Borrowing During Unemployment: Unsecured Debt as a Safety Net

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Abstract

Over the past two decades, U.S. consumers have increasingly relied on unsecured debt to finance consumption. The growth in unsecured debt has been particularly striking for low-income households. Some researchers have suggested that poor households use this debt to smooth consumption intertemporally, implying that these credit markets effectively serve as a safety net for disadvantaged households. This paper examines whether unsecured credit markets do, in fact, play an important role in the ability of disadvantaged households to supplement unemployment-induced earnings losses. I use panel data from two nationally representative surveys to address the two central questions of this paper. First, I consider whether households rely on unsecured credit markets to supplement temporary shortfalls in earnings. While I find no evidence that low-asset households borrow in response to these shortfalls, I show that households with assets do borrow. Among these households with assets, borrowing is particularly responsive to these idiosyncratic shocks for younger and less-educated households. The second question I consider is why low-asset households do not borrow. I provide evidence that they are not supplementing these lost earning via other income sources, showing that consumption falls in response to these earnings shortfalls. I also show that the borrowing and consumption behavior of low-asset households is different from other households. While some other explanations cannot be ruled out, the evidence presented here suggests that low-asset households do not have sufficient access to unsecured credit to help smooth consumption in response to transitory income shocks.

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1 Introduction

An extensive and growing literature examines how households smooth consumption in response to idiosyncratic income shocks. Many of these studies focus on the role played by government programs such as unemployment insurance (Gruber, 1997; Browning and Crossley, 2001), AFDC (Gruber, 2000), or Food Stamps (Blundell and Pistaferri, 2003). Other studies have considered how households insure via private transfers (Bentolila and Ichino, 2004), or self-insure against income shocks through the earnings of other household members (Cullen and Gruber, 2000), by postponing purchases of durable goods (Browning and Crossley, 2001), or by refinancing mortgage debt (Hurst and Stafford, 2004).[1]

This paper contributes to this literature by considering another mechanism by which families can self-insure against income shocks—borrowing through unsecured credit markets.[2] There are important reasons to focus on unsecured credit markets in this context. First, unlike other components of net worth, unsecured debt is potentially available to families that have no assets to liquidate or to collateralize loans. Thus, these credit markets provide low-asset households with a unique mechanism for transferring their own income intertemporally. Second, with recent expansions in these markets, unsecured credit is potentially available to a substantial fraction of U.S. households. More than three-quarters of all U.S. households have a credit card, and outstanding balances on revolving credit exceed $750 billion (Federal Reserve, 2005). Recent research suggests that unsecured debt has become easier to obtain: limits on credit cards have become increasingly more generous; unsecured debt as a percentage of household income has grown; and the risk-composition of credit card loan portfolios has deteriorated (Evans and Schmalensee, 1999; Lupton and Stafford, 1999; Gross and Souleles, 2002; Lyons, 2003). Moreover, growth in credit card debt has been most striking among households below the poverty line. From 1983 to 1995, the share of poor households with at least one credit card more than doubled, from 17 percent to 36 percent, while average balances across poor households grew by a factor of 3.8, as compared to a factor of 2.9 for all households.[3]

This expansion of unsecured credit could have particularly important implications for these low-income households. Bird, Hagstrom, and Wild (1999) shows that low-income households paid down credit card debt during the economic expansion of the mid to late 1980s, but that outstanding credit card balances grew during the recession of 1990-1991. Observing this countercyclical trend in credit cards balances, the authors speculate that poor households may use credit cards to smooth consumption intertemporally, implying that these credit markets effectively serve as a safety net. The possibility that credit markets help households smooth

[1] For a paper that examines several of these sources of smoothing see Dynarski and Gruber (1997).

[2] Unsecured, or non-collateralized, debt generally includes revolving debt or debt with a flexible repayment schedule such as credit card loans and overdraft provisions on checking accounts, other non-collateralized loans from financial institutions, outstanding store or medical bills, education loans, deferred payments on bills, and loans from individuals. Credit card loans account for about half of all unsecured debt, and other unsecured loans from financial institutions account for another 30 percent.

[3] Statistics for unsecured debt are based on the author's calculations from the Panel Study of Income Dynamics (PSID). The figures for credit card use are based on calculations using the Survey of Consumer Finances (SCF).

consumption has very important policy implications—if families can self-insure against transitory earnings variation, then this diminishes the need for public transfers. Nevertheless, little is know about the degree to which households use unsecured credit markets in response to income shocks.

The first part of this paper investigates whether unsecured debt plays an instrumental role in a household's ability to smooth consumption by examining how borrowing responds to unanticipated unemployment-induced earnings variation. The results show that low-asset households do not borrow from unsecured credit markets in response to these idiosyncratic shocks. Thus, these credit markets are not serving as an important safety net for these households. This finding is robust to a variety of different tests of sensitivity.

The second part of this paper considers several possible explanations for why these households do not borrow. For example, these households may simply use other supplemental income sources to maintain consumption when earnings are low such as government, inter-household, or intra-household transfers, obviating the need for unsecured markets. The evidence presented here, however, indicates that these households are not relying on alternative sources in lieu of credit markets. Welfare and private transfer receipt is small for this sample. Moreover, I show that these households are not able to smooth consumption over these temporary income shocks. The fact that consumption falls in response to transitory spells of unemployment implies that these low-asset households may be short on liquidity during unemployment. I therefore also investigate whether these households face binding borrowing constraints in unsecured credit markets. I present evidence that these households tend to have very low credit limits and their applications for credit are frequently denied, suggesting that low-asset households face frictions in unsecured credit markets. I also show that the borrowing behavior of households that are not likely to be constrained from unsecured credit markets—those with higher asset holdings—is different from that of low-asset households. Unlike low-asset households, those with assets increase unsecured debt on average by 10 cents for each dollar of earnings lost due to unemployment. Among this group with assets, borrowing is particularly responsive to these shocks for younger and less educated households. While I cannot rule out other possible explanations such as precautionary motives or impatience, the evidence presented here points to the fact that, despite recent expansions in unsecured credit markets, low-asset households do not have sufficient access to these markets to help smooth consumption in response to a large idiosyncratic shock.

The following section discusses the empirical literature examining how households insure against income shocks as well as studies examining the sensitivity of consumption to known income variation. I present a description of the empirical methodology in Section 3 and describe the data in Section 4. The results in Section 5 show that low-asset households do not borrow to supplement lost earnings during unemployment. This section also explores why these households do not borrow, comparing their consumption and borrowing behavior to other households. In Section 6 I discuss sensitivity analyses, verifying that the results are robust to different specifications and functional form assumptions. Section 7 concludes.

2 Related Literature

Several studies that examine consumption behavior in response to unanticipated income shocks have shown that while many households are not fully insured against these shortfalls, there is significant evidence of a fair amount of smoothing in response to these shocks (Dynarski and Gruber, 1997). How do households smooth? For some households, government programs are clearly an important source of consumption insurance. A few studies have shown that in the case of unemployment-induced earnings shocks, unemployment insurance (UI) plays an important role (Gruber, 1997), particularly for low-asset households (Browning and Crossley, 2001). Other research has shown that the AFDC program helps women transitioning into single motherhood smooth consumption; consumption for this group increases by 28 cents for each additional dollar of potential benefits (Gruber, 2000). Among a low-income population, the response of food consumption to a permanent income shock is dampened by a third after accounting for Food Stamps (Blundell and Pistaferri, 2003). Empirical studies have also shown that the consumption smoothing role of private transfers from friends and family is small in the U.S. (Bentolila and Ichino, 2004), particularly relative to the role of government transfers (Dynarski and Gruber, 1997).

Households may also self-insure against idiosyncratic income shocks by changing the work effort of other family members, postponing expenditures on durable goods, or dissaving. Research suggests that additional income from other family members does not play a significant role (Dynarski and Gruber, 1997), although some of this added worker effect is crowded out by UI (Cullen and Gruber, 2000). There is evidence that some households smooth non-durable consumption by delaying purchases on durables (Browning and Crossley, 2004), and these durables are more responsive to income shocks for low-educated households (Dynarski and Gruber, 1997). Households can self-insure against lost earnings by maintaining a buffer stock of liquid assets, but evidence suggests that household saving is often not sufficient to insure against larger shortfalls such as an unemployment spell. The median 25-64-year-old worker only has enough financial assets to cover three weeks of pre-separation earnings. This falls far short of the average unemployment spell, which lasts about 13 weeks (Engen and Gruber, 2001; Gruber, 2001).

Alternatively, households with access to credit markets may borrow from future income to supplement current shortfalls. To date, the empirical research in this area has focused on secured debt. Hurst and Stafford (2004) present evidence that secured credit markets help households smooth consumption. They show that homeowners borrow against the equity in their home in order to smooth consumption. This is especially true for households without a significant stock of liquid assets. They conclude that homeowners with low levels of liquid assets who experience an unemployment shock were 19 percent more likely to refinance their mortgage.

Beyond Hurst and Stafford (2004), which only looks at homeowners, little is known about the role that household saving/borrowing plays in smoothing consumption in response to idiosyncratic shocks. However, there is a related empirical literature that tests the permanent income hypothesis by examining consumption, saving, and borrowing behavior in response to known or predictable variation in income. Attanasio (1999),

Browning and Lusardi (1996), and Carroll (1997) provide surveys of this literature. A few of these studies look directly at saving and its components. For example, Flavin (1991) considers how several components of net worth respond to predictable changes in income. Flavin considers changes in liquid assets as well as changes in total debt including mortgages, but she does not examine components of debt. Her results, which concentrate on "truly wealthy" households, show that 30 percent of an anticipated increase in income is saved in liquid assets, 6 percent in purchases of durables, and 20 percent in reductions in total debt. Similarly, for a subsample of high-income households, Alessie and Lusardi (1997) report that between 10 and 20 percent of an expected income change goes towards reducing debt. Neither of these papers report results for unsecured debt or for non-wealthy households. A closely related literature explores possible explanations for the excess sensitivity of consumption to predictable changes in income including heterogeneity in preferences or liquidity constraints (Zeldes, 1989; Runkle, 1991). Evidence from this literature suggests that access to credit markets does affect consumption behavior. For example, Jappelli et al. (1998) shows that consumption growth is sensitive to known income for households that report being turned down for a loan.

