The Growth of Consumer Credit and the Household Debt Service Burden*

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ABSTRACT

Household debt is at a record high relative to disposable income. Some analysts are concerned that this unprecedented level of debt might pose a risk to the financial health of American households and ultimately lead them to curtail their spending. In this paper, I summarize some of the relevant facts concerning the growth of consumer credit and the household debt service burden, outline the results of the research that has been conducted in this area, and look at the questions that might be answered with additional research.

Household debt is at a record high relative to disposable income. Some analysts are concerned that this unprecedented level of debt might pose a risk to the financial health of American households and ultimately lead them to curtail their spending.[1]

Consumer spending accounts for over 2/3 of the U.S. gross domestic product, and has been a key driver of the strong economic growth the country has experienced since the early 1990s, so possible risks to its growth should be taken seriously. A high level of indebtedness among households could also lead to increased household delinquencies and bankruptcies, which could threaten the health of lenders if loan losses are greater than anticipated.

In spite of the attention paid to movements in consumer credit in the press and on Wall Street, the determinants and effects of growth in consumer credit have not been a major focus of research economists, so there has been relatively little research to evaluate the role of consumer credit in the economy. In this paper, I attempt to summarize some of the relevant facts concerning the growth of consumer credit and household debt service burdens, outline the results of the research that has been undertaken in this area, and look at the questions that might be answered with additional research.

In stark contrast to the view of growth in consumer credit as a negative force in the economy, a consensus seems to be emerging from recent research that consumer credit growth is *positively* related to consumption in future periods. Little evidence has been found that household debt service burdens are negatively related to future consumption, though some theoretical models suggest a more complex relationship may be at work. Specifically, high debt service burdens could make household consumption more sensitive to a drop in income (or in expectations of future income), but more research is needed to evaluate these models.

The outline of the paper is as follows. Section 1 discusses overall trends in household borrowing. Section 2 discusses the concept of debt service burden, and discusses the new measure which has recently been released by the Federal Reserve Board. Section 3 presents some relevant facts that models of consumer credit growth and debt service burdens might be

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[1]See, for example, the New York Times (1999). The view that consumer credit is a negative force in the economy is commonly articulated in the press; in fact, Durkin and Jonasson (1998) find that the majority (by some measures over 80 percent) of articles on consumer credit are negative in tone, a pattern that has been consistent at least since 1950, the first year they analyzed.

expected to explain. Section 4 discusses some of the economic research relating to consumer credit growth and to household debt service burdens. Section 5 discusses some of the key questions regarding these issues that future research could address, and Section 6 concludes.

1. Trends in Household Borrowing

According to the Federal Reserve's Flow of Funds Accounts, household debt totaled over $6.3 trillion at the end of the third quarter of 1999. Of this total, households owed $4.4 trillion in mortgage debt and almost $1.4 trillion in consumer credit.[2] The top panel of Chart 1 plots total household debt, mortgage debt, and consumer credit relative to disposable personal income (DPI) since 1970. All three series are at or near all-time highs, but the primary driver of the rapid rise over time has been mortgage debt. The chart shows that mortgage debt has trended up over this period, rising from 36 to 66 percent of DPI, while consumer credit has fluctuated in a relatively narrow range--roughly 16 to 21 percent of DPI--over the past 30 years.

The bottom panel of Chart 1 shows consumer credit and its components -- revolving and nonrevolving debt -- relative to DPI. Revolving debt is defined as debt that has flexible repayment schedules, and includes credit cards and overdraft plans on checking accounts, while nonrevolving debt consists of auto and other closed-end loans. Revolving debt has increased relative to DPI (and relative to nonrevolving debt) over time, rising from less than one percent of DPI in 1970 to more than nine percent of DPI in 1999.

