European
Historical
Economics
Society

EHES WORKING PAPERS IN ECONOMIC HISTORY | NO. 36

Household Debt and Economic Recovery
Evidence from the U.S. Great Depression

Katharina Gärtner
Free University Berlin, John-F.-Kennedy-Institute, Department of Economics

MARCH 2013

EHES Working Paper | No. 36 | March 2013

Household Debt and Economic Recovery
Evidence from the U.S. Great Depression

Katharina Gärtner
Free University Berlin, John-F.-Kennedy-Institute, Department of Economics *

Abstract

The Great Recession has focused renewed attention on the role of household leverage in the business cycle. Household debt overhang and the ensuing process of deleveraging are often cited as factors holding back economic recovery. This paper studies the relationship between household debt and economic performance during the Great Depression in the U.S. on the state level. Using a newly compiled dataset, I present evidence that debt overhang in the household sector acted as a severe drag on economic recovery in the 1930s. States with higher initial debt-to-income ratios recovered considerably slower. These findings point toward a close link between the accumulation of debt and the severity and duration of recessions.

JEL codes: E2, E3, N22, R2

Keywords: Great Depression, household debt, mortgage finance, U.S.

Acknowledgements:
Versions of this paper were presented at Cambridge University (September 2012), London School of Economics (December 2012), and Utrecht University (February 2013). The author is especially grateful to Moritz Schularick, Irwin Collier, Martin Knoll, Ewout Frankema, and Lucais Sewell. I remain solely responsible for the errors and interpretations.

* Katharina Gärtner, Free University Berlin, John-F.-Kennedy-Institute, Department of Economics, gaertner@gsnas.fu-berlin.de

1 Introduction

Given the slow pace of economic recovery from the Great Recession in the U.S. and elsewhere, economists have begun examining the factors that keep economies depressed in the wake of financial crises.[1] The speed of economic recovery continues to be a much-discussed topic in the media as well as in the economics profession. This debate has typically focused on whether financial crises have been associated with deeper and more prolonged spells of recession than other forms of crisis.

So far, two different interpretations of the historical evidence on recoveries from financial crises have been put forward. The first line of interpretation posits that financial crises are associated with substantially weaker recoveries. Reinhart and Rogoff (2009a), for instance, argue in their widely cited work that declines in output, employment, and asset markets during recessions driven by financial crises are not only more pronounced but also significantly protracted (see also Reinhart and Rogoff (2009b)). Several authors such as Reinhart and Reinhart (2010), Cerra and Saxena (2008), and the International Monetary Fund (2012) report similar findings, supporting the idea that financial crises have a more adverse effect on economic performance during the period of recovery than "normal" recessions do.[2] The second line of interpretation, however, contends that there is little evidence for differences in output performance between different types of recession during the recovery period. On the contrary: it is even argued that the economy might bounce back faster from deep recessions triggered by financial crises than recessions in which financial crisis has played no role (see Howard et al. (2011); Bordo and Haubrich

[1] In the 2012 U.S. presidential election the issue gained national importance when the economic record of the outgoing administration became a matter of public and scholarly debate.

[2] Reinhart and Reinhart (2010) take a long-term perspective on financial crisis that incorporates the recovery period by examining the behavior of key macroeconomic indicators during the decade before and the decade after the crisis. They find that financial crisis significantly adversely affect the performance of these indicators, including slower income growth rates and elevated unemployment. Cerra and Saxena (2008), analyzing a sample of 160 countries, argue that financial crises are associated with large output losses that tend to be highly persistent. Based on this previous research, Reinhart and Rogoff (2012) argue that the U.S. has performed better during the current recovery than during previous systemic financial crises and has performed better than other countries that experienced similar systematic financial crises in 2007–2008. Some critics, however, have pointed out that a sample such as used by Reinhart and Rogoff (2009a), Reinhart and Reinhart (2010), and Cerra and Saxena (2008) comprising advanced and developing economies might not offer meaningful evidence. Nevertheless, Schularick and Taylor (2012b), focusing on 14 advanced economies between the years 1870 and 2008, also stress that the recent recovery has been far better than could have been expected given the historical record on recoveries from financial crises. From a sample of 21 advanced economies since 1960, the International Monetary Fund (2009) concluded that financial crisis-based recessions tend to be more severe and longer lasting than recessions associated with other shocks. The subsequent recovery is usually weaker, with tight credit conditions and weak domestic demand being important features of these periods.

(2012)).[3] Even though the general consensus is that recessions driven by financial crisis are more costly than other recessions (see for example Kaminsky and Reinhart (1999); Cerra and Saxena (2005a,b); Reinhart and Rogoff (2009b); Schularick and Taylor (2012a); Bordo and Haubrich (2010); Taylor (2012)), there remains some uncertainty about how recoveries from financial crises differ qualitatively from recoveries associated with standard recessions.[4]

While the explanatory power of the crisis type (i.e. financial or not) on the length, strength, and quality of recovery remains debated, recent research suggests that the development of certain macroeconomic variables during the pre-crisis period could be decisive. Schularick and Taylor (2012b) offer an insightful perspective using pre-crisis credit growth instead of a binary approach to identify slumps set off by financial crises. The authors conclude that "all recessions [and recoveries] are not created equal": the more credit intense the expansion years preceding a crisis, the more severe the recession and the slower the recovery. This is particularly interesting because leverage has been identified as playing an important role in financial crises.[5] In a similar vein, one strand of literature that seeks to explain the current sluggish recovery stresses that high and persistent levels of household debt – known as a *debt overhang* – holds back economic recovery, because households continue to deleverage in an attempt to repair their balance sheets (see Mian et al. (2011); Mian and Sufi (2012)).[6]

This paper aims to contribute to this debate. It offers a new perspective by analyzing the link between high household indebtedness and economic performance during the recovery from the Great Depression in the U.S. The Great Depression is an obvious place to look. As in the run-up to the recent crisis, the years preceding the Great Depression were a time of marked credit expansion. Household indebtedness more than doubled in the 1920s, from 15 percent of GDP in 1920 to 32 percent of GDP in 1929.[7] After the

[3]Howard et al. (2011) examine 59 advanced and emerging economies since 1970. They define the recovery by indexing the level of GDP to 100 at the date of the recession trough. But they also note that the strength of recovery varies under certain circumstances. For instances, recessions featuring severe housing downturns are associated with slower recoveries, while deep recessions are followed by faster recoveries. Bordo and Haubrich (2012) analyze U.S. recessions since 1880. According to the authors, the weak current recovery is a major departure from historical precedent. Their approach, however, has been criticized by Krugman (2012), who identifies several misattributions and argues that using growth from the recession trough as a measure of recovery success provides a blurred picture. This criticism also applies to the approach used by Howard et al. (2011). Reinhart and Rogoff (2012) also observe that Bordo and Haubrich (2012) failed to distinguish between systemic financial crises and non-systemic ones. Schularick and Taylor (2012b) note that the implications of financial crises might be hard to identify given the small sample size when only focusing on U.S. experience.

[4]See also Brunnermeier and Sannikov (2012), who state that "[e]mpirically, the profession has not settled the question of how fast recovery occurs after financial recessions."

[5]See for example Tobin (1989), who called it the "Achilles heel of capitalism." Sutherland et al. (2012) argue that high debt in general is associated with more pronounced vulnerabilities and thus can weaken macroeconomic stability.

[6]See Konczal (2012) for an overview of studies discussing this *balance sheet recession view*.

[7]Data drawn from Goldsmith (1955, Table D-1), Grebler et al. (1956, Table N4), James and Sylla

Great Crash in 1929, households tried to reduce their debt burdens (Temin, 1976, 171) as incomes fell.[8] Aggregate demand collapsed, with consumer expenditures decreasing by 18 percent between 1929 and 1933 (Temin, 1976, Table 1).[9]

In this paper, I use cross-sectional data for U.S. states to examine state-level variation in household indebtedness and the strength of recovery during the Great Depression. The level of household debt varied substantially across states at the onset of the Depression. I look for evidence of a correlation between household debt and economic performance during the recovery period. The state-level focus not only allows a more detailed and nuanced study of the Great Depression in the U.S.; it is also helpful in circumventing problems associated with unobserved heterogeneity in cross-country studies. In examining this relationship, I compiled a new dataset containing state-level data on credit, income, employment, and various other control variables for the period 1925–39.

I am not the first person to study state-level performance during the Depression with the goal of understanding its specific drivers. Previous contributions have pointed out differences in economic structures and in initial prosperity as main factors that produce spatial variation in economic performance (Wallis, 1989; Rosenbloom and Sundstrom, 1997; Garrett and Wheelock, 2006). The role of New Deal spending and regional variation in banking crises has also been discussed in great detail (Fishback et al., 2003, 2005). It is thus important to control for a wide range of other factors. To the best of my knowledge, debt overhang in the household sector has not been examined systematically as a central factor behind the divergence in state-level economic performance in the 1930s. Therefore, this paper hopes not only to make a specific contribution to the aforementioned studies on the role of household debt in the business cycle but also to illuminate an important aspect in the comparative development of U.S. states during the Great Depression.

The main findings of this paper are as follows. First, I demonstrate with a cross-sectional analysis that there was a close relationship between household indebtedness and economic performance during the recovery period. More indebted states showed worse economic performance than less indebted states. Second, I show that this indebtedness/performance relationship was mostly driven by a slower pace of economic recovery, but not by a more severe recession. Thus, state-level data for the U.S. in the 1930s provide strong evidence for the view that household indebtedness shapes the recovery path, a

(2006, Table 889), Schularick and Taylor (2012a).

[8] Between 1929 and 1933, personal income per capita declined by about 35 percent in real terms (data drawn from Schwartz and Graham (1955)).

[9] Temin (1976) found that the collapse in aggregate consumption in 1930 was even more pronounced than in 1921 and 1938 and argued that "the fall in consumption must be regarded as truly autonomous." (Temin, 1976, 83). Examining the reasons of the collapse in consumption, Romer (1990) claimed that the 1929 stock market crash created uncertainty about future income causing consumers to decrease spending on durable goods. Olney (1999, 320) notes the significance of consumer debt, writing that "[t]he 1930 drop in consumption resulted from the unique combination of historically high consumer indebtedness and punitive default consequences."

view consistent with studies on debt overhang in the household sector during the current recession. Third, I present some suggestive evidence that deleveraging was an important factor as high debt-to-income states reduced their debts more strongly. My findings are robust to the inclusion of controls for initial income levels, for sector-specific shocks, for bounce-back effects, for effects of fiscal and monetary policy, as well as for the degree of bank distress. Overall, I find that household debt overhang is an important aspect in explaining the severity and duration of the Great Depression in the U.S.

The remainder of this paper is structured as follows. Section 2 provides a theoretical discussion, reviewing literature on the link between household debt, economic downturns, and subsequent recoveries. After discussing the dataset and the methodology, in section 3 I analyze the relationship between household debt and economic performance during the 1930s. Moreover, I examine deleveraging as a possible transmission mechanism for the adverse effect of high household indebtedness. The final section provides a summary of my findings.

2 Household Debt and the Economy: Then and Now

In recent academic and political debates, the credit boom that preceded the Great Recession features prominently. This comes as no surprise, as it has been widely noted that countries experiencing particularly pronounced credit booms, such as the U.S. but also the United Kingdom and Spain, have faced more sluggish recoveries than countries like Germany or Canada, which entered the Great Recession with low private credit levels. Using U.S. county level data, Mian, Rao, and Sufi (2011) and Mian and Sufi (2012) show how the accumulation of household debt affected consumption and employment during the recession. They argue that the substantial accumulation of household debt between 2002 and 2006 in combination with the collapse in home prices at the onset of the economic crisis helps one to understand the onset, severity, and the length of the subsequent collapse in consumption (Mian et al., 2011). Faced with the strong decline in housing prices, highly leveraged counties experienced a severe shock to their balance sheets in 2007 and 2008. Affected households started to reduce their debt burdens and rebuild their balance sheets. This, in turn, resulted in a significant drop in household consumption expenditures and pronounced weaknesses in aggregate demand. The researchers conclude that weak household deleveraging and the resulting drop in aggregate demand were major causes of the high and persistent level of unemployment (Mian and Sufi, 2012).[10] This relationship

[10]Both Mian et al. (2011) and Mian and Sufi (2012) employ U.S. county-level data for their studies. Using household survey data from the Panel Study of Income Dynamics, Dynan (2012) offers evidence consistent with this argument. Also Glick and Lansing (2009) make a similar point arguing that the deleveraging by U.S. households would act as near-term drag on overall economic activity through a prolonged slowdown in consumer spending.

appears to apply not only to the United States but also to countries globally. Analyzing a sample of advanced economies over the past three decades, the International Monetary Fund (2012) finds that housing busts and recessions that were preceded by larger run-ups in household debt tended to be deeper and protracted.[11]

How can the close relationship between debt overhang in the household sector and economic performance be rationalized? This question is not entirely new. The role of financial factors in the business cycle was the subject of research as far back as the 1930s. The boom leading up to the Great Depression was associated with a strong increase in household indebtedness.[12] While the literature emphasizes the rapid expansion of consumer credit during the *années folles*, caused by the *consumer durable revolution* (Vatter, 1967) and the related proliferation of the installment plan (Olney, 1987; Hyman, 2011), mortgage debt as the largest component of total household liabilities increased at an even slightly faster pace between 1920 and 1929.[13] The rise in residential mortgage debt was associated with a nationwide real estate boom. Though prices probably peaked in 1925 – well in advance of the Great Depression – residential housing starts remained strong for the rest of the decade, fueling a continuous rise in household mortgage debt.[14]

High levels of household debt accumulated during the 1920s were the principal ingredient to Irving Fisher's concept of a self-enforcing debt deflationary spiral that reinforces an initial economic shock (Fisher, 1933).[15] According to Fisher, once household debt is perceived as excessive either by creditors or debtors, credit markets tighten and force creditors to consolidate by liquidating asset positions to reduce debt stocks. The subsequent asset price slump increases the value of debt in real terms, enforcing another cycle of distress selling and debt-deflationary spiral. Accordingly, Fisher concludes that the Great Depression was "an example of a debt-deflation depression of the most serious sort" (Fisher, 1933, 345).