This study contributes to the empirical literature in several ways. This is the first study to test empirically the extent to which households borrow from unsecured credit markets in response to earnings shocks. While previous research within the literature examining excess sensitivity has looked at household borrowing behavior, my study is unique in that I examine how borrowing responds to large idiosyncratic shocks, rather than predictable variation. These shocks are arguably more difficult to insure against. Unlike these previous studies, I focus on low-asset households rather than the wealthy, and I examine unsecured debt. Unsecured credit markets are a unique source of consumption smoothing for low-asset households because they do not have a buffer of savings to supplement income shortfalls. These credit markets are also interesting to examine given the significant growth in non-collateralized debt over the past two decades—growth which has been strongest among disadvantaged households. Additionally, this paper provides further evidence on the importance of borrowing constraints. While previous research in this literature has focused on differences in consumption behavior across different types of households, this paper directly examines differences in borrowing behavior across different types of households facing strong incentives to borrow. Lastly, this study presents estimates for the responsiveness of consumption and other components of net worth which support findings from previous research.

3 Methodology

The response of borrowing to changes in income will depend on whether the income change is temporary or permanent. Measured changes in labor income for the head of household i, ΔY_i, can be decomposed into a transitory (ΔY_i^{τ}) and a permanent ($\Delta \mu_i$) component: $\Delta Y_i = \Delta Y_i^{\tau} + \Delta \mu_i$. Then, to examine how household borrowing responds to changes in transitory income, one could estimate the following:

$$\Delta D_i = \alpha_0 + \alpha_1 \Delta Y_i^{\tau} + \alpha_2 \Delta \mu_i + X_i \alpha_3 + \xi_i \qquad (1)$$

where $\Delta D_i = D_{it} - D_{it\text{-}1}$, and D_{it} represents the level of unsecured debt for household i at the end of year t, $\Delta Y_i^{\tau} = Y_{it}^{\tau} - Y_{it-1}^{\tau}$ represents the change in transitory income, $\Delta \mu_i = \mu_{it} - \mu_{it\text{-}1}$ represents adjustments to permanent income, and X_i is a vector of observable demographics that are indicative of permanent income and preferences. Using Equation (1) to estimate the responsiveness of borrowing to exogenous earnings changes presents several problems. First, in survey data we observe ΔY_i, not ΔY_i^{τ} and $\Delta \mu_i$. Second, the labor supply decision, and therefore income, is endogenous to the household borrowing decision. Third, the change in labor income in national surveys is likely to be measured with error.

Addressing these concerns, I exploit the panel nature of the data to identify transitory and exogenous changes in income resulting from an unemployment spell of the head of household i that occurs at some point during year t as a result of: a layoff, illness or injury to the worker, being discharged or fired, employer bankruptcy, or the employer selling the business. This excludes quits and other voluntary separations that are less likely to be exogenous to the borrowing or consumption decision. I also restrict attention to spells with a duration of at least one month, as these longer spells are less likely to be voluntary and more likely to have a significant impact on total household income. To focus on unanticipated spells, I restrict the sample to households whose heads are employed at the beginning of year t and have no spells of unemployment in year t-1. This excludes the chronically unemployed as well as those that experience seasonal layoffs.[4] To restrict attention to transitory variation, I limit my sample to households whose heads are employed in year t+1 and do not experience an unemployment spell in that year. This restriction excludes spells that are likely to have a more permanent effect on expected future lifetime earnings. Additional concerns about heterogeneity in the nature of unemployment spells are discussed in Section 5.2.3.

For each household I construct a dummy variable, U_i, indicating whether during year t the head experiences a spell of unemployment as defined above. Treating this unemployment spell indicator as an instrument for changes in earnings, I estimate the following two-stage model:

$$\Delta Y_i = \delta_0 + \delta_1 U_i + X_i \delta_2 + \upsilon_i \qquad (2)$$

$$\Delta D_i = \beta_0 + \beta_1 \Delta \hat{Y}_i + X_i \beta_2 + \eta_i \qquad (3)$$

where $\eta_i = \gamma \Delta \mu_i + \varepsilon_i$. Because U_i indicates only transitory spells of unemployment, $\Delta \hat{Y}_i$ reflects the predicted change in *transitory* earnings from the first stage equation. This procedure isolates the change in earnings that occurs due to a transitory spell of unemployment, so estimates of β_1 reveal the extent that household borrowing responds to a one-dollar change in earnings due to unemployment, with negative point estimates implying that the household increases debt holdings in response to a drop in earnings. Another

[4] I focus on changes in the earnings of the head because, as others have argued, these income changes are more likely to be exogenous (Dynarski and Gruber, 1997). I also consider changes in total family income in Section 5.2.3.

approach would be to estimate directly the effect of an unemployment spell on borrowing in a reduced form equation by regressing changes in debt on the spell indicator. The main drawback of this approach is that by treating all spells the same it ignores heterogeneity in the severity of spells across households. In Section 5, I verify that these reduced form results are qualitatively consistent with the two-stage estimates.

The vector X_i includes a variety of characteristics of the household that influence saving and borrowing decisions or that are indicative of permanent income, preferences, or consumption needs. These include characteristics of the head in period t-1 such as educational attainment, race and marital status, flexible controls for family size, changes in family size, and an indicator for changes in marital status. I also account for other factors that are likely to have an effect on household borrowing, such as changes in the health status of the head when available, that occur during the period between observations on unsecured debt. The vector X_i also includes an indicator for whether the level of unsecured debt at the end of year t-1 exceeds the annual earnings of the head in that year to capture the fact that borrowing behavior may respond differently for households that carry a substantial amount of unsecured debt initially. For example, these households may be at or close to their borrowing limits, and therefore are more likely to be constrained than other households. Data from the SCF suggest that existing debt is an important reason for individuals being denied credit.

A key assumption in this approach is that U_i is orthogonal to the error term, η_i, which includes any components of the change in permanent income not captured by X_i. Changes in other components of income may be correlated with both borrowing behavior and unemployment spells violating the assumption that U_i is uncorrelated with η_i. The current UI program, for example, provides supplemental income during unemployment spells, and this transfer income is likely to affect the demand for liabilities to supplement earnings shortfalls. To avoid a potential bias resulting from the omission of UI benefits, I include a measure of potential UI benefits in the vector X_i. I do not include actual transfer income because take-up decisions are endogenous. I calculate potential UI benefits as a function of state tax and benefit policies in year t-1, initial earnings, total household income, marital status, and family size.[5]

This two-stage approach has several advantages. First, it isolates a transitory component of labor income. Second, by capturing exogenous variation in earnings, this approach avoids the biases that result from the endogeneity of labor supply. Third, this approach addresses concerns with attenuation bias given the reasonable assumption that measurement error in this unemployment indicator is uncorrelated with measurement error in changes in earnings. Furthermore, these spells often result in significant earnings losses, providing a strong incentive for the household to borrow.

Are these unemployment spells an appropriate instrument? To be a valid instrument these spells must be sufficiently correlated with the changes in the earnings of the head, and they must be uncorrelated with η_i.

[5] I am indebted to Jonathan Gruber for providing me with state tax and UI benefit simulation models. The federal AFDC/TANF program is another potential source of transfer income for the unemployed, but because my sample excludes heads with discontinuous work histories or heads that experience longer unemployment spells this transfer program is not likely to be a strong source of supplemental income for this sample.

These unemployment spells, which by construction last at least one month, do have a significant impact on the earnings of the head. The estimates of δ_1 in the first-stage equation are large and very significant.[6] Also, the rich set of demographic variables available in both datasets allow me, in part, to control for household characteristics and other components of income that are likely to be correlated with both the unemployment spell and borrowing behavior. The data also allow me to identify spells that are arguably transitory and unanticipated and therefore less likely to be correlated with η_i. Although these spells are likely to have both a permanent and a temporary component, others have argued that such spells are predominantly transitory (Huff-Stevens, 1997). Nevertheless, an important concern is that U_i may be correlated with unobservable household characteristics or future expectations about earnings that affect the borrowing decision. This is particularly problematic if the effect of U_i on future expectations is systematically different for the different groups of households that I examine. I investigate this further in Section 5.2.3.

The first part of my empirical analysis examines whether households use unsecured credit to supplement income shortfalls. To address this question, I focus on low-asset households because these households are potentially the most relevant group to consider for questions concerning whether unsecured credit markets serve as a safety net. Households with sizable asset holdings have the option of depleting these assets rather than borrowing during unemployment spells. Thus, any borrowing for these households may in part substitute for other sources of consumption smoothing such as dissaving. Households without significant asset holdings, however, have few alternatives for supplementing lost earnings. They do not have assets that they can liquidate or borrow against for secured debt; unsecured credit markets are the only mechanism by which they can transfer their own income intertemporally. If borrowing behavior for these low-asset households responds to temporary spells of unemployment then this would provide evidence that unsecured credit markets provide an important source of supplemental income during earnings shortfalls. I examine several different groups of low-asset households based on ex ante asset holdings:[7] those with non-positive financial assets, those with a non-positive total gross asset position excluding unsecured liabilities, and those with total gross assets equaling less than 6 weeks of the head's initial earnings (asset-to-earnings ratio less than 0.12). For each of these groups, I present evidence that these households do not borrow in response to unemployment-induced earnings shortfalls. The second part of the empirical analysis examines why these households do not borrow. I re-estimate Equations (2) and (3), replacing changes in unsecured debt with changes in consumption, to test the responsiveness of consumption to unemployment-induced earnings losses. These estimates will provide evidence on whether these households are able to supplement lost earnings through other means besides

[6] Adding the U_i dummy to Equation (2) increases the R^2 of this first-stage equation by 23 to 52 percent depending on the subsample. The R^2 for Equation (2) ranges from 0.05 to 0.12.

