dollars in 1919 and climbed to 4.9 million until 1929 (Olney 1999) and the automobile was at the center of installment selling. In 1919, 1.65 million cars were sold and the number increased to 4.46 million sold cars in 1929.¹⁶ Olney (1999) reports that in 1929 nearly one quarter of households bought a car, and 15 percent of households bought a car on installment, up from 4.9 percent in 1919. Including sales of used cars, more than seven million cars were sold in 1929; in 1919 merely

¹⁵All data in this paragraph on installment credit is from Seligman (1927) unless stated otherwise.

¹⁶Carter et al. (2006, Table Df343-346).

two million cars were sold. Before the 1920s, installment selling was mostly operated by producers and sellers. After the war, installment credit was increasingly operated by sales finance agencies. These financial corporations operate in the following way: A car dealer, for instance, was required to pay for the stock of cars cash down. Certainly, most dealers did not have the means to pay for their stock of cars immediately. Banks, on the other hand, refused to grant loans to dealers. Hence, there was need for a new mechanism of intermediation between dealers and producers which was provided by sales finance agencies. In 1916, there were six finance companies in car installment business; by 1929 more than one thousand sales finance companies were in business, although the “big four”, GMAC, CCC; CIT, and Universal dominated installment business in the 1920s and 1930s. (Olney 1991). Total outstanding automobile paper increased fivefold between 1919 and 1929, whereas paper on other consumer goods (such as TV-sets, radios, etc.) increased by a factor of three in the same period. Overall, the the consumer durable goods revolution in the 1920s would most certainly not have taken these dimensions without the innovation of installment credit.

A second important feature of the 1920s debt revolution was the unprecedented increase in mortgage financing of commercial and residential structures and the evolution of mortgage securitization markets. Snowden (2010) reports that four intermediaries were the key actors in the 1920s mortgage business: commercial banks, life insurance companies, mutual savings banks and Building & Loans (B&L). Although the former three intermediaries accounted for 6.6 billion dollars of new investment, it only represented one third of the total expansion of residential mortgage debt during the 1920s. The remaining two thirds were financed by B&L corporations or non-institutional investors amounting to more than twelve billion dollars of new investment. The B&L sector increased by the number of customers, assets and in number, which increased from 8.000 in 1919 to 13.000 in 1927 (Bodfish 1931 via Snowden 2010). During the 1920s, B&Ls “became leaders in developing affordable, low-down payment loans [and] by the end of the 1920s they wrote more mortgage debt on one-to-four-family homes each year than life insurance companies, commercial banks and mutual savings banks combined”(Snowden 2010, p.10).¹⁷ Securitization of mortgage debt - creating marketable securities investors could buy - was soon to follow. Mortgage insurance companies and real estate bond houses issued different, but essentially similar, securities based on mortgage financed commercial or residential property. The market grew

¹⁷Data on B&Ls can be found in (Grebler et al., 1956, Table N-13).

rapidly in the 1920s: By 1930, fifty mortgage insurance companies were active in New York alone, originating and marketing securities written on three billion dollars of mortgage debt (Snowden 2010). The market for real estate bonds increased rapidly too. By 1929 more than six billion dollars (of which 2.4 billion dollars concern residential property) of real estate bonds have been outstanding. A rise of more than 5.6 billion dollars or almost 1.200 percent in ten years (Grebler et al. 1956, Table L-2).

The third component of financial market innovation was the rise of brokers' loans during the 1920s and especially towards the end of the decade. A broker's loan is a loan from a bank to a professional broker who finances a margin account for investors who seek to buy securities or commodities with the money granted. The investor is, thus, participating in the securities or commodities market with the broker's money or leveraging his financial investment. A rise in the total amount of broker's loans indicates a higher willingness of investors to speculate in financial markets. Between 1918 and 1929, broker's loans increased by a factor of four from one billion dollars to more than four billion dollars.¹⁸ As a share of GDP, broker's loans increased by a factor of seven between 1918 and 1928. At the same time, the most important stock market index in the U.S., the Dow Jones Industrial Average (DJIA), rose from 107.23 points in 1919 to 248.5 points in 1929 (see Figure 8). The latter number camouflages the speculative excess because of the inclusion of the stock market crash in October 1929 - the DJIA leveled off at 300 points in 1928.¹⁹ Certainly, the increase of the DJIA also reflects the economic expansion of the 1920s, the so called fundamentals. However, it is commonly accepted that speculation was vibrant at least during the last two years before the stock market crash of 1929. Shares sold on the New York Stock Exchange (NYSE) increased from an annual average of 26 million shares in 1919 to more than 93 million shares in 1929.²⁰ These numbers, however important they are, do not provide information on newly issued equity on the stock market. In fact, they include both, shares already issued and traded on secondary markets and newly issued shares. Figure 9 provides data on newly issued corporate capital. Although there was some growth between 1921 and 1927, the graph shows a rather remarkable increase in firms' stock market activity from 1927 on. The value of common stock between 1927 and 1929 increased from 500 million US-Dollars to more than 4.5 billion US-Dollars, which constitutes an increase by a factor of nine. The value of newly issued preferred stock

¹⁸Carter et al. (2006, Table Cj866-869).

