The Post-1980 Debt Disinflation: An Exercise in Historical Accounting

November 30, 2014

Abstract

The conventional division of household payment flows between consumption and saving is not suitable for investigating either the causes of changing household debt-income ratios, or the interaction of household debt with aggregate demand. To explain changes in household debt, it is necessary to use an accounting framework that isolates net credit-market flows to the household sector, and that takes account of changes in the debt-income ratio resulting from nominal income growth as well as from new borrowing. To understand the implications of changing household income and expenditure flows for aggregate demand, it is necessary to distinguish expenditures that contribute to demand from expenditures that do not. The categorization of household expenditures as savings or investment used in the national accounts does not satisfy these criteria. Applying a conceptually appropriate accounting framework to the historical data reveals that the rise in household leverage over the past three decades cannot be understood in terms of increased household borrowing. For both the decade of the 1980s and the full post-1980 period, rising household debt-income ratios are entirely explained by the rise in nominal interest rates relative to nominal income growth. The rise in household debt after 1980 is best thought of as a debt-disinflation, analogous to the debt-deflation of the 1930s.

Keywords: household debt, debt dynamics, deleveraging, disinflation, interest rates, accounting

1 Introduction

Between 1929 and 1932, US household leverage – measured as the ratio of household debt to gross domestic product – grew by 10 percentage points. This growth was entirely due to falling prices and incomes; new borrowing by households fell sharply during this period. The rise in the real burden of debt through deflation was famously identified by Irving Fisher as central to the macroeconomics of the Depression.(Fisher, 1933)

While debt-income ratios were roughly stable for the household sector in the 1960s and 1970s, they rose sharply starting in the early 1980s. The rise in household leverage after 1980 is normally explained in terms of higher household borrowing. But with correct accounting, this more recent episode of rising household leverage turns out to resemble the debt-deflation of the early 1930s. The rise in household debt after 1980 cannot be explained by increased household borrowing, since the net flow of funds to households through the credit markets was substantially lower in this period than in earlier postwar decades. During the housing boom period of 2000-2007, there was indeed a large increase in household borrowing. But this is not the case for the earlier rise in household leverage in 1983-1990, when the debt-income ratios rose by 20 points despite a sharp fall new borrowing by households. For both the 1980s episode of rising leverage and for the post-1980 period as a whole, the entire rise in debt-income ratios is explained by the rise in nominal interest rates relative to nominal income growth. Unlike the debt deflation of the 1930s, this "debt-disinflation" has received little attention from economists or in policy discussions.

Our paper makes two interconnected contributions. First, we adapt a standard decomposition method utilized in the public finance literature to analyze the effects of interest rates, inflation and growth on leverage, as distinct from the level of borrowing. By quantifying the contribution of each of these factors, as well as defaults, to annual change in debt-income ratios, we are able to give a complete decomposition of changes in the household debt-income ratio over time, something that to our knowledge has not previously been done.[1] Second, we distinguish household spending on currently produced goods and services from other household expenditure flows, in order to examine the relationship between household borrowing and aggregate demand. We show that there is not in general a systematic relationship between changes in household debt-income ratios and aggregate demand. Over the past 80 years, household borrowing and the household sector's contribution to aggregate demand sometimes have moved together, but often have not. Both these contributions rely on careful accounting of all payment flows by and to households.

The policy conclusion of our analysis is that, if lower household leverage is desired, the supply of and demand for household credit are second-order issues. The central factor in the long-term evolution of leverage is the relationship between nominal interest rates, inflation and income growth. A broader conclusion is that in important respects, the experience of deflation in the 1930s has important

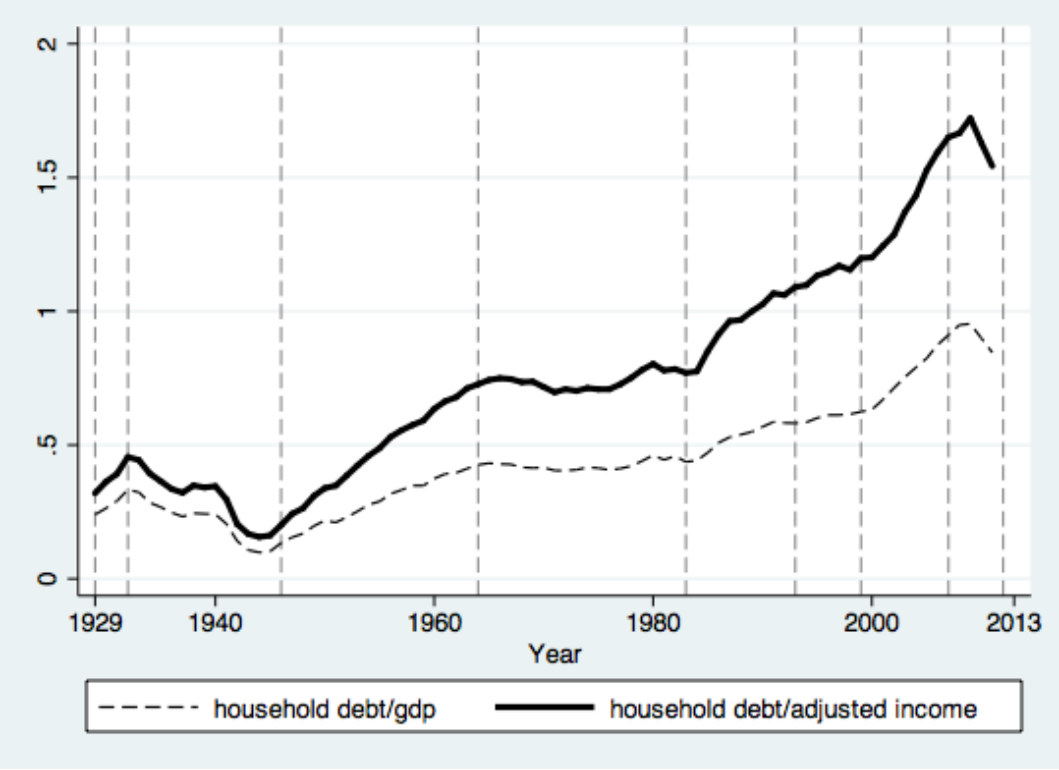
[1] Barba and Pivetti (2009) describes such a decomposition, but does not carry it out.

macroeconomic lessons that also apply to economies with rising prices.

1.1 Accounting and History

In examining leverage trends, one is often concerned with the ratio of outstanding debt to some measure of the capacity to repay debt, typically income. In this paper we use a measure of income that reflects household's ability to repay debt, which we describe more fully later. Using this measure, during the 1960s and 1970s, the ratio of debt to income for the US household sector was roughly constant. In 1983, the ratio stood at around 75 percent, the same as 20 years earlier. Then between 1983 and 2008, the ratio doubled, to over 160 percent. (See Figure 1.) Why did household leverage rise so sharply after 1983, after being stable for the previous 20 years? And what were the macroeconomic implications of this rise in household debt ratios? Did the rise in household debt help sustain aggregate demand, in the face of other factors that tended to hold down demand after 1980?

Figure 1: Household Leverage 1929 - 2011



The lines show the gross nominal debt of the household sectors relative to nominal GDP and adjusted nominal income. Nominal income is adjusted to include only cash payments received by households, following (Cynamon and Fazzari, 2014).

Any attempt to answer these questions using macroeconomic data must use an appropriate accounting framework. It is normal to discuss both the evolution of

household debt and aggregate demand in terms of household savings behavior. The savings concept in national accounts, however, is not appropriate for either of those purposes. Savings in the national accounts includes all spending that is not directed toward current consumption, with mortgage interest payments included in consumption. Dissaving in this concept does not correspond to credit-market borrowing. While it is natural to suppose that the rise in household debt after 1980 is connected with the similarly-timed fall in personal savings, in fact there is no direct connection between the two trends.

While we are the first, to our knowledge, to carry out a complete decomposition of historical changes in the debt-income ratio for the household sector, the methodology is familiar for public debt. It is well-known that changes in the ratio of public debt to GDP can be decomposed changes into the primary balance (i.e new borrowing), the real growth rate, the nominal interest rate, and inflation as independent determinants of public leverage. (Escolano, 2010) The primary goal of this paper is to shed light on the causes and consequences of the increase in household leverage after 1980; a secondary goal is to make the case for accounting decompositions as an empirical methodology. This methodology is particularly appropriate for the Keynesian paradigm, oriented as that is toward the evolution of macroeconomic variables in historical time.

1.2 Fisher's Debt Deflation

Using our measure of income, household debt-income ratios rose by13 points between 1929 and 1932, from 32 percent to 45 percent. Business leverage rose by even more. This is not because households and businesses were borrowing more to maintain spending levels in the face of lower incomes. In fact, both household and business borrowing fell sharply, both because of the efforts to deleverage and because the collapse of the banking system sharply reduced the availability of credit. The leverage increases during this period are entirely due to the fall in nominal GDP, which in turn is due in about equal parts to deflation and the fall in real output. Deflation also implied higher real interest rates on existing debt, further hampering efforts to deleverage.