[7] Asset holdings may be endogenous. I condition on initial asset holdings because this measure of wealth is less likely to be endogenous to unemployment spells. However, if unemployment spells are correlated over time then ex ante asset holdings may be endogenous to these spells. I mitigate this problem somewhat by excluding those who experience a spell of unemployment in the year prior to my first observation on household assets.

borrowing. I also examine the borrowing and consumption behavior of households with assets to determine whether the responsiveness of these outcomes is systematically different for these households.

4 Data and Descriptive Results

The empirical analysis uses two independent surveys to examine household borrowing and consumption behavior: the Survey of Income and Program Participation (SIPP) and the Panel Study of Income Dynamics (PSID). These surveys are the only nationally representative sources of panel data that provide information on household income, employment, assets, and liabilities over multiple years. Each survey offers unique advantages. The SIPP has a significantly larger sample for analyzing borrowing, and it provides unsecured debt data on an annual basis. The PSID offers a panel with a longer duration, and as a result reveals more information about past, current, and future income streams and employment outcomes. The longer duration facilitates the estimation of permanent income in Section 5.2.3. Also, unlike the SIPP, the PSID provides information on food and housing consumption.[8] See the data appendix in Sullivan (2004) for a more detailed summary of these data.

The 1996 panel of the SIPP provides demographic and economic information on a random sample of households interviewed every 4 months from April 1996 to March 2000. Respondents are asked about their stock of assets and liabilities four times over the duration of the panel at one-year intervals. The measure of unsecured liabilities provided by the SIPP includes credit card debt, unsecured loans from financial institutions, outstanding bills including medical bills, loans from individuals, and educational loans. For the analysis that follows, I restrict attention to the 13,643 households that are interviewed in each of the first nine waves of the 1996 panel (thus providing two observations on assets and liabilities for each household), and whose heads in the third wave work full time and have positive earnings in each of the first three waves and do not experience an unemployment spell during these first three waves. To avoid confounding borrowing decisions with that of retirement, this initial sample only includes households whose heads are between the ages of 20 and 63.[9] Given these restrictions, the results that follow are representative of working age households with strong attachment to the labor force.

In the SIPP, the first observation for debt is at the 4^{th} interview, prior to the observed unemployment spells which are taken from the 4^{th} through 6^{th} waves of the panel. The second debt observation is from the 6^{th} interview, one year after the initial reported level of debt. To avoid spells that are likely to have a more permanent effect on expected future lifetime earnings, I also condition on the head being employed after the 6^{th}

[8] For renters, housing consumption is measured by reported rental payments unless the respondent receives free public housing, in which case the reported rental equivalent is used. For homeowners housing consumption is imputed based on the current resale value of the house using an annuity formula. See Meyer and Sullivan (2003).

[9] To address outliers, the sample is truncated at the top and bottom 2.5 percent of the distributions for changes in unsecured debt, changes in wealth, and changes in income. The sensitivity of the results to these restrictions is tested in Section 6.

wave. I also exclude very wealthy households—those with asset-to-income ratios greater than 4.[10] From the remaining 9,400 households I focus on low-asset households, but also compare the borrowing and consumption behavior of these low-asset households to that of the wealthier households.

The PSID is a longitudinal survey that has followed a nationally representative random sample of families and their extensions since 1968. At five-year intervals (1984, 1989, and 1994) a wealth supplement to the PSID takes an inventory of the assets and liabilities for each household. While the PSID over-samples low-income families, all estimates are weighted using the sample weights. Two separate PSID samples are constructed for the analysis that follows. To analyze household borrowing I examine a sample of households with the same head in 1984 and 1989, so ΔD_{it} represents a five-year change in unsecured borrowing rather than an annual change. I obtain prior year employment and income information for this "borrowing" sample from adjacent waves, and changes in unsecured debt are calculated by linking the 1984 and 1989 waves of the wealth supplement. Thus, for the PSID borrowing results, I consider the effect of unemployment-induced earnings variation in 1988 on changes in unsecured borrowing over a five-year period.[11] Because consumption data are available annually from the PSID, I construct a second, larger "consumption" sample for the analysis of consumption behavior. For this sample I pool each wave from 1984 through 1993, linking adjacent waves to construct measures of annual changes in food and housing consumption. I impose the same sample restrictions as those for the SIPP sample. In addition, I exclude observations reporting zero food consumption. In both PSID samples initial wealth measures reflect the levels reported at the most recent wealth supplement prior to the current wave. These restrictions yield a "consumption" sample of 18,714, and 15,666 of these households have asset-to-income ratios below 4.

Descriptive statistics for the 1996 SIPP sample and the 1984-1993 PSID sample are presented in Table 1.[12] As explained in the previous section, my identification strategy effectively compares the borrowing behavior of those that do not experience an unemployment spell in a given year (Columns 1 and 4) to those that do become unemployed (Columns 2 and 5). The earnings shocks are not small—those that become unemployed experience a significant drop in earnings both in absolute and relative terms. For households without assets in

[10] I exclude these wealthy households because they may have access to much cheaper resources for supplementing lost earnings than those available in unsecured credit markets. For example, these households may face lower fixed costs for collateralized borrowing than less wealthy households, or they may have access to larger private transfers. The results are not qualitatively sensitive to the exact specification of these wealthy households. Analysis of borrowing and consumption behavior for this wealthy sample shows that neither responds to income shocks.

[11] I do not link observations from 1989 to 1994 in the PSID because the 1994 data do not include information on the reason why the head left a job, so quits are not observed. Due to the long intervals between observations on assets and liabilities and small samples sizes for the PSID borrowing sample, the discussion of results in Section 5 will focus on the borrowing results from the SIPP.

[12] Comparing the demographic characteristics across employment status, there are only small differences in age, gender of the head, and family size. However, the employed sample is somewhat more educated, and significantly more likely to be married. Differences are more noticeable when comparing households across asset holdings. Those without assets are on average less educated, less likely to be married, more likely to be minority, and more likely to experience a spell of unemployment than heads of households with assets. See Sullivan (2004) for more details.

the SIPP (Columns 1-3), earnings fall by about 50 percent. Comparing changes in debt across employment status for households without assets provides a preliminary look at how these households respond to exogenous unemployment spells. Relative to those who do not experience an unemployment spell, households in the SIPP whose heads become unemployed borrow less—unsecured debt falls for the unemployed subsample both in absolute terms (-729) and relative to those that do not experience an unemployment spell (-960), although these changes are not statistically significant. Unsecured debt also falls for the unemployed subsample in the PSID relative to those that remain employed (-283), but this difference is not statistically significant. Thus, there is little evidence from the summary statistics that these low-asset households are borrowing to supplement lost earnings during unemployment. On the other hand, there is some evidence that consumption falls in response to the unemployment spell for this group. Those whose heads become unemployed lower food and housing consumption by $495 more than households whose heads do not experience an unemployment spell, but this difference is not significant. Comparing these reductions in relative consumption to the fall in earnings suggest that consumption falls by about 10 cents per dollar of lost earnings.

Table 1 also reports summary statistics for households with assets (Columns 4-6). These households with assets are somewhat more likely to borrow than those without assets. In the SIPP, the unemployed subsample increases unsecured debt by $811 more than the employed subsample, and this difference is statistically significant. This relative increase in borrowing for unemployed households may suggest that households with assets are borrowing to supplement lost income. A relative drop in earnings of $7387 for this group implies that on average borrowing increases by about 11 cents for each dollar of earnings lost. The increase in unsecured debt is also evident for households with assets in the PSID sample, although the relative difference in this case is not significant. Food and housing consumption falls for the unemployed households with assets relative to those that do not lose their jobs.

Table 2 shows the distributions of unsecured debt (SIPP and PSID) and consumption (PSID) for the full samples, as well as for households with and without assets. For both subsamples, the distribution is somewhat skewed. The median level of initial debt for SIPP households is $1529, but 30 percent of the households do not carry any unsecured debt. A sizeable number of households also have no change in unsecured debt over time—most of which carry zero debt in both periods. Potential complications with this non-linearity are discussed in Section 6. Households without assets are less likely to borrow. 45 percent have no outstanding unsecured debt initially. Households with assets hold more ex ante unsecured debt.[13] They also spend more on both food and housing, but the distributions of changes in consumption are fairly similar across asset holdings.

[13] There are several potential explanations for why households with assets also hold unsecured debt, including transaction costs and hyperbolic discounting (Brito and Hartley, 1995; Laibson, Repetto, and Tobacman, 2000).

