Borrowing During Unemployment: Unsecured Debt as a Safety Net

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Abstract

This paper explores two related questions: Does unsecured debt help households supplement lost earnings during unemployment, and does limited access to such credit have important welfare implications? These questions have become particularly relevant as consumers increasingly rely on unsecured debt to finance consumption. Growth in unsecured debt has been most striking among the poor. Some researchers suggest that these poor households use this debt to smooth consumption across spells of unemployment. Using panel data from two nationally representative surveys, I examine whether borrowing and consumption are responsive to transitory spells of unemployment. I find that households with some initial wealth do in fact borrow during unemployment spells, increasing unsecured debt on average by 10 cents for each dollar of earnings lost. By contrast, households with low initial wealth do not use unsecured debt to supplement lost earnings. Moreover, data on food and housing consumption indicate that these low asset households have difficulty smoothing consumption during unemployment spells. The results provide strong evidence that low asset households are constrained from unsecured credit markets, suggesting that unsecured credit markets are not a safety net for these most disadvantaged households.

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1 Introduction

More than ever consumers are relying on unsecured debt to finance consumption.[1] Average household balances on unsecured loans doubled in real terms between 1984 and 1999. Much of this growth is due to a rise in credit card debt: outstanding balances on credit cards across all households more than tripled on average from 1983 to 1998. By 1998 more than 75 percent of all U.S. households had at least one credit card and nearly half of all households carried outstanding balances on these accounts.[2] 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 (Bird, Hagstrom, and Wild, 1999). Evidence 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.[3] Some researchers suggest that the increased availability of unsecured credit to poor households allows these households to smooth consumption across spells of unemployment. The issue of how poor households maintain consumption during unemployment is particularly interesting at a time when other traditional safety nets such as AFDC/TANF are narrowing their coverage by imposing time limits and/or work requirements.

This paper investigates whether unsecured debt plays an instrumental role in a household's ability to supplement lost earnings, and whether restricted access to these credit markets has noticeable welfare implications. This study explores two related questions. First, does exogenous earnings variation affect household borrowing behavior? To address this question I examine the response of unsecured debt to transitory changes in income. I focus on temporary shocks to income because

[1] Unsecured debt (or non-collateralized debt) refers to debt that is not guaranteed by the pledge of any collateral. This 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, 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.

[2] 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). Aggregate data on revolving debt imply that these numbers understate the level of and growth in unsecured debt. This discrepancy may be due to under-reporting of unsecured debt in household surveys (Gross and Souleles, Forthcoming-a). In this study a "credit card" refers to all payment cards that provide a revolving line of credit including bankcards, store cards, and gas cards.

[3] See Evans and Schmalensee (1999), Lupton and Stafford (1999), or Gross and Souleles (Forthcoming-b).

households do not have the same incentives to borrow in response to permanent shocks. I consider whether the borrowing response is different for households at different levels of initial assets to allow for heterogeneity in access to credit markets. I also consider the borrowing behavior of low asset households separately because these households cannot use savings to self-insure against income shortfalls. Thus, unsecured debt is the only mechanism by which these low asset households can transfer income intertemporally. My results show that households with assets increase unsecured debt on average by 10 cents for each dollar of earnings lost due to unemployment. For households with low initial wealth, however, unsecured debt does not respond to lost earnings. These results are robust to a variety of different tests of sensitivity.

To consider whether market frictions affect well-being, I address a second question: Does restricted access to these credit markets have negative welfare implications for households facing an income shortfall? I examine how consumption responds to income shocks and how this response differs for households with and without assets. The results show that the consumption of low asset households is more responsive than that of households with assets. Moreover, sensitivity analyses show that these differences cannot be entirely explained by heterogeneity in the nature of unemployment shocks across asset groups, or by disparities in the income elasticity of consumption at different levels of permanent income.

This study is the first to test empirically the extent to which households borrow from unsecured credit markets to supplement lost earnings.[4] My results provide strong evidence that current credit markets are not a viable safety net for low asset households. The fact that consumption falls in response to transitory spells of unemployment suggests that these low asset households are short on liquidity during unemployment. Moreover, differences in the response of consumption to unemployment for households with and without assets imply that low asset households experience greater losses in material well-being due to restricted access to unsecured credit.

The following section briefly discusses the extensive literature on consumption smoothing and borrowing constraints, and highlights a few studies looking at household borrowing behavior. Section 3 lays out a theoretical argument for why households borrow in response to exogenous income variation. I present a description of the empirical methodology in section 4 and describe the data in section 5. The results in section 6 show how the responsiveness to lost earnings of both unsecured debt and consumption differs across asset holdings. In section 7 I discuss sensitivity analyses, verifying that the results are robust to different specifications and functional form assumptions. I also consider an alternative way to identify transitory income losses, and compare the nature of

[4] A few theoretical studies have shown that unsecured debt should play an important role in smoothing transitory income: Brito and Hartley (1995) and Laibson, Repetto, and Tobacman (2000).

unemployment spells across subsamples. Section 8 provides a brief discussion of the potential policy implications of this study and concludes.

2 Previous Research

This study contributes to an extensive empirical literature that looks at how households smooth consumption, as it is the first to test empirically the extent to which households use unsecured debt to supplement lost earnings. In this section I highlight other studies within this empirical literature that examine how households finance consumption when earnings are low, and I discuss some of the previous research on the use of unsecured debt.

Much of the empirical literature on micro level consumption behavior has examined the importance of liquidity constraints, because these frictions can explain why consumption growth is sensitive to information that theory suggests should be orthogonal to the consumption path (Zeldes, 1989a; Runkle, 1991; Jappelli, Pischke, and Souleles, 1998).[5] The literature on consumption and liquidity constraints is somewhat in agreement that at least some households face binding constraints, but there is little consensus within this empirical literature on how to identify which households are constrained. Several studies have used the initial level of wealth to identify constrained households.[6] Zeldes (1989a), for example, splits a sample of households using both financial wealth and total wealth relative to income, specifying households with asset holdings valued at less than 2 months worth of income as constrained. He shows that these constrained households exhibit excess consumption growth. Souleles (1999) also argues that liquidity constraints cause excess sensitivity in consumption. He separates households by holdings of liquid wealth relative to earnings to show that nondurable consumption for constrained households (the bottom 15 percent of the liquid wealth-to-earnings distribution) is sensitive to predictable changes in earnings, while nondurable consumption for unconstrained households (the top 25 percent of the distribution) is not sensitive to these anticipated changes. Following the approach of these studies of excess sensitivity, I separate households by initial asset holdings in order to allow for heterogeneity across households in access to unsecured credit. Unlike these studies, my intention is not to test for excess sensitivity to known

[5] A precautionary motive can also lead to excess sensitivity. See Attanasio (1999), Browning and Lusardi (1996) or Carroll (1997) for a discussion of the excess sensitivity of consumption.

[6] Many alternative procedures have been used. For example, several studies use self-reports of constraints (Jappelli, 1990; Cox and Jappelli, 1993; Jappelli et. al., 1998), but these self-reports are not available in the panel data used in this study. 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. They estimate this probability simultaneously with household consumption behavior in a switching regression framework.

income. Rather, I consider how borrowing and consumption behavior responds to transitory shortfalls in income because these shocks provide an incentive for households to borrow.

Although, in general, more households have access to unsecured debt than other forms of credit such as mortgage loans, studies have shown evidence of frictions in unsecured credit markets. Gross and Souleles (Forthcoming-a) 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. They find that consumers respond to changes in their credit limits, increasing debt balances by 10 to 14 percent of the change in the limit. Moreover, this "marginal propensity to consume out of liquid wealth" is much higher for borrowers near the credit limit initially, suggesting that constraints on credit card borrowing are binding for these consumers.

Several studies consider the consumption behavior of households in the presence of variable earnings. 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 3 weeks of pre-separation earnings. This falls far short of the average unemployment spell, which lasts about 13 weeks (Engen and Gruber, 2001). Gruber (1997) shows that unemployment insurance (UI) is an important source of consumption insurance, however only about 40 percent of the unemployed are eligible for UI (Blank and Card, 1991). Furthermore, replacement rates rarely amount to more than half of pre-separation earnings. Browning and Crossley (2001) also look at the ability of households to smooth consumption during unemployment. Using Canadian data they find that on average UI plays only a minimal consumption smoothing role, but they find strong evidence that some households are liquidity constrained and that UI does help these constrained households to smooth consumption.

Dynarski and Gruber (1997) show that in addition to public transfers, households also supplement lost income through increased work effort of the household, lower taxes, or dissaving. Although Dynarski and Gruber do not look at data on saving and borrowing, their results for other sources of consumption smoothing imply that each dollar loss in earnings due to unemployment results in a drop in net worth of 20 to 25 cents. They also consider how the ability to supplement lost earnings differs across different educational groups. Their results suggest that while dissaving offsets about a third of unemployment-induced earnings variation for households headed by either a high school graduate or a college graduate, dissaving plays no role for households headed by a high school dropout. Not surprisingly, the responsiveness of consumption to lost earnings is notably different across these groups, suggesting that there is heterogeneity across households in the ability to maintain well-being during unemployment. Dynarski and Gruber show that for high school dropouts, household

consumption is reduced by 70 cents for each dollar of lost income as compared to only 20 cents for high school graduates. Much of the drop in total consumption for high school dropouts reflects a decrease in spending on consumer durables. They also show evidence of this heterogeneity in the responsiveness of consumption across asset holdings.

The literature on household borrowing behavior in the presence of variable income is limited. A descriptive study of the use of credit cards by the poor (Bird et al., 1999) has shown 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 suggest that poor households may use credit cards to smooth consumption, although they admit that their explanation is "speculative."

In a study of mortgage refinancing behavior, Hurst and Stafford (2001) present evidence that secured credit markets help households smooth consumption. Looking at a sample of homeowners, they show that these households 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.

A number of studies have examined the potential benefits that may result from expanded availability of unsecured credit.[7] Access to unsecured credit can reduce the need to maintain a sizable portfolio of liquid assets as a precaution against income shortfalls (Blanchflower, Evans, and Oswald, 1998). The liquidity that these credit markets provide can help small businesses grow or promote entrepreneurship (Evans and Leder, 1998; Holtz-Eakin, Joulfaian, and Rosen, 1994; Evans and Jovanovic, 1989).[8] In this study I consider another potential benefit: that access to unsecured credit allows households to borrow more easily from future earnings, enabling them to smooth consumption across spells of unemployment.

[7] Studies have also noted the deleterious effects of easier access to credit, arguing that indebtedness has contributed to poor health, a rise in divorce rates, and increased drug use. I do not address these issues here. See Manning (2000) for a discussion.

[8] On the other hand, a significant literature argues that liquidity constraints are not crucial in entrepreneurial decisions (Meyer, 1990; Hurst and Lusardi, 2001).

3 A Theoretical Discussion

In this section I outline a simple permanent income model to demonstrate how borrowing and consumption respond to variation in labor income and how these responses differ across households depending on access to credit markets. The purpose of this discussion is to provide a framework for the methodology that follows. The intention here is three-fold. First, this canonical model shows how borrowing and consumption decisions depend on the nature of income variation. Specifically, these responses will depend on expectations about the timing and persistence of the income shocks. Second, this model demonstrates how credit constraints affect borrowing and consumption behavior. Lastly, I discuss why households accrue unsecured debt despite the high interest rates charged on these loans.

In a permanent income model where households with intertemporally separable and quadratic preferences maximize expected lifetime utility, consumption will be proportional to lifetime resources.[9] Assuming no borrowing constraints, and an infinite planning horizon, consumption (C_t) at time t can be defined as,

$$C_t = \lambda\left(\sum_{j=0}^{\infty} \frac{E_t[Y_{t+j}]}{(1+r)^j} + A_t\right) \qquad (1)$$

where r is the interest rate which is fixed and equal to the rate of time preference, $\lambda = r/(1+r)$, $E_t[y_{t+j}]$ represents expectations at time t of labor earnings in period $t+j$, and A_t is wealth at the start of period t. The right hand side of equation (1) represents permanent income; the expected discounted value of future earnings streams. Given the budget constraint $A_{t+1} = (1+r)[A_t + Y_t - C_t]$, the first difference of equation (1) can be expressed as

$$\Delta C_{t+1} = \lambda \sum_{j=0}^{\infty} \frac{E_{t+1}[Y_{t+j+1}] - E_t[Y_{t+j+1}]}{(1+r)^j} \qquad (2)$$

[9] These assumptions are not innocuous. For example, Zeldes (1989b) shows that certainty equivalence implicit in quadratic preferences can generate excess sensitivity of consumption to transitory changes in income, and that this is particularly problematic at low levels of financial wealth. See Browning and Lusardi (1996) for further discussion of complications with the certainty equivalence assumption. Nevertheless, I invoke these assumptions for ease of exposition. The result that households smooth consumption over transitory income variation is robust to a variety of different specifications for preferences including constant relative risk aversion. See Attanasio (1999) for a more detailed discussion of the permanent income hypothesis and alternative models of consumption behavior.

where $\Delta C_{t+1} = C_{t+1}-C_t$ is the first difference in consumption. Equation (2) states that consumption responds proportionally to changes in expectations about lifetime resources. Suppose, for example, income falls in period t+1 by some amount Z for a single period due to an unexpected unemployment spell, but household expectations about income remain unchanged for all subsequent periods. Equation (2) shows that consumption in period t+1 will be λZ less than C_t, as the household spreads out the loss in income over all remaining periods. The consumption response will be different, however, if the income loss in expectation is permanent. For example, suppose the household expects the income loss Z to occur in each subsequent period, as oppose to in a single period. In this case C_{t+1} will be $\lambda\sum_{j=0}^{\infty}\frac{Z}{(1+r)^j}$ less than C_t; the income loss is fully absorbed by a reduction in consumption in period t+1.[10]

This discussion demonstrates that households will smooth consumption in the presence of transitory income variation, but consumption will be responsive to permanent changes in income. Equation (2) also shows how the timing of the responsiveness of consumption will depend on the degree to which income variation is anticipated. If, for example, a temporary earnings loss that will occur in period t+2 is perfectly anticipated in period t, then consumption will change between t and t+1 as explained above, and as a result, consumption will not respond to the earnings loss in the period that this loss occurs. Anticipated income changes affect consumption in periods prior to the period of the income change, while unanticipated decreases in income will not affect changes in consumption until the period during which the income shortfall is realized.