¹⁹Carter et al. (2006, Table Cj797-807).

²⁰Carter et al. (2006, Table Cb52-54).

increased by a smaller magnitude, though still significant enough. Between 1927 and 1929, the value of preferred stock rose by a factor of three. What this all amounts to is that there is ample evidence for the claim made before that firms turned to the stock market to finance their activities instead of taking out new loans from banks.

Summarizing, the rapid growth of the consumer durable industry would have not materialized without the simultaneous expansion of household debt. This expansion itself is based on the unprecedented innovation in financial markets, e.g. sales finance agencies or the securitization of debt obligations. All these factors have led to an increased importance of the financial sector. Figure 10 presents various measures of the of income of the finance sector (including insurance and real estate). Income share of finance (in percent of GDP) has increased from below three percent of GDP to almost 4.7 percent of GDP, a level unreached until the late 1970s.²¹ A similar trend is observed for different measures of GDP, excluding defense expenditures or net exports of financial services from GDP. Another important measure is compensation in finance, insurance and real estate as a share of total compensation (wages and salaries). Compensation in finance increased from 3.3 percent in 1919 to 5.3 percent in 1928, an increase of 61 percent in just ten years.

5.2 Changing attitudes and advertising

Furthermore, societal attitudes towards consumer credit changed considerably as did advertising and marketing techniques (Olney 1991). The effect of the former was an increased demand for credit, whereas the latter dramatically expanded the circle of peers with which households were able to compare themselves.

All of these developments in the financial sector would not have had that great of an impact without a fundamental change of societal attitudes toward credit and debt, sometimes fueled by more aggressive and manipulative methods of advertising and marketing. According to Seligman (1927), “the purchasing public was gradually accustoming itself to pay for the cars (...) in successive installments, chiefly in monthly payments“. Similarly, Olney (2002) wrote that families or individuals “[o]nce characterized as spendthrifts who could not be trusted to repay their debts and who therefore required the threat of stringent default penalties to force adherence to a credit contract, by 1929 these same families were

²¹For a longer series than presented here the reader is referred to Philippon (2013) who provides data until 2009.

sophisticated borrowers taking advantage of the opportunity to 'buy now, pay later.'”(p. 2).

Advertising, on the other hand became significantly more important to sellers during the 1920s. Greater availability of credit made expensive products readily available for many households (though not all), whereas advertising rendered these products desirable (Olney 1991). Not surprisingly, total advertising expenditures for advertising in print media undoubtedly increased during the 1920s.²² Another medium for placing ads was the radio. According to the Public Broadcasting Service (PBS), the first ad to air on radio for a real estate developer in New York City, was aired in 1922.²³ Local networks soon became big business and radio broadcasting developed further during the 1920s. The widespread distribution of radios during the 1920s, often bought on installment, meant that mass consumerism sparked mass communication, which further fueled mass consumerism through broadcasting of advertisements for new products or new financial possibilities to obtain these products. For instance, twelve million people had access to a radio in 1930, and more than 50 percent of families owned a radio set in the large urban areas of New York, Illinois or California.²⁴ Summarizing, societal changes of attitudes towards debt-financed consumption and new advertising possibilities facilitated the evolution of a debt-financed consumer durable goods revolution during the 1920s.

6 Concluding remarks

This paper has shown that the 1920s have been a period of rising top-end inequality in the United States. The rise of top income shares leveled off only in 1929, just before the onset of the Great Depression. In addition, household debt has risen to unprecedented levels and, simultaneously, personal saving has declined to historical lows. This paper sug-

²²see Olney 1991, Table 5.1, who uses various sources to show that advertising expenditures exploded during the 1920s. For instance, estimates of Printers' Ink increased from 2.3 billion dollars in 1919 to 3.4 billion dollars in 1929; Pope's estimates more than double from 1.4 billion dollars to 2.9 billion dollars in the same period. Furthermore, Olney (1991) also reports that the sizes of advertisements have increased during the 1920s and that advertisements have, in general, become more manipulative and less informational.

²³Information available at: <http://www.pbs.org/wgbh/aso/databank/entries/dt20ra.html>.