5 Results

5.1 Do Unsecured Credit Markets Serve as a Safety Net?

To determine whether households borrow to maintain well-being in the presence of variable earnings, I estimate the responsiveness of unsecured debt to earnings shortfalls that result from transitory spells of unemployment ($\widehat{\beta}_1$ from Equation (3)) for both the SIPP and the PSID samples. As discussed in Section 3, I focus on low-asset households. Panel 1 of Table 3 reports the IV estimates for three different groups of low-asset households based on ex ante asset holdings: those with non-positive financial assets, those with a non-positive total gross asset position excluding unsecured liabilities, and those with total gross assets equaling less than 6 weeks of the head's initial earnings. Looking at households in the SIPP with no financial asset holdings (Column 1), the point estimate for the effect of unemployment-induced earnings variation on borrowing ($\widehat{\beta}_1$) is close to zero and not statistically significant. The estimates of $\widehat{\beta}_1$ for the other low-asset subsamples (Columns 5 and 9) are the wrong sign—suggesting that unsecured borrowing decreases with unemployment-induced earnings losses. Similar estimates from the PSID are also the wrong sign. Together these results provide virtually no evidence that these low-asset households borrow during unemployment spells. If these low-asset households are borrowing from unsecured credit markets, the amount of borrowing is very small.[14] For those without any assets (Column 5), I reject a one-sided test that the responsiveness is strictly greater than 4.8 cents for each dollar lost. Panel 2 of Table 3 reports estimates from a reduced form equation regressing changes in debt on the unemployment spell indicator and the other controls. Consistent with the IV estimates, these OLS estimates for low-asset households provide no evidence that borrowing responds to unemployment spells. In each case, the coefficient on the job loss indicator is small or negative and not significantly different from zero.

5.2 Why Low-Asset Households do not Borrow

5.2.1 Other Sources of Income

These households may not have an incentive to borrow if they supplement the shortfall via other income sources. For example, low-asset households may choose to rely on public or private transfers rather than borrow to supplement the shortfall. Previous research, however, shows that this is unlikely in the case of unemployment shocks. Results from Dynarski and Gruber (1997) suggest that government transfers, other than UI, play a very small role in supplementing unemployment-induced earnings losses, and they argue that for many households UI does not provide enough liquidity to maintain consumption during unemployment. They also estimate that the role of additional earnings of the spouse is small. In addition, transfers such as public assistance are not likely to play an important role in my analysis, because all household heads in my

[14] I also explored other specifications that allowed for a larger sample of low-asset households such as those with asset-to-earnings ratios less than 0.3. This specification increases the low-asset sample by 30 percent but the coefficient and standard error for predicted income do not change significantly.

sample have a strong attachment to the labor force. Furthermore, Bentolila and Ichino (2004) provide evidence that family transfers are not an important source of insurance for U.S. households.

If low-asset households are fully able to supplement lost earnings via other sources of income, such as public or private transfers, then this should be evident in their consumption behavior—their consumption would not be sensitive to these transitory earnings shocks. To examine this, I re-estimate Equations (2) and (3) using changes in consumption as the dependent variable in (3). Table 3 reports the results for two measures of consumption that are observable in the PSID sample—food and food plus housing. The IV estimates in Panel 1 show that food consumption, by itself, does respond to earnings losses. For example, households without financial assets (Column 3) reduce consumption by 13 cents for each dollar of lost earnings, and this response is statistically significant. The point estimates for the other low-asset groups also suggest that food consumption falls in response to unemployment-induced earnings losses, but the response for households without assets (Column 7) is not significant. For the combined measure of food plus housing consumption in Panel 3, the IV estimates show a larger response. The response for households without financial assets (Column 4) is 29.2 cents per dollar of earnings lost. The drop in consumption is somewhat smaller for the other low-asset subsamples. The OLS estimates reported in Panel 2 are consistent with the IV results.

This finding that consumption for low-asset groups is responsive to unemployment-induced earnings shocks is consistent with previous research. Dynarski and Gruber (1997), also find that unemployment spells result in a reduction in consumption, although they do not look at very low-asset households. For a sample of households in the bottom 75 percent of the financial assets distribution, they find that food and housing consumption falls by 25.5 cents for each dollar of earnings lost. Browning and Crossley (2001) also report drops in expenditures during unemployment for a low-asset sample.

5.2.2 Limited Access to Unsecured Credit

The results up to this point, present two stylized facts. First, low-asset households do not borrow to supplement lost earnings during unemployment. Second, these households are not able to smooth consumption in the presence of unemployment-induced earnings shocks. This latter point shows that these low-asset households do not have sufficient access to public and private transfers to effectively smooth consumption over transitory earnings variation, and this is consistent with a model where these households face frictions in credit markets. Descriptive evidence on access to credit card debt—a major component of unsecured debt—from the SCF indicates that low-asset households have very limited access to these markets. Fewer than one in five low-asset households have a credit card. Moreover, the average total credit limit for those households with cards is only $1958, and net of outstanding balances, their available credit is less than $800. Thus, very few low-asset households have access to enough liquidity via credit cards to offset even a small fraction of the average earnings shortfall of about $10,000 (Table 1). Half of all applications for credit by these low-asset

households are denied, and nearly a third report that they did not apply for credit because they expected to be turned down. Moreover, the average interest rate on a credit card for low-asset households is about 15 percent.

Other studies have shown evidence of frictions in unsecured credit markets. Gross and Souleles (2002) draw from evidence that households respond to changes in the credit limit on credit cards to conclude that many households are constrained from borrowing with credit cards. As Davis, Kubler, and Willen (2002) demonstrate, high borrowing costs discourage consumption smoothing through credit markets. Thus, even if these households have access to credit, it may not be optimal for them to borrow to smooth transitory shocks if the borrowing rate is too high. In other words, the utility loss that results from a drop in consumption may not be sufficient to justify borrowing at high rates such as 15 percent. In this case, households face constraints in unsecured credit markets in that they can only borrow at prohibitively high rates. Previous research has modeled borrowing constraints in this way by specifying the market return on net wealth as a function of initial asset holdings (Altonji and Siow, 1987).

If constraints explain why low-asset households do not borrow through unsecured credit markets, then one would expect the borrowing and consumption behavior of unconstrained households to be different from these low-asset households. While borrowing constraints are not directly observable, evidence on access to credit from the SCF suggests that households with assets have much greater access to unsecured credit markets than those without assets. Therefore, I examine the borrowing and consumption behavior of households with assets to determine whether their behavior is different from that of low-asset households. Many previous studies that examine how households smooth consumption in response to idiosyncratic income shocks compare high- and low-asset households to determine the role of borrowing constraints: Dynarski and Gruber (1997), Browning and Crossley (2001), and Hurst and Stafford (2004).[15]

The results in Table 4 show how borrowing and consumption behavior responds to transitory shortfalls in earnings for households with assets. The IV results in Panel 1 of Table 4 show that borrowing responds significantly to a job loss for households with financial assets (Column 1). For these households, unsecured borrowing increases by 9.2 cents for each dollar of earnings lost due to unemployment. This response is significantly different from zero. Households with positive total assets borrow 9.6 cents for each dollar lost (Column 5), while households with asset-to-earnings ratios greater than 0.12 borrow 10.3 cents (Column 9). These responses are statistically significant. The borrowing results from the PSID are similar, although much less precise. The OLS results in Panel 2 are consistent with those reported in Panel 1.

[15] The literature on liquidity constraints is somewhat in agreement that at least some households face binding constraints, but there is little consensus on how to identify which households are constrained. Several studies have used the initial level of wealth to identify constrained households (Zeldes, 1989; Souleles, 1999). Other studies use self-reports of constraints (Jappelli, 1990; Cox and Jappelli, 1993; Jappelli et. al., 1998). Engelhardt (1996) notes that households transitioning from renting to owning face a down payment constraint. Also, Garcia, Lusardi, and Ng (1997) model the probability that a household is constrained as a function of social and economic factors beyond just income and assets.

These results show that some households do in fact borrow during unemployment, increasing unsecured debt by about 10 cents for each dollar of earnings lost. Although this response is somewhat modest, compared to other common sources for supplementing earnings losses, it is not insignificant. For example, Dynarski and Gruber (1997) estimate that unemployment insurance supplements 7 to 22 cents of each dollar of lost earnings due to unemployment. They estimate additional earnings of the spouse (the added worker effect) to respond by 2 to 12 cents for each dollar lost.

The fact that households with assets borrow in response to lost earnings suggests that these households may be using this credit to smooth consumption. To investigate whether unsecured credit markets affect the ability of households to maintain well-being, I also examine the consumption behavior of households with assets. For households with positive financial assets, food consumption falls by 4.2 cents for each dollar of earnings lost (Column 3). The response of food consumption is similar for households with positive total assets or asset-to-earnings ratios greater than 0.12. The response is also small when looking at food and housing consumption.

To test whether these findings are noticeably different from those for low-asset households, I compare the borrowing and consumption responses across households with and without assets. P-values are provided in Panel 1 of Table 4 for tests of the hypotheses that the response of borrowing or consumption to lost earnings is the same across asset holdings.[16] For example, there is some evidence that the response of borrowing for households with assets is different from that of those without assets (comparing Column 5 in Tables 3 and 4, p-value = 0.053). Although the response of consumption for households with assets is smaller than that of low-asset households, in most cases I cannot reject the hypotheses that these responses are the same across asset holdings. One exception is when comparing the differences in the responsiveness of food and housing consumption across financial asset holdings (Column 4). Households with financial assets reduce consumption by 5.5 cents for each dollar of earnings lost, while those without financial assets reduce consumption by 29.2 cents. The hypothesis that this response of consumption to lost earnings is the same for households with and without financial assets is rejected at the 95 percent confidence level.

As additional evidence on how households supplement unemployment-induced earnings shocks, I also examine the responsiveness of other components of net worth to these earnings shortfalls. These results, reported in Panel 1 of Table 5, show that households with asset-to-earnings ratios greater than 0.12 liquidate 48 cents worth of assets for each dollar drop in earnings, indicating that dissaving plays a very important role for supplementing lost earnings for this group.[17] This finding is consistent with previous research on the

[16] The t-statistic for these hypotheses tests are calculated by combining all households into one sample and re-estimating equations similar to (2) and (3), but with an indicator variable added that identifies whether the observation is a low-asset household and interact this indicator variable with other covariates. I then test whether the coefficient on predicted changes in earnings interacted with the indicator is significant.