Given the strong upward trend of revolving debt, it might appear that it is less cyclical than nonrevolving debt. However, as shown in the top panel of Chart 2, growth in both components of consumer credit is highly cyclical, falling as the economy enters a recession and rising quickly in the expansion that follows. Revolving debt has consistently grown faster than nonrevolving debt, at least until the past year. The lower panel of Chart 2 shows the growth in total consumer credit along with the growth in consumer durables expenditures. The two series are highly correlated, with the obvious implication that consumer credit is often used to finance durables expenditures. Also, the positive correlation suggests that consumer credit is not

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[2]In addition to mortgage and consumer debt, household sector debt includes about $1/2 trillion in other loan categories that include security credit, bank loans not elsewhere classified, loans to the household sector from the U.S. government, and debt owed by nonprofit organizations (which are grouped with households in the Flow of Funds Accounts).

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primarily used as a "bridge" to get households through tough times. If that were the case, we would expect consumer credit growth to be strong when the economy slows. The chart shows that the opposite holds; consumer credit grows most quickly as the economy comes out of a recession and households are buying durable goods.

2. The Household Debt Service Burden

Given that household debt is at an all-time high relative to disposable personal income, the question arises as to whether this high level of debt will lead to financial problems for households. While the level of debt is important in assessing this question, it may also be useful to measure the amount of payments a household makes in servicing that debt. An otherwise identical household with a $10,000 loan that has a 30-year maturity may have less short-term risk of default than a household with a $10,000 loan with a 1-year maturity, since the latter household's required monthly payments would be about 12 times higher than the former's.[3] Thus, getting information on required loan payments might be helpful in assessing the risk of delinquencies and defaults by households.

The household debt service burden--defined as households' required debt service payments relative to their disposable personal income--is a measure of the resources households must devote each month to service their debt. The debt service burden could have a role in propagating shocks, as households may be more likely to cut back spending in response to a negative income shock when their debt service burden is high. Furthermore, lenders may be more inclined to tighten terms on household borrowing when household debt service burdens are high.

One conceptual issue that comes up when analyzing household debt service burdens is whether the measure should include only required payments, or should also include "voluntary" payments such as prepayments on mortgages and other closed-end loans and payments above the minimum on credit cards. While both approaches have merit, measures that include only required payments seem to be more consistent with the goal of predicting household credit quality problems. If we included optional payments, the household debt service burden would rise when households made substantial prepayments on their mortgages or paid down their credit

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[3]This example assumes an 8 percent interest rate.

card debt by more than usual--behavior that we would typically associate with healthy consumer finances.[4] Such optional payments are not included in the debt service burden measure analyzed here, but it is useful to keep in mind that, for credit cards in particular, most of a given month's payments are voluntary and thus will not be included in our measure of debt service burden.

Given current data sources, attempting to estimate the debt service payments of households is a difficult task. The ideal data set for such a calculation would include loan-level data on required payments for every household in the United States. Such a data set is not available, and thus any estimate of the household debt service burden based on aggregate data should be considered only a rough approximation of the current debt service burden faced by households. Nevertheless, this rough approximation may be useful if, by using the same method and data series over time, it generates a time series that captures the important fluctuations in household debt service payments.

The top panel of Chart 3 shows our estimate of the time series of the household debt service burden. The method used to estimate this series is explained in the appendix. This measure of debt service burden is currently at a relatively high level--in the same range as it was heading into the last recession--but has not climbed to the level reached in the mid-1980s. The bottom panel of Chart 3 shows the consumer and mortgage components of the household debt service burden measure. Despite the fact that consumer debt is only about 1/3 the size of mortgage debt, the required payments on consumer debt are actually higher than those on mortgage debt because of the shorter maturities on consumer debt. These shorter maturities also cause the debt service burden measure associated with consumer debt to be more sensitive to the current growth rate of credit, and hence to be more variable over time. As a result, shorter-term movements in the total debt service payment series tend to be caused by movements in consumer debt payments, which in turn are most closely related to growth in consumer credit. Because of the longer maturities--and thus the slower repayment of principal--mortgage debt payments are affected to a greater extent by the level of interest rates than are consumer debt payments. Since 1985, mortgage debt has grown faster than income in all but one year, but mortgage interest rates

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[4]Similarly, if voluntary payments were included, a sharp drop in payment rates would reduce the debt service burden, but might be a sign of deteriorating household financial positions.

have generally been on a downward trend. The net result is that mortgage debt payments have fluctuated in a relatively narrow range--between 5-1/4 and 6-1/4 percent of DPI over this period. Over the past few quarters, mortgage debt payments have moved up as mortgage debt has grown strongly and mortgage interest rates have stopped their decline.