²⁴See Bureau of the Census online available at: http://www.census.gov/newsroom/releases/archives/census_2000/cb02-cn62.html for data on how many people had access to radio and <http://www.census.gov/geo/maps-data/maps/pdfs/thematic/radios.pdf> for the distribution of ownership of radio sets by states in 1930.

gests that these trends can be explained by applying the relative income hypothesis to the 1920s. Households who do not experience a rise in relative incomes, thus relative consumption, face a trade-off between keeping up with consumption of higher income groups or a painful loss of relative status. Given the decline in saving rates and the increase in household debt, both perfectly compatible only with the relative income hypothesis, households obviously chose to keep up. As a result, private consumption remained high but at the cost of an unsustainable credit bubble. This credit bubble was allowed to develop after fundamental institutional changes, such as the deregulation of financial markets, occurred. Financial market deregulation and financial innovation enabled commercial banks to transform themselves into investment banks. Consumer installment credit exploded during the 1920s and financial innovation, such as securitization, enabled financial institutions to issue ever more debt to households and sell it to investors. In addition, households' attitudes towards credit and debt-financed consumption appear to have changed along with new and more aggressive methods of advertising for consumer goods and methods of financing in times of increasing income inequality. However, after the onset of the Great Depression, households were left with rising real debt in the context of severe deflation. In this sense, the narrative developed here is also compatible with the balance sheet recession view of Mishkin (1978) and Koo (2009) or the debt-deflation theory of Fisher (1933).

Of course, this study does not rule out other possible causes of the Great Depression in the United States or internationally. Indeed, given the magnitude and length of the crisis, it would be highly peculiar to solely rely on a mono-causal line of argument. This paper merely attempts to add another piece to the bigger picture. In addition, data limitations, most importantly decile-specific data on consumption, saving and debt, considerably limit the depth of this study. For instance, although aggregate data on personal saving is readily available, to the best of our knowledge, there is no reliable data on personal saving by quartiles or even deciles. The same is true for data on consumption or household debt. These limitations, however, point to possible paths for future research on the topic. More consolidated aggregate data together with reliable data at the household level would most certainly be helpful in further investigating the role of income inequality before the Great Depression.

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Appendix A

Figures

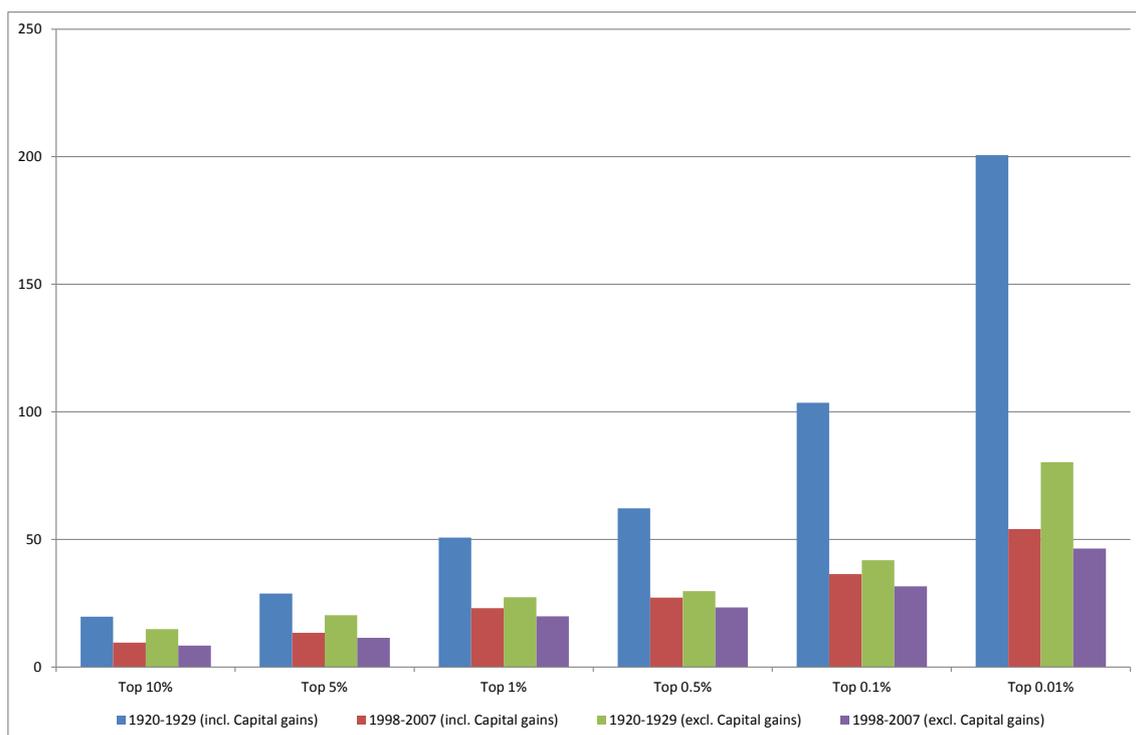


Figure 1: Growth of top income shares before two crises; 1920-1929 and 1998-2007.