[17] The coefficient on the UI replacement rate is large and negative, suggesting that changes in financial assets are smaller in states with higher UI replacement rates. This finding that the UI program displaces saving is consistent with Engen and Gruber (2001).

responsiveness of components of saving to anticipated variation in income. Flavin (1991) finds that 30 percent of an anticipated increase in income is saved in financial assets for wealthy households. Alessie and Lusardi (1997), who provide similar estimates for a high-income sample, suggest that 30 to 50 percent goes into financial assets. My findings suggests that for households with some wealth financial assets play a similar role in supplementing large income shocks as they do supplementing anticipated income changes. On the other hand, the results in Table 5 show that financial assets do not respond to these income shocks for those with assets valued at less than 6 weeks of pre-separation earnings. Total secured debt is not responsive to unemployment-induced earnings variation for households with assets, and debt actually increases (insignificantly) for low-asset households. Secured debt could increase in response to a negative earnings shock if a household liquidates a secured asset rather than borrowing against it. For example, a household may sell their car to supplement lost earnings, resulting in a reduction in vehicle debt.

I also estimate the effect of unemployment-induced earnings changes in period t+1, on changes in the flow of these components of net worth between period *t* and *t+1*.[18] This approach, which follows Flavin (1991), controls for time-invariant household characteristics that may affect borrowing behavior, such as permanent income or preferences for debt. Panel 2 of Table 5 provides results for the second differences of these components of net worth that are consistent with those discussed earlier, although the estimates are very imprecise. Again, there is no evidence that unsecured borrowing is responsive to the income shock for low-asset households. The point estimate for the sample of higher asset households (-0.062) is slightly smaller than those reported earlier, but the standard error is large. I address other approaches for controlling for differences in permanent income in the following section.

5.2.3 Heterogeneity of Unemployment Spells

If low-asset households experience unemployment spells that have a permanent effect on earnings, then these households have an incentive to reduce consumption rather than borrow to maintain well-being. Thus, the assumption that the earnings shocks identified in the data are temporary is critical for determining why, in response to these shocks, low-asset households do not borrow, and why consumption falls. To some extent, I mitigate complications with more permanent spells of unemployment by focusing on households that work again and do not experience an unemployment spell the year following the initial job loss. This restricts attention to unemployment spells that are observed to be temporary. To test whether these unemployment spells have a transitory effect on income, I exploit the panel nature of the data to examine the long-term impact of these spells on earnings, total household income, and consumption. To this end, I regress each of these outcomes on leads and lags of the unemployment spell in a model including demographic controls and a household fixed effect. The results for the SIPP in Figure 1 show that earnings fall by 10 to 20 percent during

[18] The samples for these second differences are smaller because, in order to condition on re-employment in period *t+2* (waves 10-12), I only include households that remain in the 1996 SIPP Panel for all 12 waves.

the period from 12 months prior to the separation to 4 months prior. These results provide evidence that the spells are somewhat anticipated by both groups. Figure 1 also shows that the impact of these unemployment spells on earnings is larger in percentage terms for the low-asset group. However, the spells do not appear to be more permanent for this group. While, these spells do have a persistent effect on earnings, within eight months after the separation earnings are back to their pre-separation levels for both groups. This finding is consistent with previous research that argues that unemployment spells similar to the ones I examine are predominantly transitory (Huff-Stevens, 1997). I also examine the long-run pattern for consumption in the PSID (not reported). Consistent with the results reported in Section 5.2.2, households with assets appear better able to smooth consumption than households without assets. However, consumption nearly returns to pre-separation levels within two years after the unemployment spell for the low-asset households.[19] See Sullivan (2004) for more details on the results for consumption.

It is important to note that even though the spells are not more permanent for low-asset households, they may expect them to be more permanent, and consumption and borrowing behavior depend on expectations about the permanence of these shocks. To address this, I consider other approaches to control for permanent income and income uncertainty. For example, I employ an alternate measure of transitory income defined as deviations of current income from an estimate of permanent income. With panel data I can exploit both past and future earnings and employment outcomes as well as changes in family structure to construct an estimate of permanent income. In particular I follow Altonji and Doraszelski (forthcoming), estimating

$$Y_{it} = X_{it}\gamma + \mu_i + \omega_{it} \qquad (4)$$

where Y_{it} is total household income for household i in year t, X_{it} is a vector of time-varying demographics including a fourth order polynomial in age, centered at 40, indicators for marital status and children, the number of children, and a set of year (PSID) or wave (SIPP) dummies. Equation (4) allows for an individual specific effect, μ_i, as well as a random error term, ω_{it}. As explained in Altonji and Doraszelski, estimates of μ_i are a measure of permanent income capturing the average over past, current, and future family income streams controlling for both demographics and time. In both the SIPP and the PSID, Equation (4) is estimated for unique gender-race (minority/non-minority) subsamples of household heads and spouses by pooling multiple waves of the respective panels.[20] I report means for this measure of permanent income in Table 1. These sample averages are quite close to the means for total household income. Differences are more noticeable in the PSID, as permanent income for this sample captures information over a much longer time period than is available from the SIPP.

[19] Other studies have found a more persistent effect (Stephens, 2001). My results differ from previous studies because I condition on re-employment in the year following the job loss.

[20] For the SIPP all 12 waves of the 1996 panel are used. The PSID sample includes data from the 1968-1993 waves. Following Altonji and Doraszelski (forthcoming), I exclude individuals for whom I have fewer than 4 observations.

Using this predicted measure of permanent income, $\hat{\mu}_i$, I construct a measure of transitory changes in income, ΔZ_{it}, as deviations of current total household income from permanent income, so $\Delta Z_{it} = Y_{it} - \hat{\mu}_i$. I substitute this alternate measure of transitory income for ΔY_i in Equation (2), and re-estimate the effect of unemployment-induced changes in transitory income on borrowing and consumption. Consistent with results reported in Section 5, the results in Table 6 show that low-asset households do not borrow in response to transitory losses in total income. The results for consumption suggest that these households reduce spending in response to the idiosyncratic shock, but the standard errors for these estimates are large. Also, the results for households with assets show that unsecured borrowing is responsive to these shocks. For this group, borrowing responds by about 20 cents for each dollar drop in transitory income due to unemployment. In each case this response is significantly different from zero. These responses are slightly larger than those reported in Section 5, which is partly due to the fact that this approach captures transitory changes in total household earnings rather than transitory changes in the earnings of the head. Due to the lack of precision in the estimates for the low-asset households, I cannot reject the hypotheses that the consumption responses are the same across asset holdings.[21]

Precautionary motives might also affect the estimates presented earlier if households are risk averse and unemployment shocks generate greater uncertainty about future earnings. Carroll and Samwick (1998) find strong evidence that some households save for precautionary reasons. For these motives to explain the findings in this study, however, the unemployment shocks need to generate greater uncertainty for households without assets than for households with assets.[22] However, evidence from Carroll, Dynan, and Krane (1999) suggests that the role of precautionary motives is small for low-asset households. These authors conclude that saving does not respond to increases in unemployment risk for low permanent income households, but they do find evidence of a precautionary response for households with moderate levels of permanent income. I directly test the importance of precautionary motives by including as a covariate in Equation (4) the variance of log income for each household across all waves of the panels.[23] This measure reflects idiosyncratic income uncertainty and includes information about the unemployment spell as well as future income streams. Previous research has shown that this measure is highly correlated with a consumer's "target" amount of precautionary saving

[21] As an additional test of the heterogeneity in the nature of spells across households with and without assets, I estimate a probit model of the probability of experiencing an unemployment spell in period *t* conditional on observable information at *t*-1. For both groups of households, baseline information provides almost no power for predicting unemployment probabilities. Estimates indicate that for both groups none of the observable information at baseline is significant in predicting the probability of an unemployment spell except potential unemployment benefits.

[22] Precautionary motives may also affect the results presented here if the ability to borrow affects these motives as suggested by Davis et. al. (2002). For example, access to credit markets could substitute for precautionary wealth, suggesting that unconstrained households have less incentive to maintain a buffer of assets to smooth transitory income shocks than constrained households. Thus, if precautionary motives are strong, low-asset households may be less constrained than other households.

[23] Models using similar measures of uncertainty such as the log of the variance of log income yield similar results. These measures of uncertainty follow Carroll and Samwick (1998).

(Carroll and Samwick, 1998). Estimates in Table 6 show that controlling for income uncertainty does not noticeably change the response of borrowing or consumption. While including income uncertainty lowers the estimates of the responsiveness of consumption for low-asset groups, the estimates change by a small and insignificant amount.[24]

6 Robustness

Through a series of additional specification checks, I examine the robustness of my results. For example, I verify that the consumption results are not driven by differences in income elasticity of food consumption. Because food is a larger share of total expenditures for low-asset households, food consumption may be more income elastic for these households with low permanent incomes; consumption may be more responsive for low-asset households because these households are at a different point on the Engel curve. Estimates of the income elasticity of food consumption show that differences in permanent income across asset holdings do not explain the noticeable differences in the responsiveness of consumption for households with and without assets. These and other robustness results are reported in Sullivan (2004).

I also examine the borrowing behavior of other disadvantaged groups, such as young or low-educated households. The results in Table 7 show evidence that some disadvantaged households do borrow in response to unemployment-induced earnings variation. Moreover, for these groups the response is somewhat larger than those reported earlier. However, there is evidence of heterogeneity in the responsiveness of borrowing across asset holdings. Among households with assets and heads that do not have a high school degree, unsecured borrowing responds by about 25 cents for each dollar of earnings lost due to unemployment, and this response is statistically significant. High school dropouts without assets show no evidence of borrowing in response to an earnings shock, and in some cases, I can reject that the responsiveness of borrowing is the same across asset holdings. The results for the responsiveness of consumption (not shown) suggest that the low-educated households with assets are better able to smooth consumption than those without assets. The results for a sample of young households are similar, although less precise.