To determine how saving responds to permanent and transitory changes in income, rewrite equation (1) to solve for an equation for saving (S_t),[11]

$$S_t = -\lambda\left(\sum_{j=0}^{\infty}\frac{E_t[Y_{t+j}]-Y_t}{(1+r)^j}\right) \qquad (3)$$

where $S_t = Y_t - C_t$. Equation (3) shows that in the case of a transitory unemployment shock—so that current income is lower than expected future income—S_t will be negative, suggesting that the household borrows or liquidates assets in response to the shock. In other words, the household will dissave to smooth consumption when income is expected to rise. If the unemployment shock is

[10] The result that, in the case of a permanent shock, the drop in consumption is equal to the income loss—so there is no dissaving—occurs because the discount rate is assumed to be equal to the interest rate. The general result that households do not smooth consumption in response to permanent changes in income still holds if this assumption is relaxed, although the consumption change does not necessarily equal the income change.

[11] This is the "saving for a rainy day" equation from Campbell (1987).

permanent, however, current income is not lower than expected future income, so the household does not dissave.

Consumption and borrowing will respond differently to transitory income variation if the assumption of perfect credit markets is relaxed. For example, consider the case where a household cannot carry a negative net asset position so $A_{t+1} \geq 0$,[12] which from the budget constraint implies that $C_t \leq A_t + Y_t$. If the household receives an exogenous income draw low enough that this borrowing constraint is binding, then consumption will be below the utility maximizing level so the drop in consumption will be greater than is implied by equation (2).[13] This suggests that consumption will be more responsive to a temporary income shortfall if the shortfall causes the household borrowing constraint to bind. The borrowing constraint is more likely to bind if the income draw is particularly bad or if ex ante asset holdings are low. By definition, households facing binding constraints, such as the one discussed here, will borrow less than the desired amount. Thus, ceteris paribus, borrowing will be less responsive to a given transitory change in income for constrained households than for households that do not face constraints.[14]

This simple model shows that in the absence of constraints households will dissave in response to transitory income losses. This does not imply, however, that households will necessarily borrow in response to these losses. Dissaving could take the form of depleting assets or borrowing from financial institutions or other individuals. A household may choose to borrow rather than deplete assets for several reasons. Liquidating assets can carry high transaction costs, making this a particularly unattractive source for small amounts of liquidity. Also, households that choose to keep cash on hand to insure against bad earnings draws face the opportunity cost of holding these money balances. Households can avoid this opportunity cost by reducing cash balances and relying on credit markets for short-term liquidity. Thus, the option of borrowing from unsecured credit markets allows households to hold fewer money balances.[15] This is consistent with Blanchflower, Evans, and Oswald (1998) who find that having a credit card allows the average consumer to reduce checking account balances by more than $2000.

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[12] Borrowing constraints can take many different forms. For example, the household may be able to carry negative assets, but can only borrow up to a specified amount: $A_{t+1} \geq c$ where c is some negative number. Market imperfections can also arise if the market return on net wealth is a function of initial asset holdings (see Altonji and Siow (1987)).

[13] This example ignores the effect that non-binding borrowing constraints may have on consumption behavior. As several studies have shown (Zeldes, 1989a; Browning and Lusardi, 1996), the fact that borrowing constraints may bind in the future provides an incentive for an individual to reduce current consumption.

[14] Precautionary motives may also induce households to borrow less. See section 6 for further discussion.

[15] See Brito and Hartley (1995) for a formal model of the optimal choice of money balances and the decision to borrow. They show that the probability of borrowing increases with the return on other assets and decreases with the interest rate on unsecured borrowing.

Households that borrow face the choice between collateralized and non-collateralized debt. Although the former generally has lower interest costs, collateralized debt also tends to have greater fixed time and transaction costs.[16] Households will choose collateralized loans only if the principal is sufficiently large to justify paying the fixed costs. Brito and Hartley (1995) show that even moderate fixed costs on collateralized loans can make unsecured borrowing a more attractive option for financing consumption. Because of the high variable costs but minimal fixed costs associated with unsecured credit, these markets are an attractive source for short-term liquidity or for loans of small dollar value.

This theoretical discussion provides direction for the empirical analysis that follows. To determine whether unsecured borrowing is used to supplement lost earnings, I consider the effect of transitory changes in earnings on borrowing and consumption. I focus on transitory variation because households will not borrow in response to permanent income shocks. As explained here, borrowing constraints can lead to heterogeneity across households in the responsiveness of consumption and borrowing. When looking at transitory earnings variation, the model discussed here implies that unconstrained households will exhibit less variation in consumption and therefore greater variation in borrowing than constrained households. For this reason, I examine the borrowing and consumption behavior of households that are likely to be constrained separately from other households. Other possible explanations for this heterogeneity will be discussed in sections 6 and 7.

4 Methodology

The goal of this empirical analysis is to determine whether in practice unsecured borrowing plays an important role in a household's ability to supplement transitory income shortfalls. To address this question I examine the degree to which borrowing and consumption are responsive to temporary unemployment spells. I also consider whether these responses are systematically different for households that are likely to have only limited access to these credit markets.

[16] In 1998 the average annual interest rate for a credit card was nearly 16 percent, while the average annual rate for a two-year automobile loan was 8.7 percent, and the average mortgage interest rate was 7 percent (see Evans and Schmalensee, 1999). Some of the fixed costs of collateralized borrowing include origination and underwriting fees, broker fees, and settlement and closing costs. The average origination fee for a conventional home mortgage in 1995, for example, was 1 percent of the principal balance (Bennett, Peach, and Peristiani, 1998).

4.1 Econometric Model

As discussed in the previous section, households will have an incentive to borrow if they expect income to rise in the future. This suggests that if a household experiences a temporary income shortfall, then the household will dissave or borrow to maintain consumption during this period when income is low. To estimate the responsiveness of household borrowing to changes in income, I could estimate the following:

$$\Delta D_i = \alpha_0 + \alpha_1 \Delta Y_i + X_i \alpha_2 + \xi_i \qquad (4)$$

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, and $\Delta Y_i = Y_{it} - Y_{it\text{-}1}$ is the observed change in annual labor income for the household head.[17, 18] 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 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.

Changes in other components of income may be correlated with both borrowing behavior and changes in the earnings of the head violating the assumption that ΔY_i is uncorrelated with ξ_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

[17] Currently the Survey of Income and Program Participation panel used in the empirical analysis provides data on liabilities for only two periods. With the release of additional waves of data on debt, fixed-effects models can be estimated. I omit time subscripts because the current estimates reflect first differences for a cross-section of households.

[18] This approach implicitly assumes that ΔD_i is continuous. Although the latent variable representing desired borrowing might be continuous, observed borrowing is discontinuous. For example, households without any initial debt ($D_{it\text{-}1}$=0) may desire to reduce the level of borrowing, but D_{it} cannot be negative. I investigate potential biases that result from these discontinuities in section 7.2.

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.[19]

Using equation (4) to estimate the responsiveness of borrowing to exogenous earnings changes presents several problems. First, the labor supply decision of the head, and therefore earnings, is endogenous to the household borrowing decision. Second, the change in labor income in national surveys is likely to be measured with error. Lastly, this approach does not distinguish between transitory and permanent changes in income. As discussed in section 3, households only have an incentive to dissave or borrow when the income loss is transitory. Furthermore, as was also discussed in section 3, the magnitude of the response of unsecured debt over a single period will depend on the degree to which the income change is anticipated.

Addressing these concerns, I exploit the panel nature of the data to identify transitory and exogenous changes in income. To isolate exogenous income changes, I focus on income changes resulting from unemployment spells of the head of household i that occur 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 only include spells with a duration of at least one month, as these longer spells are also less likely to be voluntary and more likely to have a significant impact on total household income.[20] To focus on unanticipated spells, I also 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.[21] As discussed above, the household's incentive to borrow will depend on the degree to which the spell has a permanent effect on income. To restrict attention to transitory variation, I limit my sample to households whose heads are employed in year t+1 and do

[19] 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. I am indebted to Jonathan Gruber for providing me with state tax and UI benefit simulation models.

[20] Dynarski and Gruber (1997) make a similar argument.

[21] 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). Some households, however, may substitute earnings from other members for earnings of the head, reducing the need to borrow if the head becomes unemployed. Because the demand for unsecured debt during spells of unemployment of the head will vary depending on the household's ability to benefit from the increased work effort of other members, I also consider changes in total family income as part of my sensitivity analysis (see section 7.1).

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.[22]

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 IV model:

$$\Delta Y_i = \delta_0 + \delta_1 U_i + X_i \delta_2 + \upsilon_i \quad (5)$$

$$\Delta D_i = \beta_0 + \beta_1 \Delta \hat{Y}_i + X_i \beta_2 + \eta_i \quad (6)$$

where $\Delta \hat{Y}_i$ is the predicted change in earnings from the first stage equation. This procedure isolates the change in earnings that occurs due to 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. This two-stage approach has several advantages. First, unemployment spells often result in significant earnings losses, providing a strong incentive for the household to borrow. Second, by capturing exogenous variation in earnings, this approach avoids the biases that result from the endogeneity of labor supply. Lastly, given the reasonable assumption that measurement error in this unemployment indicator is uncorrelated with measurement error in changes in earnings, then instrumenting for earnings variation with unemployment spells corrects the attenuation bias that results from classical measurement error.

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 only affect borrowing through changes in earnings. These unemployment spells, which by construction last at least one month, do have a significant impact on the earnings of the head.[23] Also, the rich set of demographic variables available in both datasets allow me, in part, to control for household characteristics that are likely to be correlated with both the unemployment spell and borrowing behavior. As mentioned above, I also control for changes in other components of income that may be

[22] Obviously, this restriction does not eliminate all permanent variation in the income process becuase households may not know that the spell will be temporary and, as shown in equations (2) and (3), consumption and borrowing behavior depend on expectations about the permanence of these shocks. Furthermore, even spells lasting less than one year can have a permanent effect on lifetime earnings. Concerns about permanent income shocks are particularly important if the nature of these unemployment spells differs across the different groups of households that I examine. I will address these issues in greater detail in section 7.1.

[23] The unemployment spells have significant predictive power. The estimates of δ_1 in equation (5) are large and very significant. Adding the U_i dummy to equation (5) increases the R^2 of this first-stage equation by 23 to 52 percent depending on the subsample. The R^2 for equation (5) ranges from 0.05 to 0.12.

correlated with both borrowing behavior and unemployment spells such as UI. The data also allow me to identify spells that are arguably unanticipated and therefore less likely to be correlated with η_i. An important concern is that U_i is correlated with future expectations about earnings, and these future expectations 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. In sections 6.2 and 7.1 I will present evidence suggesting that the effect of U_i on income uncertainty is not systematically different across groups. Using U_i as an instrument remains problematic, however, if these spells are correlated with unobserved preferences that affect borrowing behavior. [24]

4.2 Market Frictions

To determine the importance of unsecured credit markets for supplementing unemployment-induced earnings losses, I estimate equations (5) and (6) for low asset households separately from other households. A comparison of $\hat{\beta}_1$ across samples of households with and without assets will provide evidence on whether constraints play a role in the responsiveness of household borrowing to transitory changes in income.[25]

I split the sample for two reasons. First, the borrowing and consumption behavior of these households may be systematically different because of market imperfections. As explained earlier, relative to the case with perfect credit markets, consumption is more responsive and therefore borrowing is less responsive to transitory changes in income in the case with borrowing constraints. If some households do in fact have only limited access to unsecured credit, then the presence of these restrictions should be evident in both the borrowing and consumption behavior of these households.

Second, I look at low asset households separately 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 fewer alternatives for supplementing lost earnings.

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[24] Another approach would be to estimate the marginal effect of an unemployment spell on household borrowing in the reduced form equation:

$$\Delta D_i = \gamma_0 + \gamma_1 U_i + X_i \gamma_4 + \varepsilon_i . \qquad (7)$$

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 6 I will also present estimates for equation (7), and verify that these results are qualitatively consistent with those derived from estimation of equations (5) and (6).

[25] Other possible explanations for why borrowing behavior might vary across asset holdings will be discussed in sections 6 and 7.

Unsecured credit markets may be the only means for these households to transfer 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.

Unfortunately, borrowing constraints are not observed in the data. Following an approach common in the liquidity constraint literature, I separate households according to initial wealth levels.[26] I specify different groups of constrained and unconstrained households because no single designation precisely identifies which households face constraints in unsecured credit markets. In particular, I examine three different groups of low asset households: those with a non-positive total gross asset position (excluding unsecured liabilities), those with non-positive financial assets, and those with total gross assets equaling less than 6 weeks of the head's initial earnings.[27] Evidence from the SCF suggests that these low asset households have less access to liquidity via unsecured credit markets. For example, households with financial assets are much more likely to have a credit card than those without financial assets, and conditional on having a card the wealthier households have credit limits on these cards that are on average more than 6 times as large as the limits for households without financial assets. Also, households without financial assets are much more likely to be close to their credit limit.[28]

To determine whether access to unsecured credit markets affect the well-being of households, I re-estimate equations (5) and (6), replacing changes in unsecured debt with changes in consumption, to test the responsiveness of consumption to unemployment-induced earnings losses. With these estimates I can examine whether the responsiveness of consumption is systematically different for low asset households, providing some evidence for whether these households suffer greater losses in material well-being as a result of constraints in unsecured credit markets.