Sources: World Top Incomes Database

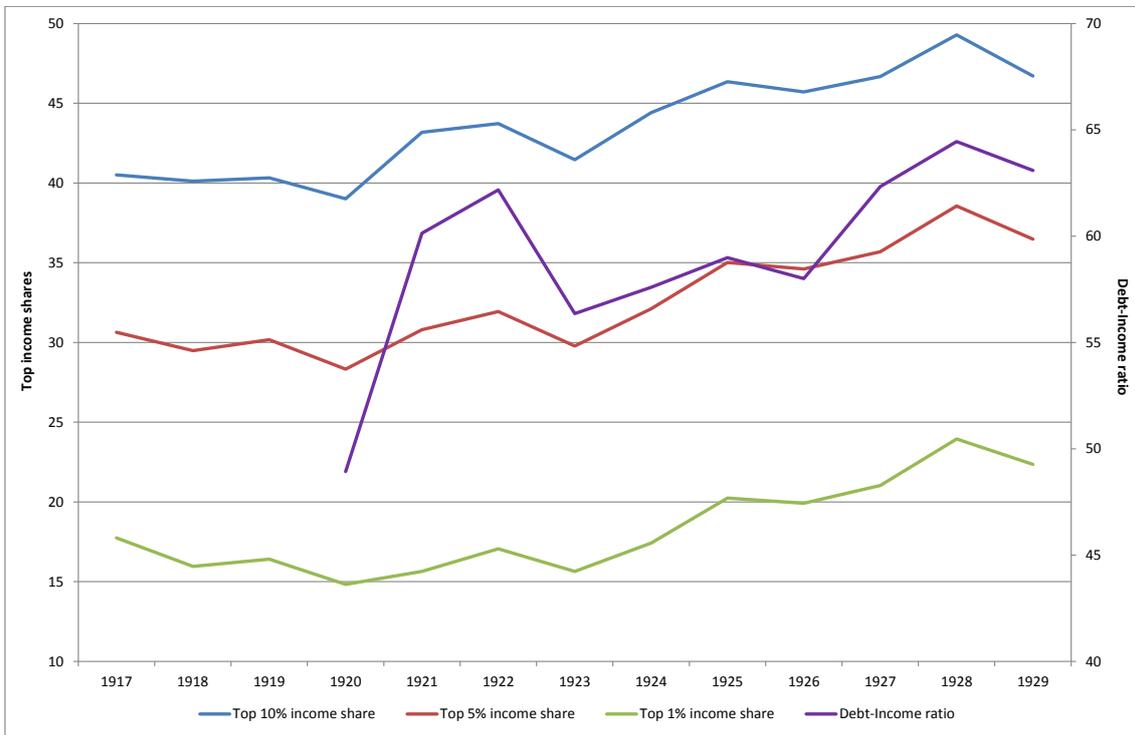


Figure 2: Top income shares (incl. capital gains) and household debt in percent of disposable personal income, 1917-1929.

Sources: World Top Incomes Database; (IMF, 2012, Fig. 3.9)