Yet Fisher's insights were largely forgotten in subsequent decades. Not only were there no financial crises in advanced economies in the three decades after the Second World War.

[11] Already Glick and Lansing (2010) offer evidence that the link between rising leverage and rising house prices since the late 1990s as documented by Mian and Sufi (2009) might be a global phenomenon. The same holds true for the link between household leverage before the crisis and the decline in consumption during the crisis.

[12] This unprecedented credit boom has been emphasized in several accounts of the 1920s (e.g. Allen (1931, 167 ff.)).

[13] Total consumer credit (i.e. long-term and short-term) increased from $6.07 bn in 1920 to $14.4 bn in 1929 for an average annual growth rate of 9 percent. During the same period, residential mortgage debt rose from $7.2 bn to $18.9 bn, which amounts to an average annual growth rate of about 10 percent (data drawn from Goldsmith (1955, Table D-1), Grebler et al. (1956, Table N4), James and Sylla (2006, Table 889).

[14] For a discussion of the real estate boom and bust of the 1920s, see for example White (2009) and Allen (1931, 270 ff.).

[15] This was the first attempt to account systematically for the role of private debt in business cycle theory.

Fisher also neglected to discuss why changes in debt levels – which, by definition, go hand in hand with equivalent changes in assets – have macroeconomic consequences. As every debt is an asset for someone else, debt deflation episodes redistribute wealth, though the aggregate asset position of the household sector remains more or less unchanged. In short, the unexpected price level shocks discussed by Fisher would only have redistributive effects within the household sector.

Tobin (1980, 10), focusing on the implications of distributional shocks between debtors and creditors, asserts that "[a]ggregation would not matter if [...] the marginal propensity to spend from wealth were the same for creditors and debtors." Tobin reasons that the borrower and lender status is not randomly distributed among households. Rather, the debtor status indicates a comparably higher marginal propensity to spend. In this case, a redistribution of wealth from borrowers to lenders is not neutral in terms of demand. King (1994) further pursues Tobin's argument, presenting suggestive evidence on the link between the shortfall of consumption in the 1990s and the previous rise in the household-debt-to-income ratio by county and region for the United Kingdom. Another perspective was offered by Mishkin (1978), who argues that household balance sheet adjustments triggered by financial distress lower demand for tangible assets, which is to say, for consumer durables and residential housing.[16]

The recent financial crises and the subsequent recession has precipitated renewed interest in these questions. Several recent contributions argue that a shock to household balance sheets results in a significant reduction in consumption (Hall, 2011; Eggertsson and Krugman, 2011; Guerrieri and Lorenzoni, 2011; Philippon and Midrigan, 2011). Though this research focuses on the state of the household balance sheet, it differs from Mishkin (1978) in two regards: First, most authors define the shock to household balance sheets as a sudden credit tightening. Second, deleveraging is considered the main transmission mechanism linking high household debt to a decrease in consumption. In line with Tobin (1980) and King (1994), these studies assume heterogeneous agents, i.e. that some households are borrowers and some are lenders.

Eggertsson and Krugman (2011) model a crisis that results from a deleveraging shock triggered by sudden awareness that assets are overvalued and household collateral constraints too lax, a so-called *Minsky moment*.[17] The authors assume that households are

[16]In an earlier paper, Mishkin (1977) makes a similar point examining the 1973—75 recession. In addition to the 'liquidity hypothesis,' Mishkin (1978) tested Ando and Modigliani's 'life-cycle hypothesis.' Based on this model, he reasons that a drop in a household net wealth has a significant impact on consumption. Accordingly, the large drop in household net wealth between 1929 and 1930, further intensified by price deflation between 1930—32, might have contributed to the decline in aggregate demand. While this model does not distinguish between the effect of assets and the effect of liabilities on the household balance sheet, debt deflation nevertheless partly explains why household net worth decreased substantially during this period.

[17]This term goes back to Hyman Minsky and his financial instability hypothesis. Minsky argues that the economy is inherently unstable due to "capitalist finance" (Minsky, 1986, 219). He characterizes

heterogeneous: debtor households are impatient; creditor households are patient. As a consequence of the sudden downward revision of acceptable debt levels, debtors need to cut back on current consumption to adjust to the borrowing constraint.[18] Therefore, to sustain spending by the creditor so as to maintain a certain level of consumption, interest rates have to decrease. However, according to the authors, a nominal interest rate of zero can still be too little to induce sufficient spending; hence, the economy may be stuck in a liquidity trap.[19]

Other models propose similar (if not identical) mechanisms. For instance, the model of Guerrieri and Lorenzoni (2011) and the model of Eggertsson and Krugman (2011) both assume that borrowers deleverage by reducing consumption, but the former also assumes that lenders increase precautionary savings as well. Through the sudden reduction in the demand for, and increase in, the supply of savings, interest rates fall and output declines, with both effects being strongest in the short run.[20] In related work, Philippon and Midrigan (2011) focus on housing as both a consumption good and as a means of providing liquidity via home equity borrowing. When a shock limits the ability of households to extract equity from their houses, leveraged households are forced to reduce their consumption. Applying their model to the Great Recession, they conclude that a reduction in credit at the household level accounts for the decrease in output and employment to a non-negligible extent.

While these theoretical and empirical contributions assume different transmission mechanisms, they all agree that the buildup of debt in the household sector coupled with a shock to household balance sheets can contribute significantly to deep and prolonged economic downturns. The history of the Great Depression provides a fascinating testing ground for these hypotheses. Before turning to the empirical evidence on the relationship between household debt and state-level economic performance during the 1930s, however,

---

the business cycle upswing as a period of transitory tranquility that expands as economic agents become increasingly optimistic, increasing the willingness to borrow and to engage in speculative and debt finance practices. As balance sheets deteriorate, financial fragility arises. The boom comes to an end when short- and long-term interest rates rise, creating the so-called the *Minsky moment*. Whether this later leads to a deep recession, a financial crisis, or debt deflation depends mainly on structural characteristics and specific policies, such as overall economic liquidity, government size, and lender-of-last-resort actions by the central bank. The tendencies that precipitate a boom are also determined by institutional structures and policy systems (Minsky, 1986, 197ff.). Though Minsky focuses on corporate debt, his hypothesis, or parts of it, have been applied to cases of household indebtedness by Eggertsson and Krugman (2011) and Palley (1994), among others.

[18] Way back in 1896 Bagehot noted that "[c]redit – the disposition of one man to trust another – is singularly varying. In England, after a great calamity, everybody is suspicious of everybody; as soon as that calamity is forgotten, everybody again confides in everybody."

[19] Hall (2011) makes a similar point, arguing that in an economy with a disabled monetary policy the decline in aggregate demand driven by deleveraging is a major factor in understanding the nature of the contraction.

[20] Contrary to the findings of Eggertsson and Krugman (2011), borrowing and lending are driven by idiosyncratic income shocks rather than by preferences, though Eggertsson and Krugman (2011) also incorporate a nominal debt deflation mechanism.

I present in the next section the dataset and discuss the methodology.

3 Estimating the Effects of Household Debt on Economic Recovery in the 1930s

The trajectory of the Great Depression in the U.S. is well known. After the stock market crash in October 1929, the U.S. economy entered a sharp recession. In the second half of 1932, industrial production increased slightly but a wave of banking failures in early 1933 pushed the U.S. back into depression. It was only after the banking holiday in the spring of 1933 that the recovery began in earnest. Until 1937, real GNP grew at an average annual rate of over 8 percent. In the period 1937–38, the recession within the depression initiated new economic troubles. Despite the high growth rates throughout the recovery, the fall in output was so severe that the U.S. only returned to its pre-Depression growth path around 1942 (see, e.g. Romer (1990, 1992)). The strength of the recovery differed substantially across U.S. states, however.

In this section, I study the role of household debt in the 1930s. The key question to be addressed is whether there is systematic evidence that higher levels of indebtedness were associated with slower recovery. The analysis will focus on state-level economic performance in the recovery period, i.e. from 1933 to 1939. Economic performance is defined using four different indicators: personal income, wages, employment, and consumption. I also study other sub-periods and perform various robustness tests. The sub-periods that I examine are the Great Depression as a whole (1929–39), the contraction period (1929–32), as well as two periods excluding the recession within the Depression (1929–37 and 1933–37). This differentiated approach reveals that the strong relationship between household debt and economic performance is mostly due to a slower pace of economic recovery and not to a more severe slump in the initial years of the Depression recession.

3.1 Data and Methodology

To study the effect of household debt on economic performance during the Great Depression, I compiled a new dataset. The dataset covers 48 U.S. states and the District of Columbia from the years 1929 to 1939 at annual frequency.[21] For each state, it assembles data on household debt, on income and wages per capita, on employment for the period, on New Deal spending, on sectoral output composition, on discount rates set by the respective regional Federal Reserve Banks, on bank failures, and on retail sales. In doing so, I draw on a variety of data sources and the work of other scholars such as Fishback

[21] Alaska and Hawaii did not become U.S. states until 1959.

et al. (2005) and Wallis (1989). Below I briefly describe the key variables and introduce the empirical model to be estimated.[22]

For the period of the Great Depression and the subsequent recovery, most standard indicators for economic performance and business cycle activity (e.g. GDP, consumption) are unavailable due to lack of reliable and consistent state-level data. To circumvent this shortcoming, I use state-level per capita income (INC_s) and per capita salaries and wages ($WAGE_s$) as dependent variables. While at the national level, per capita income[23] serves as a good proxy for GDP per capita (correlation coefficient of 0.98 for the period 1929—39), per capita salaries and wages (the largest share of total household income) are a more sensitive income measure of economic fluctuations.[24] I draw data on total household income and salaries and wages from Schwartz and Graham (1956). To study the effects of household debt on employment, I also use the employment index provided by Wallis (1989) (EMP_s) as a third dependent variable. The index is calculated from establishment surveys on firms undertaken by the Bureau of Labor Statistics (BLS).[25] According to Fishback et al. (2005), retail sales serve as a strong proxy for consumption, both for durable and non-durable goods. As a fourth dependent variable, therefore, I use data on retail sales supplied by Fishback et al. (2005) to examine effects on consumption ($SALES_s$).

In the empirical literature examining the effects of indebtedness on economic performance, the household debt-to-income ratio is commonly used as key explanatory variable (see, e.g., Olney (1999), Glick and Lansing (2010), Mian et al. (2011), Philippon and Midrigan (2011), International Monetary Fund (2012), Mian and Sufi (2012)). I use the average state-level ratio of household debt-to-income in 1929 ($DEBT_{s,1929}$) to proxy for household leverage.[26]

As data on total household debt is unavailable at the state level, average annual debt-to-income ratios are calculated using annual state-level mortgage debt data drawn from the All Bank Statistics (ABS) (Board of Governors of the Federal Reserve System, 1959). In assessing the adequacy of the approximation, I calculated the share of total residential mortgage debt, the share of national-level mortgage debt, and the share of household debt.

[22]For a complete description of data, see Appendix B.

[23]Personal income comprises wages and salaries, supplementary types of labor income such as employer contributions to private pension, net proprietor's income for unincorporated businesses, property income, and transfer payments.

[24]Wage and salary disbursements accounted for on average 58.5–65.2 percent of personal income in the 1930s (see Creamer and Merwin (July 1942, 23)).

[25]The index base year is 1929 (100) (Wallis, 1989).

[26]I use the word leverage in a broader sense to stand for household indebtedness relative to income. Typically, the concept of leverage relates to the ratio of household debt to household assets. In the event of an adverse economic shock, households with an unexpected debt overhang are forced to readjust to their targeted net asset position through deleveraging. By leverage I generally mean the debt-to-income ratio or income leverage. "Debt overhang" also refers to the debt-to-income ratio of households.

As shown in Figure 1, mortgage debt is by far the largest share of household debt during the period 1925–39, amounting to on average 60 percent of total household debt. At the national level, mortgage debt reproduces the trends and fluctuations in total household debt fairly well, with a variable correlation of 0.8.