By testing the responsiveness of borrowing and consumption to unemployment-induced earnings variation conditional on initial assets, this empirical analysis should provide evidence on whether unsecured credit markets are an important source of liquidity for the unemployed. This analysis will

[26] I exclude very wealthy households, but I examine the borrowing behavior for these wealthy households in section 6.4. I look at very wealthy households—those with asset-to-income ratios greater than 4—separately because these households 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.

[27] 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.

[28] Calculations are based on the author's calculations from the 1995 SCF.

also indicate whether current credit markets serve as a safety net for the most disadvantaged households, and whether frictions in unsecured credit markets affect the ability of households to smooth consumption over spells of unemployment.

5 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 two nationally representative sources of data that provide panel information on household income, employment, assets, and liabilities.[29,30] 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 rather than at five-year intervals as in the PSID. In fact, the SIPP is the only panel survey that offers annual observations on household liabilities. Thus, from the SIPP I observe changes in income and changes in unsecured debt for the same time period. Furthermore, because assets are surveyed more frequently, the SIPP provides an annual measure of household wealth, which is used to split the samples. The PSID, on the other hand, 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 7. Also, unlike the SIPP, the PSID provides information on food and housing consumption, allowing an analysis of the responsiveness of household consumption to exogenous changes in income. This section describes these two surveys and provides a brief descriptive summary of the samples used in the empirical analysis. See the data appendix for a more detailed summary of these data, including precise definitions of key variables.

5.1 Survey of Income and Program Participation

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

[29] The Consumer Expenditure Survey (CEX) also provides similar information, but the duration of each CEX panel is only one year and the wealth data are limited. The Survey of Consumer Finances (SCF)—a cross-sectional survey that asks detailed questions about household liabilities—links two of its surveys (1983 and 1989) into a panel, but only a small subset of respondents are interviewed in both of these years. The National Longitudinal Survey of Youth provides asset and liability data only at five-year intervals, and does not provide consumption data.

[30] A detailed analysis of wealth data by Curtin, Juster, and Morgan (1989) concludes that both the SIPP and the PSID provide reliable wealth data based on comparisons to other wealth surveys and aggregate data.

asked about their stock of assets and liabilities four times over the duration of the panel at one-year intervals.[31] 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. Credit card debt accounts for about half of all unsecured debt. The data appendix describes the components of unsecured debt in more detail.

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.[32]

The data on unemployment spells are taken from the 4th through 6th waves of the panel. 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 6th wave.[33] The final sample includes 11,625 households, although much of the analysis in the following section excludes very wealthy households, focusing on the 9,350 households with asset-to-income ratios less than 4.

5.2 Panel Study of Income Dynamics

The PSID is a longitudinal survey that has followed a nationally representative random sample of families and their extensions since 1968. The survey provides detailed economic and demographic information for a sample of about 7,000 households. 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. The core sample used throughout this analysis includes the national sample as well as the over-sample of low income families, but excludes the supplemental Latino sample.

Two separate PSID samples are constructed for the analysis that follows. To analyze household borrowing I consider a sample of households with the same head in 1984 and 1989. I obtain prior

[31] The Asset and Liability topical module is administered at the 3rd, 6th, 9th, and 12th waves, but only the first two waves of this topical module are currently available to the public.

[32] Due to the presence of extreme outliers in the distribution of changes in unsecured debt, I truncate the sample at the 5th and 95th percentiles of the changes in unsecured debt distribution. The top and bottom one percent of the changes in wealth and changes in income distributions are also excluded. The sensitivity of the results to these restrictions is tested in section 7.2.

[33] Households may not expect these spells to be temporary, and as explained in section 3, consumption and borrowing depend on expectations about the permanence of these shocks. Alternative specifications for transitory changes in income are considered in section 7.

year employment and income information for this "borrowing" sample from adjacent waves, and changes in unsecured debt are calculated by linking subsequent waves of the wealth supplement.[34] 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.[35]

For both the borrowing and consumption samples I restrict attention to heads between the ages of 20 and 63 who in the previous year report working at least 40 weeks, have positive earnings, and do not experience an unemployment spell.[36] I also 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.

Whenever possible, variable definitions are consistent with those from the SIPP. The wealth supplement includes a measure of unsecured liabilities similar to the variable available in the SIPP.[37] I construct an identifier for unemployment, which does not include quits, and I again exclude observations where the head is not working in the year following the second observation on consumption or borrowing. These restrictions yield a "consumption" sample of 18,714, and 15,666 of these households have asset-to-income ratios below 4.

5.3 Descriptive Results

Descriptive statistics for the 1996 SIPP sample and the 1984-1993 PSID sample are presented in table 1. I separate households by gross total assets in order to compare demographics across asset holdings. All dollar figures are shown in constant 1996 dollars. Means for all households (columns 1 and 4), show that the respondents from these two surveys are fairly similar. The most striking difference is in the educational attainment of the head, where SIPP respondents are more educated. In part, these differences can be explained by the fact that the average education of household heads increased from the 1984-1993 period to 1996. Although PSID households appear wealthier, this is almost entirely due to top coding of wealth measures in the SIPP. Unsecured debt levels are

[34] I do not link wealth observations from 1989 to 1994 because the 1994 data do not include information on the reason why the head left a job, so quits are not observed.
[35] Household heads from the 1988-1990 waves are excluded from this pooled cross-section because data on either current or prior year consumption are not available.
[36] Following the procedure used to construct the SIPP sample, observations with outliers in the distributions of changes in unsecured debt, changes in wealth, and changes in income are excluded. For the consumption sample, I also exclude observations in the top and bottom 1 percent of the changes in consumption distribution.
[37] Unlike the SIPP, the PSID does not break down unsecured debt into its components.

noticeably higher in the SIPP because these numbers are reported seven to twelve years after reports of unsecured debt in the PSID. As mentioned earlier, unsecured debt grew substantially over these years. These differences, however, are less evident on average because unsecured debt is top coded in the SIPP.

Comparing households across asset holdings reveals some distinct differences between these two groups. Heads of households 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. All of these differences are statistically significant for both the SIPP and the PSID. Average earnings are about 35 percent lower for households without assets, and ex ante unsecured debt is about 27 percent lower. Heads of households without assets are slightly younger. Households with non-positive total asset holdings comprise 8.2 percent of the households in the SIPP sample and 6.2 percent in PSID sample.[38] In the results that follow, I also split households by holdings of financial assets and by asset-to-income ratios. With these specifications, between 13 and 18 percent of the sample are in the low asset group.

The empirical analysis considers how households respond to exogenous unemployment spells. As a preliminary look at how these earnings shocks affect borrowing and consumption, I compare the means for various outcomes conditioning on whether or not the head experiences a spell of unemployment as defined in the previous section. Table 2 reveals some differences across these groups. Heads that experience an unemployment spell tend to have lower initial earnings than heads that remain employed although this difference is only significant for the subsamples with positive asset holdings (columns 6 and 12). Differences in initial food consumption across employment status are small. For households with assets, the unemployed groups appear somewhat more likely to borrow. In the SIPP, the unemployed subsample (column 6) increases unsecured debt by $812 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 $6950 for this group implies that on average borrowing increases by 12 cents for each dollar of earnings lost. The increase in unsecured debt is also greater for the unemployed in the PSID sample, although the relative difference in this case is not significant.

For households without assets the relative borrowing behavior follows a different pattern (columns 3 and 9). Relative to those who do not experience an unemployment spell, households

[38] Previous studies using self-reports of credit constraints have estimated that a larger fraction—closer to 0.2—of households is constrained (Jappelli, 1990). Unsecured credit markets, however, do not require the loan to be backed by the pledge of physical assets, so in general fewer households will be constrained from these markets.

whose heads become unemployed borrow less. In the SIPP, unsecured debt falls for the unemployed subsample (column 2) both in absolute terms and relative to those that do not experience an unemployment spell, although these changes are not significant.

Food and housing consumption on average falls for the unemployed households both with and without assets. For households without ex ante assets, those whose heads become unemployed (column 9) lower consumption by $495 more than households whose heads do not experience an unemployment spell. For households with positive asset holdings, the relative drop in consumption is $757 and this change is statistically significant. Comparing these reductions in relative consumption to the fall in earnings suggest that for both groups consumption falls by about 10 cents per dollar of lost earnings.

Table 3 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 samples, the distribution is somewhat skewed. The median level of initial debt for SIPP households is $1529, but 31 percent of the households do not carry any unsecured debt. Not surprisingly, households without assets are less likely to borrow. 45 percent have no outstanding unsecured debt initially. Households with assets spend more on both food and housing, but the distributions of changes in consumption are fairly similar across asset holdings.

Due to the fact that a significant fraction of households have no outstanding unsecured debt (31 percent in the SIPP and 42 percent in the PSID) a sizeable number of households have no change in unsecured debt over time. Unsecured debt is unchanged because these households carry zero debt in both periods. These households may be systematically different from households with unsecured debt for several reasons, including unobserved borrowing constraints, risk aversion, or low discount rates. In section 7.2 I address potential complications with this non-linearity at zero in the distribution of changes in debt.

6 Results

Following the methodology outlined in section 4, I examine whether households rely on unsecured credit markets to supplement lost earnings by looking at how borrowing and consumption respond to earnings variation, and how the responsiveness differs for households with and without assets. Using data on changes in financial assets I also examine the importance of household saving for supplementing unemployment-induced earnings losses, as households with assets may choose to liquidate these assets instead of borrowing during unemployment spells. I also separate households by poverty status in order to determine whether poor households, who have exhibited increasing

involvement in unsecured credit markets in recent years, use unsecured debt to supplement lost earnings. Lastly, results are provided separately for wealthy households, as these households may have access to cheaper alternatives to unsecured credit markets.

6.1 Unsecured Debt

To determine whether households borrow in response to lost earnings, I estimate the responsiveness of unsecured debt to transitory earnings shortfalls for both the SIPP and the PSID samples. Within each of these samples, equations (5) and (6) are estimated for households with different levels of initial asset holdings. The IV results for the SIPP sample in panel 1 of table 4 show that borrowing responds significantly to a job loss for households with positive total assets (column 2). For these households, unsecured borrowing increases by 10.5 cents for each dollar of earnings lost due to unemployment. This response is significantly different from zero. There is no evidence, however, that households without assets (column 1) borrow during unemployment spells. For these households, the point estimate suggests that unsecured borrowing decreases with unemployment-induced earnings losses, although this change is not statistically significant. At the 90 percent confidence level, I can reject a one-sided test that the responsiveness for these households without assets is strictly greater than 2 cents for each dollar lost. Moreover, at the 95 percent confidence level the hypothesis that the response to lost earnings is the same for households with and without assets is rejected.

Panel 1 also shows results for samples of households separated by financial asset holdings (columns 3 and 4) and asset-to-earnings ratios (columns 5 and 6). The results for these subsamples are similar to those reported in the first two columns. Borrowing is significantly responsive to unemployment-induced earnings losses for households with some financial assets or at least sufficient assets to cover 6 weeks of pre-separation earnings, while households without financial assets or with low asset-to-earnings ratios do not increase unsecured borrowing in response to these earnings losses. In both cases, the response for the low asset group is not significantly different from zero. Households with financial assets borrow 10.1 cents for each dollar of income lost due to unemployment, while households with asset-to-earnings ratios greater than 0.12 borrow 11.4 cents. These responses are

statistically significant. For households with asset-to-earnings greater than 0.12, I can reject the hypothesis that the response is equal to that of the low asset households.[39]

Table 4 also provides parameter estimates for some of the demographic characteristics included in X_i. For all subsamples, an increase in family size results in an increase in unsecured debt, suggesting that households borrow to meet the increased consumption needs. This effect is statistically significant for all subsamples except for households with non-positive total assets. This response, however, may in part be due to the fact that additional adult members may bring new outstanding debt balances to the household's portfolio of liabilities. The parameter estimates for the effect of education and marital status are not very precise. There is some evidence that the change in debt is lower for African-Americans than for other racial groups. The parameter estimates for the UI replacement rate show that households with higher potential replacement rates have larger increases in unsecured debt. This response is significant for each of the higher asset groups. For example, a 10 percentage point increase in the UI replacement rate results in an increase in unsecured borrowing ranging from \$146 to \$201—which represents about 2 percent of initial financial assets for these households. This implies that the UI program may have a small effect on displacing saving.[40]

Panel 2 of table 4 reports OLS estimates of equation (7) that are consistent with the IV estimates. On average a household with positive total assets whose head experiences an unemployment spell will increase borrowing by \$840 relative to those that do not become unemployed, and this change is statistically significant. Given that the average drop in earnings during unemployment for this group is \$7542 (see table 2), this implies that these households accrue unsecured debt to supplement about 11 cents of each dollar of earnings lost. The point estimates for households with positive financial assets or with asset-to-earnings ratios greater than 0.12 show a similar response. As with the IV results, the OLS estimates for low asset households (odd columns) 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.