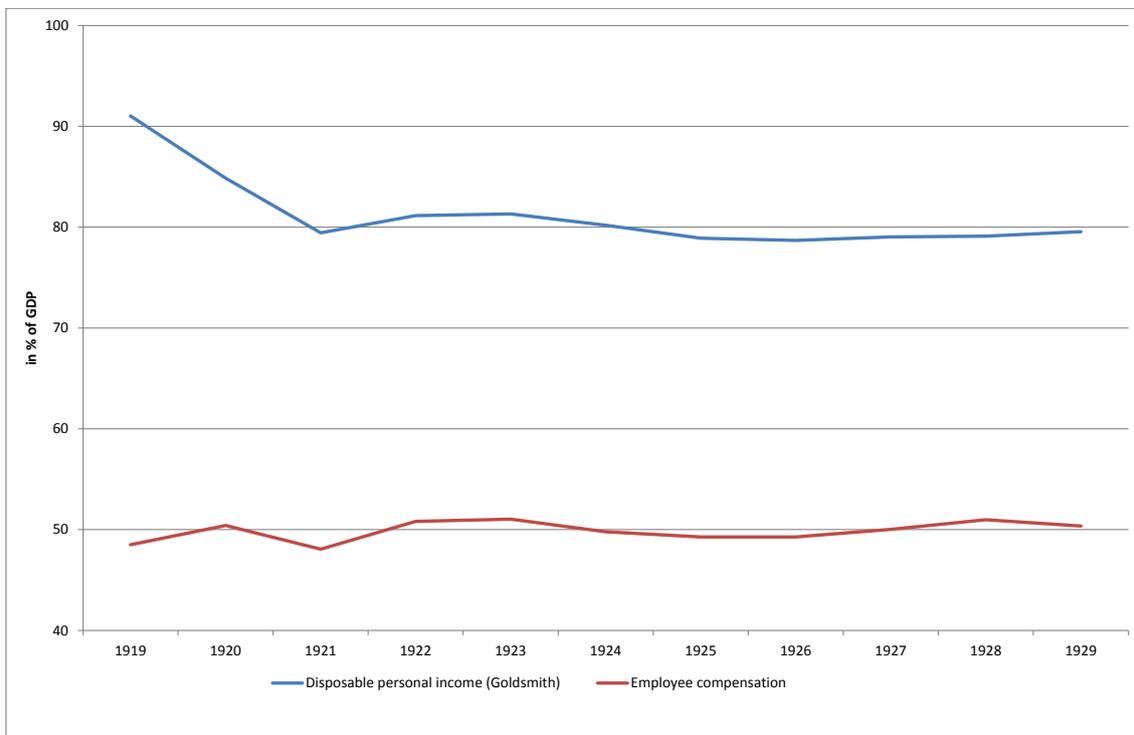


Figure 3: GDP income approach - disposable personal income and employee compensation in percent of GDP, 1919-1929.

Sources: Carter et al. (2006, Table Ca9-19); Goldsmith (1955, Table N-1, p.427); Kuznets (1937, Table 4)

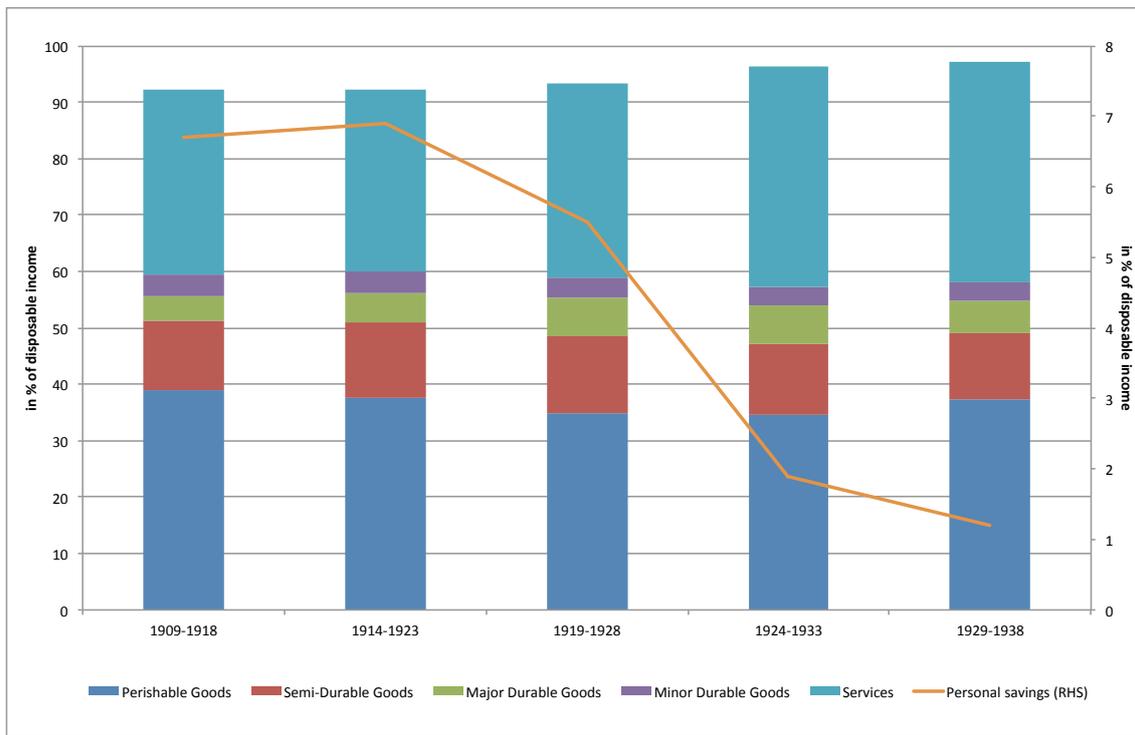


Figure 4: Expenditures on goods and services and personal saving rate (in percent of disposable income), decade averages.

Source: Olney (1991, Table 2.8)