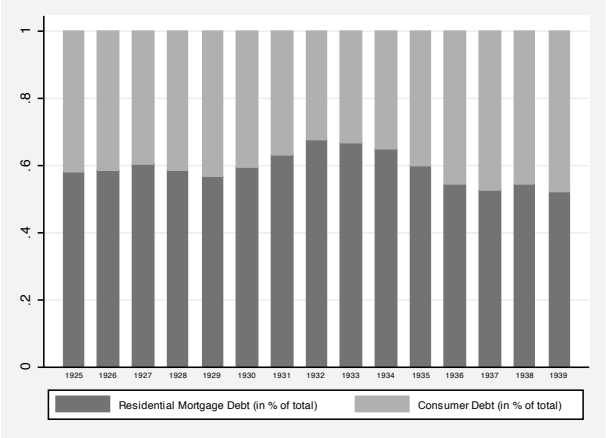

Figure 1: Shares of Nonfarm Private Debt, 1925–39 *Source: James and Sylla (2006, Tables 889); Goldsmith (1955, Table D-1); Grebler et al. (1956, Table N4).*

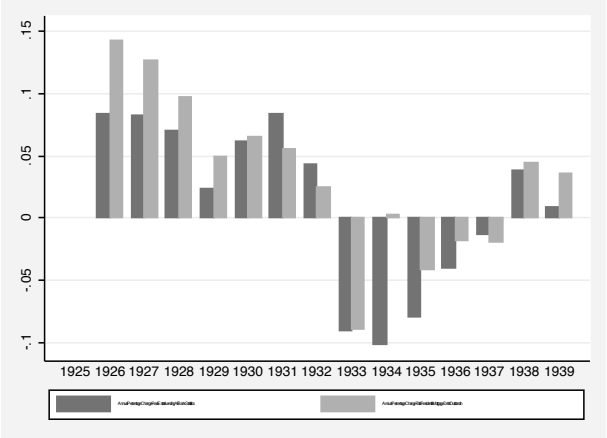

Figure 2: Total Annual Percentage Change for U.S. Mortgage Debt Outstanding and All Bank Statistics Real Estate Lending, 1925–39 *Source: All Bank Statistics; Grebler et al. (1956, Table N4)*

Yet data from the ABS suffer from two constraints: First, they underestimate total mortgage debt because they do not record household lending by all financial intermediaries. The ABS cover mortgages issued by national banks, chartered state banks, loan and trust companies, stock savings banks, unincorporated private banks, and mutual savings banks. This neglects major lenders for mortgage credit such as building and loan associations and life insurance companies. Second, the data series also comprises loans on farmland and other properties, as well as loans on bonds and mortgages.[27]

Nevertheless, real estate lending as reported by in the ABS appears to be a good indicator for total residential mortgage lending. Figure 2 compares annual percentage changes in the ABS on national level with annual percentage changes in total residential mortgage debt outstanding as reported by Grebler et al. (1956). As is quite evident, the two data series follow the same trend for the national level. Both series are strongly correlated (approx. 0.8) for the period 1925–39.

Figure 2 also confirms the strong increase in mortgage indebtedness during the sec-

[27]For instance, the share of farm mortgages was between 20 and 30 percent of total mortgages during the period 1925-–39.

ond half of the 1920s.[28] Data drawn from the ABS suggest a strong positive relationship between the mortgage debt-to-income level in 1929 and the percentage change in mortgage debt per capita from 1925 to 1928.[29] Unsurprisingly, this indicates that households had higher debt-to-income ratios when the boom years came to an end in states with a particularly pronounced credit growth in the 1920s.[30]

The key explanatory variable in the following analysis is the initial average state-level indebtedness of households, $DEBT_{s,1929}$, defined as the mortgage debt-to-income ratio as of 1929 for each state. As a robustness check, I also use the mortgage debt-to-income ratio as of 1932 ($DEBT_{s,1932}$) for each state. Results for these two key variables are reported separately in section 3.2, but the results are very similar.

Debt levels are unlikely to be the only drivers of economic performance, however. Hence, it is crucial to account for other factors that may produce spatial inequality in economic performance and propose additional control variables. In selecting variables I follow previous literature (see for example Calomiris and Mason (2003), Romer (1993, 32 ff.), Fishback et al. (2005, 38), Garrett and Wheelock (2006)). The control variables fall into the following broad categories: income level, fiscal policy, and the effects of the New Deal; sector specific factors; potential regional differences in monetary policy; and bank failures.

Let me now discuss the other factors that may have induced spatial inequality and the control variables needed to compensate for them. I have five salient points. First, the depression could have had different effects on states depending on their productivity levels, which is why I include – state-level income per capita in 1933 relative to nation-wide income per capita in 1933 – as a measure of aggregate productivity.

Second, since bank failure rates vary widely across states, $BANKFAIL_s$ controls for the degree of bank distress at the state level between 1929 and 1933 and is defined as the annual average rate of bank suspensions in the period 1929—33.[31] Although the exact transmission mechanism through which bank failures magnify the extent of economic

[28]This applies to all loan categories reported in the ABS: real estate loans, loans secured by collateral other than real estate, and all other loans (see Table 9). The increase in real estate loans and loans on collateral (including loans backed by securities) stands out in particular and provides a suggestive link between the real estate boom and the stock market boom and the growth of credit.

[29]The correlation coefficient is 0.43. The relationship remains strong (corr. 0.48) even when omitting influential observations (VT, MA, NH, CT, NY). This also applies when using the change in total loans p.c. as reported in the ABS 1925—28 (corr. 0.40). But because state-level income data is unavailable prior to 1929, it is impossible to determine the extent to which the increase in household debt corresponds to a comparable development in income.

[30]In Oklahoma, households were the lowest income levered (with a mortgage debt-to-income ratio of 0.13). Households were the highest income levered in Vermont (with a mortgage debt-to-income ratio of 0.43).

[31]While most northeastern states had low failure rates, several mid-western and southern states faced substantial bank distress, with failure rates exceeding ten percent in the period 1929—33.

decline is disputed,[32] bank failures have been identified as a significant factor in explaining economic performance during the period of the Great Depression (see, for example, Friedman and Schwartz (1963), Bernanke (1983), Calomiris and Mason (2003), Romer (1993, 32 ff.)). Bank failures might matter particularly as an indicator of credit supply (see Calomiris and Mason (2003)).

Third, during the 1930s, particularly as part of the New Deal, the federal government embarked on expansionary fiscal policy and issued substantive volumes of loans and grants throughout the United States to revive economic activity. As a result, federal civilian spending as a share of GNP increased from about one to eight percent during this decade (Rockoff, 1998, 130). Because New Deal spending per capita differed markedly across states (see for example Fishback et al. (2005, 38)), I control for cross-sectional level effects with the variable $NEWDEAL_s$, which measures cumulative per capita government spending and lending from 1933 to 1939 for each state.

Fourth, sector-specific shocks might create spatial differences in economic performance depending on the sectoral composition of output in a respective state. Sectors particularly affected by the economic downturn after 1929 were agriculture, mining, construction, and durable manufacturing. By contrast, the services and transportation sector were affected to a lesser extent (Garrett and Wheelock, 2006, 464). Accordingly, states with an initially unfavorable sectoral specialization can be expected to experience larger declines in per capita income than states less dependent on these sectors. I use $AGRIC_{s,1929}$ and $MAN_{s,1929}$ to proxy for sector specific factors. These variables measure salaries and wages received from agriculture and manufacturing as a share of total personal income at the state level in 1929.[33]

Fifth, and finally, I aggregated states into regions based on the Federal Reserve Districts as a control variable. It measures the extent and timing of the monetary policy response by the respective regional Federal Reserve Bank ($MONPOL_s$) to account for possible differences in monetary policy. The variable is calculated using data on discount rates set by the respective regional Federal Reserve Banks in the contraction period, i.e. 1929–32. Timing and scale of interest rate cuts are used as weights. Earlier and stronger interest rate cuts are attributed a higher weight than smaller and posterior reductions in discount rates. The results suggest that differences in monetary policy generally did not produce spatial variation in economic outcomes.

[32]Friedman and Schwartz (1963), for example, point out the negative impact of banking panics on money supply, which led to a decline in spending, employment, and output. Bernanke (1983), by contrast, argues that the principal conduit for the transmission of shocks is that of disrupted credit flows through the increased cost of financial intermediation.

[33]In 1929, about 25 percent of national income came from salaries and wages in the manufacturing sector and about 10 percent from salaries and wages in the agricultural sector (data drawn from Carter (2006)).

Summary statistics for the main variables are presented in Table 1.

Table 1: Summary Statistics

	Mean	Min	Max	Std. Dev.	N
$DEBT_{s,1929}$	0.0986	0.0130	0.4259	0.0953	49
ΔINC_s (1929–39)	0.0107	-0.2012	0.2104	0.0836	49
$\Delta WAGE_s$ (1929–39)	0.0626	-0.3238	0.3040	0.0956	49
ΔEMP_s (1931–39)	0.1624	0.0812	0.0178	0.3907	48
$\Delta SALES_s$ (1929–39)	0.0100	-0.3027	0.2302	0.1268	48
$DELEV_s$	0.0793	-0.5230	1.1480	0.3481	48
$NEWDEAL_s$ (in 1967$)	238.27	107.46	746.78	111.21	49
$BANKFAIL_s$	0.1340	0.0081	0.3944	0.0829	49

I use a cross-sectional OLS model. The estimation equation for the baseline specification covering the period 1933–39 is:

$$\Delta Y_s = \alpha + \beta_1 DEBT_{s,1929} + \beta_2 INC_{s,1933} + \beta_3 AGRIC_{s,1929} + \beta_4 MAN_{s,1929} + \beta_5 NEWDEAL_s + \beta_6 MONPOL_s + \epsilon_s \quad (1)$$

with s indexing states. The error term is assumed to be well behaved. ΔY_s varies in the regressions. I use four different dependent variables: income per capita, salaries and wages per capita, employment, and retail sales. ΔY_s is

$$\Delta Y_s = lnY_{s,1937} - lnY_{s,1933} \quad (2)$$

In other words, it expresses the observed percentage change of the respective dependent variable during the recovery period. This period also covers the recession within the depression and might thus confuse different effects. For this reason, the specification is estimated to exclude the years 1938 and 1939 as a second measure of the recovery period.

3.2 Household Debt and Recovery, 1933–39

What were the implications of high ex-ante levels of household income leverage for economic performance during the recovery period? The initial visual inspection of the data suggested a notable relationship between the level of household indebtedness as of 1929 and the growth rate in personal income between 1933 and 1939. Figure 3 shows the correlation plot for these two variables. The plot indicates that high-debt states showed worse economic performance than lower indebted states.[34]

While the relationship in Figure 3 is indicative, one also needs to control for other

[34]This negative relationship remains robust even when omitting the influential states VT, MA, NH, NY, CT, and PA.

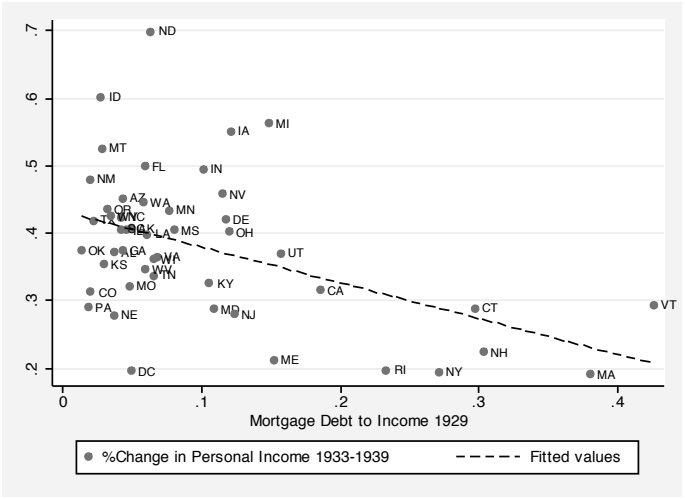

Figure 3: Debt to Income 1929 and Percentage Change in Personal Income 1933–1939. *Source: Board of Governors of the Federal Reserve System (1959); Schwartz and Graham (1956).*

variables, as I stress above. I thus now turn to formal regression analysis using the baseline specification outlined in the previous subsection.

Table 2 shows the regression of ex-ante household indebtedness on the percentage change in four indicators for economic performance from 1933 to 1939: income per capita, wages per capita, employment, and retail sales. The model is estimated with heteroskedasticity-robust standard errors.[35] These benchmark results show an interesting picture: regression coefficients on $DEBT_{s,1929}$ are negative and highly significant on the five percent level for all dependent variable specifications. Everything else being equal, the coefficients point toward a decrease in the growth rate of employment, per capita income, and per capita salaries and wages during the recovery between 2.7 and 4.2 percentage points for a debt-to-income ratio ten percentage points above the sample mean. At the very least, these preliminary results suggest that in states where households initially faced relatively high debt balances, economic performance between 1933 and 1939 was markedly weaker.