To estimate payments on the revolving component of consumer debt, we assume the required minimum payment is 2-1/2 percent per month. This estimate is based on the February 1999 Senior Loan Officer Opinion Survey conducted by the Federal Reserve Board. In this survey, banks indicated that required minimum payments on credit cards were in the 2 to 3 percent range, and had not changed substantially over the previous decade. The minimum payment is an important assumption; if a 5 percent minimum were to be used, our debt service burden measure would be at an all-time high, while when 2-1/2 percent is used, the series is below the peak reached in the mid-1980s.

3. Household Debt Service Burdens and Consumer Credit Growth--What Do They Mean?

Debt service burdens seem to be associated with higher delinquencies on consumer loans. For example, as shown in Chart 4, the debt service burden is correlated with--and tends to lead-- delinquencies on consumer loans. Econometric analysis indicates that the lagged debt service burden is a statistically significant predictor of current delinquencies, which suggests that the measure is a useful harbinger of household distress. It also seems to predict changes in personal bankruptcies.

In this section I use a simple error-correction model to examine whether the debt service burden and other household credit variables are helpful in forecasting consumer spending. The results I present here are broadly consistent with those found in other studies that will be discussed below. The model relates growth in consumer spending to the lagged ratio of spending to income (the error-correction term), lagged spending growth, lagged income growth, the ratio of wealth to income, and the real fed funds rate. This equation assumes that--all else equal--there is a long-run ratio of expenditures to income, and that deviations from this ratio decay over time, assuming no further shocks.

The basic model is shown in column 1 of Table 1. The log of the ratio of consumption to income is negative and significant, indicating that if the level of consumption rises relative to

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income--and all else is equal--consumption growth will be lower in the following period. The lagged changes in income and consumption do not enter significantly. The lagged fed funds rate is negative and significant, while the lagged ratio of net worth to income enters positively, capturing the "wealth effect" on consumption. In columns 2-5, I add credit variables to the model to check whether they help predict spending. The credit variables are also lagged one period to focus on their predictive power. Note that an insignificant coefficient does not rule out a relationship between credit variables and spending, because credit variables might indirectly influence outlays through their effect on other right-hand-side variables in the equation, but have no direct, independent effect. This exercise simply asks whether adding credit market variables to a spending equation improves its forecast.

As can be seen in column 2, the debt service burden measure, despite its predictive power for measures of financial stress, does not have a significant effect on spending.[5] Furthermore, as shown in columns 3 and 4, neither consumer loan delinquencies nor the growth in per-capita personal bankruptcy filings is a statistically significant predictor of spending. These credit quality variables may not enter significantly because households that go delinquent on their loans or file for bankruptcy each quarter generally account for a small fraction of aggregate spending. In addition, changes in lending standards and in bankruptcy law may introduce variation in the delinquency and bankruptcy series that is not directly related to household financial distress. Another reason may be that under the U.S. bankruptcy system, households often obtain debt relief without incurring large penalties, so that a household's spending might actually rise after its bankruptcy case is completed. Also, as we shall see later in the paper, some theoretical models suggest a relationship between debt service burdens and consumption that is more complex than can be checked in a simple regression model.

A final reason for the weak link between aggregate debt service burdens and consumption is that the aggregate burden may not measure well the debt service burden of low- and medium-wealth households, who may be the most likely to encounter credit problems and whose consumption may be the most sensitive to changes in debt service burdens. Table 2 shows the distribution of household debt service payments by household net worth as computed from the

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[5]Similar results are obtained if the logarithm of the debt service burden is entered into the regression.