These feedbacks between nominal income, expenditure and leverage were the core of Irving Fisher's theory of debt deflations. (Fisher, 1933) In Fisher's story, households and businesses attempted to improve their financial position by reducing expenditure on current output, which put downward pressure on the price level. Lower prices imply lower nominal incomes; in the conditions of the early 1930s, the fall was sufficiently rapid that deflation reduced the denominator of the debt-income ratio faster than expenditure cuts could reduce the numerator, and debt-income ratios rose even as spending fell. Higher debt-income ratios forced households and businesses to cut spending further, leading to the explosive fall in incomes and prices that initiated the Depression. There are other elements to Fisher's theory, including the link from debt defaults to bank failures and thus to a fall in the money supply emphasized by later monetarists. But the link from falling prices to a higher debt-income ratio is the critical one for our purposes.

While the Fisher story of debt-deflation during the 1930s is well-known, it is not always recognized that there is nothing in the logic of the story that depends on outright deflation. Any decline in the growth rate of nominal income has the same effect of raising the debt-income ratio. A one point reduction in inflation is no different from a one point increase in deflation in this respect. So we may speak of a debt-disinflation as well as a debt-deflation. Nor is this a merely theoretical possibility. A large share of changes in household debt-income ratios in the decades since the Depression is accounted for by the factors identified by Fisher in 1939, as opposed to changes in lending and borrowing. We call the direct effects of inflation, income growth and interest rates on debt ratios "Fisher dynamics." Properly accounting for these dynamics puts the rise in household debt ratios after 1980 in a new light. This rise was not due to higher borrowing by households, and made no contribution to aggregate demand. Rather, it was entirely the result of the increase in nominal interest rates and fall in inflation under Paul Volcker. In this sense, the increase in household leverage after 1980 is appropriately described as a debt-disinflation.

2 The Choice of Accounting Convention

In this paper, we reanalyze household income and expenditure flows in terms of two alternative accounting conventions. The purpose of our first convention is to shed light on the evolution of household debt by isolating payment flows between the household sector and the credit system. The purpose of our second convention is to shed light on the evolution of aggregate demand by grouping household payment flows according to whether they do or do not constitute demand for currently produced goods and services. In both cases, we are interested not in absolute magnitudes, but in the size of the payment flows relative to household income. We adjust reported household income to include only cash payments received by households, and distinguish between changes in adjusted income attributable to inflation and the residual, which we refer to, following standard practice, as "real" income growth. Most discussions of leverage ignore the denominator of the ratio, implicitly assuming that nominal income growth rates are stable over time. But this is not a good assumption historically for the US, or for most other countries. To give a full account of changes in debt-income ratios over time, variation in rates of income growth and inflation must be included.

2.1 Why New Conventions Are Needed

National accounting conventions can be traced back at least to the 17th century with the work of William Petty and Gregory King in England and de Boisguillebert and Vauban in France; today's conventions are largely products of the 20th century, developed under the pressure of varying policy needs and theoretical frameworks. (Stone, 1984; Bos, 1992) One important tension is between the national income accounts' organization in terms of accrued income and the financial or flow-of-funds accounts organization in terms of cash flow. (Massaro, 2011) A system of accounts

that purports to track the flow of real resources through markets will necessarily measure and classify transactions differently than one that tracks money payments and obligations. While neither of these paradigms is inherently superior, confusion arises when concepts from one are combined with concepts form the other. In the case of financial variables like debt, it is important to consistently use the flow of funds concept.

In any monetary economy, economic units make and receive many different kinds of payments. A system of national accounts groups units into sectors, and groups income and payment flows into various categories. Any complete system of accounts must respect the condition that total incomes received by any unit or sector must equal total expenditures made. But the grouping of individual income and expenditure streams is a matter of convention. Provided that one follows the chosen convention consistently, there is no logical restriction on the ways that income and expenditure flows can be grouped. The question is what accounting convention is most useful for the particular question being asked. Since nominal quantities are not generally meaningful, analysis of national accounts typically focuses on ratios. A full accounting of the change in any ratio must include changes in both the numerator and the denominator.

There are four steps that must be taken to produce an accounting framework suitable to addressing questions about the evolution of household debt. First, they must be put on a cashflow basis, removing all imputed non-market transactions – for instance the value of services from owner-occupied housing. We must also remove transactions between third parties that are conventionally assigned to the household sector but do not involve any payments to or from households, such as employer purchases of health insurance. Second, income and expenditure flows must be classified in a way that separates cash flows to and from the credit markets from non-credit transactions. Third, expenditures that contribute to demand for currently produced goods and services must be distinguished from expenditures that do not. Fourth, the evolution of the numerator and the denominator of the debt-income ratio must be described consistently within the same framework.

2.2 Alternative Classifications of Household Expenditures

Household expenditures are, with a few variations, classified in broadly the same ways in most modern national accounting systems. Taxes on income are first distinguished as their own category as a deduction from income, and the remaining expenditure flows (equal to "disposable income") are divided into "consumption" and "saving." Net acquisition of financial assets is grouped in saving, while interest payments and expenditure on services and nondurable goods is grouped in consumption.[2] There is some variation in the treatment of net acquisition of durable goods. Some statistical

[2]Strictly speaking, the NIPAs groups only mortgage interest payments with consumption, since they add to the imputed rental payments on owner-occupied housing. Nonmortgage interest payments are counted in a separate category. But mortgage interest is by far the largest part of household interest payments. And all interest payments are counted as reducing saving just as consumption does.

agencies, including the US BEA in the NIPAs, group expenditure flows associated with net acquisition of housing as saving, and flows of expenditure devoted to other durable goods as consumption. Other statistical agencies, such as the US Federal Reserve in its financial accounts, group all expenditure on durable goods as savings. Net acquisition of financial assets is not tracked in the national income and product accounts, which are supposed to cover only market transactions in final goods and services.

Because they separate expenditure flows that respond to current household requirements from flows that are presumed to be oriented toward future needs, the standard conventions are appropriate for discussions of investment in terms of output reserved from current requirements. For other kinds of questions they may be unclear or misleading. In particular, neither of the standard conventions is well-suited to discussions of changes in leverage and aggregate demand, since the standard definition of borrowing includes both credit market and non-credit market transactions, and the standard definition of consumption does not correspond with household expenditures on currently produced goods and services.

A discussion of debt in relation to household income and expenditure must use treat these latter categories on a consistent flow of funds or cash-flow basis. This is because debt is incurred as a result of a divergence between cash income and cash outgoings, and because debt must be serviced out of cash income. Changes in non-market flows or third-party payments do not directly affect either borrowing requirements or repayment capacity. For example, a reduction in employer contributions to defined benefit pension funds is reported as a fall in household income in the national accounts; if household expenditure remained unchanged, this would imply a fall in the personal savings rate. But it is logically impossible for such a fall in pension contributions to explain an increase in household borrowing, since employer pension contributions have no direct effect on current household cashflows. Similarly, an increase in imputed rents for owner-occupied homes will show up as an increase in consumption, again implying, all else equal, a fall in personal savings. But again, this cannot explain an increase in borrowing, since it has no effect on the cash payments made by households.

To exclude imputed noncash transactions and transactions that do not involve payments to or from households, and to distinguish expenditures that contribute to demand from those that do not, we follow the approach proposed by Cynamon and Fazzari (2014). For 1948-2011, we use their data; for 1929-1947, we adjust the official series on household income and expenditure using the same procedure described in their paper. The changes proposed by Cynamon and Fazzari convert the household income and expenditure series in the national accounts to a consistent cashflow basis by: eliminating the various imputations for nonmarket goods and services; grouping all household interest payments with transfers rather than with consumption; separating nonprofit institutions from the household sector; and attributing third-party payments for medical and pension benefits to the payor's sector rather than to the household sector. We follow them in our adjustment of household income and definition of demand expenditures. We then combine their series with household interest payments, from the NIPAs, the change in household debt, from the financial

accounts, and the default rate on household debt, from the sources described in Section 3. This allows us to calculate the primary balance for the household sector.

The issues are summarized in table 1. The first two columns show the current standard conventions used in the NIPAs and financial accounts. The third column shows the convention proposed by Cynamon and Fazzari. The final two columns show our two alternative proposed conventions. Our first convention, we argue, is appropriate for analyzing the evolution of household debt over time. The second convention is appropriate for questions about aggregate demand.

Table 1: Alternative Accounting Treatments of Household Expenditure

Flow	Financial Accounts	NIPAs	C & F	M & J 1	M & J 2
Income Taxes	Deduction from income				
Services & Nondurable Goods	Consumption			Primary Expenditure	Demand Expenditure
Durable Goods	Saving	Consumption		Primary Expenditure	Demand Expenditure
Residential Investment	Saving		Household Investment	Primary Expenditure	Demand Expenditure
Mortgage Interest	Consumption		Transfers	Interest	Non-Demand Expenditure
Personal Interest	Transfers			Interest	Non-Demand Expenditure
Transfers	Transfers			Primary Expenditure	Non-Demand Expenditure
NAFA	Saving	n/a	Financial Saving	Primary Expenditure	Non-Demand Expenditure

The treatment of credit market borrowing differs between the conventions. In the NIPA convention, neither changes in financial assets nor changes in liabilities appear directly. Saving is the residual term, defined as investment by the owner-occupied housing sector plus the difference between income and consumption for the remaining household sector. The accounts do not address the form taken by saving other than residential investment. In the financial accounts, household credit market liabilities are included directly, and saving is defined as the increase in household durable goods, owner-occupied housing and financial assets, less the increase in household liabilities. In the financial accounts, there is no residual term, so an error term must be included. Cynamon and Fazzari's convention is the same as the NIPA convention except that residential investment is separated from saving; the consolidation of owner-occupied housing with the household sector also means that mortgage interest is no longer included in consumption. Financial saving is the residual term, so there is no distinction between change in financial items on the asset side of the household balance sheet from changes on the liability side.