Figure 4 explores this relationship between the level of household indebtedness and the strength of economic recovery in simple graphical form. The graphs present an index with 1933=100 for all four dependent variables distinguishing between the 13 high-debt states and the 12 low-debt states, i.e. the states in the top and bottom quartile for the 1929 debt-to-income ratio. It shows a clear divergence of recovery paths in these two groups

[35]Standard errors and levels of significance are not distorted by heteroskedasticity because standard test procedures (like the Breusch-Pagan test) do not detect it. This assumption is also supported by the fact that regressions with and without heteroskedasticity-robust standard errors and levels of significance do not differ significantly. All regression results in this paper are reported with heteroskedasticity-robust standard errors and levels of significance. For income p.c., SD has been omitted as an outlier. Wallis (1989) does not provide an employment index for DC in any given year.

for all economic performance indicators. Overall, low-debt states appear to recover faster and stronger during the period 1933–39.[36]

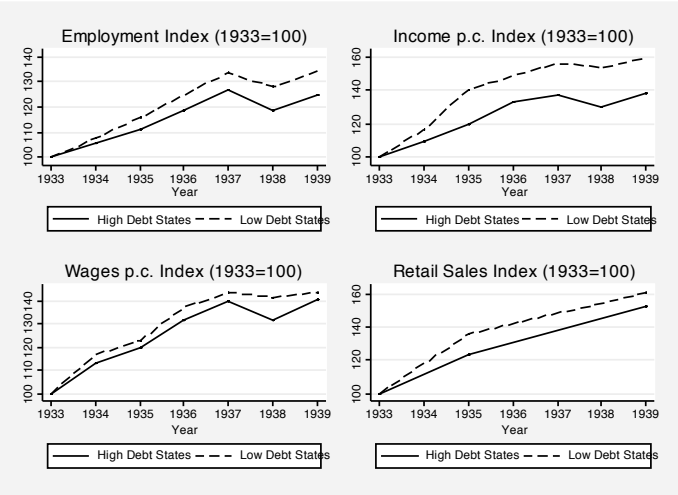

Figure 4: Recovery in Employment, Income p.c., Wages p.c., and Retail Sales for High-Debt and Low-Debt States *Source: Board of Governors of the Federal Reserve System (1959); Schwartz and Graham (1956); Fishback et al. (2005); Wallis (1989).*

According to the regression results in Table 2, the level of per capita income in 1933 correlates negatively to economic performance in the recovery period. This means that the initially less prosperous states experienced a stronger recovery. The immediate question, however, is how these less prosperous states performed during the contraction period. If they performed worse than more prosperous states – due to a sectoral composition that made the state economy more vulnerable to shocks, say – the negative effect of income per capita as of 1933 may be due to catch-up or bounce-back effects. In the "plucking model" of business fluctuations, Friedman (1993) argues that the size of the contraction affects the subsequent expansion and thus hypothesizes a bounce-back effect. For this reason, I include an additional control for a bounce-back effect ($BOUNCEBACK_s$) that is calculated as the percentage change (change in natural logs) of the respective dependent variable in the period 1929–32.[37]

Table 3 repeats the benchmark regression of Table 2 when controlling for a bounce-back effect. Regression coefficients on $DEBT_{s,1929}$ in columns (1) to (4) remain negative and highly significant on the five percent level for all dependent variable specifications.[38] All

[36]Accordingly, the 12 low-debt states are CO, ID, KS, MT, NE, NM, OK, OR, PA, SD, TX, and WY. The 13 high-debt states are CA, CT, IA, MA, ME, MI, NH, NJ, NY, OH, RI, UT, and VT.

[37]The respective $BOUNCEBACK_s$ variables are defined as $\Delta INC_{s,1929-32} = lnINC_{s,1932} - lnINC_{s,1929}$, $\Delta SAL_{s,1929-32} = lnSAL_{s,1932} - lnSAL_{s,1929}$ and $\Delta EMP_{s,1929-30} = lnEMP_{s,1930} - lnEMP_{s,1929}$. Since no data is available for retail sales in 1932, $\Delta INC_{s,1929-32} = lnINC_{s,1932} - lnINC_{s,1929}$ will be used as a proxy for the bounce-back effect in retail sales. The growth rates in retail sales and personal income strongly correlate for the period 1929—39 (corr. 0.64).

[38]To test for the robustness of this relationship, I have analyzed other periods of recovery as well: 1933–36, 1934–36, and 1934–37. The negative correlation between initial household debt and economic performance remains robust and significant.

Table 2: Regression Results Recovery, 1933–39

	(1) $\Delta\ INC_s$ 1933–39	(2) $\Delta\ WAGE_s$ 1933–39	(3) $\Delta\ EMP_s$ 1933–39	(4) $\Delta\ SALES_s$ 1933–39
$DEBT_{s,1929}$	-0.2820***	-0.2320***	-0.3880**	-0.3206**
	(0.0862)	(0.0786)	(0.1505)	(0.1357)
$INC_{s,1933}$	-0.1120***	-0.0883***	0.0222	0.4384
	(0.0227)	(0.0166)	(0.0562)	(0.0482)
$AGRIC_{s,1929}$	2.3208***	-0.0514	-0.2951	-0.1114
	(0.1995)	(0.2374)	(0.6808)	(0.7552)
$MAN_{s,1929}$	0.2726*	0.3230***	-0.2830	-0.1055
	(0.1556)	(0.1267)	(0.2505)	(0.1830)
$NEWDEAL_s$	0.0000	0.0001	0.0002*	0.0002*
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
$MONPOL_s$	-0.0323*	-0.0323**	-0.0267	-0.0148
	(0.0168)	(0.0139)	(0.0290)	(0.0244)
Constant	0.3427***	0.3445***	0.2596***	0.3941***
Specification	OLS	OLS	OLS	OLS
N	48	49	48	48
R^2	0.6477	0.4314	0.2384	0.1765

Note: Standard errors in parentheses; *** p<0.01, ** p>0.05, * p<0.1. Standard errors are heteroskedasticity-robust.

things being equal, the coefficients suggest a decrease in the growth rate of employment, retail sales, per capita income, and per capita salaries and wages during the recovery between 2.2 and 3.2 percentage points for a debt-to-income ratio ten percentage points above the sample mean for the period 1933–39. Moreover, the explanatory power of the specification is substantive, explaining up to about 69 percent of the regressand's variation. The null hypothesis of the F-test can clearly be rejected for all specifications except for regression (4).[39] Even though the model has weak explanatory power for $SALES_s$, the results suggest a statistically significant relationship between high initial household indebtedness and the decline in consumption during the period 1933–39. Yet because the availability of retail sales data for the period 1929–39 is insufficient for making reliable conclusions, these findings provide suggestive evidence at best.[40] Nevertheless, the results provide some indication that highly indebted households cut back consumption more strongly than households with lower levels of indebtedness.

The period 1933–39 includes the effects of the 1937 recession and hence might be confusing different effects. To extend the analysis, I use regressions (5) to (7) to examine the time period 1933–37 but excluding the effects of the 1937 recession. Since no data on retail sales is available for 1937, $SALES_s$ is omitted as a dependent variable.[41] As can be seen, the results hold up: regression coefficients on $DEBT_{s,1929}$ are negative and statistically significant on the one percent level for (5) and (6).[42] Once again, the model has high explanatory power. These regressions confirm the findings presented in Table 2 suggesting that in states where households initially faced comparably high debt balances, economic performance between 1933 and 1937 as well as between 1933 and 1939 was markedly weaker. The results remain significant when including weights for state size, i.e. when measured by state population in 1930 (see Appendix, Table 14).

As for the other control variables in Table 3, the results indicate that there is indeed a strong bounce-back effect: states that had suffered more pronounced losses in income and employment during the slump experienced a stronger and more rapid recovery.[43] This is in line with previous findings. For instance, Rosenbloom and Sundstrom (1997) attribute

[39]The F-value is 27.53 in column (1), 8.34 in column (2), 5.68 in column (3), 2.48 in column (4), 22.68 in column (5), 4.29 in column (6) and 6.39 in column (7) with respective p-values of about 0.00. (Except for column (4), where the p-value is 0.03.) The F-test is not distorted by multicollinearity because standard test procedures (like Variance Inflation Factors (VIFs) and simple bivariate correlation) do not detect it among explanatory variables. Most importantly, multicollinearity between $MAN_{s,1929}$ and $AGRIC_{s,1929}$ is not present. The VIFs for $MAN_{s,1929}$ and $AGRIC_{s,1929}$ remain well below any critical threshold.

[40]Data on retail sales are available for 1929, 1933, 1935, and 1939.

[41]For income p.c., SD has been omitted as an outlier as has been MI for salaries and wages p.c. For employment, AZ and VT have been omitted as outliers. Wallis (1989) does not provide an employment index for DC in any given year.

[42]The p-value (0.14) for the coefficient on $DEBT_{s,1929}$ in column (7) still offers suggestive evidence against the null hypothesis.

[43]Coefficients on $BOUNCEBACK_s$ are negative and highly significant for all three economic indicators and both periods of recovery.

the strong recovery in the Mountain region to a strong bounce-back effect. Also, Garrett and Wheelock (2006) showed that low-income states that had suffered larger declines during the recession would gain faster and stronger during the recovery. At the same time, sector-specific shocks were not a significant factor producing variation in economic outcomes.[44] This points toward the fact that the sectoral composition of output is less relevant in explaining scope and speed of recovery, confirming the finding by Garrett and Wheelock (2006, 465) that income growth varied little across sectors during the recovery period. The coefficients on $NEWDEAL_s$ are economically or statistically significant in neither specification. Differences in monetary policy generally did not produce statistically significant variation in economic performance. If anything, a slower and weaker countercyclical response to the initial shock was associated with slightly lower growth during the recovery.

Having examined the debt ratios at the onset of the Great Depression, I now turn to the debt overhang households continued to face in 1932. This accounts for possible changes in household debt-to-income ratios that took place during the contraction period 1929—32. Figure 5 summarizes the changes in household debt-to-income ratios in graphical form. Throughout the economic downturn, i.e. from 1929 to 1932, the average state-level mortgage debt-to-income ratio slightly increased. This applies both to high- and low-debt states. Yet though income leverage in low-debt states barely increased between 1929 and 1932, income leverage in high-debt states rose by about 11 percentage points. Not surprisingly, this indicates that households were unable to repair their balance sheets during the years of contraction; the truth was they faced persistent high or even significantly increased debt levels at the onset of the recovery.[45]

Table 4 assesses the implications of the debt overhang with which households entered the period of recovery by regressing the debt-to-income ratio as of 1932 ($DEBT_{s,1932}$) on the percentage change in economic indicators from 1933 to 1937 and from 1933 to 1939. The results are consistent with patterns seen previously when using debt levels as of 1929. The coefficients on income leverage remain negative and highly significant, which suggests a decrease in the growth rate of employment, per capita income, and per

[44] Coefficients on $MAN_{s,1929}$ and $AGRIC_{s,1929}$ differ remarkably between income p.c. and salaries and wages p.c. Total personal income p.c. also includes farm and nonfarm proprietor income. (In 1929, proprietor income accounted for about 17 percent of total personal income, with farm proprietor income accounting for seven percent of total personal income and nonfarm proprietor income accounting for ten percent of total personal income.) In the agricultural sector, farm proprietor income increases far more during the period of recovery than do salaries and wages in the farm sector. This implies that $AGRIC_{s,1929}$ has a more pronounced effect on income p.c. compared with wages and salaries p.c. For manufacturing, it is impossible to disentangle these dynamics because Schwartz and Graham (1956) report salaries and wages in the manufacturing sector but not proprietor income in the manufacturing sector. I assume that comparable dynamics created the differences in magnitude to the coefficients on $MAN_{s,1929}$.

[45] As can be expected, there is a strong correlation (0.99) between the mortgage debt-to-income ratio in 1929 and in 1932.

Table 3: Regression Results Recovery, 1933–37 and 1933–39 (Including Bounce-Back Effect).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	$\Delta\ INC_s$	$\Delta\ WAGE_s$	$\Delta\ EMP_s$	$\Delta\ SALES_s$	$\Delta\ INC_s$	$\Delta\ WAGE_s$	$\Delta\ EMP_s$
	1933–39	1933–39	1933–39	1933–39	1933–37	1933–37	1933–37
$DEBT_{s,1929}$	-0.2580***	-0.2266***	-0.3150**	-0.3034**	-0.2708***	-0.2844***	-0.2758
	(0.0837)	(0.0749)	(0.1520)	(0.1380)	(0.0980)	(0.0756)	(0.1852)
$INC_{s,1933}$	-0.0407	-0.0601**	-0.0141	0.0803	0.0068	0.0240	-0.0322
	(0.0358)	(0.0235)	(0.0562)	(0.0541)	(0.0390)	(0.02053)	(0.0568)
$BOUNCEBACK_s$	-0.3226**	-0.1748	-1.4882***	-0.1774	-0.5625***	-0.3531***	-1.6508***
	(0.1453)	(0.0847)	(0.4128)	(0.1595)	(0.1467)	(0.1139)	(0.3226)
$AGRIC_{s,1929}$	2.2322***	0.0526	-0.6310	-0.1634	1.6112***	0.3830	-0.4333
	(0.2550)	(0.2239)	(0.5473)	(0.7891)	(0.3121)	(0.3880)	(0.4437)
$MAN_{s,1929}$	0.2096*	0.2258*	-0.4068*	-0.1284	0.1258	0.0628	-0.1579
	(0.1292)	(0.1271)	(0.2295)	(0.1827)	(0.1546)	(0.1075)	(0.2052)
$NEWDEAL_s$	0.0000	0.0001	0.0002	0.0002*	0.0000	0.0001	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
$MONPOL_s$	-0.2907	-0.0273**	-0.0429	-0.0127	-0.0114	-0.0122	-0.0288
	(0.0179)	(0.0132)	(0.0265)	(0.0254)	(0.0164)	(0.0120)	(0.0214)
Constant	0.2022**	0.3001***	0.1873***	0.3161	0.1426*	0.2135***	0.1806***
Specification	OLS	OLS	OLS	OLS	OLS	OLS	OLS
N	48	49	48	48	48	48	46
R^2	0.6952	0.4861	0.4706	0.1974	0.6824	0.5544	0.4966

Note: Standard errors in parentheses; *** p<0.01, ** p>0.05, * p<0.1. Standard errors are heteroskedasticity-robust.