1995 Survey of Consumer Finances. As shown in column 2, the debt service to income ratio does not differ much across households with varying wealth positions. However, the ratio of debt service to net worth, shown in column 3, does vary across the groups; indeed, debt service payments are 65 percent of net worth for households in the lowest net worth group, but are only about 2 percent of net worth for households in the top group. Moreover, column 4 indicates that over half of the aggregate debt service is paid by households in this top net worth group, suggesting that movements in this group's burden may strongly affect the aggregate burden measure. As can be seen in column 5, the delinquency rate is quite low for households in the top group, suggesting that this group's consumption might be less sensitive to measures of financial stress such as the debt service burden.

Going back to Table 1, column 5 shows that the sign on lagged consumer credit growth is positive and significant, indicating that high debt growth tends to be associated with high future growth in spending. There are at least two possible reasons why consumer credit growth might lead spending. Both explanations rely on credit growth acting as a proxy for changes in sentiment. A rise in borrowing may indicate that households have favorably revised their expectations of future income, and thus may be more willing to make outlays for bigger-ticket items going forward. A second possible reason is that high debt growth may indicate that financial institutions have become more optimistic about households' ability to repay their debt, and hence may be more willing to make loans in the future. Further research is needed to distinguish between these hypotheses.

Of course, the results in this section rely on a fairly simple model of consumption,[6] but they are consistent with the evidence compiled from other studies (discussed below). They suggest that strong consumer credit growth should not necessarily be seen as an ominous sign

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[6]The model presented here was meant to be illustrative and thus was intentionally kept simple, but the results from this model are robust to several modifications. For example, the coefficient on lagged consumer credit is little changed if the lagged change in net worth is added to the model. Also, the results are roughly consistent with those from other error-correction models. For instance, an alternative way to estimate an error-correction model is to perform a two-step estimation, in which the cointegration relationship is estimated in the first stage, and the error from this estimation is entered into a second-stage forecasting equation. The coefficient on the change in consumer credit is positive and significant in this type of forecasting equation as well, whether the cointegrating vector includes consumption and income, or consumption, income and wealth jointly. The only result that varied across specifications was that the delinquency rate entered negatively and significantly in some specifications.

that the economy is set to slow because consumers are reaching the limits of their borrowing capacity; instead, it may indicate that households are optimistic about future income growth, and are borrowing more in anticipation of this growth in income. From this point of view, strong growth in consumer credit is worrisome only to the extent that it reflects unrealistic income expectations on the part of households. While rapid growth in consumer credit seems to be associated with rapid future growth in spending, this relationship does not rule out the possibility that high debt service burdens might eventually cause future spending to fall in response to a drop in income by more than it otherwise would. The results so far simply indicate that there is no direct and consistent short-term impact of debt service burdens (or other measures of credit quality) on spending that is discernible using simple regression models.

4. Previous Research

Consumer credit and household debt service burdens do not figure prominently in traditional economic theories of consumption. For example, the best-known model of household consumption is the life-cycle model (see Ando and Modigliani (1963)). In its standard formulation, households have access to a single asset, with which they can borrow and lend freely. Within this model, credit is simply used to transfer consumption from periods where household income is high to periods where household income is low, and has no particularly interesting features in and of itself. The only portion of debt service burden that enters into the model is the interest rate, which is postulated to be the same for borrowing and lending.

There have been many proposed modifications to this basic life-cycle model in the years since it was first introduced, but relatively few of them dealt directly with some of the salient features of household credit markets: Households generally pay higher rates on their debt than they can earn on their assets, household debt can be either secured or unsecured, and households often hold assets and debts simultaneously. Allowing these features to enter the model introduces substantial computational complexity. Even so, researchers have made progress on both theoretical and empirical fronts in recent years in understanding how consumer credit conditions affect consumption.