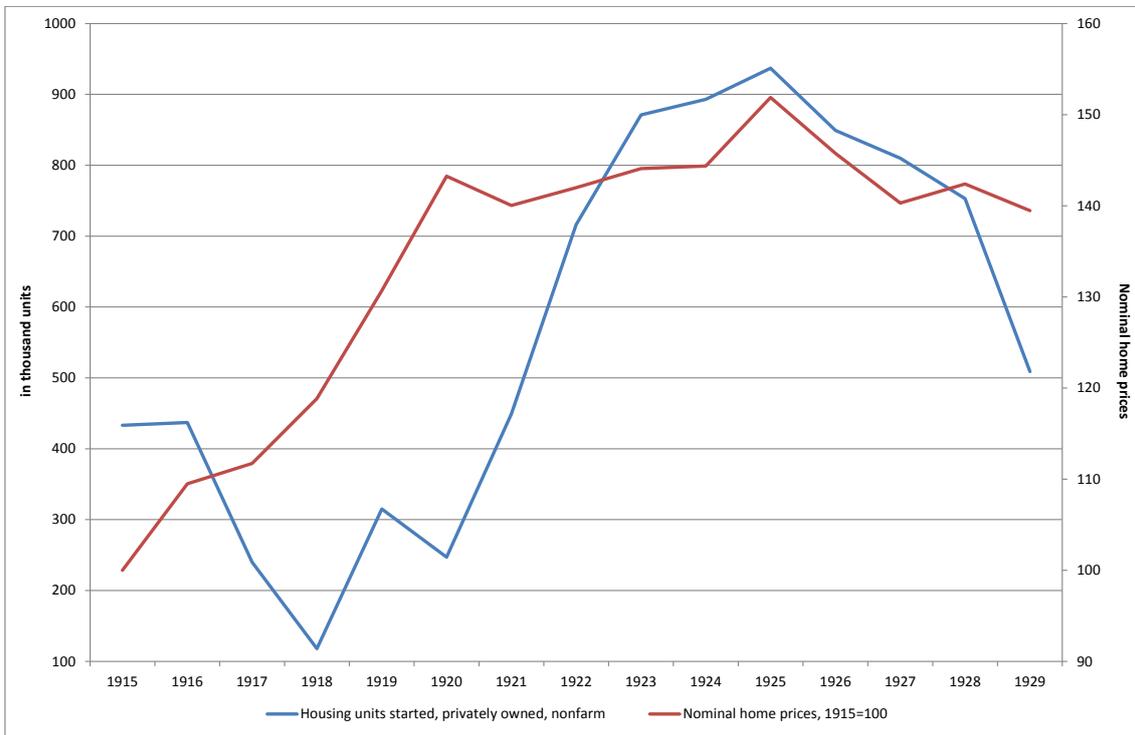


Figure 5: Housing units started (privately owned, nonfarm) and nominal home prices, 1915-1929. Sources: Carter et al. (2006, Table XY), Grebler et al. (1956, Table XY)



Figure 6: Total short-term consumer debt and consumer nonmortgage debt in percent of income, 1917-1929.

Sources: Goldsmith (1955, Table D-1); Olney (1991, Table 4-1)

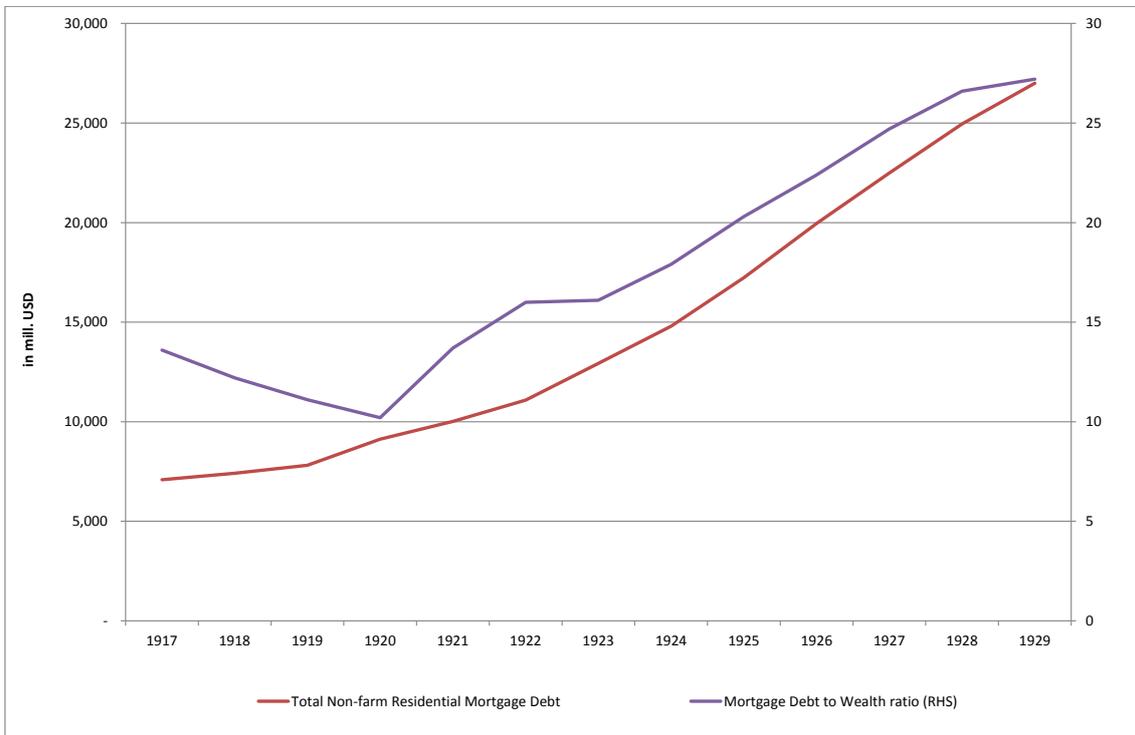


Figure 7: Total non-farm residential mortgage debt and as a share of non-farm residential wealth, 1900-1929.