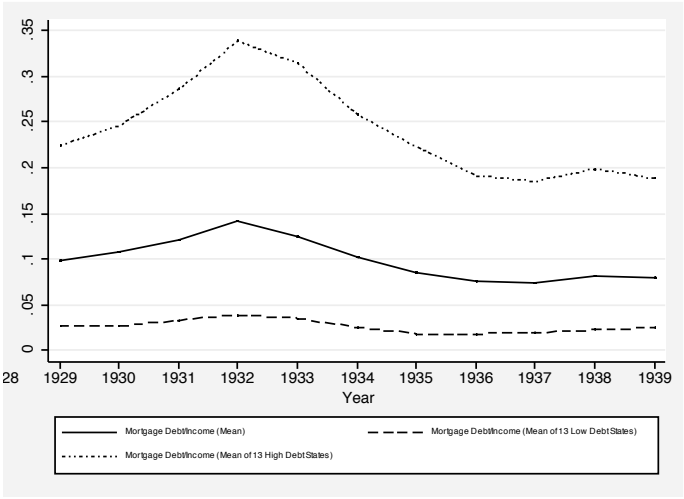

Figure 5: Mortgage Debt-to-Income 1929–39 *Source: Board of Governors of the Federal Reserve System (1959); Schwartz and Graham (1956).*

capita salaries and wages between 1.6 and 2.3 percentage points for a debt-to-income ratio ten percentage points above the sample mean.[46] Moreover, the explanatory power of the specification remains substantive, explaining up to about 71 percent of the variation of the dependent variable. Finally, the null hypothesis of the F-test can clearly be rejected for all specifications.[47]

The results imply that states in which households faced higher income leverage at the onset of the recovery period experienced a weaker economic performance in the period 1933—37/1939, everything else being equal. On balance, these regressions confirm the earlier results from Table 3, which indicate that high levels of household debt acted as a drag on economic recovery during the 1930s.

3.3 Robustness Tests

3.3.1 Factor Analysis

The regressions presented above aim to measure a latent concept of state economic performance using four different observables: personal income per capita, wages per capita, employment, and retail sales. This is because the "ideal" measure of economic performance – state-level real GDP, i.e. value added on the territory of the individual state – is unavailable. While all four indicators are strongly correlated (bivariate correlation coefficients between 0.82 and 0.94), there are certain conceptual limitations that may

[46]The p-value for the coefficient on income leverage in column (7) is 0.26.

[47]The F-value is 30.02 in column (1), 8.71 in column (2), 5.31 in column (3), 2.6 in column (4), 23.42 in column (5), 4.12 in column (6), and 6.23 in column (7), with respective p-values of about 0.00. The F-test is not distorted by multicollinearity.

Table 4: Regression Results Recovery, 1933–37 and 1933–39 (Using Debt Levels as of 1932)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	$\Delta\ INC_s$	$\Delta\ WAGE_s$	$\Delta\ EMP_s$	$\Delta\ SALES_s$	$\Delta\ INC_s$	$\Delta\ WAGE_s$	$\Delta\ EMP_s$
	1933–39	1933–39	1933–39	1933–39	1933–37	1933–37	1933–37
$DEBT_{s,1932}$	-0.1970***	-0.1556***	-0.2008**	-0.2243**	-0.2030***	-0.1934***	-0.1567
	(0.0547)	(0.0497)	(0.1021)	(0.0922)	(0.0583)	(0.0525)	(0.1349)
$INC_{s,1933}$	-0.0322	-0.0572**	-0.0118	0.0924*	0.0153	0.0274	-0.0356
	(0.0334)	(0.0235)	(0.0572)	(0.0534)	(0.0382)	(0.0206)	(0.0602)
$BOUNCEBACK_s$	-0.3334**	-0.1781	-1.4785***	-0.1901	-0.5741***	-0.3572***	-1.6456***
	(0.1414)	(0.1330)	(0.4156)	(0.1580)	(0.1432)	(0.1155)	(0.3304)
$AGRIC_{s,1929}$	2.2470***	0.0695	-0.6176	-0.1573	1.6257***	0.4035	-0.4167
	(0.2467)	(0.2213)	(0.5556)	(0.7732)	(0.3193)	(0.3847)	(0.4570)
$MAN_{s,1929}$	0.2356*	0.2356*	-0.4047*	-0.1158	0.1505	0.0737	-0.1619
	(0.1237)	(0.1255)	(0.2322)	(0.1768)	(0.1505)	(0.1063)	(0.2086)
$NEWDEAL_s$	0.0000	0.0001	0.0002	0.0002*	0.0000	0.0001	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
$MONPOL_s$	-0.0278	-0.0270**	-0.0430	-0.0112	-0.0103	-0.0112	-0.0293
	(0.0175)	(0.0128)	(0.0264)	(0.0249)	(0.0161)	(0.0116)	(0.0216)
Constant	0.1907***	0.2947***	0.1823***	0.3031***	0.1307**	0.2069***	0.1778***
Specification	OLS	OLS	OLS	OLS	OLS	OLS	OLS
N	48	49	48	48	48	48	46
R^2	0.7075	0.4927	0.4679	0.2135	0.6940	0.5643	0.4966

Note: Standard errors in parentheses; *** p<0.01, ** p>0.05, * p<0.1. Standard errors are heteroskedasticity-robust.

dilute their quality as proxies for real state-level GDP. Personal income per capita and wages per capita might be biased because they include out-of-state wage earnings as well as property income from out-of-state assets. The retail sales indicator measures changes of consumption at the state level. Hence, it reflects changes in personal income as well as changes in the propensity to consume. A further bias might result because retail sales include both sales of tradable as well as non-tradable goods, which means they also include goods that have been produced out of state. The employment indicator is only fully consistent if we assume that state-level demand for labor derives entirely from the demand for goods produced within the state. Despite these limitations, however, a substantive share of the variance for all four variables can be attributed to state-level fluctuations of economic performance.

One way to estimate how well these indicators record state-level economic performance is to undertake an explanatory factor analysis. This method identifies the extent to which the variance of these four measures is caused by a set of common, underlying (or unobservable) factors.

The analysis suggests that one dominant factor – state economic performance – drives 90 percent of existing cross-state variance in personal income per capita, wages per capita, employment, and retail sales in the period 1929–39.[48] The loading patterns in Table 5 (see Appendix) confirm the substantive influence of this factor on all four indicators. Hence, using the factor scores calculated from this analysis as a dependent variable offers an additional way to scrutinize the effect of high levels of household debt on economic performance so as to examine the robustness of earlier findings.[49]

3.3.2 Dynamics in Recession and Recovery

The results presented above suggest a statistically significant negative relationship between household indebtedness and economic performance during the period of recovery, i.e. from 1933 to 1937 and from 1933 to 1939, respectively. Yet it is possible that dynamics differ when it comes to recession and recovery. Previous contributions (e.g. Wallis (1989) and Garrett and Wheelock (2006)) point out the important role of industrial structure variation in determining differences in economic performances during the 1930s. According to their findings, adverse economic effects of high levels of household indebtedness may vary in recession and recovery depending on the significance of other shocks, such as those affecting the agricultural sector or manufacturing industries. Hence, I use a more

[48] As data for retail sales is only available for the years 1929, 1933, 1935, and 1939, the analysis is based on observations for these years. (At that time there were only 48 states.) The corresponding eigenvalue of this factor is 3.6, compared with 0.2 for the second (see Appendix, Table 10). For the respective scoring coefficients, see Table 10 (see the Appendix).

[49] Summary statistics for the factor score in 1929, 1933, and 1939 are presented in Table 13 (see the Appendix).

Table 5: Regression Results Recovery, 1933–39 (Using Factor Score)

	(1)	(2)	(3)
$DEBT_{s,1929}$	-0.3240**	-0.2348*	
	(0.1339)	(0.1214)	
$DEBT_{s,1932}$			-0.1856**
			(0.0823)
$INC_{s,1933}$	0.0611	0.0902**	0.1005**
	(0.0477)	(0.0438)	(0.0432)
$BOUNCEBACK_s$		-0.3809***	-0.3829***
		(0.0847)	(0.0841)
$AGRIC_{s,1929}$	0.0256	-0.0400	-0.0330
	(0.7721)	(0.6939)	(0.6739)
$MAN_{s,1929}$	-0.1163	0.0054	0.0218
	(0.1932)	(0.1600)	(0.1548)
$NEWDEAL_s$	0.0002*	0.0001**	0.0002**
	(0.0001)	(0.0001)	(0.0001)
$MONPOL_s$	-0.0166	-0.0080	-0.0067
	(0.0243)	(0.0240)	(0.02343)
Constant	0.3505***	0.1612**	0.1536***
Specification	OLS	OLS	OLS
N	48	48	48
R^2	0.1780	0.3675	0.3835

Note: Standard errors in parentheses; *** p<0.01, ** p>0.05, * p<0.1. Standard errors are heteroskedasticity-robust.

differentiated approach that addresses these issues in two steps. First, I examine whether the impact of household debt differs for the contraction period – from 1929 to 1932 – to account for these effects and magnitudes. Second, I study the Great Depression as a whole – from 1929 to 1939 – to analyze whether differences in the levels of household debt still matter for state-level economic performance when viewed in the long term. This sensitivity analysis might provide additional insights as it explores the question whether or not the negative effect of household indebtedness applies only to the medium term, which is to say, only to the recovery.

The 1929—32 Slump Eggertsson and Krugman (2011) assume that households deleverage immediately to the new borrowing constraint after a *Minsky moment*. The deleveraging cut back consumption, which in turn decreases output as aggregate demand falls. But if household leverage is the dominant driver of the slump, we should find a close relationship between levels of household debt and the change in economic indicators for the period 1929—32. The empirical literature dealing with regional variation during the most severe years of the contraction (from 1929 to 1932) most often uses differences in economic structure – particularly in industrial composition – for explaining differences in

economic performance (see for example Wallis (1989)). According to Garrett and Wheelock (2006, 464), for example, states that derived a high percentage of personal income from sectors facing severe shocks[50] during the contraction years experienced larger declines in per capita income than did more diversified states or states depending mainly on sectors that performed comparably well during the slump.

For the contraction phase, the specification is slightly altered. $NEWDEAL_s$ was omitted because New Deal spending did not start until 1933. Instead, the specification includes $BANKFAIL_s$ because the series of four banking panics identified by Friedman and Schwartz (1963) began in fall 1930 and only ended with Roosevelt's banking holiday in March 1933. The initial prosperity is defined as state-level income per capita as a share of total U.S. income p.c. in 1929 ($INC_{s,1929}$).

When estimating this model for the recession period in Table 6, the degree of ex-ante household indebtedness does not have significant explanatory power for state-level economic performance in the first years of the Depression. In light of the research cited as well as the noisy data, this is certainly not surprising. It is likely that any negative effect of relatively high household indebtedness on economic performance was offset by lower vulnerability to adverse macroeconomic shocks due to higher diversification (see also Rosenbloom and Sundstrom (1997)).[51] This dynamic is also suggested by the evidence presented in Table 6: the coefficients on $MAN_{s,1929}$ and $AGRIC_{s,1929}$ are negative for all dependent variable specifications. Both the manufacturing and the agricultural sector were particularly affected by the economic downturn starting in 1929. Interestingly, states with relatively high debt-to-income ratios were primarily concentrated on the East Coast. These states were both more diversified and less dependent on heavy industry compared with states in other regions. By contrast, states in the Mountain region – even though among the lowest income levered states – were highly dependent on the mining and lumber industry and thus faced among the most severe decline in employment and income.[52] In addition, states in the northeast also had generally higher per capita incomes than states in other regions.[53] Garrett and Wheelock (2006) show that states entering the economic contraction with relatively high per capita incomes tended to suffer smaller contractions in per capita income than did low-income states. This relationship is also apparent in

[50] As noted before, sectors that performed particularly poorly after 1929 were agriculture, mining, durable manufacturing, and construction, while other sectors (services, say) suffered far less (Kindleberger, 1973; Garrett and Wheelock, 2006).

[51] Rosenbloom and Sundstrom (1997) also cite higher trend employment growth as a significant factor preventing a more severe contraction in the South Atlantic States.

[52] The lumber industry depended heavily on demand in the construction sector and thus was particularly vulnerable to the collapse in construction during the economic downturn. The heavily industrialized East North Central region, together with the Mountain region, experienced significant difficulties during the slump (Rosenbloom and Sundstrom, 1997).

[53] Average per capita income in 1929 was $845 in the Northeast, $631 in the Midwest, $661 in the West, and $499 in the South (Schwartz and Graham, 1955).

column (1) and (2). The results suggest that states with high per capita incomes as of 1929 performed better when compared with states that had lower levels of per capita income.

Table 6: Regression Results Contraction, 1929–32

	(1)	(2)	(3)
	Δ INC_s 1929–32	Δ SAL_s 1929–32	Δ EMP_s 1931–32
$DEBT_{s,1929}$	0.0980	0.0624	0.1592
	(0.1508)	(0.1235)	(0.0963)
$INC_{s,1929}$	0.1508**	0.0942*	-0.0164
	(0.0610)	(0.0551)	(0.02815)
$AGRIC_{s,1929}$	-0.7673*	-0.0215	-0.4437
	(0.4600)	(0.4671)	(0.4995)
$MAN_{s,1929}$	-0.2011	-0.5631**	-0.0240
	(0.2259)	(0.2263)	(0.1343)
$BANKFAIL_s$	-0.3001*	-0.0597	0.1653
	(0.1757)	(0.1635)	(0.1197)
$MONPOL_s$	-0.0035	0.0128	0.0116
	(0.0241)	(0.0222)	(0.0166)
Constant	-0.3910***	-0.2416***	-0.1010***
Specification	OLS	OLS	OLS
N	49	48	47
R^2	0.4312	0.2580	0.1362

Note: Standard errors in parentheses; *** p<0.01, ** p>0.05, * p<0.1. Standard errors are heteroskedasticity-robust.