Several papers have found results similar to a result in this paper: Strong growth in consumer credit is associated with strong future consumption growth. Bacchetta and Gerlach

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(1997) find that predictable consumer credit growth--the growth in consumer credit that could have been forecast given earlier data--predicts consumption growth in five OECD countries, including the U.S. Ludvigson (1999) also finds that predictable growth in consumer credit helps to predict consumption in the U.S. Antzoulatos (1996) finds that the OECD consumption forecast for the U.S. would have been more accurate had consumer credit growth been included as an explanatory variable, and that consumer credit growth appears to positively predict future consumption. McCarthy (1997) also finds that a rise in debt is associated with a future rise in consumer expenditures.[7]

Why does strong consumer credit growth predict consumption growth? The authors of these studies have generally pointed to credit constraints as the main reason for the association. Japelli and Pagano (1989) suggested that credit and consumption fluctuations might be linked because of credit constraints. They find that the ratio of consumer credit to consumption varies widely across countries, ranging from 0.2 percent of consumption in Greece to 36.7 percent of consumption in Sweden, and that mortgage debt relative to consumption follows a similar pattern. They also find that consumption shows more "excess sensitivity" to income in countries at the lower end of this distribution. After evaluating other possible explanations, they conclude that this cross-country evidence indicates that credit constraints are an important determinant in departures from the life-cycle model of consumption.

In the more recent literature, Bacchetta and Gerlach argue that their results are consistent with time-varying credit constraints. In addition to finding the positive relationship between predictable credit growth and consumption, they also find that a measure of credit tightness, the "wedge" between borrowing and lending rates, is significantly negatively related to future consumption in several of the countries studied, a finding consistent with time-varying credit constraints affecting consumption. The study finds that when a variable measuring banks' willingness to lend is used as an instrumental variable for credit growth, the relationship between credit growth and consumption still holds, suggesting that the relationship is driven by changes

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[7]In contrast to the results of these studies, Mishkin (1976) finds that durable expenditures are negatively related to household debt. The main difference seems to be that Mishkin's regressions used the levels of expenditure and debt, while the more recent papers have used changes in these variables due to concerns about cointegration.

in availability of credit rather than changes in the demand for credit.[8] Bacchetta and Gerlach also find that the sensitivity of consumption to credit growth in the U.S. has declined over time. The authors interpret this finding as being consistent with the idea that financial deregulation in the 1980s has diminished the importance of credit constraints in the U.S.

Ludvigson proposes a model in which liquidity constraints are time-varying and proportional to a household's income. In this type of model, one can produce the empirical finding that predictable consumer credit growth predicts consumption growth. Ludvigson also finds that a one-time deregulation of credit markets in which liquidity constraints are eased leads to an increase in consumption. Ludvigson interprets this finding as saying that the deregulation of credit markets in the 1980s may have spurred consumption in that decade.

Antzoulatos finds that models that do not include consumer credit underpredict U.S. consumption growth when income growth is strong. Antzoulatos' hypothesis is that when households expectations about future income increase, they wish to borrow more against this future income. However, some households may hit their credit limits, and thus not be able to borrow as much as they would like. Thus, when the next period arrives, these households spend more out of their contemporaneous income than they would if they had not been constrained in the prior period, a phenomenon that Antzoulatos calls a consumption surge. He argues that consumer credit growth is thus helpful in predicting a consumption surge, and should be included in macroeconomic forecasting equations.

While these papers find that credit constraints may help to explain why consumer credit growth helps predict consumption, they do not examine in detail why credit constraints vary over time. Rajan (1994) provides a rationale for why bank credit policies may fluctuate, and why therefore credit constraints may be time-varying. In Rajan's model, investors are relatively forgiving of poor earnings by banks when other banks are also having trouble, but are far less forgiving if a bank has poor earnings when most other banks are doing well. Banks therefore loosen standards in good times in order to keep earnings high, but will tighten standards (and suffer a greater fall in short-term earnings) in periods when other banks are experiencing

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[8]Duca and Garrett (1995) also find evidence that changes in an index of banks' willingness to lend are positively related to future household spending on durables.

difficulties and when it is thus more difficult for investors to determine the bank's relative strength versus other banks. Rajan shows that this type of behavior can lead to cycles in which banks in general have relatively loose credit policies during good times, and tighten standards as a group during bad times.