I also tested the sensitivity of my results to other sample restrictions. The results for a sample of only married families are similar to those reported in Tables 3 and 4, although somewhat less precise. Relaxing the restrictions on employment in $t-1$ and $t+1$ does change the results somewhat. I still find that low-asset households do not borrow in response to the earnings shocks. However, if those who do not become re-employed are included in the sample of households with assets, then the response falls to 6-8 cents, but is still

[24] Other factors, such as differences in non-separability across asset holdings, may explain the findings in this section. For example, there may be differences across these groups with respect to work related expenses, risk aversion, or preferences for leisure. Also, unobserved factors that are correlated with having few assets may also explain why these households do not borrow. For example, these low-asset households may exhibit hyperbolic discounting which may lead them to borrow up to their limits prior to an earnings shock (Laibson et. al., 2000). Similarly, low-asset households may make rule-of-thumb consumption decisions that lead to excess sensitivity of consumption to transitory earnings variation. These alternative explanations cannot be entirely ruled out.

significant. If those that experience an unemployment spell during *t-1* are also included, the response falls to about 4 cents and the estimate is only marginally significant.

Other tests are conducted to determine whether the results are sensitive to assumptions about the functional form of the borrowing and consumption equations, paying particular attention to non-linearities in the distribution of changes in borrowing. If ΔD_i in Equation (3) is equal to zero, the underlying model implies that the household chooses to keep debt unchanged in real terms. The data suggest that many of these households carry zero debt in both periods. As shown in Table 2, 20 percent of households in the SIPP sample report no change in unsecured borrowing. These households may be systematically different from households with non-zero changes in unsecured debt for several reasons including unobserved borrowing constraints, risk aversion, or low discount rates. To examine the degree to which these households without any unsecured debt influence the results, I re-estimate IV and OLS models including an indicator for households with zero initial unsecured debt and interactions of this indicator with other covariates.[25] Evidence from these models show results consistent with those reported earlier. Low-asset households with positive ex ante debt do not borrow in response to the earnings shock, but the response of borrowing for higher asset households with non-zero unsecured debt initially is slightly larger in magnitude than those reported in Table 4.

In addition, results from an ordered probit model estimating the effect of unemployment spells on borrowing are consistent with the findings reported in Tables 3 and 4.[26] Also, to test the exclusion of extreme values in my initial samples, I re-estimate the reduced form model of the effect of unemployment for a sample that does not exclude extreme values using quantile estimation. Estimates at the 75th percentile of the changes in unsecured debt are quite consistent with the results in Panel 2 of Tables 3 and 4. Quantile estimates of a two-stage model also yield similar results. See Sullivan (2004) for more details.

7 Conclusions

By examining household borrowing behavior, this study sheds light on whether households use unsecured debt to supplement income shortfalls. In the absence of borrowing constraints, the permanent income hypothesis shows that a household facing a transitory income shortfall will dissave in order to smooth consumption. For households with low initial assets, this implies that borrowing will respond to the transitory variation. The empirical evidence does not support this theoretical prediction. For low-asset households—a

[25] This approach is likely to suffer from some bias due to selection on unobservables. One concern is that the indicator for unemployment spells is not exogenous to the initial level of unsecured debt. A regression of the initial level of unsecured debt for all households on the unemployment indicator, U_i, and household demographics shows that U_i has a small and statistically insignificant effect on initial debt holdings in the SIPP.

[26] The ordered probit model estimates the effect of the unemployment spell indicator on a dependent variable that takes on three separate values indicating whether unsecured debt decreases, remains unchanged, or increases. The marginal effects from this model suggest that becoming unemployed has no effect on the probability of changing unsecured debt for low-asset households, while the probability of increasing unsecured debt increases by 9 percent for households with assets. However, none of the estimates from this model are statistically significant.

group without wealth to liquidate or to borrow against—I find no evidence that unsecured debt is responsive to unemployment-induced earnings losses, suggesting that, despite recent expansions in unsecured credit markets, low-asset households do not have sufficient access to these markets to help smooth consumption in response to large idiosyncratic shocks. This casts considerable doubt on the viability of current credit markets as a safety net for low-asset households.

This paper also sheds light on why these households do not borrow. I show that consumption falls in response to these earnings losses, suggesting that these households do not maintain well-being via other income sources. I also consider whether these households face borrowing restrictions in unsecured credit markets. Descriptive evidence of access to these credit markets shows that these households face fairly low credit limits and are frequently denied additional credit. I also show that the borrowing and consumption behavior of households with assets is different. The results indicate that these households do, in fact, borrow during unemployment spells, increasing unsecured debt by about 10 cents for each dollar of earnings lost. Among this group with assets, borrowing is particularly responsive to these idiosyncratic shocks for younger and less educated households. The findings also show some evidence of heterogeneity across households in the ability to smooth consumption when faced with a significant transitory earnings shock such as an unemployment spell. For example, the results show that food and housing consumption of households without financial assets is more than 5 times as responsive to unemployment-induced earnings losses as that of households with financial assets. Sensitivity analysis shows that these differences cannot be entirely explained by heterogeneity in the nature of unemployment shocks across these groups, or by disparities in the income elasticity of consumption at different levels of permanent income. These results provide evidence that low-asset households are short on liquidity during unemployment.

These findings indicate that recent expansions in unsecured credit markets have not enabled low-asset households to maintain well-being. If credit market frictions explain why these households do not borrow, then efforts to expand private credit markets, or to provide publicly insured credit for the unemployed, could enable some households to self-insure against unemployment. Previous studies have proposed policies designed to help households self-insure against earnings losses (Flemming, 1978; Feldstein and Altman, 1998). However, concerns with moral hazard are likely to confound any policy aimed at providing credit to unemployed workers who are constrained from private credit markets. In addition, studies have argued that indebtedness has contributed to several adverse outcomes including poor health, a rise in divorce rates, and drug use (see Manning, 2000). The design of a policy to extend credit to the unemployed would benefit from further research addressing the potential adverse effects of expanding access to credit.

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Table 1: Summary Statistics (SIPP and PSID)

	Assets<=0			Assets > 0		
	Employed	Unemployed	Difference	Employed	Unemployed	Difference
	(1)	(2)	(3) = (2) - (1)	(4)	(5)	(6) = (5) - (4)
SIPP						
Initial Total Household Income	36,198	28,491	-7,707*	52,496	40,973	-11,523*
	(1,038)	(3,485)	(3,636)	(390.9)	(2,499)	(2,529)
Permanent Income	35,061	24,468	-10,593*	49,542	35,521	-14,021*
	(795.3)	(3,525)	(3,613)	(316.0)	(1,537)	(1,570)
Initial Earnings of Head	23,227	21,482	-1,744*	36,523	26,936	-9,586*
	(576.9)	(3,320)	(3,370)	(307.9)	(1,957)	(1,981)
Change in Earnings of Head	-380.3	-10,820	-10,440*	-766.9	-8,154	-7,387*
	(394.9)	(3,295)	(3,426)	(163.8)	(941.5)	(955.7)
Initial Unsecured Debt	2,977	3,909	932.2	4,175	3,336	-838.6*
	(188.1)	(907.2)	(926.5)	(70.0)	(345.4)	(352.4)
Change in Unsecured Debt	231.0	-728.5	-959.6	-104.4	706.4	810.8*
	(157.2)	(888.5)	(902.3)	(48.1)	(320.9)	(324.5)
Unemployment Duration (weeks)		23.97			18.80	
		(3.27)			(70.04)	
N	743	30		8,407	220	
PSID						
Initial Total Household Income	24,852	20,976	-3,876*	53,365	38,169	-15,196*
	(685.9)	(1,578)	(1,720)	(328.9)	(1,426)	(1,464)
Permanent Income	30,229	26,538	-3,691*	48,435	41,271	-7,163*
	(443.1)	(1,073)	(1,161)	(156.1)	(763.9)	(779.7)
Initial Earnings of Head	19,082	13,923	-5,159	38,523	28,265	-10,258*
	(463.5)	(3,576)	(3,606)	(118.1)	(497.5)	(511.3)
Change in Earnings of Head	-151.4	-4,969	-4,818*	708.0	-7,291	-7,999*
	(252.8)	(1,121)	(1,464)	(131.8)	(686.2)	(698.8)
Initial Unsecured Debt	574.4	302.9	-271.5	2,436	1,358	-1,079*
	(81.8)	(579.1)	(584.9)	(88.0)	(420.3)	(429.4)
Change in Unsecured Debt	543.0	260.3	-282.7	542.4	1,011	468.5
	(172.4)	(844.1)	(861.6)	(97.7)	(645.0)	(652.4)
Initial Food & Housing Consumption	7,987	6,789	-1,198*	13,396	10,871	-2,525*
	(132.4)	(348.8)	(373.1)	(60.6)	(273.5)	(280.2)
Change in Food & Housing Consumption	362.0	-133.1	-495.2	231.1	-525.4	-756.5*
	(91.9)	(306.8)	(320.3)	(25.1)	(176.9)	(178.6)
Unemployment Duration (weeks)		19.03			17.12	
		(1.58)			(0.57)	
N	906	70		14,305	385	

Notes: Monetary figures are expressed in 1996 dollars. Standard errors are in parentheses. * denotes significance at the 0.05 level. All results are weighted. Permanent income is estimated using all 12 waves of the 1996 SIPP and waves 1968-1993 in the PSID. See text for more details. Assets refer to gross total household assets at baseline.

SIPP Sample: This sample includes households from the 1996 panel with heads between the ages of 20 and 63 who are not full-time students. I include only households whose heads report working full time and having positive earnings in each of the first three waves. Households with asset-to-annual earnings ratios greater than 4 at baseline are excluded. See text for additional details.