Source: Grebler et al. (1956, Table L-1 and L-6)

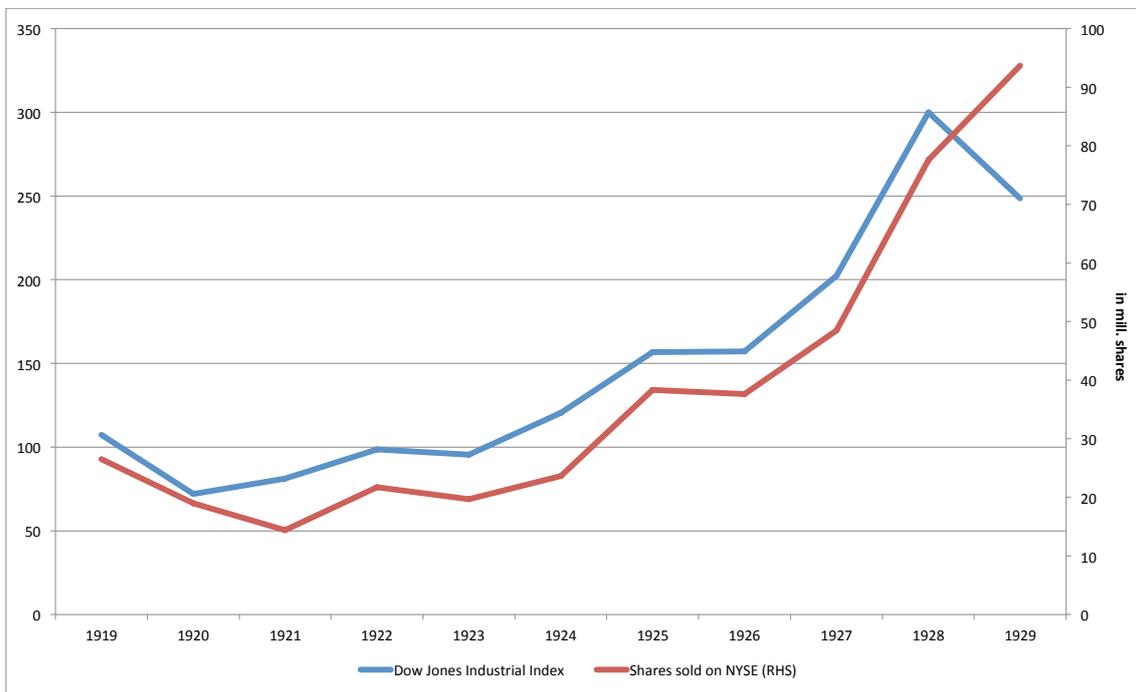


Figure 8: Shares sold on New York Stock Exchange (NYSE) and Dow Jones Industrial Index, 1919-1929.

Source: Carter et al. (2006, Table Cb52-54 and Cb797-807)