Bernanke, Gertler and Gilchrist (1996) also provide an explanation for why liquidity constraints might be time-varying. In their model of firms, there is a flight to quality during economic downturns, so that firms with less capital face more difficulty in obtaining credit in recessions. They suggest that this "financial accelerator" has an important role in propagating business cycles. While their research focuses primarily on firms, they suggest that a similar mechanism could occur in the household loan market. Ferri and Simon (1997) explore this idea using the Survey of Consumer Finances, and find that the number of households who are credit constrained rises during recessions, and they find some evidence that lower-quality borrowers receive less credit during recessions than higher-quality borrowers--evidence that is supportive of a "flight to quality" in the consumer loan market.

In a remarkable article, Olney (1999) provides some historical background on the relationship of consumer credit and consumption, and finds that consumer credit had an important role in the Great Depression. Previous researchers identified a large drop in consumption in 1930 which could not be explained by changes in wealth or income as a key to the onset of the Great Depression. Olney finds that the high level of consumer debt in 1930, combined with harsh penalties on those who defaulted on their debt, could explain the bulk of this fall in consumption. In the 1920s, households who defaulted on their secured debt would lose not only the use of the good that secured the debt, but also the equity they had built in the good, termed the "surplus." As a consequence, households actively fought default by decreasing consumption to make their payments even when they lost their job or suffered a fall in wages. As a result, default rates on auto loans barely budged in the early 1930s, in marked contrast to loss rates on business loans.

Between 1933 and 1938, courts in several states ruled that the consequences of consumer default were too harsh. In 1938 a decision at the federal level changed the laws nationwide; Chrysler and Ford entered into a consent decree in which all sales finance companies were

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required to return the surplus in the event of default. As a result, the consequences of default were lessened considerably, and default rates immediately rose. Olney examines the relationship between consumption and consumer credit before and after default penalties were eased. In the period 1919-1932, when default penalties were high, lagged debt has a negative effect on current consumption. The relationship changes over time, so that by the 1938-41 period, when the penalties had become much lighter, lagged debt had a positive impact on current consumption.

Turning to research on the relationship between credit quality variables and consumption, Murray (1997) argues that debt burdens should not be thought of as a leading indicator of recessions, noting that households having credit problems represent a relatively small portion of households. Murphy (1998), in contrast, finds that the lagged debt service burden ratio has a negative and significant coefficient in a consumption forecasting equation, a finding that is at odds with the regression results presented earlier in this paper. One reason for the difference may be that the model here contains variables not included in Murphy's regressions. In experimenting with the regressions that I presented here, if the error-correction term is excluded, some measures of the debt service burden entered significantly. It is difficult to argue that the error-correction term does not belong in a consumption forecasting model; in any event, the finding of a significantly negative relationship does not appear to be robust.

McCarthy (1997) finds that delinquency rates on consumer loans appear to have little direct effect on consumer spending, but may have an indirect effect through credit availability: Banks' willingness to make consumer loans, as measured by the Federal Reserve's Senior Loan Officer Opinion Survey, is negatively related to delinquency rates. Thus, the relationship of debt service burdens to consumption may be complex; a rise in debt burdens may cause a rise in delinquencies, which leads to a tightening of credit availability, which may negatively impact consumption. Thus, while credit quality variables may not enter into a short-term forecasting equation, they may still be helpful in understanding the environment facing households, and could be incorporated into a more complex model of credit and consumption. Garner (1996) also finds that measures of debt burden and credit quality do not have a significant effect on consumption growth.