The Great Depression, 1929–39 The results so far indicate the important role of debt overhang in the recovery, but not in the slump period. Highly indebted states recovered more slowly but did not suffer from a worse recession. The natural next step is to look at the entire Great Depression episode. Reassuringly, the detrimental effects of debt overhang become clearly visibly once the time frame is enlarged.

Table 7 regresses $DEBT_{s,1929}$ on the percentage change in the four indicators of economic performance: income per capita, salaries and wages per capita, employment, and consumption on ex-ante household indebtedness.[54] Seven separate estimations ((1)-(7)) are reported. Regressions over 1929–39 and 1929–37 produce essentially similar results. In all cases, the coefficients on the key regressor of interest – household debt – show the

[54]The model controls for both $BANKFAIL_s$ and $NEWDEAL_s$ since the period covers the series of banking panics between 1930 and 1933 as well as the years of the New Deal. Just as in Table 6 for the contraction phase, initial prosperity is defined as income per capita at the state level in 1929 as the share of total U.S. income p.c. in 1929 ($INC_{s,1929}$). For percentage change in employment, the model is slightly altered due to data specifics (see column (3)). The employment index by Wallis (1989), though it starts in 1929, uses only state-level data from 1931 on. Before 1931, the indices are based on regional data. This means that state-level estimates reflect differences in the composition of employment regarding the share of nonmanufacturing and manufacturing employment; they do not reflect specific state-level trends.

expected negative signs. Furthermore, they are economically meaningful and statistically significant at the five percent level for estimations (3), (5), and (6). Assuming we control for other determinants, this implies that for the period from 1929 to 1937 a mortgage debt-to-income ratio ten percentage points above the sample mean is associated with a growth rate drop in income per capita of 2.3 percentage points (from 6 percent to about 3.7 percent) and a growth rate drop in real salaries and wages per capita of two percentage points (from about 4.5 percent to 2.3 percent). For the period 1929–39, a mortgage debt-to-income ratio ten percentage points above the sample mean is associated with a growth rate drop in employment of 2.6 percentage points.[55] Hence, the results suggest that higher levels of household debt acted as a drag on the economy throughout the entire Great Depression.

The coefficients on agriculture mostly imply what we would expect: states that were highly dependent on agriculture experienced larger economic declines. The evidence on manufacturing is more mixed.[56] The coefficients on bank failures and New Deal lending and spending and monetary policy are instable and insignificant. The explanatory power of the model for the period 1929 to 1937 and for the period 1929 to 1939 is comparably weak, however.[57]

Summing up, the adverse effects of debt overhang are most strongly visible in the recovery, but are also present over the entire 1929—39 period. During the slump years, the relationship is harder to prove. In light of the various shocks that hit the regional economies during the slump period, this is not particularly surprising.

[55]For salaries and wages p.c., WV was omitted as an outlier. For employment, MI and NC were omitted as outliers. Wallis (1989) does not provide an employment index for DC in any given year.

[56]See also Figure 6. Manufacturing employment decreased considerably more than nonmanufacturing employment during the Great Depression. Again, coefficients on $MAN_{s,1929}$ and $AGRIC_{s,1929}$ differ remarkably between income p.c. and salaries and wages p.c. For the farm sector, there are substantial differences during the Great Depression between the percentage change in proprietor income and the percentage change in salaries and wages received in the farm sector. While proprietor income decreased by about four percent in real terms on a national level in the period 1929—37, wages in the agricultural sector decreased by more than eight percent. As a result, the effect of $AGRIC_{s,1929}$ on income per capita as a dependent variable is much smaller than on salaries and wages per capita. For manufacturing, I again assume that comparable dynamics created the substantial differences in the magnitude of coefficients on $MAN_{s,1929}$.

[57]The specifications account for between 11 and 32 percent of the variation in the economic performance proxies. The null hypothesis of the F-test (regressors are jointly equal to zero) cannot be rejected. The F-value for the specification in column (1) is 2.65 (p-value of 0.02). For the specification in column (2), the F-value is 2.55 (p-value of 0.03), 4.94 in column (3) (p-value of 0.00), 1.77 in column (4) (p-value of 0.12), 2.34 in column (4) (p-value of 0.04), 1.74 in column (5) (p-value of 0.13), and 0.89 in column (7) (p-value) of 0.52). Here again, the F-test is not distorted by multicollinearity.

Table 7: Regression Results Great Depression, 1929–37 and 1929–39

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	$\Delta\ INC_s$	$\Delta\ WAGE_s$	$\Delta\ EMP_s$	$\Delta\ SALES_s$	$\Delta\ INC_s$	$\Delta\ WAGE_s$	$\Delta\ EMP_s$
	1929–39	1929–39	1929–39	1929–39	1929–37	1929–37	1929–37
$DEBT_{s,1929}$	-0.1943	-0.1311	-0.2603**	-0.0327	-0.2305**	-0.2016**	-0.1302
	(0.1236)	(0.1065)	(0.1257)	(0.1851)	(0.1075)	(0.1010)	(0.1251)
$INC_{s,1929}$	-0.0074	-0.0554	-0.0036	0.0814	0.0041	0.0014	0.0014
	(0.0487)	(0.0480)	(0.0360)	(0.0719)	(0.0422)	(0.0423)	(0.0331)
$AGRIC_{s,1929}$	0.5676	-0.6151*	-0.5543	-0.0543	-0.0482	-0.4049	-0.2155
	(0.4610)	(0.3640)	(0.3827)	(0.8483)	(0.3568)	(0.4038)	(0.4099)
$MAN_{s,1929}$	0.1080	-0.0870	-0.0932	-0.3358	0.0644	-0.0749	-0.0999
	(0.1885)	(0.1796)	(0.1677)	(0.2711)	(0.1579)	(0.1518)	(0.1527)
$BANKFAIL_s$	-0.1272	0.0135	0.1520	-0.2259	-0.0670	0.0113	0.0190
	(0.1494)	(0.1206)	(0.1636)	(0.2111)	(0.1291)	(0.1327)	(0.1729)
$NEWDEAL_s$	0.0001	0.0002*	0.0003***	0.0001	0.0001	0.0001	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
$MONPOL_s$	-0.0157	-0.0198	0.0104	0.0047	0.0045	-0.0029	0.0004
	(0.0247)	(01892)	(0.0188)	(0.0357)	(0.0196)	0.0171	0.0185
Constant	-0.0171	0.1038*	0.1237**	-0.1105	-0.0076	0.0552	0.1520***
Specification	OLS	OLS	OLS	OLS	OLS	OLS	OLS
N	49	48	48	48	49	48	46
R^2	0.1136	0.2471	0.3146	0.1966	0.1283	0.1616	0.1320

Note: Standard errors in parentheses; *** p<0.01, ** p>0.05, * p<0.1. Standard errors are heteroskedasticity-robust.

3.4 Deleveraging in the 1930s

The previous subsections have revealed an important feature of the recovery from the U.S. Great Depression. High debt balances in the household sector had an adverse effect on state economic performance. This was predominantly a recovery effect. Can we say something about the particular channels through which high household debt held back the economy?

Eggertsson and Krugman (2011) and Guerrieri and Lorenzoni (2011) propose that in response to the deleveraging shock – the sudden downward revision of acceptable debt levels – households decrease indebtedness to arrive at the new borrowing constraint. According to the theoretical and empirical studies discussed in section 2, an important aspect in the process of deleveraging is a decline in consumption, as households are forced to cut back on expenditures to repair their balance sheets (see also Mian et al. (2011)). For the period of the Great Depression, several authors documented a strong decrease in consumption (for example, Romer (1993) and Olney (1999)). Moreover, Mishkin (1978) argued that household debt had an important role in explaining the consumption collapse during the 1930s. The evidence presented in the previous subsections also provides suggestive evidence for a negative relationship between high initial debt levels and the growth rates in retail sales between 1933 and 1939. This negative relationship suggests that consumption was weaker in high-income leveraged households during this period. In this section, I explore deleveraging as a potential channel in greater detail.

The immediate question is whether high debt-to-income states reduced their indebtedness more during the period of recovery. The assumption that deleveraging may be an important transmission mechanism implies that states with higher pre-recession debt ratios deleverage more when adjusting to their targeted net debt position in response to an economic crisis. Figure 5 already provides a first indication. Between 1933 and 1937, the average state-level mortgage debt-to-income ratio dropped by about 50 percent. Yet the dynamics were substantively different between states with high household debt ratios and states with lower household debt ratios, particularly during the recovery, Between 1932 and 1937, the mortgage debt-to-income ratio fell by 13 percentage points in the 13 states with the highest debt-to-income ratios in the sample but only by two percentage points in the 13 states with the lowest debt-to-income ratios in the sample.

Table 8 takes a more formal approach by regressing $DEBT_{s,1932}$ on the change in real mortgage debt per capita ($DELEV_s$) for the two periods of recovery examined earlier, 1933—37 and 1933—39.[58] The results confirm what Figure 5 intimates: highly indebted households reduced debt more aggressively than low-income levered households. Regres-

[58] $DELEV_s$ is defined as $\ln DEBT_{s,1937} - lnDEBT_{s,1933}$ or $\ln DEBT_{s,1939} - lnDEBT_{s,1933}$. respectively.

sion coefficients on debt to income are negative and statistically significant on the five (column (1)) and one percent level (column (2)), respectively. For the period 1933 to 1937, the coefficient in column (1) implies a 5.5 percentage point lower growth rate of per capita mortgage debt (from -9 percent to about -15 percent) for a 1932 debt-to-income ratio ten percentage points above the sample mean. This variation across states in the reduction of debt is pronounced. Between 1933 and 1937, the 13 states with the highest debt-to-income ratios significantly reduced their per capita mortgage debt stock in real terms by 30 percent. By contrast, the amount of per capita mortgage debt only decreased by about 6 percent in the 13 states that had the lowest debt-to-income ratios at the onset of the recovery.[59] On balance, the findings provide some support for the theory that indebted households need to deleverage significantly if they are to repair their balance sheets.[60]

Table 8: Debt and Deleveraging

	(1)	(2)
	Δ $DELEV_s$ 1933–37	Δ $DELEV_s$ 1933–39
$DEBT_{s,1932}$	-0.5507**	-1.0506***
	(0.2284)	(0.3045)
Constant	-0.0214	0.2288***
Specification	OLS	OLS
N	49	49
R^2	0.1100	0.2020

,

4 Conclusion

Using U.S. state-level data, this paper examines the relationship between variation in levels of household debt and economic performance during the 1930s. The evidence suggests that high debt levels were associated with worse economic performance, as recovery was considerably weaker in states with high initial debt-to-income ratios. Everything else being equal, the total growth rate of per capita income, per capita wages, and employment was between 2.2 and 3.2 percentage points lower when the household debt-to-income ratios were ten percentage points higher than the U.S. average. These results are robust

[59]The 13 bottom quartile debt-to-income ratio states are CO, FL, ID, IL, MT, NC, NE, NM, OK, PA, SC, TX, and WY; the 13 top quartile debt-to-income ratio states are CA, CT, DE, MA, ME, MI, NH, NJ, NY, RI, UT, and VT.

[60]For a comprehensive survey of studies contributing to the balance sheet recession view, see Konczal (2012) for. Table 15 (Appendix) shows the regression results for the period 1933-–37 and 1933—39 when substituting $DEBT_{s,1929}$ and $DEBT_{s,1932}$ with $DELEV_s$ as the key explanatory variable. The coefficients on deleveraging are positive and statistically significant except for employment in column (7). The model has relatively high explanatory power. It explains between 23 and 69 percent of the variation in real outcomes. These regressions provide suggestive evidence for the fact that the more households in a state reduced their p.c. debt burdens, the weaker the state performed economically.

to the inclusion of various controls as well as for different time periods. I interpret this as evidence that debt overhang created a significant drag for the recovery. Deleveraging of households appears to be an important force driving this trend, as states with higher initial debt-to-income levels reduced debt at a higher rate. Moreover, though the adverse effects of high household indebtedness are strongest for the recovery years, they are also present over the entire Depression period 1929–39.

These findings for the Great Depression in the U.S. are consistent with other studies relying on cross-sectional variation in household leverage such as Mian et al. (2011) for the U.S. or King (1994) and the International Monetary Fund (2012) for international contexts. The similarity of the results for very different periods of crisis suggests a close link between the accumulation of household indebtedness and economic recovery paths.

References

Allen, F. L. (1931): *Only Yesterday: An Informal History of the Nineteen-Twenties*, Blue Ribbon Books, New York.

Bank of Governors of the Federal Reserve System (1943): *Banking and Monetary Statistics, 1914-1941*, Washington, D.C.

Bernanke, B. S. (1983): "Nonmonetary Effects of the Banking Crisis in the Propagationof the Great Depression," *American Economic Review*, 70, 257–76.