2.3 Our Proposed Conventions

In order to classify household payment flows in a way that is suitable for answering questions about household debt, we propose two alternative conventions. In our first convention – the "Fisher Dynamics" convention – we subtract interest payments from the increase in household credit market liabilities to get new borrowing by households; the negative of this is the household primary balance. Household primary expenditure is the residual term; since disposable income adjusted for noncash imputations plus the increase in credit-market liabilities captures all cash incomings, primary expenditure by definition includes all non-interest cash outgoings. In our second alternative convention, we follow Cynamon and Fazzari in identifying household expenditures that contribute to demand for currently produced goods and services. Observed borrowing plus their category of financial saving yields a residual category of non-demand expenditure.

The logic of the Fisher dynamics convention is analogous to the logic of the similar convention for governments. In the absence of access to credit markets, both borrowing and interest payments would be zero. So primary expenditure in our sense would always be equal to income, and the primary balance would be zero. Deviations of the primary balance from zero therefore show the net effect of credit markets on household expenditure. Equivalently, the primary deficit – i.e. borrowing less interest payments – represents the net flow of funds to households through the credit markets. Either way, if we want to talk about the interaction of household credit with other expenditure flows, this is the appropriate category. The logic of our second convention is that total expenditure by households must be equal to total receipts – including income, borrowing, and sale of assets – and that expenditure can be divided between flows that do and do not fall on currently produced goods and services.

All financial accounts begin with the following identity, which must hold for all economic units:

$$total\ cash\ inflows = total\ cash\ outflows$$

Cash inflows can be divided into current income and receipts from borrowing, while cash outflows include all the items listed in Table 1: taxes, purchases of services, durable goods and nondurable goods, residential investment, interest payments, and transfers. Households both receive income from the sale of financial assets and make payments to purchase financial assets, but these two sets of payments are combined into net acquisition of financial assets (NAFA) in the financial accounts, so we have to include them either as income or expenditure. We include them as expenditure. This gives us:

$$total\ cash\ inflows = taxes + services + durable\ goods + nondurable\ goods +$$

$$residential\ investment + interest + transfers + NAFA$$

Following standard practice, we treat taxes as a deduction from income. For the moment, we will group all remaining items on the right hand side as "expenditure." We also take account of defaults. The official financial accounts do not observe borrowing directly, but measure it as the change in the debt stock. Thus defaults show up in the accounts as lower observed borrowing. To get the true level of borrowing by households, we must add the total debt charged off due to defaults to the change in debt.

$$(income - taxes) + (debt\ change + defaults) = disposable\ income + borrowing$$

$$disposable\ income + borrowing = expenditure \tag{1}$$

Our two conventions vary in how they divide up the right hand side of Equation 1. For our first convention, we separate out interest payments and call the residual "primary expenditure". So we have:

$$disposable\ income + borrowing = primary\ expenditure + interest$$

We call the difference between primary expenditure and income the primary balance. The primary balance is the difference between the unit's total cash outgoings and the outgoings it would have in the absence of access to credit markets. This gives us:

$$debt\ change = primary\ balance + interest - defaults \tag{2}$$

This identity is the starting point for the analysis of "Fisher dynamics" in Section 3.

For our second convention, we instead divide expenditure on the basis of whether it does or does not fall on currently produced goods and services. Demand expenditure includes residential investment and that part of consumption that reflects market purchases of currently produced goods and services. Non-demand expenditure then consists of interest payments, transfer payments, and net acquisition of financial assets. So we have:

$$disposable\ income + borrowing = demand\ expenditure + (interest + transfers + NAFA) \tag{3}$$

The purpose of this decomposition is to isolate those expenditures that contribute to aggregate demand, and show how they behave in relation to the unit's financial position. Fo simplicity, we combine transfers and net acquisition of financial assets into a singe category, which we treat as a balancing item. We discuss the historical behavior of this decomposition in Section 4.1.

3 "Fisher Dynamics" in US Household Debt

This section follows Mason and Jayadev (2014) in combining equation 2 with inflation and real income growth to give a systematic accounting of changes in debt-income ratios over time. This approach is standard for public debt but not normally applied to private debt. But it is essential if we are going to make any systematic comparison of the relative importance of different factors in changes in debt ratios over time. In particular, this approach focuses attention on the fact that the debt-income ratio has a denominator as well as a numerator. It is common to speak about changes in borrowing and changes in debt-income ratios as if they were synonyms.[3] But they are not: The evolution of the ratio depends not only on household borrowing, but on real income growth and inflation. Faster growth of nominal income – whether due to real income growth or inflation – reduces the debt-income ratio, just as much as lower borrowing does. This fact is visible in episodes of deflation but is just as true in periods of positive inflation, when it is more often overlooked.

For any unit or sector, one can define the evolution of leverage over time as:

$$b_{t+1} = d_t + (\frac{1+i}{1+g+\pi})b_t + sfa_t$$

$$\Delta b_t = b_{t+1} - b_t = d_t + (\frac{i-g-\pi}{1+g+\pi})b_t + sfa_t \tag{4}$$

where b is the ratio of gross debt to income, d is the ratio of the borrowing – that is, deficit net of interest payments – to income, i is the *nominal* interest rate, g is the *real* growth rate of GDP, and π is the inflation rate. sfa_t is the stock-flow adjustment term and captures any difference in debt stocks that cannot be attributed to either interest payments or new borrowing. In some empirical applications, it is necessary to include this term to capture measurement errors that lead to the observed debt stocks being different from those implied by the previous period's debt stock and borrowing. In this paper, we treat the primary balance as a residual, so there is no possibility of discrepancies of this kind. But the sfa_t term is still necessary to take defaults into account. Since Equation 4 is written in terms of interest payments and the primary balance (defined as all non-interest expenditures less income), both normalized by income, our first accounting convention is necessary in order to apply the equation to household data. Equation 4 is well known to macroeconomists as the law of motion of government debt and in that context has been called 'the least controversial equation in macroeconomics' (Hall and Sargent, 2011).

In order to separate out the contributions of the variables, we use a linear approximation of the equation to assess the impacts of each "Fisher variable" and net borrowing.

$$\Delta b_t \approx d_t + (i_t - g_t - \pi_t - c_t)b_{t-1} \tag{5}$$

Here c_t is the fraction of debt charged off due to default.

[3]For example, compare the title and first sentence of Dynan and Kohn (2009).

The typical application of this equation is to decompose changes in the public debt-GDP ratio over time, generally into changes due to the primary balance, the real growth rate, the nominal interest rate, and inflation. Decompositions of the changes in the debt-GDP ratio have been carried out for various countries and periods, including the US (Hall and Sargent, 2011; Aizenman and Marion, 2009), the UK (Buiter, 1985; Das, 2011), India (Rangarajan and Srivastava, 2003), and more or less broad sets of countries (Giannitsarou and Scott, 2008; Abbas et al., 2011). A common finding in these papers is that changes in growth, inflation and interest rates play a large role in the evolution of public-debt GDP ratios historically. In particular, the fall in debt-GDP ratios in most advanced countries in the decades after World War II is primarily explained by growth rates in excess of interest rates; in many countries, public debt-GDP ratios fell substantially even though governments rarely or never ran primary surpluses.

3.1 Data and Variable Definitions

Except where otherwise noted, data used for the decompositions is drawn from the National Income and Product Accounts and their predecessor series. The variables are defined as follows.

Table 2: **Average Values of the "Fisher Variables" by Period, 1929-2011**

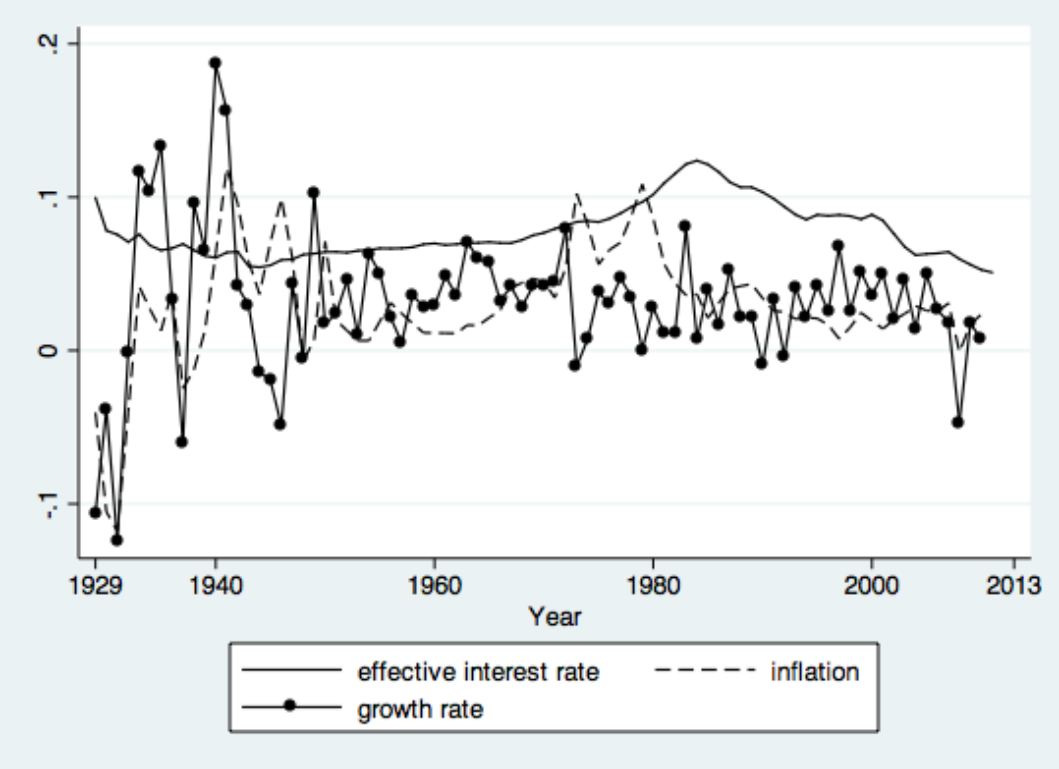
Period	i	g	π
1929 to 1932	8.1	-6.8	-7.6
1933 to 1945	6.4	6.7	4.1
1946 to 1963	6.6	3.2	2.4
1964 to 1983	8.7	3.5	5.6
1984 to 1993	10.7	2.2	3.2
1994 to 1999	8.7	3.9	1.8
2000 to 2007	7.1	3.3	2.4
2008 to 2011	5.5	-0.7	1.3