Panels 3 and 4 provide IV and OLS estimates using the borrowing sample from the PSID. These estimates are analogous to those presented for the SIPP except that the PSID results are for a baseline sample from 1984 while the SIPP results are from a sample of households in 1996. Also, in the PSID

[39] One may argue that the cost of leisure, and therefore the labor supply decision, is fundamentally different for low asset households. For example, given that heads of low asset households are less likely to be married (see table 1), these households may have less access to supplemental earnings from other adults in the household. I examine whether the results are sensitive to this difference in marital status across asset holdings by calculating estimates for a sample of only married heads. The results for this sample are very similar to those reported in table 4, although somewhat less precise.

[40] In a study of the effects of UI on saving, Engen and Gruber (2000) conclude that a 10 percentage point increase in the replacement rate reduces financial assets by 1.4 to 5.6 percent.

results, ΔD_{it} represents a five-year change in unsecured borrowing from 1984 to 1989 rather than an annual change. Parameter estimates for demographic covariates are not shown for ease of exposition. The IV estimates for the PSID sample (panel 3) are fairly similar to those for the SIPP sample. The point estimates suggest that borrowing for households with assets is responsive to unemployment-induced earnings losses. The magnitudes range from 11.5 to 14.7 cents for each dollar of lost earnings, although the estimates are not precise. None of these responses are statistically significant. Again, the results provide no evidence that low asset households borrow to supplement lost earnings. Due to imprecision in these estimates, I cannot reject the hypothesis that the borrowing response across any pair of subsamples is the same.[41]

The results presented in table 4 show that some households do in fact borrow during unemployment spells, increasing unsecured debt by about 10 cents for each dollar of earnings lost. This provides some preliminary evidence that unsecured credit markets may be an important source of insurance against lost earnings. The estimates for low asset households—a group likely to have fewer alternatives for supplementing lost income—however, suggest that borrowing is not an important means for smoothing variable earnings for these households. These results provide no support for the conjecture that current unsecured credit markets serve as a safety net against lost earnings for households with low wealth.

Although the response for households with assets 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 finding that low asset households do not borrow to supplement lost earnings is consistent with the expectation that these households face borrowing constraints. Another possible reason that low asset households do not borrow in response to a temporary shortfall in earnings is that these households supplement the shortfall via other sources. For example, low asset households may choose to rely on public or private transfers rather than borrow to supplement the shortfall. Results from Dynarski and Gruber (1997), however, suggest that government transfers other than UI and private transfers play a very small role in supplementing unemployment-induced earnings losses.

[41] Limitations with the PSID wealth and liability data in part explain why these results are so imprecise. Although 1994 wealth data are available, these data do not include information on quits, so I am limited to changes in unsecured debt from 1984 to 1989, resulting in a sample much smaller than the one from the SIPP. Also, observations on changes in debt span 5 years. This timing does not coincide with the timing of the unemployment spells, which occur during 1988, and the changes in annual earnings observed from 1987 to 1988. Due to these limitations, I focus on the borrowing results from the SIPP going forward.

Moreover, their evidence does not suggest that disadvantaged households rely on these transfers more heavily than other households. Also, transfers such as public assistance are not likely to play an important role in my analysis, because all household heads in my sample have a strong attachment to the labor force. Bentolila and Ichino (2001) provide additional evidence that family transfers are not an important source of insurance for U.S. households. Other possible explanations for why these households do not use credit markets will be explored in the following section as well as in section 7.

6.2 Consumption

The results for borrowing provide evidence that households with some wealth borrow to supplement lost earnings, while low asset households do not borrow. To assess whether these differences across asset holdings in the use of unsecured debt have important implications for material well-being, in this section I examine the consumption behavior of these households, and discuss how my results fit with the existing literature on how households smooth consumption across spells of unemployment that was highlighted in section 2. If earnings lost during unemployment result in a drop in total income, then the fact that households without assets do not use unsecured debt to supplement lost earnings suggests that in order to satisfy the intertemporal budget constraint, consumption for these households must fall. Furthermore, given that these unemployment spells are expected to be transitory, then drops in consumption would provide some evidence that these households are constrained.[42]

To test whether consumption is more sensitive to unemployment-induced earnings losses for these low asset households than for other households, I re-estimate equations (5) and (6) using changes in consumption as the dependent variable in (6).[43] Table 5 reports the results for two measures of consumption—food and food plus housing. These results indicate that in some cases low asset households experience a larger drop in consumption in response to an unemployment spell. The IV estimates in panel 1 show that food consumption, by itself, responds modestly to earnings losses. For households with positive total assets (column 2), food consumption falls by 4.8 cents for each dollar of earnings lost. The point estimate is slightly larger for households with non-positive total assets (column 1), but this response is not significantly different from zero. Differences in the responsiveness of food consumption are more evident when households are separated by financial

[42] Precautionary motives, which are discussed at the end of this subsection, could also explain why consumption falls. Other potential reasons are discussed in section 7.

[43] This follows Dynarski and Gruber (1997). I also estimate these models using the change in log consumption and the results do not qualitatively change. For a discussion of using food and housing expenditures in the PSID as a measure of material well-being, see Meyer and Sullivan (2002).

asset holdings (columns 3 and 4). In this case food consumption falls by 4.2 cents for those with financial assets, but households without financial assets reduce consumption by 13 cents for each dollar of lost earnings. However, these point estimates are not precise enough to reject the hypothesis that the response is the same for these two groups.[44] Changes in family size are a strong predictor of changes in consumption across all subsamples. Unlike the results for borrowing, there is not strong evidence that the UI replacement rate has an effect on changes in consumption.[45]

Looking at food and housing consumption in panel 2, the IV estimates show more distinct differences.[46] Households with financial assets (column 4) reduce consumption by 5.5 cents for each dollar of earnings lost, while the response for households without financial assets (column 3) is 29.2 cents. Both responses are significantly different from zero, and these responses are significantly different from each other. The differences are less noticeable in the other subsamples. The consumption response for households with non-positive total assets is 12 cents per dollar of lost earnings, but this response is not significantly different from zero or from the response for households with positive total assets.

Panels 3 and 4 present OLS estimates for the response of consumption to unemployment. Consistent with the IV results, point estimates show that food and housing consumption for households without financial assets (panel 4, column 3) falls by $1168 more than those that do not become unemployed in response to an unemployment spell. Households with financial assets, on the other hand reduce consumption by only $480 during unemployment. Again, the responsiveness of consumption is not noticeably different for households with and without total assets.

This analysis of the response of consumption to unemployment spells considers a single one-year change in consumption. As discussed in section 3, however, if these spells are anticipated then households may adjust consumption prior to the period that the spell occurs. Also, the effect of unemployment spells on consumption may last for many periods after the employment separation.[47]

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[44] Comparing these households without financial assets to very wealthy households (see section 6.4 and table 7), at the 90 percent confidence level I can reject the hypothesis that the responsiveness of food consumption is the same for these two groups.

[45] In addition to the covariates reported in table 5, all specifications include a second order polynomial in the number of children and adults in the household in order to express consumption in equivalent terms across different family compositions.

[46] Although housing consumption is likely to be fairly inelastic in the short run due to rental contracts and the fixed costs of moving, data from the PSID show that households that experience an unemployment spell are 1.5 times more likely to move than households that do not experience a spell. Data on reasons for moving show that unemployed households are also more likely to move for the purpose of reducing consumption than other households. For homeowners, housing consumption is calculated using the current resale value of the house. Annual changes in this measure may capture changes in quality—due to postponed maintenance for example—that may be sensitive to unemployment shocks.

[47] See Stephens (2001).

In section 7.1, I examine the importance of these lag and lead effects of unemployment on consumption.

These results for the responsiveness of consumption are consistent with previous work on the effects of unemployment on consumption. Dynarski and Gruber (1997), using PSID data, also find that unemployment spells result in a reduction in consumption, and that the response differs depending on initial asset holdings, 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, while they estimate the response for households in the top 25 percent of the financial asset distribution to be 8.4 cents. They suggest that the difference in these responses may be the result of liquidity constraints. Looking only at food and housing consumption overlooks durable goods, which are likely to be the most elastic component of expenditures. Using CEX data on total consumption Dynarski and Gruber show that the reduction in expenditures on durable goods in response to an unemployment spell is much more noticeable for constrained households. Thus, because consumption data from the PSID do not include durables, it is likely that the results in table 5 are understating the total drop in consumption.

Stephens (2001) looks at the long run impact of unemployment spells. He does not separate households by asset holdings, but his results for all households show that on average, food consumption falls by 9 percent during the year of the unemployment spell. Dynarski and Sheffrin (1987) estimate the effect of annual changes in weeks unemployed. They show that unemployment has no effect on the food consumption of older white-collar workers, but expenditures drop by $12 per week of unemployment for younger white-collar workers. They suggest that this latter response may well be the result of binding borrowing constraints for these younger workers.

The results presented thus far show evidence of heterogeneity in the response of both borrowing and consumption across asset holdings. In particular, I find no evidence that low asset households use unsecured borrowing to supplement lost earnings, while there is evidence that wealthier households use unsecured debt to supplement earnings during a job loss. These households increase unsecured borrowing by approximately 10 cents for each dollar of lost earnings. The results for consumption also show that responsiveness differs across asset holdings. Consumption is more sensitive to these earnings losses for low asset households than other households. This evidence is consistent with a model where low asset households are constrained from borrowing from unsecured credit markets.

Precautionary motives may also play a role if households are risk averse and the unemployment shocks generate greater uncertainty about future earnings. Studies such as Carroll and Samwick (1998) have found strong evidence that some households save for precautionary reasons. For these motives to explain the findings in this section, however, the unemployment shocks need to generate

greater uncertainty for households without assets than for households with assets. The role of precautionary motives, however, is likely to be small here given evidence from Carroll, Dynan, and Krane (1999) who 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.[48]

The results for borrowing and consumption reported in tables 4 and 5 could also be explained by heterogeneity across these groups in the nature of unemployment spells, or by the fact that food consumption responds differently at different levels of permanent income. In section 7 I will investigate the importance of these alternative explanations for why borrowing is less sensitive and consumption is more sensitive to unemployment-induced earnings losses for low asset households than for wealthier households.

6.3 Saving

Households with positive assets holdings also have the option of liquidating assets to smooth consumption during unemployment spells. To examine the role that saving plays in supplementing lost earnings I analyze the responsiveness of financial assets to unemployment-induced earnings changes. I follow the approach outlined in section 4, replacing changes in borrowing with the change in financial assets as the dependent variable in equation (6), and separating households by the ratio of total assets to pre-separation earnings. In table 6 financial assets show a small and insignificant response for households with low asset-to-earnings ratios. On the other hand, both the OLS and IV results imply that households with assets exceeding 6 weeks of pre-separation earnings spend down financial assets to supplement lost earnings. The IV results show that these households liquidate 46 cents worth of assets for each dollar drop in earnings, and this change is statistically significant. These results indicate that saving plays a very important role for supplementing lost earnings for wealthier households. The fact that low asset households do not have a sufficient buffer to supplement lost earnings may explain in part why these households have a more difficult time financing consumption during unemployment.

[48] Differences in non-separability across asset holdings may also explain the findings in sections 6.1 and 6.2. For example, there may be differences across these groups with respect to work related expenses, risk aversion, or preferences for leisure. Expenditure data from the CEX, however, suggest that disadvantaged households spend a smaller fraction of total expenditures on work-related expenses than other households. For further discussion of separability see Bentolila and Ichino (2001).

6.4 Poor and Wealthy Households

By focusing on the borrowing and consumption behavior of low asset households, I can examine whether credit markets are an important resource for supplementing lost earnings for households without other means of self-insurance. In order to discern whether the most disadvantaged rely on unsecured credit markets, I look at the borrowing behavior of households in poverty. As mentioned earlier, descriptive evidence shows that unsecured debt for poor households has been growing at a faster rate than for non-poor households. Over time the borrowing behavior of poor households has followed a somewhat countercyclical pattern, prompting some researchers to speculate that poor households use unsecured debt to smooth consumption. I look at the borrowing behavior of poor households directly to determine whether these households are using unsecured debt to supplement lost earnings during unemployment spells.

Table 7, presents IV estimates of equations (5) and (6) for both poor and non-poor households. The results from the SIPP sample in panel 1 show that the borrowing response for households below 150 percent of the poverty line is very small and not significant, providing little evidence that these households borrow to supplement lost earnings during unemployment spells. This casts considerable doubt on the viability of current credit markets as a safety net for this group. Households above this poverty threshold, however, do appear to borrow during unemployment spells, although the response is small. Unsecured debt for this group increases by 8.3 cents for each dollar of lost earnings. This response is statistically significant, although it is not significantly different from the response for poor households. The consumption response for non-poor households is consistent with those reported for households with assets in table 5. The point estimates for poor households show that food consumption is slightly more responsive relative to non-poor households, but the difference is not significant. The response for food and housing consumption is similar for both poor and non-poor households.

Throughout the analysis presented thus far, I have excluded households whose asset-to-earnings ratios are greater than 4—which accounts for about one in six households—because these very wealthy households may respond in a systematically different manner to lost earnings. Wealthy households, by definition, have a large asset portfolio from which they can self-insure against earnings losses. The theoretical discussion in section 3 explains why households with assets may choose to borrow rather than deplete assets. In this framework, however, one could argue that the fixed costs on collateralized loans are lower for very wealthy households. These households, for example, may have greater access to revolving lines of credit or home equity loans that generally have lower fixed costs than other collateralized loans, making these loans a cheaper sources of credit

than those available in the unsecured credit market.[49] In this sense, those who use unsecured debt to supplement lost earnings may, to some degree, be constrained from other credit markets.