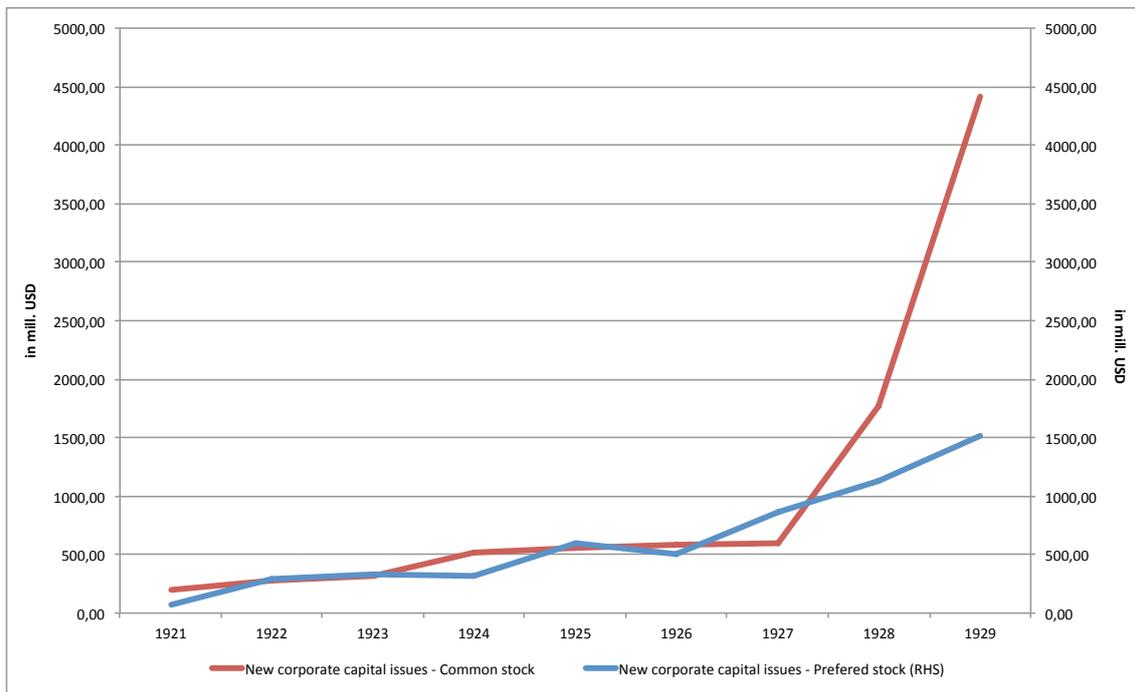


Figure 9: New corporate capital issued; Common and preferred stock, 1921-1929.

Source: U.S. Department of Commerce (1930, Table 315)

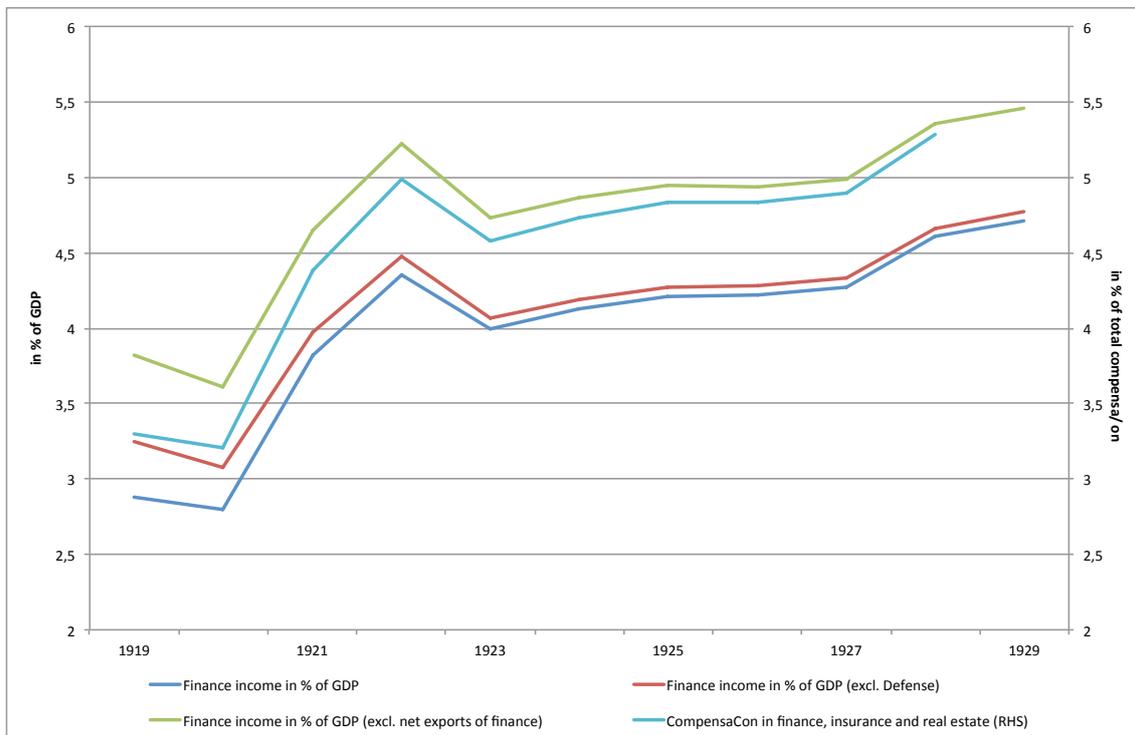


Figure 10: Finance income in percent of GDP (various measures) and compensation in finance, insurance and real estate as a share of aggregate compensation.

Source: Philippon (2013)

Appendix B

Data

Table 1: Series name and sources

Series name	Source
World Top Income Shares	World Top Incomes Database
Household debt in percent of disposable personal income	IMF 2012, Fig. 3.9
Disposable personal income	Goldsmith 1955, Table N-1
Employee compensation	Kuznets 1937, Table 4
Gross domestic product	Carter et al. 2006, Table Ca9-19
Expenditures on goods and services; personal savings rate	Olney 1991, Table 2.8
Housing units started (privately owned, nonfarm)	Carter et al. 2006, Table Dc510-530
Nominal home prices	Grebler et al. 1956
Total short-term consumer debt	Goldsmith 1955, Table D-1
Consumer nonmortgage debt	Olney 1991, Table 4.1
Total nonfarm residential mortgage debt	Grebler et al. 1956, Table L-1
Mortgage debt to wealth ratio	Grebler et al. 1956, Table L-6
Finance income in percent of GDP (various measures)	Philippon 2013
Compensation in finance, insurance and real estate as a share of aggregate compensation	Philippon 2013

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