This shows the average values of the effective interest rates faced by households, the growth rate of adjusted household income, and inflation for each of our eight periods. See text for details on variable definitions.

Our adjusted household income and demand expenditure series are taken from Cynamon and Fazzari (2014) for 1948-2011. For 1929-1947, we construct an adjusted household income measure using the same procedures. The specific adjustments can be found in their Table 1.

Income. Our measure of income includes only cash payments received by households, after taxes; it excludes both imputed noncash income, and payments on behalf of households made by third parties. This income measure is referred to below as adjusted personal income. The reasons for these exclusions are that credit market borrowing depends on the difference between money outlays and money income, and that only cash income is available for debt service.

Figure 2: Evolution of Effective Interest Rates, Growth and Inflation



The lines show the behavior of the three Fisher variables since 1929. Adjusted income is calculated as described in the text; nominal income growth is the sum of real income growth and inflation. The effective interest rate is total household interest payments divided by the start-of-period stock of household debt. When the effective interest rate exceeds nominal income growth, a household primary balance of zero implies rising leverage; when nominal growth exceeds the effective interest rate, a primary balance of zero implies falling leverage.

Debt. The stock variable b is the end-of-period value of total credit market liabilities, divided by adjusted personal income. Debt, as defined here, does not include non-credit liabilities. These are a small portion – less than 2 percent in recent years – of total household liabilities, consisting mainly of security credit. Including these liabilities in our debt measure would not affect our qualitative results.

Borrowing. Borrowing is the year over year change in household debt, pus the amount of debt written off by default. Adding defaults is necessary because borrowing flows are not observed directly in the financial accounts; credit flow series are computed from the change in liabilities. This means that without our correction, defaults show up as lower net borrowing.

Primary balance. The household primary deficit d is calculated as borrowing minus

interest payments, divided by adjusted personal income. This is equivalent to the way the primary deficit is calculated for governments.

Demand expenditure. This includes consumption less imputed noncash expenditures and less payments on behalf of households by third parties, plus residential investment in owner-occupied housing.

Interest rates. Interest payments are gross interest paid by households. (Gross rather than net interest is is appropriate since interest income is included in disposable personal income.) The effective interest rate i is total interest payments divided by the stock of debt at the start of the period. In other words, it is the average interest rate on the current debt stock, not the marginal rate on new borrowing.

Growth and inflation rates. Growth g and inflation π are the percent changes in the level of adjusted income and the personal consumption expenditure (PCE) deflator, respectively, from the previous year.[4]

Writeoffs. For 1999-2012, the annual quantity of debt charged off by default is taken from the New York Fed's Consumer Credit Panel, which gives the conceptually correct measure, gross writeoffs observed at the household level. For 1985-1998, chargeoffs are taken from net writeoffs of consumption loans and mortgages on single-family dwellings. For 1935-1984, chargeoffs are based on gross writeoff rates for all debt held by commercial banks, as reported to the FDIC. See the discussion in Section 3.

Figure 2 and Table 2 show the behavior of the three "Fisher variables" over the whole 1929-2011 period. Note that the effective interest series does not behave like the federal funds rate. It is much smoother and usually significantly higher. The smoothness of the effective interest rate series is due to both the fact that the effective interest rate in any given year reflect debts incurred over many previous years, and the fact that the market rate faced by private borrowers generally moves than less than one for one with the policy rate. Note in particular that the effective nominal interest rate faced by households exceeded the inflation rate in every year but 1974, and it has remained well above zero even during the most recent period when the nominal federal funds rate has been fixed at zero.

For the evolution of debt ratios, the most important question is whether nominal interest rates are greater or less than the sum of real growth and inflation. The higher are nominal interest rates compared with nominal growth rates (or, equivalently, real interest rates compared with real growth rates), the greater will be the increase in debt ratios for a given level of new borrowing. When interest rates

[4]Conceptually, the ideal inflation measure would reflect the change in household income attributable to inflation. The PCE or CPI is appropriate for this purpose if we think that wages are set in real terms, but over short periods this may be a misleading assumption; the GDP deflator or an index of unit labor costs might be more appropriate. Fortunately, the various indexes move broadly together, so our results are not qualitatively affected.

exceed growth rates, a primary balance of zero will imply rising leverage, while when growth rates exceed interest rates, a primary balance of zero will imply falling leverage. Over the full 1929-2011 period, the two cases ($i > g + \pi$ and $i < g + \pi$) are about equally common.

3.2 Accounting for Defaults

An important difference between private and public sector debt dynamics is that for public debt, defaults are discrete, rare events. By contrast some fraction of private debt is written off by lenders every year. So a full accounting of changes in private debt must explicitly include the share of debt written off each year through default. Unfortunately, there does not exist a good series for defaults covering our full period. The financial accounts produced by the Fed do not record defaults; since net borrowing is computed from the change in debt stock, defaults appear as reduced borrowing. Our series for household borrowing and primary deficits are corrected for this bias, as described below. A related problem, which we have not been able to correct for, is the fact that many loans have a period of nonperformance before being written off; since our interest rate measure is the ratio of total interest payments to the face value of outstanding debt, this means our measure of the effective interest rate is biased downwards in proportion to the fraction of nonperforming loans. We do not believe this materially affects our results. But it is worth raising, since it means that the already-large role of defaults in explaining household deleveraging after 2008 is to some degree understated.

A number of data sources do allow for estimates of the fraction of household debt written off in recent periods. Since 1999, the New York Federal Reserve's Consumer Credit Panel (CCP) has tracked household credit flows, including defaults directly. (Lee and van der Klaauw, 2010) To our knowledge, this is the only source that captures the full universe of household debt writeoffs; importantly, it measures gross rather than net writeoffs. (Gross is the right measure for our purposes since recoveries do not affect the liability side of household balance sheets.) While writeoffs are measured in the underlying panel data, they are not reported in the main publication based on the CCP, the Quarterly Report on Consumer Credit and Debt. On the advice of Meta Brown at the New York Fed, we have constructed our default series by combining the Quarterly Report on Consumer Credit and Debt with the default data reported in Haughwout et al. (2013). For 1999-2012, this is our measure of the change in household debt attributable to default.

For 1985-1998, we construct a default measure based on the the Federal Reserve's measure of commercial bank default losses on credit card debt, other consumer loans, and residential mortgages on 1-4 family homes. We take a weighted average these default rates, with each year's distribution of household debt across these categories as weights. Two major problems with this series, however. First, measure includes only defaults losses at commercial banks; the default experience of debt held by commercial banks may be different from that of other household debt, especially in periods where a large fraction of household debt is securitized. Second, the writeoffs reported in this series are net of recoveries. This biases the series

downward as a measure of debt writeoffs, but the problem is not as bad as one might fear, since the bulk of household defaults have always been on unsecured loans. For the years for which both measures are available, the commercial bank measure averages about 0.5 percentage points below the CCP measure.

The Fed does not report commercial bank default losses by loan category for years prior to 1985. So for 1934-1984, we use the gross chargeoff rate on all commercial bank loans as reported to the FDIC. During the late 1980s, when default losses on commercial real-estate loans were very high, this measure gives an overestimate of the share of household debt charged off. (This does not affect our results, since the disaggregated default loss series is available for that period.) But otherwise, the default experience of household debt appears to be similar to that of commercial bank loan portfolios as a whole.

We have not been able to find a good measure of default rates for years prior to 1934, so no correction is made for defaults for our first period. But there is evidence that defaults were an important factor in the trajectory of household debt in the 1930s. (Olney, 1999)This implies that the estimate of household primary surpluses in 1929-1932 shown in Table 3 is an overestimate; the true primary balance in this period was closer to zero.

Figure 3 shows the fraction of loans to households written off by each of these three measures.