To determine the importance of unsecured debt for wealthy households, I look at how their borrowing and consumption behavior responds to unemployment spells. The results in column 3 of table 7 show that these wealthy households do not rely on unsecured debt to supplement lost earnings, and these lost earnings do not result in a drop in consumption. The point estimate for the responsiveness of borrowing is small (0.034) and not statistically different from zero. This suggests that these households use other sources, such as dissaving or collateralized credit markets, to supplement lost earnings. Consumption for these wealthy households does not appear to be sensitive to transitory income shocks. Neither food consumption nor food and housing consumption responds to unemployment-induced earnings losses. These wealthy households are able to smooth consumption during unemployment without accumulating unsecured debt, providing some indication that these households have access to cheaper resources for supplementing lost earnings than those available in the unsecured credit market.

7 Robustness

In this section I examine the sensitivity of the results from section 6 to various assumptions implicit in the estimation procedure. First, I consider several alternative explanations for why the borrowing behavior of low asset households may be systematically different from that of other households even in the absence of borrowing constraints. For example, the nature of unemployment spells may be fundamentally different across these two groups. Next, I investigate 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. Lastly, I examine whether the results for consumption can be explained by disparities in the income elasticity of food consumption at different levels of permanent income.

7.1 Heterogeneity of Unemployment Spells

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

[49] One reason these very wealthy households may have access to cheaper credit is that a larger fraction of these households have equity in homes against which they can borrow. In the SIPP 93 percent of these wealthy households are homeowners, while just under 60 percent of other households own a home. See Hurst and Stafford (2001) for a discussion of home equity loans as a means of smoothing consumption.

consumption falls for these households. To some extent, I mitigate complications with more permanent spells of unemployment by restricting attention to households that work again and do not experience an unemployment spell the year following the initial job loss.[50] This restricts attention to unemployment spells that are observed to be temporary. However, households may not know that the spell will be temporary and, as shown in equations (2) and (3), consumption and borrowing behavior depend on expectations about the permanence of these shocks. Concerns about permanent income shocks are particularly important if the nature of these unemployment spells differ across asset holdings. If unemployment spells for low asset households are more permanent than for other households, then this could explain why, in response to these shocks, these low asset households do not borrow but consumption falls.[51]

To determine whether the differences in borrowing and consumption behavior across asset holdings result from heterogeneity in the nature of unemployment spells, I compare the duration of these spells across groups and consider their long-term impact on earnings, total family income, and consumption. Descriptive statistics for unemployment spells reported in table 1 show some differences across these groups. In both the SIPP and the PSID, households without assets are more likely to experience an exogenous spell of unemployment. In both surveys, conditional on having a spell of unemployment, spells are somewhat longer in duration for households without assets than for other households. In the SIPP unemployment spells are on average 5.7 weeks longer for households without assets. In the PSID the difference is 1.9 weeks. To determine whether these differences imply that spells for households without assets have a more permanent effect on outcomes than spells for households with assets, I look at the long run impact of unemployment on earnings, income and consumption. To this end, I estimate a reduced form equation that includes leads and lags of the unemployment spell indicator:

$$\ln Y_{it} = \sum_{j=-2}^{a} \beta_j U_{it+j} + X_{it}\gamma + \eta_i + \upsilon_{it} \qquad (8)$$

[50] The results in tables 4 and 5 do not change qualitatively if I do not condition on re-employment.

[51] Previous work has shown that unemployment spells are heterogeneous across households. Gruber (forthcoming) shows that unemployment spells are longer for households with lower ex ante levels of wealth. In a study of how unemployment affects consumption Dynarski and Sheffrin (1987) show that unemployment spells differ across occupations with spells for white-collar workers occurring less frequently but persisting for a longer duration relative to blue-collar workers. Furthermore, these authors argue that both the layoff and recall probabilities are higher for blue collar workers, so these workers are better able to predict their unemployment spells and consequently they experience less variation in consumption.

where $\ln Y_{it}$ represents the log of earnings of the head of household i in year t, U_{it+j} is an indicator of whether an unemployment spell occurs in period $t+j$, X_{it} is a vector of the same household demographics included in equations (5) and (6), and η_i is a household-specific effect.[52] I also estimate equation (8) for total family income and consumption to determine the long run impact of unemployment on these outcomes. This equation examines whether the outcomes respond to unemployment spells in periods prior to the spell implying unemployment is anticipated, and whether the spell has an effect on the outcomes for periods afterwards, implying the effect of the unemployment shock has persistence. Estimates of β_j represent the effect of an unemployment spell in period $t+j$ on an outcome in period t.

In figures 1 through 4 I plot the point estimates for β_j for each outcome normalizing β_a to zero. The results for households without assets from the SIPP sample in figure 1 show that earnings start to fall prior to the period of the spell. Earnings fall by 23 percent from periods t-3 to t-1, and by 58 percent from periods t-3 to t. Total family income follows a similar pattern, falling in response to unemployment nearly as much as income. This suggests that the earnings of the head account for a substantial fraction of total household income. Figure 1 also shows that both the earnings of the head and total family income recover substantially within two periods following the employment separation. By the second period following the unemployment spell, the head's earnings have returned to their pre-separation level.

The pattern of earnings and income for households with assets (figure 2) are fairly similar, although the earnings of the head and total income fall by a smaller percentage. For these households with assets, earnings appear to drop more noticeably than household income. This suggests that the lost earnings of the head are buffered in part by income from other sources. Similar to figure 1, earnings and income return to their pre-separation level within two periods. Thus, there is little indication that unemployment spells have a more permanent effect on income for low asset households than for other households.[53] The fact that earnings and income for both groups of households fall in the periods prior to the unemployment shock indicate that these spells are to some degree anticipated by both groups.

[52] I estimate equation (8) using the same samples described in section 5, with additional data on unemployment spells from years adjacent to these samples. Periods in the PSID represent years, while in the SIPP periods represent 4 month intervals. For the PSID, I consider the effect of unemployment for two years before (a = 2) and two years after an unemployment spell. In the SIPP I follow outcomes for three periods before (a = 3) and two periods after an unemployment spell.

[53] Other studies of the effects of unemployment on consumption have shown that unemployment has a more persistent effect. Stephens (2001) for example concludes that job displacements still have a noticeable effect on consumption 6 years after the shock occurs. Unlike this study, Stephens does not condition on re-employment in the year following the job loss. When I do not condition on re-employment, unemployment spells have a more persistent effect on outcomes than is evident in figures 1 through 4.

For the PSID, figures 3 and 4 show the response of earnings, income, and consumption to unemployment over 5 years. These figures show that earnings and income for the most part recover from the separation within two years. Food and housing consumption also rebound. For both groups, food and housing consumption is only 5 percent lower two years after the spell than two years before the spell. Looking at these outcomes two periods prior to the spell provides some evidence that these spells are partly anticipated. Food and housing consumption falls by 10.8 percent in the period prior to the job loss for households without assets, while the fall is 6.5 percent for households with assets. Earnings and income also fall in the period before the unemployment spell and the magnitudes of these drops are similar across asset holdings. Consistent with the results reported in section 6, households with assets appear to be better able to smooth consumption than households without assets. Food and housing consumption in period *t* is 22 percent lower than two periods earlier for low asset households. For the wealthier households, consumption falls by 10 percent over this same interval.

Figures 1 through 4 provide information on how the nature of unemployment spells differs across households with and without assets. In general, these figures show evidence that the spells are to some degree anticipated, but there is little indication that the ability to anticipate unemployment differs across these groups.[54] The figures also indicate that while unemployment spells do have a persistent effect, outcomes return to pre-separation levels within 2 periods for both groups of households.

As suggested in figures 1 through 4, unemployment spells appear to have an affect on outcomes in periods following the separation. To determine whether the results in section 6 are sensitive to the fact that the earnings losses that occur as a result of these unemployment spells are not entirely transitory, 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 (2001), estimating

$$Y_{it} = X_{it}\gamma + \mu_i + \omega_{it} \qquad (9)$$

[54] 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.

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 (9) 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 (9) is estimated for unique gender-race (minority/non-minority) subsamples of household heads and spouses by pooling multiple waves of the respective panels.[55] I report means for this measure of permanent income in table 1. These sample averages are quite close to the means for total family 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.

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 family 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 (5), and re-estimate the effect of unemployment-induced changes in transitory income on borrowing and consumption. The results reported in table 9 are consistent with those derived from observed changes in the earnings of the head reported in tables 4 and 5. Again, low asset households do not borrow in response to transitory losses in total income. The results suggest that unsecured borrowing does respond for households with assets. The response for this group ranges from 17.5 to 19.8 cents for each dollar of total income lost due to unemployment. In each case this response is significantly different from zero. These responses are slightly larger than those reported in section 6, which is partly due to the fact that this approach captures transitory changes in total family income rather than transitory changes in the earnings of the head. The point estimates in panels 2 and 3 of table 9 imply that consumption is quite responsive to transitory income losses for low asset households. The food and housing consumption responses for households with assets range from 4.3 to 6.4 cents for each dollar of total income lost. These estimates are very similar to those reported earlier (see the even columns of panel 2 in table 5). 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.

[55] For the SIPP all 12 waves of the 1996 panel are used. The PSID sample includes data from the 1968-1993 waves. Following Altonji et. al. (2000), I exclude individuals for whom I have fewer than 4 observations to calculate permanent income.

7.2 Non-linearities

If ΔD_i in equation (6) is equal to zero, the underlying model implies that the household chooses to keep debt unchanged in real terms. In practice, however, this captures households that carry zero debt in both periods. As reported in table 3, 20 percent of households in the SIPP sample report no change in unsecured borrowing, and 32 percent of households with non-positive assets report zero change. 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 equations (5) through (7) excluding all households with zero initial unsecured debt from the sample.[56]

The results for this sample of initial borrowers are presented in panels 1 and 2 of table 8. Parameter estimates for the low asset households (odd columns) again provide no evidence that these households borrow in response to unemployment spells. The point estimate for households without financial assets is negative, but the standard error for this estimate is large. Consistent with the results in table 4, unsecured debt rises in response to an earnings loss for households with assets. This response ranges from 11.4 to 15.1 cents for each dollar fall in earnings. These estimates are statistically significant for all three of the subsamples of households with assets. At the 90 percent confidence level, I can reject that the response is the same across asset holdings for the cases where the sample is split by total assets (columns 1 and 2) and by asset-to-earnings ratios (columns 5 and 6).

Restricting attention to a sample of initial borrowers potentially excludes many constrained households—an important group for evaluating whether unsecured credit markets are an important source for supplementing lost earnings. Furthermore, to the extent that households that borrow initially are different from non-borrowers in unobservable ways this approach suffers from selection bias. Nevertheless, the fact that these results are consistent with those reported earlier provides some evidence that the initial results are not significantly affected by a non-linearity at zero in the distribution of changes in unsecured debt. Also, the fact that low asset households in this sample with non-zero initial debt do not appear to borrow to supplement lost earnings suggests that although these households have access to unsecured debt initially, they do not have access to enough liquidity to

[56] 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 (t-statistic = -1.0 for all households; -1.46 for households with assets; and 1.32 for households with non-positive total assets).

supplement the large earnings losses that occur as a result of unemployment. For example, these households may have credit cards, but cannot accumulate debt on these cards because they are already close to their credit limit when the job loss occurs. [57]

For the results reported in section 6, I restrict the sample by excluding households with extreme values of changes in unsecured debt, because mean regressions are sensitive to these outliers. To examine whether this truncation of the sample biases my results, I re-estimate equation (7) for a sample that does not exclude extreme values using quantile estimation—a procedure that should not be sensitive to outliers. Because a large fraction of households are at or around the median of the distribution of changes in unsecured debt these quantile estimates do not converge at the median. Estimates at the 75th percentile of the changes in unsecured debt, which are not reported, are quite consistent with the results in panel 2 of table 4. With bootstrapped standard errors, these estimates at the 75th percentile are not precise, however, so I cannot reject the hypothesis that the borrowing response is the same across households.[58]

Some households that initially do not borrow may choose to borrow as a result of an unemployment spell. To examine the importance of credit markets for households that have no unsecured debt initially, I use a probit model to estimate the effect of unemployment on the probability of having outstanding debt balances in the second period, conditional on having no debt in the first period. These results shown in panel 3 of table 8 indicate that for households with no outstanding unsecured debt initially, unemployment spells have no measurable effect on the probability of borrowing in the second period. In all cases the effect of unemployment on the probability of borrowing is not significant.

7.3 Income Elasticity of Food Consumption

Even if transitory income is properly captured and the nature of unemployment spells are not significantly different across asset holdings, the responsiveness of borrowing and consumption may

[57] As additional tests of the sensitivity of the results to functional form assumptions, I estimated an ordered probit model where the dependent variable takes on three separate values indicating whether unsecured debt decreases, remains unchanged, or increases. In general, results from this specification support the findings reported in table 4.

[58] As an additional check on the sensitivity of the results to non-linearities, I follow an approach similar to the one discussed in section 4, estimating equation (5) with OLS, but estimating a quantile regression in the second stage. Second stage estimates do not converge at the median so I estimate this stage at the 75th percentile. Consistent with the IV results reported earlier, these estimates provide no evidence that a low asset household at the 75th percentile of the change in unsecured debt distribution borrows during unemployment spells. For a household with positive assets that is at the 75th percentile of the change in unsecured debt distribution, these 2-stage quantile estimates suggest borrowing does respond to unemployment-induced earnings losses. This response ranges from 8 to 11 cents for each dollar of earnings lost.

differ across these groups for reasons other than borrowing constraints. Food is a larger share of total expenditures for low asset households so food consumption may be more income elastic for these households with low permanent incomes than for other households. In other words, these groups may be at different points along the Engel curve. In this case, differences in permanent income across groups, rather than borrowing constraints, could explain why consumption is more responsive to earnings shocks for low asset households.