Board of Governors of the Federal Reserve System (1959): *All Bank Statistics 1896 - 1955*, Washington, D.C.

Bordo, M. D. and J. G. Haubrich (2010): "Credit Crises, Money, and Contractions: A Historical View," *Journal of Monetary Economics*, 57, 1–18.

——— (2012): "Deep Recessions, Fast Recoveries, and Financial Crises: Evidence from the American Record," *Federal Reserve Bank of Cleveland Working Paper 12-14*.

Brunnermeier, M. K. and Y. Sannikov (2012): "Redistributive Monetary Policy," *Jackson Hole Symposium - Federal Reserve Bank of Kansas*.

Calomiris, C. W. and J. R. Mason (2003): "Consequences of Bank Distress during the Great Depression," *The American Economic Review*, 93, 937–947.

Carter, S. B. (2006): *Historical Statistics of the United States Millennial Edition Online*, New York: Cambridge University Press, New York, chap. National income, by industry group: 1929-2002, Tables Ca35-53.

Cerra, V. and S. C. Saxena (2005a): "Did Output Recover from the Asian Crisis?" *IMF Staff Papers*, 52, 1–23.

——— (2005b): "Eurosclerosis or Financial Collapse: Why Did Swedish Incomes Fall Behind?" *International Monetary Fund Working Paper*.

——— (2008): "Growth Dynamics: The Myth of Economic Recovery," *American Econmic Review*, 98, 439–457.

Creamer, D. and C. Merwin (July 1942): "State Distribution of Income Payments 1929-41," *Survey of Current Business*, 18–26.

Dynan, K. (2012): "Is a Household Debt Overhang Holding Back Consumption?" *Brookings Papers on Economic Activity*.

Eggertsson, G. and P. Krugman (2011): "Debt, Deleveraging, and the Liquidity Trap: A Fisher-Minsky-Koo Approach," *Federal Reserve Bank of New York, Unpublished Manuscript*.

Federal Reserve Board (1933): *Ninetheenth Annual Report of the Federal Reserve Board Covering Operations for the Year 1932*, United States Government Printing Office, Washington, D.C.

Fishback, P. V., W. C. Horrace, and S. Kantor (2005): "Did New Deal Grant Programs Stimulate Local Economies? A Study of Federal Grants and Retail Sales during the Great Depression," *The Journal of Economic History*, 65, 36–71.

Fishback, P. V., S. Kantor, and J. J. Wallis (2003): "Can the New Deal's Three Rs Be Rehabilitated? A Program-by-Program, County-by-County Analysis," *Explorations in Economic History*, 40, 278—307.

Fisher, I. (1933): "The Debt-Deflation Theory of the Great Depression," *Econometrica*, 1, 337–357.

Friedman, M. (1993): "The "Plucking Model" of Business Fluctuations Revisited," *Economic Inquiry*, 31, 171–177.

Friedman, M. and A. J. Schwartz (1963): *A Monetary History of the United States, 1867-1963.*, Princeton University Press, Princeton, NJ.

Garrett, T. A. and D. C. Wheelock (2006): "Why Did Income Growth Vary across States during the Great Depression?" *The Journal of Economic History*, 66, 456–466.

Glick, R. and K. J. Lansing (2009): "U.S. Household Deleveraging and Future Consumption Growth," *FRBSF Economic Letter*.

——— (2010): "Global Household Leverage, House Prices, and Consumption," *FRBSF Economic Letter*.

Goldsmith, R. W. (1955): *A Study of Saving in the United States*, vol. 1: Introduction; Tables of Annual Estimates of Saving 1897-1949, Greenwood Press Publishers, New York.

Grebler, L., D. M. Blank, and L. Winnick (1956): *Capital Formation in Residential Real Estate: Trends and Prospects*, Princeton University Press, Princeton, NJ.

Guerrieri, V. and G. Lorenzoni (2011): "Credit Crises, Precautionary Savings, and the Liquidity Trap," Working Paper 17583, National Bureau of Economic Research.

Haines, M. R. (2006): *Historical Statistics of the United States, Earliest Times to the Present: Millennial Edition*, Cambridge University Press, New York, chap. Population by race, sex, age, nativity, and urban rural residence, Tables Aa2244-6550.

Hall, R. E. (2011): "The Long Slump," *American Econmic Review*, 101, 431–469.

Howard, G., R. Martin, and B. A. Wilson (2011): "Are Recoveries from Banking and Financial Crises Really So Different?" *Board of Governors of the Federal Reserve System International Finance Discussion Papers*.

Hyman, L. (2011): *Debtor Nation: The History of America in Red Ink*, Princeton University Press, Princeton, NJ.

International Monetary Fund (2009): *World Economic Outlook: Crisis and Recovery*, World Economic and Financial Surveys, International Monetary Fund, Washington, D.C.

——— (2012): *World Economic Outlook: Growth Resuming, Dangers Remain*, World Economic and Financial Surveys, International Monetary Fund, Washington, D.C.

James, J. A. and R. Sylla (2006): *Historical Statistics of the United States, Earliest Times to the Present: Millennial Edition*, Cambridge University Press, New York, chap. Net public and private debt, by major sector: 1916–1976, Tables Cj875–889.

Kaminsky, G. L. and C. M. Reinhart (1999): "The Twin Crises: The Causes of Banking and Balance-Of-Payments Problems," *The American Economic Review*, 89, 473–500.

Kindleberger, C. P. (1973): *The World in Depression, 1929-1939*, London.

King, M. (1994): "Debt Deflation: Theory and Evidence," *European Economic Review*, 38, 419–445.

Konczal, M. (2012): "How Mortgage Debt is Holding Back the Recovery," Tech. rep., The Roosevelt Institute.

Krugman, P. (2012): "1933 and All That," *The Conscience of a Liberal [blog entry], New York Times*.

Margo, R. A. (1993): "Employment and Unemployment in the 1930s," *Journal of Economic Perspectives*, 7, 41–59.

Mian, A. and A. Sufi (2009): "Household Leverage and the Recession of 2007 to 2009," *University of Chicago, Booth School of Business Working Paper*.

Mian, A. R., K. Rao, and A. Sufi (2011): "Household Balance Sheets, Consumption, and the Economic Slump," *Unpublished Working Paper*.

Mian, A. R. and A. Sufi (2012): "What Explains High Unemployment? The Aggregate Demand Channel," *NBER Working Paper 17830*.

Minsky, H. (1986): *Stabilizing an Unstable Economy*, Yale University Press, New Haven, CT.

Mishkin, F. (1977): "What Depressed the Consumer? The Household Balance Sheet and the 1973-75 Recession," *Brookings Papers on Economic Activity*, 123–164.

——— (1978): "The Household Balance Sheet and the Great Depression," *Journal of Economic History*, 38, 918–937.

Olney, M. L. (1987): "Advertising, Consumer Credit, and the 'Consumer Durables Revolution' of the 1920s," *The Journal of Economic History*, 47, 489–491.

——— (1999): "Avoiding Default: The Role of Credit in the Consumption Collapse of 1930," *The Quarterly Journal of Economics*, 114, 319–335.

Palley, T. I. (1994): "Debt, Aggregate Demand, and the Business Cycle: An Analysis in the Spirit of Kaldor and Minsky," *Journal of Post Keynesian Economics*, 16, 371–390.

Philippon, T. and V. Midrigan (2011): "Household Leverage and the Recession," *NBER Working Paper 16965*.

Reinhart, C. M. and V. R. Reinhart (2010): "After the Fall," *NBER Working Paper 16334*.

Reinhart, C. M. and K. S. Rogoff (2009a): "The Aftermath of Financial Crises," *NBER Working Paper 14656*.

——— (2009b): *This Time Is Different: Eight Centuries of Financial Folly*, Princeton University Press, Princeton, NJ.

——— (2012): "This Time is Different, Again? The US Five Years after the Onset of Subprime," *Voxeu.org*.

Rockoff, H. (1998): *The Defining Moment. The Great Depression and the American Economy in the Twentieth Century*, The University of Chicago Press, Chicago, chap. By Way of Analogy: The Expansion of the Federal Government in the 1930s.

Romer, C. D. (1990): "The Great Crash and the Onset of the Great Depression," *The Quarterly Journal of Economics*, 105, 597–624.

——— (1992): "What Ended the Great Depression?" *Journal of Economic History*, 52, 757–784.

——— (1993): "The Nation in Depression," *Journal of Economic Perspectives*, 7, 19–39.

Rosenbloom, J. L. and W. A. Sundstrom (1997): "The Sources of Regional Variation in the Severity of the Great Depression: Evidence from U.S. Manufacturing, 1919-1937," *NBER Working Paper 6288*.

Schularick, M. and A. M. Taylor (2012a): "Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises 1870-2008," *American Economic Review*, 102, 1029–1061.

——— (2012b): "Fact-Checking Financial Recessions: US-UK Update," *Voxeu.org*.

Schwartz, C. F. and R. E. Graham (1955): "Personal Income by States, 1929—54," *Survey of Current Business*.

——— (1956): *Personal Income by States Since 1929: A Supplement to the Survey of Current Business.*, Greenwood Press Publishers, New York.

Sutherland, D., P. Hoeller, R. Merola, and V. Zieman (2012): "Debt and Macroeconomic Stability," *OECD Economics Department Working Paper 1003*.

Taylor, A. M. (2012): "The Great Leveraging," *NBER Working Paper 18290*.

Temin, P. (1976): *Did Monetary Forces Cause the Great Depression?*, W.W. Norton & Company, New York.

Tobin, J. (1980): *Asset Accumulation and Economic Activity: Reflections on Contemporary Macroeconomic Theory*, The University of Chicago Press, Chicago, IL.

——— (1989): "Review of 'Stabilizing an Unstable Economy' by Hyman P. Minsky," *Journal of Economic Literature*, 27, 105–108.

U.S. Bureau of the Census (various years): "Current Population Reports. Series P-25, Population Estimates and Projections. Nos. 311, 917, 1095," *Series P-25, Population estimates and projections. Nos. 311, 917, 1095*.

U.S. Department of Labor: Bureau of Labor Statistics (2012): "Consumer Price Index for All Urban Consumers: All Items," *Federal Reserve Bank of St. Louis*.

Vatter, H. G. (1967): "Has There Been A Twentieth-Century Consumer Durables Revolution?" *The Journal of Economic History*, 27, 1–16.

Wallis, J. J. (1989): "Employment in the Great Depression: New Data and Hypotheses," *Explorations in Economic History*, 26, 45–72.

White, E. N. (2009): "Lessons from the Great American Real Estate Boom and Bust of the 1920s," Working Paper 15573, National Bureau of Economic Research.

A Figures and Tables

Table 9: Percentage Change in Loans Per Capita, 1925–28

	Mean	Min	Max	Std. Dev.	N
Δ Total Loans (1925–28)	0.06	-0.42	0.40	0.16	49
Δ Real Estate Loans (1925–28)	0.08	-0.36	0.40	0.20	49
Δ Loans Collateral (1925–28)	0.15	-0.37	0.55	0.20	49
Δ Other Loans (1925–28)	-0.03	-0.58	0.26	0.18	49

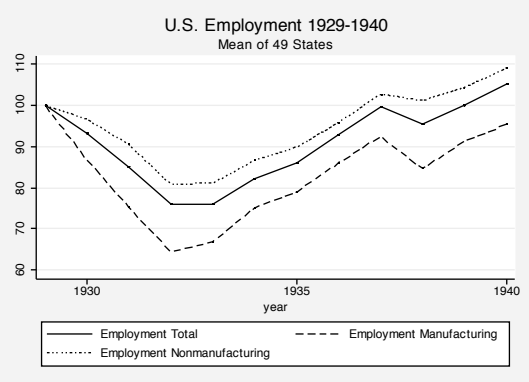

Figure 6: U.S. Employment, 1929–40 *Source: Wallis (1989).*

Table 10: Explanatory Factor Analysis

	Eigenvalue	Difference	Proportion	Cumulative
$Factor1$	3.6164	3.3972	0.9041	0.90
$Factor2$	0.2192	0.1108	0.0548	0.96
$Factor3$	0.1084	0.0525	0.0271	0.99
N				192

Table 11: Scoring Coefficients

	Factor1
INC	0.2674
$WAGE$	0.2523
EMP	0.2681
$SALES$	0.2637

Table 12: Loading Patterns

	Factor1	Uniqueness
INC	0.9669	0.0650
$WAGE$	0.9124	0.1675
EMP	0.9536	0.0603
$SALES$	0.9694	0.0907

Table 13: Summary Statistics

	Mean	Min	Max	Std. Dev.	N
$Factorscore_{1929}$	187.20	96.01	286.37	52.30	48
$Factorscore_{1933}$	124.51	56.96	223.12	39.21	48
$Factorscore_{1939}$	190.88	96.44	315.82	59.48	48