3.3 Results

Figure 4 shows annual changes in leverage and the contributions of new borrowing (expenditure minus income), debt defaults, and the three Fisher variables respectively. The contribution of each Fisher variable to the change in leverage (shown individually in Table 3) is equal to the value of the variable multiplied by the debt stock at the end of the previous period. Figure 4 shows that over some periods – especially between 1945 and 1980, and in the housing boom period of the 2000s – changes in leverage track new borrowing (the primary deficit) closely. But over other periods, the two correspond less closely. In the 1930s, the trajectories of debt-income ratios and of new borrowing are almost inverted. Comparing the period 1964-1983 to the period 1984-1995, we see that households were running primary deficits (expenditure exceeded income) in the first period, but primary surpluses in the second; but household leverage was essentially flat in the first period and rose sharply in the second.

Figure 5 expands on Figure 4 and decomposes the aggregated Fisher-variable trajectory into the contributions of its three component variables. The bars show the aggregate contribution of the three variables, as in Figure 4. The lines show the contributions of each of the three components.[5] One clearly sees here the extent to which falling income raised leverage in the early 1930s and in 2009, and how deflation raised leverage in the 1930s and inflation held it down in the later 1960s and 1970s.

[5]The lines show the respective contributions to the growth of leverage, not the variables themselves – that is, they show each variable times the start-of-period debt stock.

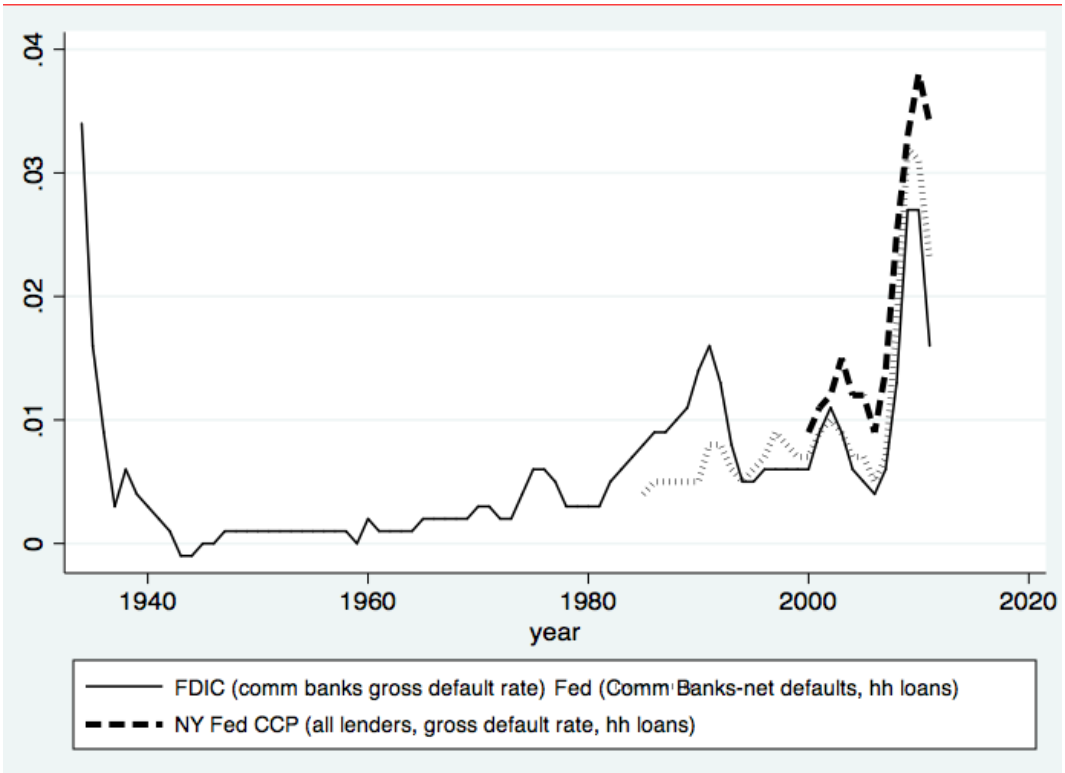
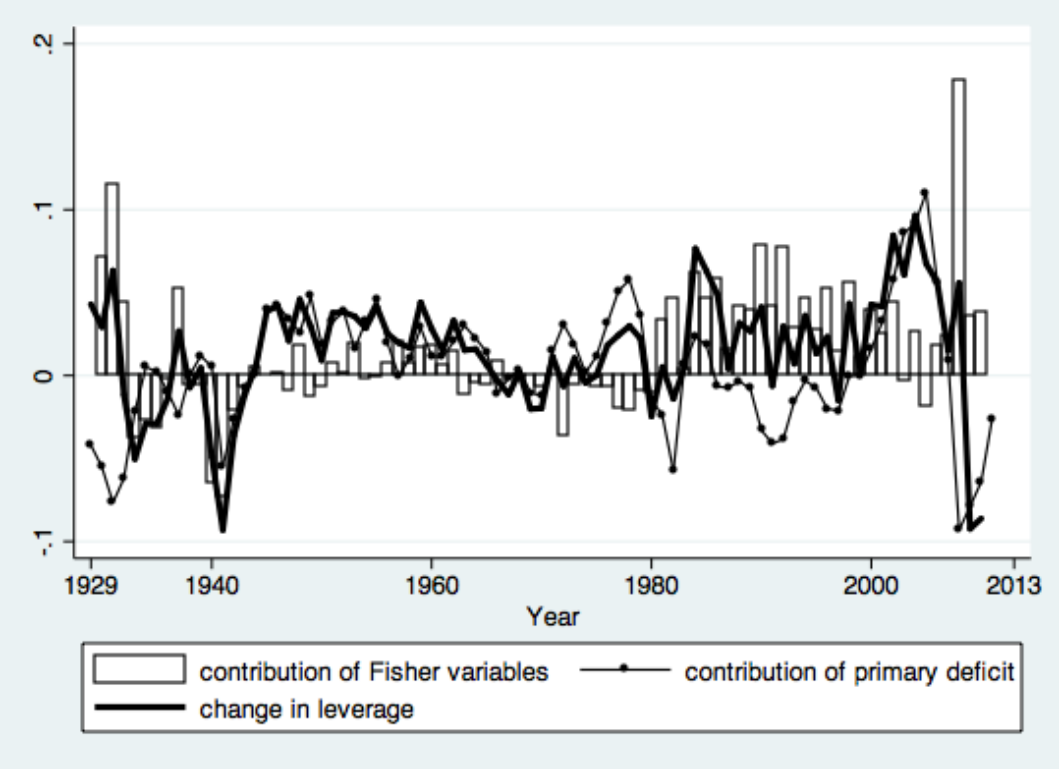


Figure 3: Annual Share of Debt Written Off, 1985-2011.
Annual debt writeoffs as a fraction of debt outstanding. Default series 1 is the gross writeoff rate for all loans by commercial banks, as reported by the FDIC. Default series 2 is the net writeoff rate for commercial bank loans to households, as reported by the Federal Reserve. Default series 3 is the gross writeoff rate for all household debt, as reported in the New York Fed Consumer Credit Panel (CCP). Series 3 is the preferred measure.

Another striking feature is the large increase in the contribution of interest payments to leverage in the 1980s, and stability thereafter. The relatively constant interest contribution over past 25 years reflects fact that interest rates facing households have declined at about the same rate as debt ratio has increased, resulting in constant debt-service burden. Another way of looking at this is that while average interest rate has declined since 1980s, it has declined more slowly than inflation, so that real interest rates facing households have remained higher than in the pre-1980 decades. In effect, the contribution of interest payments to rising leverage after 1990 is a reflection of the disinflation of the 1980s.

Table 3 presents the same information as Figures 5 and 4. It outlines eight distinct periods. The exact periodization is not based on any formal test, and nothing hinges on the precise dates chosen; but visual inspection of the figures does suggest a clear division between periods of rising, stable, and falling household debt-income ratios. What this table shows is that changes in debt-income ratios are not a good guide to household borrowing.