To determine the degree to which the income elasticity of food consumption differs at different levels of permanent income, I regress the first difference in annual food consumption on a linear function of permanent income and the first difference in total household income (ΔY_{it}):

$$\Delta C_{it} = \alpha_1 \Delta Y_{it} + \alpha_2 \hat{\mu}_i * \Delta Y_{it} + \alpha_3 \hat{\mu}_i^2 * \Delta Y_{it} + \upsilon_{it} \qquad (10)$$

where $\hat{\mu}_i$ is permanent income for household *i*, which is estimated following the procedure outlined in section 7.1.[59] I estimate equation (10) using the change in the levels of food consumption to be consistent with the results reported earlier, but I also consider the change in log food consumption. Parameter estimates for these different specifications are shown in table 10. The results using changes in levels show that food consumption on average changes by 4 cents for each dollar change in current income. Estimates of α_2 and α_3 suggest that current income does affect consumption differently at different levels of permanent income, although these differences are small. For example, consider a drop in current income of $5000. The estimates in table 10 indicate that this would result in a drop in food consumption of $103 for a household with permanent income of $48,000—the mean permanent income for households with positive total assets—whereas the drop would be $131 for households with permanent incomes of $30,000—the mean for households without assets. This implies that differences in permanent income between these two groups lead to a difference in the responsiveness of consumption of 0.6 cents ([131-103]/5000) per dollar of lost income. Point estimates from section 6 suggest that the difference across asset groups in the responsiveness of food consumption is as large as 8 cents per dollar of lost income. Thus, only a small fraction of the difference in the responsiveness

[59] This reduced form specification is derived by assuming that current consumption is a function of a cubic of permanent income so that

$$\frac{dC}{d\hat{\mu}} = \beta + 2\gamma\hat{\mu}_i + 3\delta\hat{\mu}_i^2 .$$

Given that the partial derivative of permanent income with respect to current income is equal to some constant φ then it follows from the derivative of consumption with respect to current income (Y_{it}) that the first difference in consumption can be written as $\Delta C_{it} = \phi(\beta + 2\gamma\hat{\mu}_i + 3\delta\hat{\mu}_i^2)\Delta Y_{it}$. In the estimation of equation (10) I include a full set of year dummies, as well as measures of changes in marital status and family size.

of food consumption appears to be the result of differences in permanent income. The results for the change in log consumption also suggest that the effects of differences in permanent income across groups are small. The parameter estimates in column 2 suggest that consumption is less than 1 percentage point more responsive to a $5000 drop in household income for the low permanent income households. The log linear specification in column 3 implies that the responsiveness of consumption to a percentage point change in household income increases with permanent income, although this effect is very small. The results in all three specifications indicate 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.

8 Policy Implications and Conclusions

By examining household borrowing and consumption behavior, this study sheds light on two related questions: Do households use unsecured debt to supplement lost income during unemployment, and does access to these credit markets play a role in a household's ability to maintain consumption when earnings fall? In the absence of borrowing constraints, the permanent income hypothesis shows that a household facing a transitory income shock will dissave in order 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, I find no evidence that unsecured debt is responsive to unemployment-induced earnings losses, which is surprising if these households view these income shocks as truly transitory. The fact that these households do not borrow to supplement lost earnings casts considerable doubt on the viability of current credit markets as a safety net for low asset households. It is unlikely that unsecured credit markets serve as an important insurance mechanism for lost earnings if households without alternative resources for self-insuring—those with minimal saving—do not borrow when earnings fall.

There is some evidence that the borrowing 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. This response is small but statistically significant. For many specifications, I can reject the hypothesis that the borrowing response is the same across households with and without asset holdings. Comparing this finding to estimates from the empirical literature for other sources for supplementing lost income, this response is somewhat smaller than that for unemployment insurance, but is larger than the response of the earnings of the spouse.

By looking at the ability of households to smooth consumption across spells of unemployment, I consider whether access to unsecured credit markets has important implications for the material well-being of households. The findings show 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 than 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. The same households that do not borrow in response to falling earnings also exhibit less ability to smooth consumption. Although this relationship is not necessarily causal, these results provide evidence that frictions in unsecured credit markets present barriers to maintaining consumption in the presence of variable earnings.

The fact that consumption falls in response to these transitory spells suggests that these low asset households are short on liquidity during unemployment. 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.[60] For households that do borrow, use of unsecured debt does not come without costs, particularly when outstanding balances are carried for extended periods of time. For example, if earnings drop by $12,500 due to a 6 month unemployment spell by the head of a household with assets, the results in this study indicate that this job loss will lead to an increase in unsecured debt of more than $1300. If the household pays off this debt in equal payments over 2 years, total interest costs of smoothing via unsecured debt will be about $300.[61] These costs would be much higher for those that experience prolonged spells of unemployment. A policy that extends a cheaper source of credit to unemployed workers who would otherwise borrow from unsecured markets could reduce the cost of financing consumption during unemployment spells. Providing credit has an advantage over expanding benefits in that it allows the household to internalize the cost of smoothing consumption.

Adverse incentive effects, however, are likely to confound any policy aimed at providing credit to unemployed workers who are constrained from private credit markets. First, a government backed or

[60] Economists have proposed policies designed to help households self-insure against earnings losses. Flemming (1978), for example, suggests adding a loan element to the UI benefit structure. Feldstein and Altman (1998) propose government regulated Unemployment Insurance Saving Accounts (UISA), which require workers to maintain a personal savings account to be used during unemployment spells.

[61] This example assumes an 18 percent annual interest rate on unsecured debt, and that the household borrows the same amount for each month of the spell.

government subsidized credit program for the unemployed that lowers the cost of remaining unemployed essentially reduces the cost of leisure, thus encouraging longer spell duration–a common critique of the current UI program. Second, an expansion of the availability of unsecured credit to households that do not have access to private credit markets could encourage risky behavior resulting in high default rates.[62] In addition to moral hazard problems, studies have argued that indebtedness has contributed to poor health and 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 extending credit to unemployed workers.

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Data Appendix

The empirical analysis in this paper uses data from both the SIPP and the PSID. Although I attempt to construct variables in a similar manner across samples, differences inevitably arise due to differences in the nature of survey questions. In this appendix I provide a more detailed description of certain survey questions, and explain how these questions are used to construct key variables, highlighting differences in variable definitions across surveys. In particular, I focus on the construction of unemployment spells, earnings changes, wealth measures, and the main outcome variables: changes in unsecured debt and changes in consumption.

A.1 Survey of Income and Program Participation

Changes in unsecured debt (ΔD_i): An inventory of unsecured liabilities is taken for each member of a household that is at least 15 years old. Each respondent reports outstanding liabilities as of the end of the reference period. These debts are summed across all individuals in a household and a summary household level measure of unsecured debt is provided. All respondents report debts in their own name. Respondents that are married with spouse present also report debts owed jointly with spouse. Respondents are led through a series of questions about holdings of various types of unsecured liabilities including: credit card and store card balances; doctor, dentist, hospital, and nursing home bills; loans from individuals; unsecured loans from financial institutions; educational loans; or other unsecured liabilities. Credit card loans account for about half of unsecured debt, and other unsecured

loans from financial institutions account for another 30 percent. The remaining 20 percent include loans for individuals, outstanding bills, or education loans. The outcome variable, changes in unsecured debt, is constructed by linking household reports of unsecured debt over the 12 months that separate the 3rd and 6th waves of the 1996 panel.

Total Assets: The Asset and Liability topical module asks respondents specific questions about holdings of various types of assets. These include: interest-earning assets held at financial institutions, other interest-earning assets, stocks and mutual fund shares, rental property, mortgages held for sale of real estate, amount due from sale of business or property, regular checking accounts, savings bonds, home ownership, vacation homes and other real estate, IRA and Keogh accounts, equity in a business or profession, motor vehicles, and other financial assets. Total gross assets equal the sum of all of these assets across all individuals in the household that are at least 15 years old.

Financial Assets: This includes all assets held with financial institutions such as checking accounts, savings accounts, money market accounts, certificates of deposit, and other financial assets such as stocks and mutual fund shares.

Changes in earnings (ΔY_i): Respondents report monthly employment and earnings information every 4 months. Monthly earned income is summed across the four months of each wave. Initial annual earnings are then calculated as the sum of earned income across the first three waves of the sample for household heads. Annual earnings in the second year represent the sum of the head's earnings in waves 4 through 6. The difference between these two observations on the earnings of the head represents the annual change in income.

Unemployment Spells (U_i): This indicator captures spells of unemployment for the head that occur during the reference periods of the 4th through 6th waves. A head is specified as experiencing an exogenous unemployment spell if a) the head reports not working for at least one month in the year, and b) reports as the reason for not working: a layoff, own illness or injury, being discharged or fired, employer bankruptcy, or employer sold business.

A.2 Panel Study of Income Dynamics

The PSID asks households to report both current and historical information. Income and employment questions in the PSID generally refer to the calendar year prior to the interview. Other

questions, such as questions from the wealth supplement, refer to levels of wealth components at the time of the interview. Thus, a gap exists between the reporting of debt and the reporting of key independent variables. This gap, however, is likely to be small as most interviews occur early in the year, with more than 90 percent of the sample being interviewed by May for most years. Using the 1992 and 1993 waves as an example, the timing of variables for income, employment and consumption works as follows: Changes in income represent annual income reported for 1992 less annual income reported for 1991. The indicator for unemployment spells includes any spell that occurs during the 1992 calendar year, as reported in the 1993 survey. Initial consumption, from the 1992 survey, reflects consumption at the time of the interview in early 1992 (see explanation of consumption question below). Consumption for the following year reflects consumption early in 1993. Thus, complications arise if in 1992 there is an unemployment spell prior to the PSID interview in 1992. In this case, the initial measure of consumption would be affected by the unemployment spell.

Changes in unsecured debt (ΔD_i): Unlike the SIPP, which asks each member of the household questions about several different components of unsecured debt, the PSID asks the head to report an aggregate measure of unsecured liabilities. Specifically, heads are asked: "If you added up all other debts [such as for credit card charges, student loans, medical or legal bills, or loans from relatives] (for all of your family living there), about how much would they amount to right now?" This question is part of the Wealth Supplement that is administered every five years. Debts represent outstanding balances at the time of the interview. Changes in unsecured debt represent a change over 5 years.

Total Assets: The wealth supplement asks respondents specific questions about holdings of various types of assets. The components of this measure are very similar to those listed under total assets in the SIPP, although the categories are somewhat broader in the PSID.

Financial Assets: This includes all assets held with financial institutions such as checking accounts, savings accounts, money market accounts, certificates of deposit, and other financial assets such as stocks, bonds, cash value in a life insurance policy, and mutual fund shares.

Changes in earnings (ΔY_i): This represents the change in annual earnings of the head between two consecutive waves. Earnings include wages, bonus income, overtime income, commissions, as well as income from the head's professional practice or trade.

Food Consumption: Consumption data from the PSID includes household spending on food and housing. The 1988 and 1989 waves did not include questions on food expenditures, but in all other waves included in my sample the questionnaire asks, "in addition to what you bought with food stamps, did you spend any money on food that you used at home?" Respondents are also asked about the food expenditures of the household outside of the home and receipt of food stamps in the month prior to the interview. As several other studies have argued (see Zeldes, 1989a; Gruber, 1997; Meyer and Sullivan, 2001), it is likely that the respondent will report consumption levels at the time of the interview. For this reason, I interpret the consumption response as pertaining to the interview year rather than the previous year. I construct a measure of total food consumption as the sum of expenditures on food at home, expenditures on food away from home, and dollars of food stamps received.

Housing Consumption: For non-homeowners, housing expenditures reflect rental costs, while for homeowners, the PSID provides information on monthly mortgage payments and remaining principal. Most previous research has used these data to calculate a measure of housing consumption. The PSID also asks homeowners about the current resale value of the house. Data on housing values can be converted to an annual housing consumption measure using an annuity formula. This is arguably a better measure of housing consumption for homeowners than mortgage payments. First, monthly mortgage payments will depend on the term of the mortgage loan. Second, changes in housing values can capture changes in housing quality (i.e. due to upkeep, renovations, etc.) that may not be captured by mortgage payments.

Changes in consumption (ΔC_i): The analysis considers both changes in food consumption and changes in food and housing consumption. For each measure, changes reflect differences between the measure of consumption in two consecutive waves.

Unemployment Spells (U_i): This indicator captures spells of unemployment for the head that occur at any time during the year following the year that initial earnings are reported. A head is specified as experiencing an exogenous unemployment spell if a) the head reports being unemployed for at least one month in the year, and b) reports as the reason this job ended: a layoff, being fired, employer bankruptcy, strike, or employer sold business or moved.