PSID Sample: This sample includes households from the 1984-1987 and 1990-1993 waves of the PSID with heads between the ages of 20 and 63 who are not full-time students. I include only households whose head is working full-time and does not experience an unemployment spell in the year prior to the baseline observation. Households with asset-to-annual earnings ratios greater than 4 at baseline are excluded. Unsecured debt is for a baseline sample of households from the Wealth Supplement in 1984. See text for additional details.

Table 2: Distribution of Unsecured Debt and Consumption by Asset Holdings

	SIPP		PSID				
	Initial Unsecured Debt	Change in Unsecured Debt	Initial Unsecured Debt	Change in Unsecured Debt	Food Consumption	Housing Consumption	Change in Food & Housing
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Full Sample							
% = 0	0.30	0.20	0.42	0.22	0	0	0
10th Percentile	0	-5,189	0	-4,123	2,430	1,487	-3,082
25th Percentile	0	-1,346	0	-874	3,597	3,374	-1,286
50th Percentile	1,529	0	583	0	5,071	5,605	127
75th Percentile	5,605	1,298	2,914	1,912	6,958	8,759	1,666
90th Percentile	11,464	4,970	7,140	6,455	9,080	13,270	3,762
N	9,400	9,400	2,669	2,669	15,666	15,666	15,666
Assets<=0							
% = 0	0.45	0.31	0.68	0.45	0	0	0
10th Percentile	0	-4,190	0	-1,311	1,741	568	-3,030
25th Percentile	0	-638	0	-236	2,632	1,749	-1,314
50th Percentile	406	0	0	0	3,788	3,274	192
75th Percentile	4,076	878	874	421	5,162	4,813	1,604
90th Percentile	9,171	4,701	1,894	4,276	7,019	6,221	3,604
N	773	773	148	148	976	976	976
Assets>0							
% = 0	0.29	0.19	0.40	0.20	0	0	0
10th Percentile	0	-5,254	0	-4,371	2,535	1,650	-3,085
25th Percentile	0	-1,427	0	-1,090	3,662	3,503	-1,285
50th Percentile	1,529	0	729	0	5,138	5,815	123
75th Percentile	5,808	1,377	2,914	1,912	7,019	9,076	1,671
90th Percentile	11,922	4,981	7,286	6,332	9,109	13,474	3,771
N	8,627	8,627	2,521	2,521	14,690	14,690	14,690

Notes: See notes to Table 1.

Table 3: The Response of Unsecured Debt and Consumption to Unemployment, Low-Asset Households (SIPP & PSID)

Panel 1: IV	No Financial Assets				No Assets				Asset/Earnings < 0.12			
Dependent Variable: Change in…	Unsecured Debt (SIPP)	Unsecured Debt (PSID)	Food (PSID)	Food & Housing (PSID)	Unsecured Debt (SIPP)	Unsecured Debt (PSID)	Food (PSID)	Food & Housing (PSID)	Unsecured Debt (SIPP)	Unsecured Debt (PSID)	Food (PSID)	Food & Housing (PSID)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Income Change (β_1)	-0.0017	0.0877	0.1298*	0.2918*	0.0753	0.0588	0.0657	0.1212	0.0318	0.1955	0.0668*	0.0436
	(0.0591)	(0.2156)	(0.0562)	(0.1115)	(0.0752)	(0.1825)	(0.0500)	(0.0847)	(0.0594)	(0.3699)	(0.0313)	(0.0461)
Change in Family Size	550.6*	53.8	580.1*	814.4*	233.2	570.0*	634.0*	919.9*	442.5*	301.4	601.3*	1,139.7*
	(115.6)	(305.8)	(126.3)	(192.1)	(198.3)	(266.0)	(122.9)	(171.8)	(139.4)	(416.5)	(88.9)	(129.7)
Marital Status	154.7	-545.8	-245.7	-702.6	13.6	1,216*	-55.0	-286.2	-207.1	796.1	-157.6	-168.2
	(200.9)	(758.9)	(257.1)	(437.2)	(367.2)	(505.9)	(287.0)	(563.1)	(233.5)	(721.7)	(170.4)	(264.4)
UI Replacement Rate	703.7	-4,282*	-993.1	-2,464	-1,394.8	-6,396	-813.0	-2,342	-314.4	-1,772	-294.6	62.6
	(1,494)	(1,963)	(687.4)	(1307)	(1,967)	(3773)	(694.1)	(1356)	(1371)	(2,652)	(486.4)	(736.4)
High Debt Indicator	-5,922*	-119.9			-2,893*	-683.3			-3,481*	-7,824*		
	(726.8)	(2,392)			(912.8)	(1,571)			(594.1)	(2,812)		
N	1,684	309	2,040	2,040	773	148	976	976	1,674	488	2,675	2,675
Panel 2: OLS	**No Financial Assets**				**No Assets**				**Asset/Earnings < 0.12**			
Dependent Variable: Change in…	**Unsecured Debt (SIPP)**	**Unsecured Debt (PSID)**	**Food (PSID)**	**Food & Housing (PSID)**	**Unsecured Debt (SIPP)**	**Unsecured Debt (PSID)**	**Food (PSID)**	**Food & Housing (PSID)**	**Unsecured Debt (SIPP)**	**Unsecured Debt (PSID)**	**Food (PSID)**	**Food & Housing (PSID)**
Unemployment Indicator	11.99	-477.5	-519.3*	-1,167.6*	-789.4	-339.2	-320.2	-590.6	-284.9	-625.1	-492.4*	-321.6
	(420.1)	(1,133)	(208.6)	(377.9)	(776.8)	(988.5)	(290.4)	(438.8)	(531.3)	(1,075)	(233.9)	(353.5)
N	1,684	309	2,040	2,040	773	148	976	976	1,674	488	2,675	2,675

Notes: See notes to Table 1. The standard errors in parentheses are corrected for within household dependence. All results are weighted. * denotes significance at the 0.05 level.

Controls: In addition to the covariates listed, all models include a cubic in age, a second order polynomial in family size and number of children, and indicators for educational attainment and race. The PSID results also include controls for a change in the health status of the head. See text for further discussion.

Table 4: The Response of Unsecured Debt and Consumption to Unemployment, Households with Assets (SIPP & PSID)

Panel 1: IV	**Positive Financial Assets**				**Positive Assets**				**Asset/Earnings >= 0.12**			
Dependent Variable: Change in…	**Unsecured Debt (SIPP)**	**Unsecured Debt (PSID)**	**Food (PSID)**	**Food & Housing (PSID)**	**Unsecured Debt (SIPP)**	**Unsecured Debt (PSID)**	**Food (PSID)**	**Food & Housing (PSID)**	**Unsecured Debt (SIPP)**	**Unsecured Debt (PSID)**	**Food (PSID)**	**Food & Housing (PSID)**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Income Change (β_1)	-0.0920*	-0.1242	0.0415*	0.0552*	-0.0959*	-0.1085	0.0484*	0.0701*	-0.1030*	-0.1405	0.0439*	0.0778*
	(0.0379)	(0.1513)	(0.0170)	(0.0271)	(0.0364)	(0.1496)	(0.0170)	(0.0270)	(0.0387)	(0.1455)	(0.0185)	(0.0303)
Change in Family Size	246.2*	291.4	104.4	1,171*	344.6*	229.5	728.5*	1,151*	302.9*	282.4	741.9*	1,131*
	(96.40)	(451.4)	(70.7)	(68.7)	(85.95)	(423.8)	(45.6)	(64.4)	(93.77)	(439.8)	(48.4)	(68.7)
Marital Status	-195.3	-106.5	-151.3*	-188.1	-220.6	-151.3	-151.4*	-196.8*	-184.5	-217.1	-145.1*	-193.9
	(129.0)	(376.1)	(64.2)	(99.7)	(117.0)	(372.4)	(63.5)	(97.1)	(127.3)	(399.5)	(65.9)	(102.4)
UI Replacement Rate	1,672*	822	-85.9	-233.9	2,043*	634.7	-176.7	-390.4	2,192*	970	-148.8	-483.9
	(851.6)	(1,203)	(195.3)	(298.7)	(816.2)	(1,220)	(193.9)	(297.6)	(875.1)	(1,272)	(203.8)	(325.0)
High Debt Indicator	-2,849*	-3,016*			-3,353*	-2,764*			-3,211*	-1,923		
	(394.0)	(1,402)			(381.3)	(1,363)			(425.8)	(1,472)		
H_0: β_1 Same as Table 3 (P-values)	0.284	0.389	0.133	0.040	0.053	0.425	0.740	0.536	0.083	0.334	0.533	0.539
N	7,716	2,360	13,626	13,626	8,627	2,521	14,690	14,690	7,726	2,181	12,991	12,991
Panel 2: OLS	**Positive Financial Assets**				**Positive Assets**				**Asset/Earnings >= 0.12**			
Dependent Variable: Change in…	**Unsecured Debt (SIPP)**	**Unsecured Debt (PSID)**	**Food (PSID)**	**Food & Housing (PSID)**	**Unsecured Debt (SIPP)**	**Unsecured Debt (PSID)**	**Food (PSID)**	**Food & Housing (PSID)**	**Unsecured Debt (SIPP)**	**Unsecured Debt (PSID)**	**Food (PSID)**	**Food & Housing (PSID)**
Unemployment Indicator	886.6*	745.6	-361.0*	-480.4*	836.5*	616.8	-399.5*	-579.5*	925.5*	1,012	-357.0*	-632.5*
	(348.4)	(879.1)	(150.9)	(240.2)	(302.2)	(828.8)	(141.2)	(224.6)	(328.5)	(1,005)	(152.0)	(247.1)
N	7,716	2,360	13,626	13,626	8,627	2,521	14,690	14,690	7,726	2,181	12,991	12,991

Notes: See notes to Table 3.