Figure 4: Contributions of Fisher Variables and Deficit to Leverage

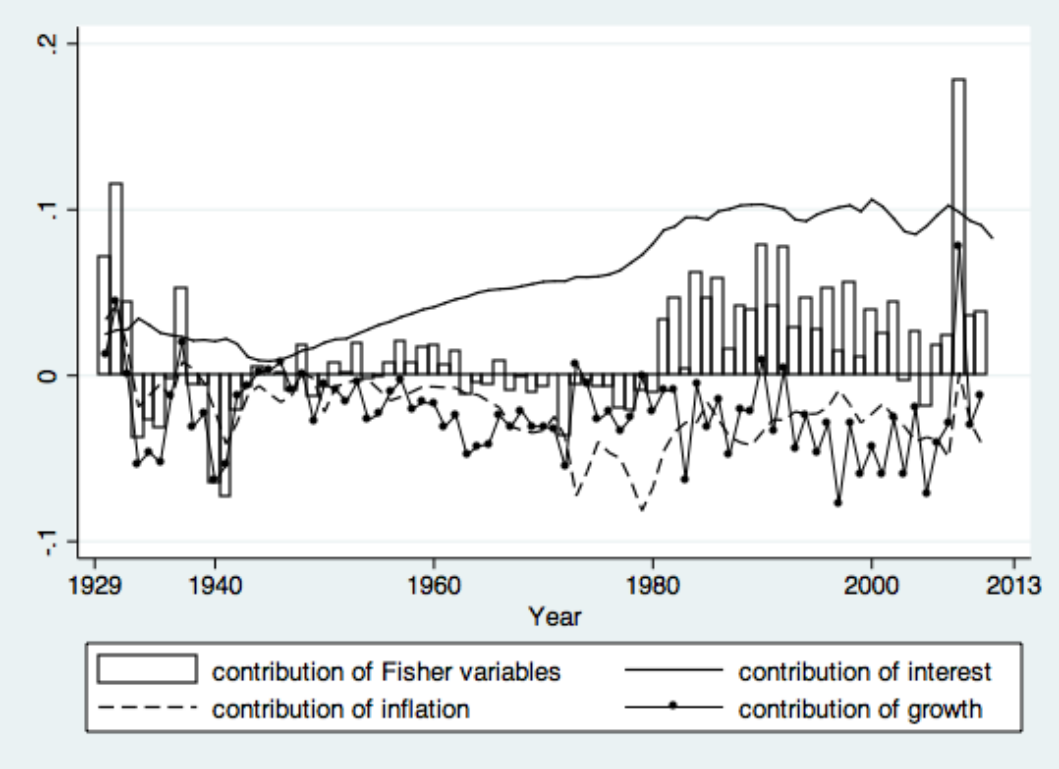


Looking at the first two lines of Table 3, we see that household debt-income ratios rose at 3.1 points per year between 1929 and 1932, and then fell at an average rate of 1.9 points from 1933 through 1945. But this did not imply any shift on the part of the household sector from deficit to surplus. On the contrary, borrowing by households was 5 points higher in 1929-1932 than in 1933-1945.[6] The dramatic shifts in household debt-income ratios in this period are almost entirely explained by the large movements in nominal income during this period. Between 1940 and 1945 (not broken out in the table), household debt-income ratios fell by 19 points, from 0.35 to 0.16. Yet households did not pay down any debt during this period. Accumulated primary surpluses totaled 5 points, compared with accumulated interest payments of 9 points. The entire fall in debt ratios was explained by inflation (11 points) and income growth (16 points). The role of falling incomes and prices in rising debt ratios in 1929-1932 was emphasized by Irving Fisher and other writers on debt deflation. But while the gap between the household primary balance and the change in debt ratios is larger for the early 1930s than for any subsequent period, the same factors continue to operate.

Moving to the postwar era, we see that the 2.9 point per year increase in debt ratios in the immediate postwar period was almost identical to the 2.6 point average

[6]This is true whether we are looking at total borrowing or, as we prefer, the primary balance, since household interest payments were about equal in the two periods.

Figure 5: Break up of Fisher Variables



This figure shows the shares of leverage changes accounted for by the three variables. The bar is the contribution of the the Fisher variables, the three lines break up the contributions by the real growth rate of household income, inflation and the nominal interest rate

primary deficit in this period. The high level of mortgage borrowing in the 1950s presumably resulted from, in addition to pent-up housing demand, a number of regulatory changes intended to encourage home mortgage borrowing, such as mortgage guarantees through the Federal Housing Administration and the Veterans Administration, and more favorable treatment of mortgage borrowing in the tax code. (Garriga, Chambers and Schlagenhauf, 2012) The stabilization of leverage after the mid-1960s reflects lower household expenditure relative to income; but this was not the most important factor. While household primary deficits were on average 1.8 points lower in 1964-1983 than in 1946-1963, the contribution of accelerating inflation was almost twice as large, reducing debt ratios by 3.3 points more per year in the second postwar period than in the first. Faster growth also played a role, reducing debt ratios by 1.1 points more per year in the second period. This was offset, however, by a 3.5 point increase in the contribution of interest payments. So while it is true that household debt ratios rose over 1946-1963 and were stable over 1964-1983, and that household borrowing was greater in 1946-1963 than in 1964-1983, it would be wrong to straightforwardly attribute the former fact to the latter.

Table 3: Decomposition of Change in Household Debt-Income Ratio, in Percentage Points per Year

	Δ b	Attributable to:				
		Primary Deficit	Interest	Growth	Inflation	Default
1929 to 1932	3.1	-5.9 *	2.7	1.9	3.1	n/a
1933 to 1945	-1.9	-0.6	2.1	-2.5	-1.2	-0.3
1946 to 1963	2.9	2.6	2.9	-1.5	-0.8	-0.0
1964 to 1983	0.2	0.8	6.4	-2.6	-4.1	-0.2
1984 to 1993	3.2	-1.1	9.9	-2.0	-3.0	-0.5
1994 to 1999	1.7	-0.9	9.9	-4.4	-2.0	-0.8
2000 to 2007	5.8	5.7	9.5	-4.3	-3.3	-1.5
2008 to 2011	-4.1	-6.6	9.1	1.2	-2.2	-5.1
1946 to 1983	1.5	1.7	4.7	-2.1	-2.6	-0.1
1984 to 2011	2.8	0.1	9.7	-2.9	-2.8	-1.5

* Since default data is not available for this period, debt writeoffs contribute to the observed primary surplus. The true primary surplus for this period will be closer to zero.

This shows the annual change in the household debt-income ratio in eight distinct periods (first column) and the contributions to that change of primary deficits and interest, growth, inflation rates and defaults. A negative number represents a component reducing in leverage and a positive number one increasing it. The sum of the contributions is not exactly equal to the change in the debt ratio due to interaction effects.

A more dramatic divergence between leverage and borrowing appears in the fifth period, 1983-1994. New borrowing by households in this period averaged 1.9 points lower than in the previous period – an even larger fall than that between 1946-63 and 1964-1983. This fall in new borrowing was enough to move the household sector into primary surplus. Yet despite this sharp fall in household borrowing, household debt-income ratios rose in this period by 3.2 points per year. This was a faster rate of increase than in the immediate postwar years, despite the fact that funds flowing to households through credit markets amounted to 2.6 percent of income in that period and *negative* 1.1 percent of income in this one. The difference is attributable to higher nominal interest rates, which added 3.5 points more annually to the ratio than in the preceding period (and 7 points more than in 1946-1963), followed by lower inflation (1.1 points) and slower income growth (0.6 points). Stabilization of debt ratios in the later 1990s also owed nothing to any change in borrowing behavior. Both primary deficits and total borrowing were essentially unchanged between the two periods. Rather, the slower rise in debt ratios in the the 1990s compared with the 1980s was entirely the result of faster income growth.

Only the housing bubble and its aftermath do we see something like the

conventional story of changes in debt ratios reflecting changes in debt-financed expenditure. The 40 point rise in household debt-income ratios during this period is almost exactly equal to households' accumulated household primary deficits. In fact, the swing from surplus to deficit during the housing boom was even greater than the acceleration in leverage growth, since higher borrowing was partly offset by higher inflation (which reduced leverage by 1.3 point per year more in this period) and higher defaults (which reduced it by 0.7 point per year more). Similarly, the 10 point swing in annual debt ratio growth – from plus 5.8 points per year to minus 4.1 points – after 2007 is still not as large as the 12 point swing in the household primary balance. The dramatic fall in household borrowing, plus the 3.6 point increase in the share annual reduction of leverage through default, was offset by lower inflation and negative income growth. Overall, households reduced their debt in this last period by 4.1 points per year, while defaults reduced leverage by 5.1 points per year, up from 1.5 points in 2000-2007. If the share of household debt written off by default had remained constant at its pre-2008 level, the reduction in household leverage over 2008-2011 would have been just 0.6 points per year – less than one-fifth its actual value. So while treating changes in debt ratios and changes in borrowing as equivalent is more reasonable for the housing boom period than for the 1980s, it still misses important parts of the story.

Over the full 1984-2011 period, the household sector debt-income ratio almost exactly doubled, from 0.77 to 1.54. Over the preceding 20 years, debt-income ratios were essentially constant. Yet over 1963-1983, households ran cumulative primary deficits equal to 20 percent of income, compared with cumulative primary deficits of just 3 percent of income over 1984-2012. So if the goal is to explain the difference in household debt growth in the decades before and after 1980, the answer cannot involve any change in borrowing behavior. Any explanation of rising household debt of the form "households borrowed more because..." does not apply to the historical facts. The entire growth of household debt after 1983 is explained by the combination of higher interest payments, which contributed an additional 3.3 points per year to leverage after 1983 compared with the prior period, and lower inflation, which reduced leverage by 1.3 points per year less. The question is not why households borrowed more after 1980; they did not. The question is why the operation of the monetary system increased the value of already-incurred debt much more rapidly after 1980 than before.

3.4 Counterfactual Scenarios

Another way of seeing the real causes of rising debt-income ratios in the 1980s is to ask what would have been the trajectory of household leverage if household primary balances had been the same as in reality but growth, interest and/or inflation rates had remained constant at the pre-1980 level. The result of that simulation exercise is shown in Figure 7. The heavy black line in the figure shows the actual trajectory of household leverage, while the dashed line shows what the trajectory would have been if i, π, and g had been fixed at their 1946-1983 average levels for the whole period. The other three lines show scenarios with growth, inflation, nominal interest rates and

real interest rates ($i - \pi$) respectively fixed at their average levels while the others vary historically. The main message of the graph is that household borrowing has made *no* contribution to the long-term growth of household debt; if interest rates, inflation and growth had been constant, then the actual pattern of household borrowing would have led to roughly stable. Leverage would even have decreased slightly over the whole period from 1960 to 2010. Second, while negative income growth increased leverage in 2008-2009 (and higher growth reduced leverage somewhat in the late 1960s), the counterfactual trajectory is closest to the actual one in the constant-growth scenario. The big differences come from higher interest rates (the overwhelming factor in the 1980s) and lower inflation (important more recently). Apart from the housing boom and its aftermath, changes in household debt ratios since 1980 have been driven by Fisher dynamics, not changes in borrowing. The common narrative of the profligate American household is applicable only to a short period of sharply increased borrowing in the mid-2000s (following which households have cut back more than proportionately).