Table 1: Summary Statistics

	SIPP			PSID		
	All	Assets<=0	Assets>0	All	Assets<=0	Assets>0
	(1)	(2)	(3)	(4)	(5)	(6)
Earnings of Head	34,489	23,041	35,484	37,618	18,757	38,290
	(259.8)	(557.4)	(275.8)	(237.5)	(446.6)	(246.9)
Total Household Income	49,256	34,371	50,587	53,343	24,839	54,376
	(346.4)	(858.9)	(366.1)	(313.1)	(696.9)	(324.2)
Permanent Income	48,548	34,423	49,811	47,686	29,923	48,320
	(324.2)	(796.0)	(342.7)	(150.0)	(416.2)	(153.8)
Initial Unsecured Debt	4,065	3,020	4,155	3,886	2,109	3,949
	(65.2)	(184.6)	(69.0)	(162.0)	(151.1)	(170.1)
Educational Attainment of Head						
No High School Degree	0.094	0.198	0.085	0.153	0.309	0.147
	(0.003)	(0.014)	(0.003)	(0.003)	(0.015)	(0.003)
High School Graduate	0.282	0.346	0.277	0.274	0.297	0.273
	(0.005)	(0.017)	(0.005)	(0.004)	(0.015)	(0.004)
Some College	0.338	0.310	0.341	0.288	0.282	0.288
	(0.005)	(0.017)	(0.005)	(0.004)	(0.014)	(0.004)
College Graduate	0.285	0.146	0.298	0.284	0.111	0.291
	(0.005)	(0.013)	(0.005)	(0.004)	(0.010)	(0.004)
Age	38.80	36.69	38.98	39.05	38.14	39.08
	(00.1)	(00.4)	(00.1)	(00.1)	(00.4)	(00.1)
Male Head	0.647	0.516	0.659	0.772	0.427	0.785
	(0.005)	(0.018)	(0.005)	(0.005)	(0.006)	(0.005)
Married	0.566	0.434	0.578	0.589	0.184	0.604
	(0.005)	(0.018)	(0.005)	(0.004)	(0.012)	(0.004)
Race of Head (White=1)	0.833	0.664	0.848	0.849	0.511	0.861
	(0.004)	(0.017)	(0.004)	(0.003)	(0.016)	(0.003)
Family Size	2.80	2.83	2.80	2.75	2.29	2.77
	(0.02)	(0.06)	(0.02)	(0.01)	(0.05)	(0.01)
Net Worth	39,284	-15,690	44,058	52,060	-8,545	54,217
	(624.0)	(1,212.9)	(645.4)	(636.7)	(2,114.1)	(654.1)
Unemployment	0.027	0.042	0.025	0.024	0.063	0.023
	(0.002)	(0.007)	(0.002)	(0.001)	(0.008)	(0.001)
Unemployment Duration (weeks)	19.34	24.37	18.65	17.42	19.03	17.12
	(0.84)	(2.67)	(0.87)	(0.54)	(1.58)	(0.57)
Food Consumption				5,600	4,121	5,652
				(23.3)	(71.1)	(24.2)
Housing Consumption				7,552	3,790	7,686
				(52.3)	(104.1)	(54.4)
N	9,350	771	8,579	15,666	976	14,690

Notes: Monetary figures are expressed in 1996 dollars. Standard errors are in parentheses. All results are weighted. Spell duration is conditional on experiencing an unemployment spell. Permanent income is estimated using waves 1968-1993 in the PSID, or using all 12 waves of the 1996 SIPP. See section 7.1 in text for more details. Assets refer to gross total household assets at baseline.

SIPP Sample: 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 restrictions and details.

PSID Sample: 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. Initial debt for the PSID is for a baseline sample of households from the first Wealth Supplement in 1984. See text for additional restrictions and details.

Table 2: Summary Statistics by Asset Holdings and Employment Status

	SIPP						PSID					
	Assets<=0			Assets>0			Assets<=0			Assets>0		
	Employed	Unemployed	Difference (2) - (1)	Employed	Unemployed	Difference (5) - (4)	Employed	Unemployed	Difference (8) - (7)	Employed	Unemployed	Difference (11) - (10)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Initial Unsecured Debt	2,981*	3,909*	927.4	4,176*	3,353*	-822.6*	2,146*	1,564	-581.5	3,973*	2,935*	-1,038*
	(188.4)	(907.2)	(926.6)	(70.2)	(346.7)	(353.8)	(156.9)	(2,464)	(2,469)	(40.1)	(176.2)	(180.7)
							(14)	(00.6)	(00)	(99.1)	(16.7)	-(06)
Change in Unsecured Debt	231.4	-728.5	-959.9	-101.9*	710.1*	812.0*	543.0*	260.3	-282.7	542.2*	1,011	468.7
	(157.6)	(888.5)	(902.4)	(48.0)	(322.4)	(326.0)	(171.8)	(731.1)	(751.0)	(97.6)	(638.0)	(645.4)
Initial Food Consumption							4,120*	4,138*	17.8	5,663*	5,210*	-452.6*
							(73.8)	(350.0)	(357.7)	(18.8)	(92.4)	(94.3)
Initial Housing Consumption							3,867*	2,651*	-1,216	7,733*	5,661*	-2,072*
							(108.0)	(787.7)	(795.1)	(27.5)	(116.6)	(119.8)
Change in Food & Housing Consumption							362.0*	-133.1	-495.2	231.1*	-525.4*	-756.5*
							(91.6)	(360.9)	(372.3)	(23.1)	(130.8)	(132.9)
Initial Earnings of Head	23,109*	21,482*	-1,627	35,751*	25,183*	-10,568*	19,082*	13,923*	-5,159	38,523*	28,265*	-10,258*
	(563.6)	(3,320)	(3,368)	(281.0)	(1,080)	(1,116)	(463.5)	(3,576)	(3,606)	(118.1)	(497.5)	(511.3)
Change in Earnings of Head	-344.5	-10,820*	-10,476*	-592.1*	-7,542*	-6,950*	-151.4	-4,969*	-4,818*	708.0*	-7,291*	-7,999*
	(351.7)	(3,295)	(3,379)	(132.4)	(752.1)	(763.6)	(252.8)	(1,121)	(1,149)	(131.8)	(686.2)	(698.8)
N	741	30		8,360	219		906	70		14,305	385	

Notes: All first differences represent annual changes except unsecured debt in the PSID, which is observed at 5-year intervals. The "Unemployed" subsample includes households whose head experiences a spell of unemployment as described in the text. See table 1 for additional notes. * denotes significance at the 0.05 level.

Table 3: 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	0.31	0.20	0.42	0.24	0	0	0
10th Percentile	0	-5,158	0	-4,886	2,430	1,487	-3,082
25th Percentile	0	-1,348	0	-1,020	3,597	3,374	-1,286
50th Percentile	1,529	0	583	0	5,071	5,605	127
75th Percentile	5,605	1,296	3,643	2,230	6,958	8,759	1,666
90th Percentile	11,413	4,965	8,305	8,022	9,080	13,270	3,762
N	9,350	9,350	2,699	2,699	15,666	15,666	15,666
Assets<=0							
% = 0	0.45	0.32	0.66	0.50	0	0	0
10th Percentile	0	-4,190	0	-2,331	1,741	568	-3,030
25th Percentile	0	-642	0	0	2,632	1,749	-1,314
50th Percentile	406	0	0	0	3,788	3,274	192
75th Percentile	4,076	905	461	366	5,162	4,813	1,604
90th Percentile	9,171	4,701	3,497	3,948	7,019	6,221	3,604
N	771	771	148	148	976	976	976
Assets>0							
% = 0	0.29	0.19	0.38	0.39	0	0	0
10th Percentile	0	-5,228	0	-4,886	2,535	1,650	-3,085
25th Percentile	0	-1,427	0	-1,166	3,662	3,503	-1,285
50th Percentile	1,529	0	729	0	5,138	5,815	123
75th Percentile	5,808	1,370	3,643	2,443	7,019	9,076	1,671
90th Percentile	11,922	4,972	8,551	8,359	9,109	13,474	3,771
N	8,579	8,579	2,551	2,551	14,690	14,690	14,690

Notes: See notes to tables 1 and 2.

Table 4: The Response of Unsecured Debt to Unemployment, By Asset Holdings (SIPP & PSID)

	By Total Asset Holdings		By Financial Asset Holdings		By Asset-to-Earnings Ratio	
	Assets<=0	Assets>0	Assets<=0	Assets>0	<0.12	>0.12
	(1)	(2)	(3)	(4)	(5)	(6)
Panel 1: IV, Dependent Variable: Change in Unsecured Debt (SIPP)						
Income Change	0.0758	-0.1047*	-0.0017	-0.1005*	0.0317	-0.1136*
	(0.0755)	(0.0391)	(0.0591)	(0.0407)	(0.0590)	(0.0420)
Age	354.8	-316.5	-273.6	-182.9	529.9	-369.6
	(628.2)	(228.0)	(362.5)	(250.1)	(417.0)	(251.3)
Age Squared	-10.9	8.26	5.94	4.98	-16.7	10.1
	(16.4)	(5.8)	(9.4)	(6.3)	(10.9)	(6.4)
Change in Family Size	231.6	339.9*	550.6*	243.3*	442.6*	297.1*
	(198.0)	(86.0)	(115.8)	(96.3)	(139.5)	(93.6)
No High School Degree	124.7	-100.5	-501.7	30.26	346.4	-162.2
	(602.9)	(217.0)	(337.7)	(253.5)	(371.1)	(241.0)
High School Graduate	137.4	59.7	10.6	91.0	348.1	39.8
	(539.1)	(150.9)	(312.1)	(158.2)	(320.8)	(161.2)
Some College	67.9	-27.6	-7.5	29.9	238.4	-28.5
	(553.9)	(135.9)	(320.3)	(140.0)	(310.4)	(143.4)
Marital Status	11.6	-213.5	154.5	-184.5	-206.1	-169.8
	(366.9)	(115.6)	(201.9)	(127.6)	(233.7)	(125.5)
African-American	-537.4	-329.7*	-398.1	-364.3*	-438.3	-331.4
	(368.1)	(158.9)	(216.6)	(180.7)	(239.5)	(178.5)
Other Minority	810.7	190.2	329.5	227.0	535.2	146.7
	(762.6)	(267.0)	(449.0)	(291.5)	(484.9)	(293.7)
UI Replacement Rate	-1,277.7	1,854.1*	700.6	1,458.4	-249.7	2,007.8*
	(1,879.7)	(738.6)	(1,456.8)	(761.1)	(1,249.0)	(796.2)
High Debt Indicator	-2,903.0*	-3,322.1*	-5,922.0*	-2,816.9*	-3,483.1*	-3,177.1*
	(910.9)	(377.2)	(727.5)	(389.5)	(594.7)	(420.5)
N	771	8,579	1,682	7,668	1,671	7,679
Panel 2: OLS, Dependent Variable: Change in Unsecured Debt (SIPP)						
Indicator of Unemployment	-789.6	840.0*	11.9	890.6*	-286.3	930.1*
	(777.8)	(301.7)	(420.3)	(348.1)	(531.8)	(328.0)
N	771	8,579	1,682	7,668	1,671	7,679
Panel 3: IV, Dependent Variable: Change in Unsecured Debt (PSID)						
Income Change	0.0588	-0.1146	0.0877	-0.1297	0.1955	-0.1466
	(0.1825)	(0.1554)	(0.2156)	(0.1566)	(0.3699)	(0.1511)
N	148	2,551	309	2,390	488	2,211
Panel 4: OLS, Dependent Variable: Change in Unsecured Debt (PSID)						
Indicator of Unemployment	-339.2	634.3	-477.5	761.6	-625.1	1,031.6
	(988.5)	(833.4)	(1,133.3)	(883.9)	(1,074.6)	(1,010.8)
N	148	2,551	309	2,390	488	2,211

Notes: See notes to table 1. The dependent variable in panels 3 and 4 represent changes in household unsecured debt from 1984 to 1989. Standard errors are in parentheses. 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 and a second order polynomial in family size and number of children. See text for further discussion.

Table 5: The Response of Consumption to Unemployment, By Asset Holdings (PSID)

	By Total Asset Holdings		By Financial Asset Holdings		By Asset-to-Earnings Ratio	
	Assets<=0	Assets>0	Assets<=0	Assets>0	<0.12	>0.12
	(1)	(2)	(3)	(4)	(5)	(6)
Panel 1: IV, Dependent Variable: Change in Food Consumption						
Income Change	0.0657	0.0484*	0.1298*	0.0415*	0.0668*	0.0439*
	(0.0500)	(0.0170)	(0.0562)	(0.0170)	(0.0313)	(0.0185)
Age	616.6*	-17.8	375.0	-42.0	46.5	0.26
	(253.4)	(91.9)	(257.6)	(94.1)	(169.7)	(102.7)
Age Squared	-16.7*	0.31	-10.24	0.92	-1.62	-0.09
	(6.14)	(2.23)	(6.38)	(2.28)	(4.38)	(2.47)
Change in Family Size	634.0*	728.5*	580.1*	104.4	601.3*	741.9*
	(122.9)	(45.6)	(126.3)	(70.7)	(88.9)	(48.4)
No High School Degree	-277.2	-37.5	-671.5	-19.9	-16.2	-51.6
	(533.0)	(72.4)	(396.0)	(72.7)	(196.9)	(76.8)
High School Graduate	-272.7	23.6	-611.6	21.7	-10.3	16.9
	(558.5)	(58.5)	(418.1)	(57.8)	(182.1)	(61.3)
Some College	-286.5	-41.3	-589.6	-40.5	-60.6	-40.8
	(551.2)	(50.7)	(415.2)	(50.1)	(186.0)	(51.5)
Marital Status	-55.0	-151.4*	-245.7	-151.3*	-157.6	-145.1*
	(287.0)	(63.5)	(257.1)	(64.2)	(170.4)	(65.9)
African-American	21.9	-66.5	337.0	-116.7*	65.1	-90.0
	(256.8)	(50.2)	(176.9)	(52.1)	(125.9)	(54.8)
Other Minority	1,305.1*	4.90	-516.3	95.8	-133.4	57.1
	(570.1)	(167.2)	(450.7)	(180.7)	(573.5)	(166.9)
UI Replacement Rate	-813.0	-176.7	-993.1	-85.9	-294.6	-148.8
	(694.1)	(193.9)	(687.4)	(195.3)	(486.4)	(203.8)
N	976	14,690	2,040	13,626	2,675	12,991
Panel 2: IV, Dependent Variable: Change in Food & Housing Consumption						
Income Change	0.1212	0.0701*	0.2918*	0.0552*	0.0436	0.0778*
	(0.0847)	(0.0270)	(0.1115)	(0.0271)	(0.0461)	(0.0303)
N	976	14,690	2,040	13,626	2,675	12,991
Panel 3: OLS, Dependent Variable: Change in Food Consumption						
Indicator of Unemployment	-320.2	-399.5*	-519.3*	-361.0*	-492.4*	-357.0*
	(290.4)	(141.2)	(208.6)	(150.9)	(233.9)	(152.0)
N	976	14,690	2,040	13,626	2,675	12,991
Panel 4: OLS, Dependent Variable: Change in Food & Housing Consumption						
Indicator of Unemployment	-590.6	-579.5*	-1,167.6*	-480.4*	-321.6	-632.5*
	(438.8)	(224.6)	(377.9)	(240.2)	(353.5)	(247.1)
N	976	14,690	2,040	13,626	2,675	12,991

Notes: See notes to table 4. Standard errors corrected for within household dependence.