Table 14: Regression Results Recovery, 1933–37 and 1933–39 (Weighted According to State Size).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	$\Delta\ INC_s$	$\Delta\ WAGE_s$	$\Delta\ EMP_s$	$\Delta\ SALES_s$	$\Delta\ INC_s$	$\Delta\ WAGE_s$	$\Delta\ EMP_s$
	1933–39	1933–39	1933–39	1933–39	1933–37	1933–37	1933–37
$DEBT_{s,1929}$	-0.3170***	-0.3041***	-0.3704**	-0.5609**	-0.2291**	-0.3398***	-0.2107
	(0.0927)	(0.0977)	(0.1681)	(0.2219)	(0.1128)	(0.1034)	(0.1962)
$INC_{s,1933}$	-0.0500	-0.0191	-0.0013	0.0897	-0.0512	0.0510	0.0016
	(0.0395)	(0.0225)	(0.0606)	(0.0639)	(0.0452)	(0.0343)	(0.0605)
$BOUNCEBACK_s$	-0.3724**	-0.5268***	-1.5768***	0.0163	-0.6400***	-0.5952***	-2.0507***
	(0.2024)	(0.1214)	(0.3992)	(0.2443)	(0.1801)	(0.1077)	(0.3309)
$AGRIC_{s,1929}$	2.6600***	0.4489*	-0.5726	0.6279	1.6451***	1.0046	-0.3166
	(0.3508)	(0.2522)	(0.4991)	(0.7423)	(0.2746)	(0.4600)	(0.4566)
$MAN_{s,1929}$	0.2081*	0.0835	-0.4574***	-0.0358	0.2093	-0.0615	-0.3772**
	(0.1165)	(0.0927)	(0.1560)	(0.1890)	(0.1134)	(0.0924)	(0.1569)
$NEWDEAL_s$	-0.0002	0.0001	0.0001	-0.0001	-0.0002	-0.0001	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0001)	(0.0001)	(0.0001)
$MONPOL_s$	-0.0270	-0.0173	-0.0149	-0.0164	-0.0161	-0.0105	-0.0053
	(0.0209)	(0.0141)	(0.0320)	(0.0379)	(0.0195)	(0.0152)	(0.0279)
Constant	0.2374***	0.2209***	0.2222***	0.4206***	0.1707**	0.1612***	0.1872***
Specification	OLS	OLS	OLS	OLS	OLS	OLS	OLS
N	48	49	48	48	48	48	47
R^2	0.7814	0.6553	0.5568	0.3098	0.7666	0.7011	0.6478

Note: Standard errors in parentheses; *** p<0.01, ** p>0.05, * p<0.1. Standard errors are heteroskedasticity-robust.

Table 15: Regression Results Recovery, 1933–37 and 1933–39 - Deleveraging

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	$\Delta\ INC_s$	$\Delta\ WAGE_s$	$\Delta\ EMP_s$	$\Delta\ SALES_s$	$\Delta\ INC_s$	$\Delta\ WAGE_s$	$\Delta\ EMP_s$
	1933–39	1933–39	1933–39	1933–39	1933–37	1933–37	1933–37
$DELEV_s$	0.0844***	0.0563***	0.0548*	0.0819**	0.0872*	0.0702*	0.0282
	(0.0249)	(0.0186)	(0.0328)	(0.0381)	(0.0511)	(0.0411)	(0.0426)
$INC_{s,1933}$	-0.0542	-0.0749	-0.0631	0.0567	-0.0021	-0.0065	-0.0717*
	(0.0372)	(0.0270)	(0.0424)	(0.0534)	(0.0448)	(0.0293)	(0.0426)
$BOUNCEBACK_s$	-0.4011***	-0.1378	-0.4077	-0.2546	-0.6573***	-0.2480**	-1.6873***
	(0.1458)	(0.1025)	(0.3276)	(0.1586)	(0.1613)	(0.1194)	(0.3144)
$AGRIC_{s,1929}$	2.1819***	-0.1294	-0.6137*	-0.2124	1.6356***	0.1096	-0.3605
	(0.2450)	(0.2558)	(0.3062)	(0.6438)	(0.3926)	(0.4020)	(0.5017)
$MAN_{s,1929}$	0.1850	0.1887	-0.1144	-0.1483	0.0427	0.1326	-0.1954
	(0.1218)	(0.0924)	(0.1743)	(0.1619)	(0.1451)	(0.1113)	(0.2060)
$NEWDEAL_s$	-0.0001	0.0001	0.0002**	0.0001	-0.0001	0.0000	0.0000
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
$MONPOL_s$	-0.0377**	-0.0389***	-0.0259	-0.0219	-0.0173	-0.0260*	-0.0319
	(0.0156)	(0.0135)	(0.0175)	(0.0236)	(0.0154)	(0.0154)	(0.0204)
Constant	0.1636**	0.3099***	0.2373**	0.2783***	0.1177*	0.2079***	0.2921***
Specification	OLS	OLS	OLS	OLS	OLS	OLS	OLS
N	48	48	48	48	49	48	47
R^2	0.7249	0.3863	0.3163	0.2209	0.6806	0.2773	0.4697

Note: Standard errors in parentheses; *** p<0.01, ** p>0.05, * p<0.1. Standard errors are heteroskedasticity-robust.

B Data Appendix

Data on credit has been drawn from Board of Governors of the Federal Reserve System (1959). The All Bank Statistics include statistics on bank balance sheets by bank class and by state for the period 1896-1955, with total loan amounts being recorded on June 30 for each year (Board of Governors of the Federal Reserve System, 1959, 3). Real estate loans include loans on farm land, loans on residential properties, loans on other properties, bonds and mortgages, mortgages purchased, and mortgages owned. When using the mortgage debt-to-income ratio, controlling for agricultural states is particularly important because a considerable share of real estate loans might be loans on farm land. Overall, the share of farm mortgages was between 20 and 30 percent of total mortgages during the period in which real estate loans were reported in the All Bank Statistics (1925—37). Nevertheless, the real estate loans reported in the All Bank Statistics are a good proxy for total residential mortgage lending (as discussed in section 3.1). Board of Governors of the Federal Reserve System (1959) also provide data on loans on collateral and other loans. Before 1928, loans on collateral include: loans on demand or time secured by stocks and bonds, loans on demand or time secured by other personal securities including merchandise, warehouse receipts, etc., loans on securities, loans on demand or time secured by collateral, and loans secured by collateral other than real estate. For the period 1929—38, however, loans on collateral only include loans with securities as collateral. All other loans include: loans on personal security; loans on depositors' books; acceptances or bills of exchange purchased or discounted; syndicate participations; customers' liability on account or drafts paid under letters of credit; advances to trust estates; personal loans; commercial paper bought in open market; overdrafts; notes and bills rediscounted loans to banks and trust companies not secured by collateral; loans and discounts not classified. With such a variety of loans, it is difficult to explain why loans in this category might have decreased or increased over time.

The federal government did not initiate a monthly survey of the labor force as defined today until 1940 (Margo, 1993). Hence, unemployment statistics for the 1930s are not entirely reliable. The employment index as calculated by Wallis (1989) is based on establishment surveys of employment done by the Bureau of Labor Statistics.[61] The BLS reported changes in employment over two month periods for firms that reported for both months. This means that the data is biased: it does not include reports of new firms and firms that stopped operations. To construct a yearly index, Wallis (1989) benchmarked the estimated employment changes to known employment totals such as the Census of Manufactures. The author provides three employment indices: total employment, manufacturing employment, and nonmanufacturing employment. According to the author, the

[61] Index base year is 1929 (100) (Wallis, 1989).

nonmanufacturing index is less reliable than the manufacturing index, as nonmanufacturing indices had to be approximated while manufacturing employment was collected by the BLS.

Income data is drawn from the series "Personal Income by States, 1929–1954" reported in the Survey of Current Business (Schwartz and Graham, 1955). It includes five different flows of income: i) wage and salary disbursements, ii) other labor income, iii) proprietor's income, iv) property income, and v) transfer payments. Wages and salary disbursements consist of wages and salaries including compensations of executives, commissions, tips, and bonuses. It covers all payments received in the current period, including retroactive wages. Contributions made by employees for social insurance are deducted from the income flows. Other labor income covers the following: contributions made by employers to health and welfare funds and private pensions; pay of military reservists; compensation for injuries; and director's fees. Proprietor's income includes the net business earnings from owners of noncorporate business both for the farm and nonfarm sector. Property income refers to rental income, cash dividend disbursements by corporations, and personal interest income. As defined here, rental income measures income received from the rental of property, royalties on patents, copyrights and rights to natural resources, and net rental returns to owner-occupants of nonfarm dwellings. Schwartz and Graham (1956) provides additional data disaggregating personal income into its components and wages and salaries by industrial sources. Wages and salaries are subdivided into disbursements received from i) farms, ii) mining, iii) contract construction, iv) manufacturing, v) contract construction, vi) manufacturing, vii) wholesale and retail trade, viii) finance, insurance, and real estate, ix) transportation, x) communication and public utilities, xi) services, xii) government, and xiii) other industries.

Measures of the importance of the manufacturing, agricultural, and construction sector are calculated as the average annual percentage of personal income received from the respective sector in salary and wage disbursements in 1929. The data is drawn from Schwartz and Graham (1956).

The degree of bank distress in a state is measured by the annual average rate of bank suspensions in the period 1929—33. Data on the number of bank suspensions are drawn from Bank of Governors of the Federal Reserve System (1943, Tables 67, 71, 72); data on the number of total banks, from Board of Governors of the Federal Reserve System (1959). The term "bank suspension" refers to banks closed to the public both temporarily or permanently on account of financial difficulties. Suspended banks are closed either by supervisory authorities or by the banks boards of directors. Banks closed during the bank holiday in 1933 have not been counted as suspensions. Banks that merged with other banks without closing are also not counted as suspensions. The same holds for banks that agreed with depositors to defer the withdrawal of a part of their deposits. Banks that

closed and reopened later or were taken over by other institutions after having closed are counted as suspensions (Bank of Governors of the Federal Reserve System, 1943, 281).

Data on lending and spending of the federal government as part of New Deal programs 1933—39 were drawn from Fishback et al. (2003). The measure used includes New Deal grants and loans. Grants include Federal Emergency Relief Administration grants, Civil Work Administration grants, Works Progress administration grants, Public Assistance grants provided under the Social Security Act, Public Work Administration federal grants, Public Works Administration nonfederal grants, Public Roads Administration grants, Public Buildings Administration grants, Agricultural Adjustment Act grants, Farm Security Administration grants, and U.S. Housing Administration grants. Loans include Public Works Administration nonfederal loans, Farm Credit Administration loans, Rural Electrification Administration loans, Reconstruction Finance Corporation loans, Home Owners Loan Corporation loans, and U.S. Housing Administration loan contracts. For the conversion into per capita grants and loan dollars, data on the population in 1930 was used.

County-level data on retail sales were drawn from Fishback et al. (2005) and converted into state-level data. For retail sales data for 1933, the authors used the Consumer Market Data Handbook as published by the U.S. Department of Commerce in 1936. For retail sales data for 1939, the authors used Historical, Demographic, Economic, and Social Data: The United States, 1790–1970, ICPSR study number 0003, as corrected by Michael Haines. As there is no data on retail sales in 1937, the period of recovery cannot be analyzed for consumption as has been done for per capita, salaries and wages per capita, and employment.

Federal Reserve Districts cut across state lines. If a state has two different regional Federal Reserve Banks, the state is assigned to the District that includes the larger share of its population (see Federal Reserve Board (1933)). Accordingly, CT is assigned to the 1st District; NJ to the 2nd; PA to the 3rd; WV to the 5th; LA and TN to the 6th; IL, IN, MI and WI to the 7th; MS, MO, and KY to the 8th; NM and OK to the 10th; AZ to the 12th. Discount rates set by the regional Federal Reserve Banks are drawn from (Bank of Governors of the Federal Reserve System, 1943).

For calculating per capita values on debt and income, annual estimates for population by state were constructed using data drawn from Haines (2006) and U.S. Bureau of the Census (various years). Haines (2006) provides state-level data on population for the census years 1920, 1930, and 1940. U.S. Bureau of the Census (various years) reports annual national population for the whole period. Combining these two series, the average annual percentage change in the national data was used for the interpolation of the state-level decadal census data. Even though this data might not cover short-term fluctuations,

it provides reliable estimates on general trends of growth or decline in population on a state level. The data was deflated using the Consumer Price Index for All Urban Consumers (All Items) (U.S. Department of Labor: Bureau of Labor Statistics, 2012). A major limitation of the presented state-level analysis is the small number of observations. Nevertheless, it is possible that state-level aggregation masks important local variation.

European Historical Economics Society

EHES Working Paper Series

Recent EHES Working Papers

2013

EHES.35 Predicting the Past: Understanding the Causes of Bank Distress in the Netherlands in the 1920s
Christopher L. Colvin, Abe de Jong and Philip T. Fliers

EHES.34 World Human Development: 1870-2007
Leandro Prados de la Escosura

2012

EHES.33 Farmer Families at the Heart of the Educational Revolution: Which Occupational Group Inherited Human Capital in the Early Modern Era?
Franziska Tollnek and Joerg Baten

EHES.32 Monetary policy without interest rates. Evidence from France's Golden Age (1948-1973) using a narrative approach.
Eric Monnet

EHES.31 Rearmament to the Rescue?
New Estimates of the Impact of 'Keynesian' Policies in 1930s' Britain
Nicholas Crafts and Terence C. Mills

EHES.30 Housing Markets during the Rural-Urban Transition: Evidence from early 20th Century Spain
Juan Carmona, Markus Lampe and Joan Ramón Rosés

EHES.29 Coping with Regional Inequality in Sweden: Structural Change, Migrations and Policy, 1860-2000
Kerstin Enflo and Joan Ramón Rosés

EHES.28 Peasant Agriculture and Economic Growth: The Case of Southeast Europe c. 1870-1940 reinterpreted
Michael Kopsidis