Figure 6: Counterfactual Leverage Scenarios

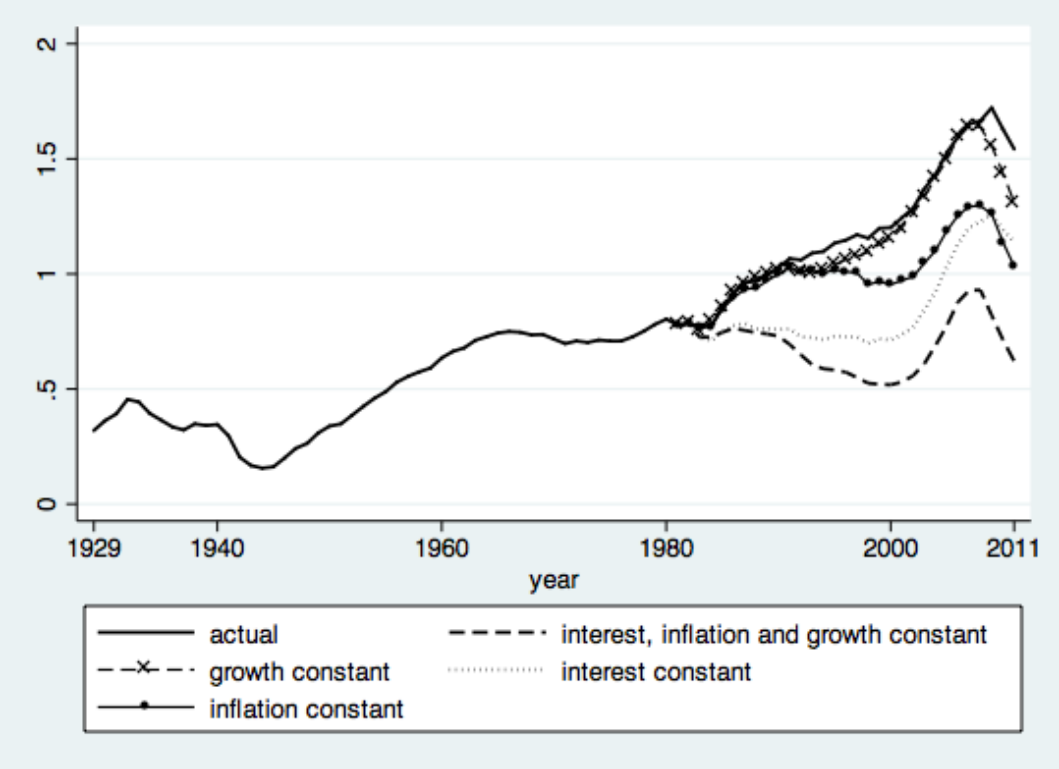


Figure 7: **Counterfactual Evolution of Household Leverage 1983-2012, Given 1946-1983 Average Values of i, g, and π.** The figure shows the result of simple simulation exercises where the real growth rate of income, the inflation rate and the nominal interest rate respectively are fixed at their 1946-1983 averages, while the other variables and the household primary balance take their historical values.

4 Household Debt and Aggregate Demand

Many discussions of household debt are based on the assumption – explicit or implicit – that there is direct relationship between changes in household leverage and aggregate demand. Following the last major episode of credit crisis and deleveraging in the late 1980s, a number of economists developed models in which changes in household debt contributed to changes in aggregate demand. (Caskey and Fazzari, 1989; Eichner, 1991; Palley, 1994) More recently this approach has been revived by Keen (2014), among others. Similar suggestions are often made in popular and policy-oriented discussions of household debt. (Krugman, 2013; Henwood, 2014).[7] It

[7]For example, Krugman writes of "the ratio of household debt to GDP since the 50s... There was a sharp increase in the ratio after World War II, but from a low base... Then there were about 25 years of rough stability, from 1960 to around 1985. After that, however, household debt rose rapidly and inexorably, until the crisis struck. So with all that household borrowing, you might have expected

seems intuitive that an increase in household debt must, all else equal, reflect greater spending by households relative to their incomes. And higher spending should mean greater demand for current output. This story is plausible at first glance. But in fact there is no logical necessity that rising debt-income ratios be associated with increased aggregate demand. Two conditions are necessary for this relationship to hold. First, changes in debt ratios must be due to changes in borrowing, rather than changes in the growth rate of nominal income. And second, if households are indeed borrowing more, this must be financing increased expenditure on currently produced goods and services rather than other forms of expenditure. Both of these conditions have sometimes held, but they do not hold consistently enough to support a reliable relationship between changes in household leverage and aggregate demand. Historically, only in a minority of cases do large shifts in the trend of household leverage correspond with large shifts in household demand for currently-produced output.

The first question – how much of changes in debt-income ratios are explained by changes in borrowing – is dealt with in Section 3 above. As we saw there, the rise in household debt-income ratios during 1946-1963 and 2000-2007 are indeed the result mainly of increased household borrowing. The conventional story in which debt ratios are a proxy for aggregate borrowing behavior is reasonable for those two periods. The relative stability of debt ratios over 1963-1982 and 1995-1999, and the fall in debt ratios from 2008, were in part the result of reduced household borrowing, but with substantial contributions from other factors – inflation in the first case, income growth in the second, and defaults in the third. But with respect to rising leverage in the Depression, falling leverage in World War II, and rising leverage in the 1980s, borrowing behavior played no role. In these cases, changes in debt-income ratios and changes in household borrowing had opposite signs. In all of these cases, changes in leverage were entirely due to changes in interest rates relative to growth rates. One may say that the 1980s were the the second episode of debt-disinflation in the United States, after the 1930s. This is also true of the post-1983 period as a whole.

In short, the link from changing debt ratios to changing borrowing applies in some periods, but not in others. So it is reasonable to construct models in which leverage reflects accumulated deficits or surpluses, but one must be cautious in applying such models to any particular historical episode. The post-1980 US, in particular, is not a good fit for such models.

4.1 Demand and Non-Demand Expenditures

Setting aside the question of whether changing debt ratios reflect changes in borrowing, we next ask whether changes in borrowing have historically reflected in changes in expenditure on currently produced goods and services. Here again, the answer is generally negative: sometimes they have, but often they have not. So the

the period 1985-2007 to be one of strong inflationary pressure." The inferences that rising debt ratios imply higher borrowing, and that higher borrowing implies greater demand, are considered so obvious that they aren't even acknowledged.

claim that changes in household leverage reliably correspond to changes in aggregate demand fails at the second step as well as the first.

To analyze the link between credit and demand, we separate household expenditures that contribute to demand for current output from expenditures that do not. The former includes investment in owner-occupied housing as well as those components of consumption that reflect cash outlays by households on current output. A number of the series we use to distinguish demand from non-demand expenditure do not exist prior to 1948. So we limit our discussion of debt and demand to the postwar period. As in the previous section, we normalize each variable by adjusted household income. The first panel of Table 4 shows the average values for each of our six postwar periods. The second panel shows the change from the preceding period; for 1984-2011, this means the change from 1948-83. The first column shows total borrowing – that is, the primary deficit plus interest payments. The second column shows spending that contributes to aggregate demand: consumption excluding imputed non-cash items, plus residential investment. The next two columns show spending that does not contribute to aggregate demand: interest payments, and a residual that includes transfers and net acquisition of financial assets. The final column shows the change in debt-income ratios, the same as in Table 3.

What Table 4 shows is that even setting aside variation in growth and inflation rates, there is not a tight link between borrowing and aggregate demand. Some periods of high household borrowing and growing debt are also periods of high household demand for current goods and services, but others are not. Comparing the first two postwar periods, for example, total annual borrowing was approximately 1.5 points higher in 1964-1983 than in 1946-1963. But household contribution to aggregate demand was 4.5 points lower in the second period than in the first, because of the large increases in net acquisition of financial assets and in interest payments. Similarly, there was no change in borrowing in 1994-1999 compared with 1984-1993, and debt growth decelerated by 1.5 points per year. Nonetheless, the household contribution to demand was more than three points higher in the later period.

Perhaps most strikingly, the large increase in borrowing and debt growth in the housing boom period was not associated with any increase in demand from the household sector. This requires some further explanation. While residential investment as a share of income was 1.2 points higher than in the late 1990s, on average, adjusted consumption was 1.4 points lower.[8] This surprising result is due to several factors. In part, it reflects the fact that our periodization is based on trends in leverage. Household debt peaked in 2008, but residential investment peaked in 2005, and by 2008 was falling steeply. If we looked just at 2000-2005, household demand would look higher. But it is also the case that when measured in terms of market purchases by households, consumption in the 2000s is lower than in the late 1990s – the opposite pattern from the official measure of consumption. This difference is due in about equal measure to (1) the contribution to measured consumption of imputed rents of owner-occupied housing, in turn the result of rising home prices; and (2) the rapid increase in this period of Medicare and Medicaid and employer health

[8]This more detailed breakout is not shown in the table, but is available on request.