There are several models that suggest that debt burdens might affect consumption, though

in an indirect way. King (1994), drawing on the work of Fisher (1933), focuses on the role of credit in propagating business cycles. In Fisher's model, when an exogenous shock (for instance to households' expected future income) hits households with high debt burdens, it causes households to cut spending to reduce their debts, which leads to a decline in asset prices, a fall in net worth, and through a complex process eventually to a further fall in output. High debt burdens, by this process, transform an initial shock into a much greater impact on output than would be the case if debt burdens were relatively low. King suggests that the debt deflation process may have had an important role in the 1990-91 recession, pointing out that the recession was worst in those countries that had the largest runup in debt in the 1980s. The role of credit in the consumption shortfall in the 1990-91 recession is of particular interest, since Blanchard (1993) and Hall (1993) both cite a "consumption shock"--a fall in consumption not fully explained by changes in household income--as being the most important cause of the recession.

Carroll and Dunn (1997) analyze the relation of household debt growth and consumption. Consistent with some of the studies cited earlier, they find that credit growth is positively related to future durables consumption, but in their model down-payment constraints play a critical role. They build a model in which a financial liberalization that loosens down-payment constraints leads to higher debt loads, and these debt loads lead to a greater sensitivity of consumption to fluctuations in unemployment expectations. They also find that in the U.S., consumption has become more sensitive to unemployment expectations after the financial market deregulation in the 1980s. Thus, in their interpretation, the higher debt loads in the 1980s were a symptom of the financial deregulation, and the higher debt loads made households more sensitive to changes in expectations.

5. Directions for Future Research

There are a number of interesting research areas that would benefit from further research. Here I list a few of the open research questions.

What is the relationship between consumer credit and consumer durables purchases?

As shown in the bottom panel of Chart 2, consumer credit growth and growth in consumer durables purchases are highly correlated. Lagged consumer durables growth helps to predict consumer credit, and lagged consumer credit growth helps to predict consumer durables

growth. Modeling the simultaneous nature of this relationship would be extremely useful for analysts who wish to forecast either series.

It seems particularly important to fully understand the positive sign on lagged consumer credit growth (or predictable contemporaneous consumer credit growth) in a consumption forecasting equation. This finding suggests that any forecaster looking to predict consumption should be watching consumer credit growth. As noted earlier, the finding appears to be robust; in addition to the regressions presented here, it has been found by Bacchetta and Gerlach (1997), Ludvigson (1999), Antzoulatos (1996), and Carroll and Dunn (1997).

The explanation offered by Bacchetta and Gerlach and Ludvigson centered on credit constraints, but more needs to be known about this. Specifically, what are the sources of the variability in denial rates over time? Are the explanations offered by Rajan (1994) and by Bernanke, Gertler, and Gilchrist (1996) correct? It is also possible that forces other than credit constraints are behind the relationship. For instance, rapid growth in consumer credit could signal that households are more optimistic about their future income prospects; in other words consumer credit growth could be another measure of consumer sentiment. For forecasters who want to predict future consumption growth, it is important to distinguish between the credit constraint and sentiment (and other) rationales for the predictive power of consumer credit.

Do debt burdens matter for household spending? How?

The empirical evidence is scant that debt burdens affect household spending, yet many analysts believe that there is some relationship between debt burdens and spending. The research reviewed in this paper suggests that debt service burdens do not enter spending equations with a significant coefficient. Of course, this does not preclude a more complex relationship. Several models, including those of Fisher, King, and Carroll and Dunn, suggest that households are more vulnerable to shocks when debt burdens are high. Thus, the debt service burden may be useful as an indicator of financial vulnerability to external shocks. It certainly seems plausible that if income comes in lower than expected (or expectations of future income fall), a household that took on substantial debt would slash spending more sharply than a household that had not borrowed. At this point there has been little convincing empirical evidence of this relationship, but not much research has been done in this area. This is an important area for further research,

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particularly at a time when debt burdens are relatively high.

Do other credit quality variables matter for household consumption?