Table 5: The Response of Components of Net Worth to Unemployment By Asset-to-Earnings Ratio (SIPP)

	Asset/Earnings < 0.12			Asset/Earnings >= 0.12		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel 1: IV						
Dependent Variable: Change in …	**Unsecured Debt**	**Secured Debt**	**Financial Assets**	**Unsecured Debt**	**Secured Debt**	**Financial Assets**
Income Change	0.0318	0.1597	-0.0987	-0.1030*	0.0158	0.4822*
	(0.0594)	(0.1866)	(0.1986)	(0.0387)	(0.1827)	(0.2171)
N	1,674	1,674	1,674	7,726	7,726	7,726
Panel 2: IV						
Dependent Variable: Second Difference in …	**Unsecured Debt**	**Secured Debt**	**Financial Assets**	**Unsecured Debt**	**Secured Debt**	**Financial Assets**
Income Change	-0.0180	0.1895	0.1109	-0.0619	-0.1581	0.3790
	(0.3410)	(0.9506)	(0.4656)	(0.1527)	(0.5198)	(0.4331)
N	1,500	1,500	1,500	6,453	6,453	6,453

Notes: Unsecured debt results in Panel 1 are copied from Column 9 of Tables 3 and 4. Secured debt includes auto loans, mortgage debt, and other asset-backed loans. The dependent variable for Panel 2 is the second difference in the respective component of net worth: the change in the component between wave 9 and wave 6 of the 1996 SIPP less this change between wave 6 and wave 3. See notes to Table 3 and text for additional notes and list of controls.

Table 6: The Response of Borrowing and Consumption Using Estimates of Permanent Income and Income Uncertainty

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel 1: Low-asset Households	**No Financial Assets**			**No Assets**			**Asset/Earnings < 0.12**		
Dependent Variable: Change in …	**Unsecured Debt (SIPP)**	**Food (PSID)**	**Food & Housing (PSID)**	**Unsecured Debt (SIPP)**	**Food (PSID)**	**Food & Housing (PSID)**	**Unsecured Debt (SIPP)**	**Food (PSID)**	**Food & Housing (PSID)**
Income Change	-0.0091	0.3373	0.9020	0.1852	0.1732	0.4360	0.0725	0.1107	0.0788
	(0.1183)	(0.2681)	(0.6443)	(0.2154)	(0.2080)	(0.5222)	(0.1368)	(0.0667)	(0.0898)
Income Change (controlling for income uncertainty)	-0.0195	0.3331	0.8828	0.1702	0.1538	0.3922	0.0413	0.1025	0.0730
	(0.1331)	(0.2583)	(0.6138)	(0.2566)	(0.1575)	(0.3746)	(0.1539)	(0.0653)	(0.0900)
N	1,684	2,040	2,040	773	976	976	1,674	2,675	2,675
Panel 2: Households with Assets	**Positive Financial Assets**			**Positive Assets**			**Asset/Earnings >= 0.12**		
Dependent Variable: Change in …	**Unsecured Debt (SIPP)**	**Food (PSID)**	**Food & Housing (PSID)**	**Unsecured Debt (SIPP)**	**Food (PSID)**	**Food & Housing (PSID)**	**Unsecured Debt (SIPP)**	**Food (PSID)**	**Food & Housing (PSID)**
Income Change	-0.1958*	0.0560*	0.0686	-0.1828*	0.0670*	0.0962*	-0.2071*	0.0610*	0.1058*
	(0.0820)	(0.0239)	(0.0368)	(0.0823)	(0.0248)	(0.0386)	(0.0868)	(0.0264)	(0.0424)
Income Change (controlling for income uncertainty)	-0.1944*	0.0560*	0.0685	-0.2031*	0.0675*	0.0965*	-0.2123*	0.0612*	0.1059*
	(0.0883)	(0.0239)	(0.0367)	(0.0871)	(0.0249)	(0.0388)	(0.0919)	(0.0265)	(0.0426)
N	7,716	13,626	13,626	8,627	14,690	14,690	7,726	12,991	12,991

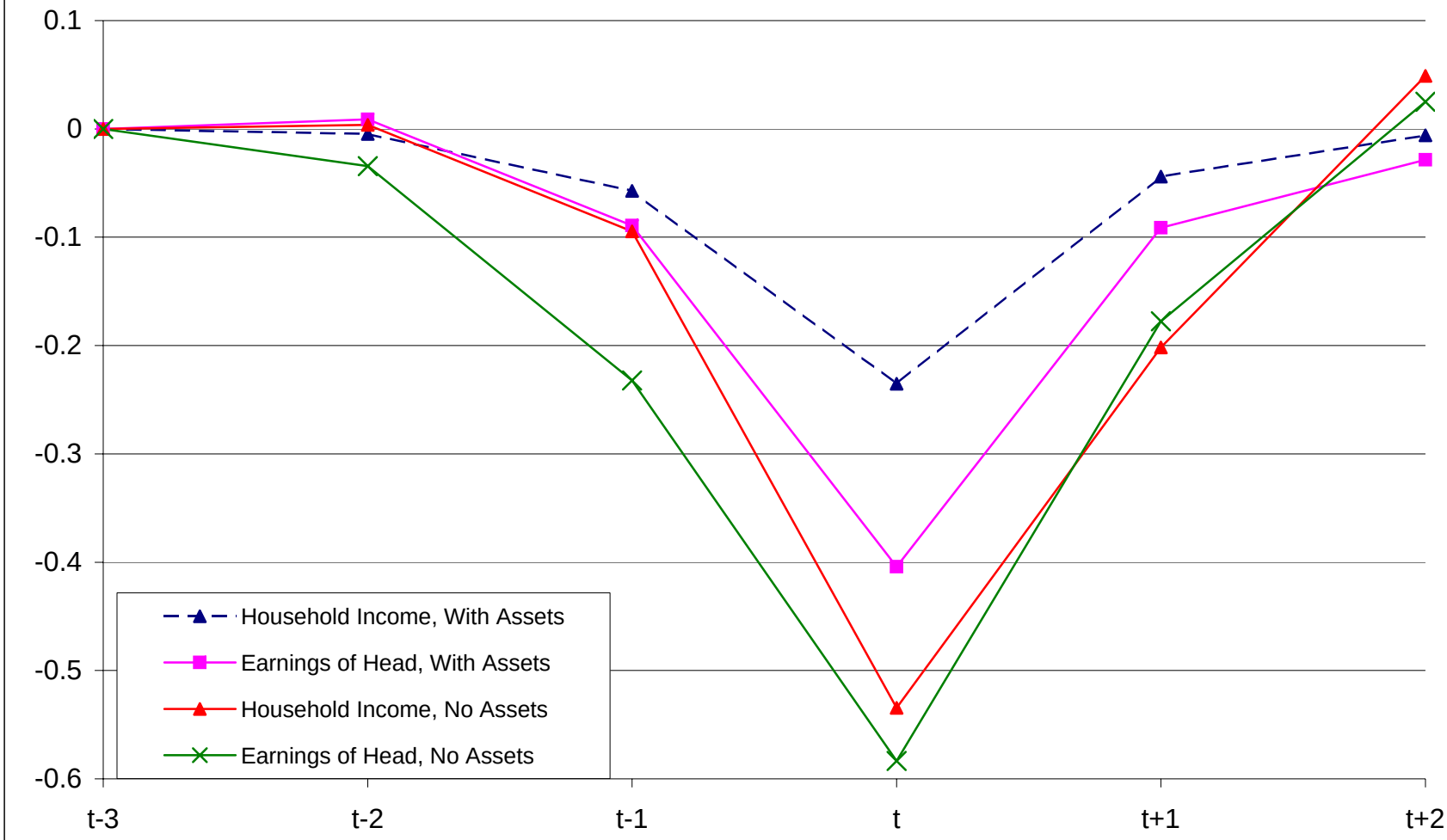
Notes: Models are estimated using unemployment spells as an instrument for deviations of current total household income from estimates of household permanent income, as explained in the text. The second row of point estimates in each panel are based on models that control for uncertainty by including the variance of log income for each household across all waves of the survey. See Table 3 for additional notes and a list of additional controls.

Table 7: The Response of Borrowing for Other Samples (SIPP)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel 1: Less than High School Degree	**All**	**No Financial Assets**	**Positive Financial Assets**	**No Assets**	**Positive Assets**	**Asset/ Earnings < 0.12**	**Asset/ Earnings >= 0.12**
Income Change	-0.1443*	-0.0259	-0.2657*	0.2900	-0.2514*	0.1375	-0.2540*
	(0.0754)	(0.0907)	(0.1241)	(0.1901)	(0.0908)	(0.1189)	(0.0971)
N	941	444	497	161	780	309	632
Panel 2: Age 25 and Younger	**All**	**No Financial Assets**	**Positive Financial Assets**	**No Assets**	**Positive Assets**	**Asset/ Earnings < 0.12**	**Asset/ Earnings >= 0.12**
Income Change	-0.2555	-0.0125	-0.3821	0.0339	-0.3004	0.0057	-0.3573
	(0.1689)	(0.2265)	(0.2482)	(0.3080)	(0.1908)	(0.2541)	(0.2148)
N	703	178	525	99	604	209	494

Notes: For all models the dependent variable is the change in unsecured debt. Panel 1 includes all households with heads without a high school degree. Panel 2 includes all households whose heads are 25 or younger. See Table 3 for additional notes and a list of controls.

Figure 1: The Long Run Effect of Unemployment on Income and Earnings by Asset Holdings (SIPP)



Notes: This figure plots point estimates from regressions of leads and lags of the unemployment indicator on household income and earnings of the head. These estimates represent changes in the outcome relative to period *t-3*. Controls include the same as those reported in Tables 3 as well as a full set of period dummies. Assets refer to gross total assets. The "With Assets" group includes all households with positive gross total assets prior to the unemployment spell. *t* represents a 4-month period.