Table 4: Annual Household Borrowing and Uses of Funds, in Percent of Adjusted Income

Panel A: Levels

	Borrowing	Demand	Non-Demand		*Memo:* Δb
			Interest	Other Non-Demand	
1948 to 1963	5.8	95.4	3.3	7	2.9
1964 to 1983	7.3	90.9	6.4	9.9	0.2
1984 to 1993	9.2	93	10.3	5.9	3.2
1994 to 1999	9.2	96.4	10.0	2.7	1.7
2000 to 2007	15.7	96.2	9.9	9.5	5.8
2008 to 2011	2.0	84.8	8.7	7.0	-4.8
1948 to 1983	6.7	92.8	5.2	8.7	1.3
1984 to 2011	10.1	94.1	9.9	6.1	2.8

Panel B: Difference from Previous Period

	Borrowing	Demand	Non-Demand		*Memo:* Δb
			Interest	Other Non-Demand	
1964 to 1983	1.5	-4.5	3.1	2.9	-2.7
1984 to 1993	1.49	2.1	3.9	-4.0	3.0
1994 to 1999	0.0	3.4	-0.2	-3.2	-1.5
2000 to 2007	6.5	-0.2	-0.1	6.8	4.1
2008 to 2012	-13.2	-7.4	-0.9	-4.9	-9.9
1984 to 2012	3.4	1.2	4.8	-2.6	1.5

contributions. The first of these is a notional flow of services that does not correspond to any market transaction; the second is a genuine contribution to demand, but is spending by the government and business, respectively, not households. Both of these are counted in official measures of household consumption but, since neither is a cash payment by households, neither is counted in ours. Because both these categories of spending rose more rapidly in 2000-2007 than in previous years (the first as a mechanical result of the housing boom itself), official measures of consumption overstate actual purchases by households more than in previous years, so correcting for them reduces household growth disproportionately in this period.

Finally, in the recession and recovery years of 2008-2011, while the change in leverage, household borrowing, and household demand all fall steeply, we can see that the change in leverage understates the fall in borrowing but overstates the fall in household demand.

So while the link between borrowing and leverage correctly describes two of the four episodes of rising household leverage since 1929, the link between leverage and demand describes only one of them, the postwar housing boom of the 1950s.[9] For the rest of the period, this assumption, even as a first approximation, is false.

5 Conclusion

The interaction of deflation and debt during the early 1930s offers an important historical lesson. It offers a dramatic illustration of a dynamic that operates in any capitalist economy where money commitments are made over an uncertain future. The interaction between debt commitments and changes in the growth rate of incomes and prices, first identified in the context of the deflationary 1930s, has played a major role in the subsequent evolution of household balance sheets in the US despite the non-recurrence of outright deflation. While stories that explain changes in debt-income ratios in terms of changes in the behavior of borrowers and/or lenders are intuitively appealing, they miss the most important factors in the evolution debt-income ratios over time.

A clear picture of the relationship between changes in household leverage, household borrowing, and aggregate demand is obscured by the failure to use appropriate accounting. Conventional savings rates combine changes in the asset and liability sides of balance sheets; they have no reliable relationship to changes in credit flows to households. Headline measures of household income and consumption are similarly problematic in the context of discussions of credit and debt, since they include substantial nonmarket, imputed payments (most importantly the imputed rent paid by homeowners to themselves) and substantial third-party payments for health and pension benefits. Discussions of household leverage will also be misleading if they ignore the denominator of the debt-income ratio and implicitly assume that its evolution is solely the result of changes in household borrowing.

A conceptually appropriate accounting framework shows that changes in household debt-income ratios since 1929 are not mainly driven by changes in household borrowing behavior. In particular, the rise in household leverage since the early 1980s is entirely attributable to higher interest rates, lower inflation, and lower income growth, in that order; household borrowing played no role. Credit-financed expenditure by households, far from rising in line with debt, has in fact been somewhat lower in the three decades since 1983 than in the three decades prior. In this sense, the rise in debt following the "Volcker coup" (Duménil and Lévy, 2011) is best thought of as a debt-disinflation analogous to the debt-deflation of the 1930s.

5.1 Debt as a Monetary Phenomenon

It was one of the great insights of Keynes that modern economies cannot be conceived of only as "real exchange" economies; many important questions can be answered

[9] We don't need to be able to address the borrowing-demand link for the 1929-1932 episode, since we already know the leverage-borrowing link doesn't hold.

only in terms of a model of a "monetary production" economy. (Leijonhufvud, 2008) After Keynes, the real-exchange vision was reasserted by allowing for the existence of money as a special asset required for exchange, but ignoring liabilities, an approach sometimes called "Monetary Walrasianism." (Mehrling, 2013) Admittedly, Keynes left the way open for this interpretation by retreating from the sophisticated account of financial markets in *The Treatise on Money* to the exogenous money supply assumption of the *General Theory*. (Bibow, 2000) But in a world where liquidity cannot be identified with any particular asset but is essentially a social relation, analysis of the financial side of the economy requires discussing the asset and liability side of balance sheets independently, rather than netting them out as the pseudo asset "net wealth". (Beggs, 2012). Any discussion of debt, in particular, must start from the fact that it is a financial liability, and not simply a negative asset nor an accumulated excess of consumption over income. To understand the evolution of debt over time and its macroeconomic implications, we need a framework that focuses specifically on the liability side of household balance sheets. Regarding debt as merely a counterpart of some broader aggregate like saving, consumption or wealth mixes it up with payment flows that behave quite differently, and therefore gives a misleading picture of its evolution over time.

Most economic analyses of debt approach it in terms of real flows. Given the current political salience of debt, and given concerns about performance of the real economy, it is natural to look for story that links debt to real economic outcomes in a straightforward way. In such stories, debt is determined by the intertemporal allocation of consumption, by the level of desired spending on real goods and services, or perhaps by the distribution of income. But in fact, the financial relationships reflected on balance sheets and the real activities of production and consumption compose two separate systems, governed by two distinct sets of relationships. Explanations that reduce debt to the financial counterpart to some real phenomena ignore the specifically financial factors governing the evolution of debt. The evolution of demand and production has to be explained in its own terms, and the evolution of debt and other financial commitments has to be explained in its terms. No simple story combining the two is likely to be useful or reliably consistent with the facts. As we have shown in this paper, this is not merely a theoretical critique. As a historical matter, the evolution of household debt in the US bears little resemblance to any of the real variables whose financial counterpart it is imagined to be. They do interact, but they are not tightly linked. While some of the turning points in household leverage are indeed associated with turning points for production and consumption, most are not, but are the result of purely monetary-financial factors. Indeed, as a first approximation, it would be better to imagine household income and expenditure as evolving according to one set of systematic relationships, and household balance sheets evolving according to an entirely separate set of relationships. Balance sheets and real flows do interact, sometimes strongly. But conceptualizing the two systems independently is an essential first step toward understanding the points of articulation between them.

5.2 Policy Implications

From a policy standpoint, the most important implication of this analysis is that in an environment where leverage is already high and interest rates significantly exceed growth rates, a sustained reduction in household debt-income ratios probably cannot be brought about solely or mainly via reduced expenditure relative to income. Even a modest increase in household expenditure from its very depressed levels of 2008-2011 would be sufficient to put leverage back on an increasing path, especially if default rates return to more historically typical levels. There is an additional challenge, not discussed in this paper, but central to both Fisher's original account and more recent discussions of "balance sheet recessions": reduced expenditure by one sector must be balanced by increased expenditure by another, or it will simply result in lower incomes and/or prices, potentially increasing leverage rather than decreasing it. (Eggertson and Krugman, 2010; Koo, 2008) To the extent households have been able to run primary surpluses since 2008, it has been due mainly to large federal deficits and improvement in US net exports.

We conclude that if reducing private leverage is for whatever reason a policy objective, it will require some combination of higher growth, higher inflation, lower interest rates and higher rates of debt writeoffs. In the absence of income growth well above historical averages, lower nominal interest rates and/or higher inflation will be essential. How, or whether, monetary policy could deliver the latter is beyond the scope of this article. But it is worth noting that the effect on the existing debt burden – and not on "real" rates on new loans – may be the most important macroeconomic consequence of low inflation in the present environment. Each year of inflation one point below target implies an additional $130 billion of foregone household expenditure to achieve a given reduction in leverage. Deleveraging via low interest rates, on the other hand, implies a fundamental shift in monetary policy. If interest rate policy is guided by the desired trajectory of debt ratios, it no longer can be the primary instrument assigned to managing aggregate demand. This probably also implies a broader array of interventions to hold down market rates beyond traditional open market operations, policies sometimes referred to as "financial repression." Historically, policies of financial repression have been central to almost all episodes where private (or public) leverage was reduced without either high inflation or large-scale repudiation. (Reinhart, 2012) Finally, defaults may remain an important part of the deleveraging process. A recent IMF staff report notes that for public sector debt, defaults are most likely to lead a long-term improvement in the fiscal position (and have generally occurred historically) in countries with small primary deficits, or primary surpluses. (Gottschalk et al., 2010) In such cases unsustainable debt growth is driven by the interaction of high effective interest rates with a large existing debt stock; a one-time reduction in the debt stock can change an unsustainable path to a sustainable one, even if the interest rates on new borrowing rise as a result.[10] A similar logic might apply to private sector debt. If so, some form

[10] As Gottschalk et al. (2010) note, if the goal is to stabilize the debt-income ratio, the amount by which default reduces the required adjustment in the primary balance is directly proportional to the interest rate-growth differential.

of systematic debt forgiveness may be the logical, and perhaps unavoidable, path to lower household leverage.

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