Controls: In addition to the covariates listed, all models include a cubic in age and a second order polynomial in family size and number of children. See text for further discussion.

Table 6: The Response of Saving to Unemployment

	By Asset-to-Earnings Ratio	
	<0.12	**>0.12**
	(1)	(2)
Panel 1: IV, Dependent Variable: Change in Financial Assets		
Income Change	-0.0979	0.4619*
	(0.1975)	(0.2345)
N	1,671	7,679
Panel 2: OLS, Dependent Variable: Change in Financial Assets		
Indicator of Unemployment	862.7	-3,305.8
	(1,767.4)	(1,848.9)
N	1,671	7,679

Notes: See data appendix for description of financial assets. See notes to table 4.
Controls: See table 4.

Table 7: The Response of Borrowing and Consumption by Poverty Status and for Wealthy Households (SIPP & PSID)

	Poverty Status		Wealthy Households
	Below 150 % of Poverty Line	**Above 150 % of Poverty Line**	**Asset-to-Earnings Ratio > 4**
	(1)	(2)	(3)
Panel 1: IV, Dependent Variable: Change in Unsecured Debt (SIPP)			
Income Change	-0.0414	-0.0831*	0.0338
	(0.0725)	(0.0369)	(0.0713)
N	984	8,366	2,275
Panel 2: IV, Dependent Variable: Change in Food Consumption (PSID)			
Income Change	0.0707	0.0446*	0.0215
	(0.0374)	(0.0179)	(0.0237)
N	1,890	13,776	3,048
Panel 3: IV, Dependent Variable: Change in Food & Housing Consumption (PSID)			
Income Change	0.0656	0.0743*	0.0010
	(0.0430)	(0.0298)	(0.0413)
N	1,890	13,776	3,048

Notes: Poverty status is based on the Census Bureau's definition for families in poverty. For additional notes see tables 1 and 4.
Controls: See table 4.

Table 8: The Response of Unsecured Debt for Households with and without Debt Initially

	By Total Asset Holdings		By Financial Asset Holdings		By Asset-to-Income Ratio	
	Assets<=0	**Assets>0**	**Assets<=0**	**Assets>0**	**<0.12**	**>0.12**
	(1)	(2)	(3)	(4)	(5)	(6)
Panel 1: IV, Dependent Variable: Change in Unsecured Borrowing (Sample: Initial debt > 0)						
Income Change	0.0781	-0.1367*	-0.0763	-0.1139*	0.0491	-0.1506*
	(0.1181)	(0.0549)	(0.1338)	(0.0518)	(0.0892)	(0.0585)
N	417	6,055	697	5,775	932	5,540
Panel 2: OLS, Dependent Variable: Change in Unsecured Borrowing (Sample: Initial debt > 0)						
Indicator of Unemployment	-841.9	1,116.5*	479.3	1,041.0*	-486.4	1,237.5*
	(1,273.3)	(425.5)	(828.2)	(456.3)	(884.1)	(451.0)
N	417	6,055	697	5,775	932	5,540
Panel 3: Probit, Dependent Variable: Indicator of Debt in Period 2 (Sample: Initial debt = 0)						
Indicator of Unemployment	-0.6151	0.0196	0.1826	-0.1590	-0.0240	-0.0153
	(0.4448)	(0.1465)	(0.2044)	(0.1855)	(0.2622)	(0.1631)
	[-0.1724]	[0.0073]	[0.065]	[-0.0583]	[-0.0083]	[-0.0057]
N	354	2,524	985	1,893	739	2,139

Notes: In panel 3 the dependent variable is equal to one if the household has positive unsecured debt in the second period and zero otherwise. Marginal effects are in brackets. See table 4 for additional notes.

Controls: See table 4.

Table 9: The Response of Borrowing and Consumption Using Estimates of Permanent Income

	By Total Asset Holdings		By Financial Asset Holdings		By Asset-to-Income Ratio	
	Assets<=0	**Assets>0**	**Assets<=0**	**Assets>0**	**<0.12**	**>0.12**
	(1)	(2)	(3)	(4)	(5)	(6)
Panel 1: IV, Change in Unsecured Debt (SIPP)						
Income Change	0.1784	-0.1870*	-0.0091	-0.1745*	0.0713	-0.1976*
	(0.1909)	(0.0760)	(0.1200)	(0.0766)	(0.1343)	(0.0800)
N	770	8,611	1,681	7,700	1,669	7,712
Panel 2: IV, Change in Food Consumption (PSID)						
Income Change	0.0793	0.0491*	0.2551	0.0418*	0.1190	0.0424*
	(0.0750)	(0.0185)	(0.1607)	(0.0184)	(0.0717)	(0.0192)
N	926	14,301	1,941	13,286	2,587	12,640
Panel 3: IV, Change in Food & Housing Consumption (PSID)						
Income Change	0.2924	0.0601*	0.6828	0.0426	0.0918	0.0643*
	(0.2060)	(0.0284)	(0.4078)	(0.0278)	(0.0919)	(0.0304)
N	926	14,301	1,941	13,286	2,587	12,640

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 section 7.1 in the text. See table 4 for additional notes.

Controls: See table 4.

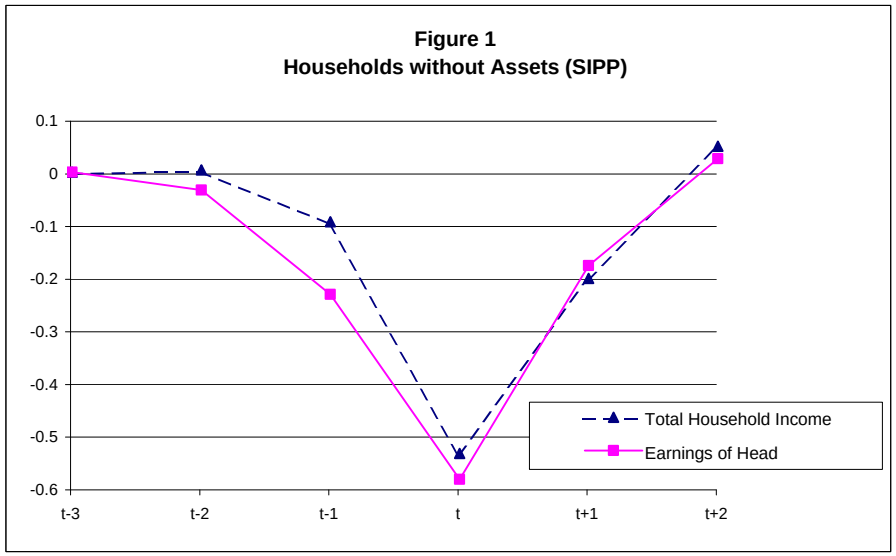
Table 10: Income Elasticity of Food Consumption, PSID (1968 - 1993)

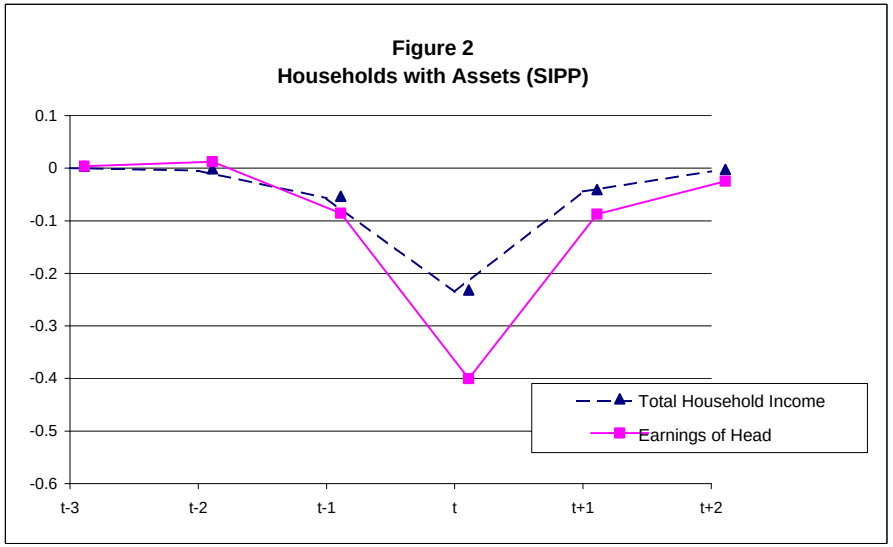
	Dependent Variable: Change in Food Consumption		
	Level Change	**Log Change**	**Log Change**
	(1)	(2)	(3)
Income Change	36.82*	0.0071*	
	(0.810)	(0.0002)	
Income Change * Permanent Income	-0.3810*	-0.0001*	
	(0.0100)	(0.0000)	
Income Change * Permanent Income^2	0.0009*	0.0000*	
	(0.0000)	(0.0000)	
Change in log (Income)			0.0513*
			(0.0038)
Change in log (Income) * Permanent Income			0.0011*
			(0.0001)
Change in log (Income) * Permanent Income^2			0.0000*
			(0.0000)
N	226,093	226,093	226,093

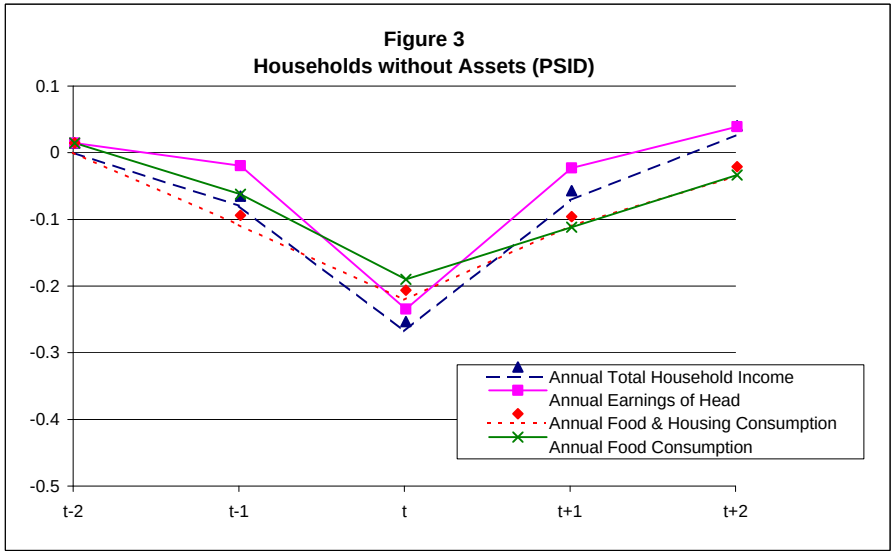
Notes: Results are from OLS estimation of equation (9). See section 7.1 for a discussion of estimating permanent income. Both permanent income and current household income are measured in thousands.

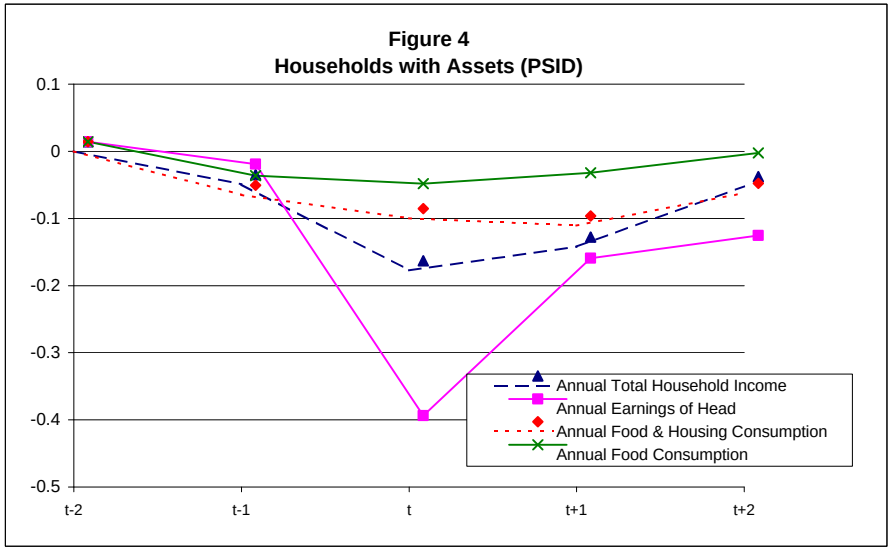
Controls: In addition to the covariates listed, all models include a full set of year dummies, as well as controls for changes in marital status and family size.

Figures 1 - 4: The Long Run Effect of Unemployment on Income, Earnings, and Consumption









Notes: These figures plot point estimates from equation (7). Assets refer to gross total assets. In the SIPP *t* represents a 4 month period, while in the PSID *t* refers to annual periods.
Controls: All models include the same demographic controls reported in tables 4 - 6. Figures 1 and 2 also include period dummies, while figures 3 and 4 include year dummies.