It seems intuitive that indicators of household stress such as delinquencies and bankruptcies might play some role in forecasting future spending activity. Yet these indicators do not appear to enter significantly into a short-term forecasting model. What is the role of "financial stress" in consumption fluctuations? Bankruptcy is not an option in most microeconomic models of consumption, so there is very little guidance from existing theory.[9]

What is the best measure of debt burden?

A number of possibilities exist for measuring debt burdens, including the ratio of debt to income and the debt service burden measure examined here. Another possibility would be to include some portion of discretionary payment in the measure in an effort to track the "usual payment." Also, one can argue that automobile lease payments and rental payments on housing should be included in the measure because they are substitutes for debt. One might also want to adjust the payments in some way to account for the deductibility (or lack thereof) of interest on mortgage and consumer loans.[10] Particularly useful here would be a theoretical model that would include a role for the debt service burden.

6. Conclusion

Consumer credit growth is often viewed in the press and on Wall Street as a negative force in the economy that will cause future consumption to slow. The available research on this question suggests quite the opposite: Strong growth in consumer credit tends to be associated with *positive* future growth in consumption. Little empirical support exists for the idea that household debt service burdens or other credit quality variables are negatively related to future consumption in the short term.

This does not mean debt service burdens do not affect future consumption, however.

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[9]Lehnert and Maki (2000) analyze the effect of a bankruptcy option on household consumption and portfolio choice.

[10]Maki (forthcoming) finds that households were quick to shuffle consumer debt into mortgage debt after the Tax Reform Act of 1986, suggesting that deductibility may be an important consideration. On the other hand, interest payments on consumer debt are small relative to principal payments, so a tax-adjusted series may not be radically different than the series discussed here.

Some theoretical models suggest that high household debt service burdens may make household spending more sensitive to changes in expectations of future income. In short, consumer credit growth is high when households are optimistic about their future income prospects; it is only when households conclude that their expectations were too optimistic that the debt begins to look too high. From this point of view, high debt burdens are not a negative force in and of themselves; they should only be viewed as a problem to the extent that the expectations of future income on which the borrowing was based were too high.

Recent research has provided some intriguing findings that change our interpretation of consumer credit's role in the economy; there is much work still to be done before our understanding is complete.

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Appendix

The Calculation of the Household Debt Service Burden

Staff at the Federal Reserve have revamped the household debt service burden series to rely only on data series that are currently available, and a new methodology has been developed to make the best use of the current data. To obtain the debt service burden series, payments are calculated separately for each type of closed-end debt and for revolving debt, and the sum of these payments is divided by disposable personal income.

To obtain payments on closed-end loans, the amount outstanding, the average interest rate, and the remaining maturity on the stock of outstanding debt in each major type of close-end loan category are calculated, and these three components are fed into a payment calculator to determine the payment for each type of loan.

Estimates of the amount of mortgage debt are taken from the Federal Reserve Board's Flow of Funds Accounts, and estimates of outstanding consumer debt are taken from the Federal Reserve G.19 statistical release. For consumer debt, a more detailed breakdown by type of closed-end loan is obtained using internal Federal Reserve estimates and data from the Installment Credit publications of the American Bankers Association.

Interest rates on closed-end consumer loans are obtained from the G.19 and G.20 statistical releases, with the exception of student loan rates, which are obtained from the Student Loan Marketing Association. An estimate of the interest rate on the stock of outstanding debt is obtained by weighting the recent history of interest rates using information on the age of outstanding loans in the Board's Survey of Consumer Finances. For the stock of outstanding mortgages, an estimate of the average interest rate is obtained from the Bureau of Economic Analysis.

Maturity series for consumer debt were taken from the G.19 release and from the ABA's Installment Credit publications. For mortgage debt, an estimated series of the average remaining maturity on the stock of outstanding mortgage debt was obtained from Credit Suisse First Boston.

For revolving debt, we assume the required minimum payment is 2-1/2 percent per month. This estimate is based on the February 1999 Senior Loan Officer Opinion Survey, in

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which banks indicated that required minimum payments on credit cards were in the 2 to 3 percent range, and had not changed substantially over the previous decade.
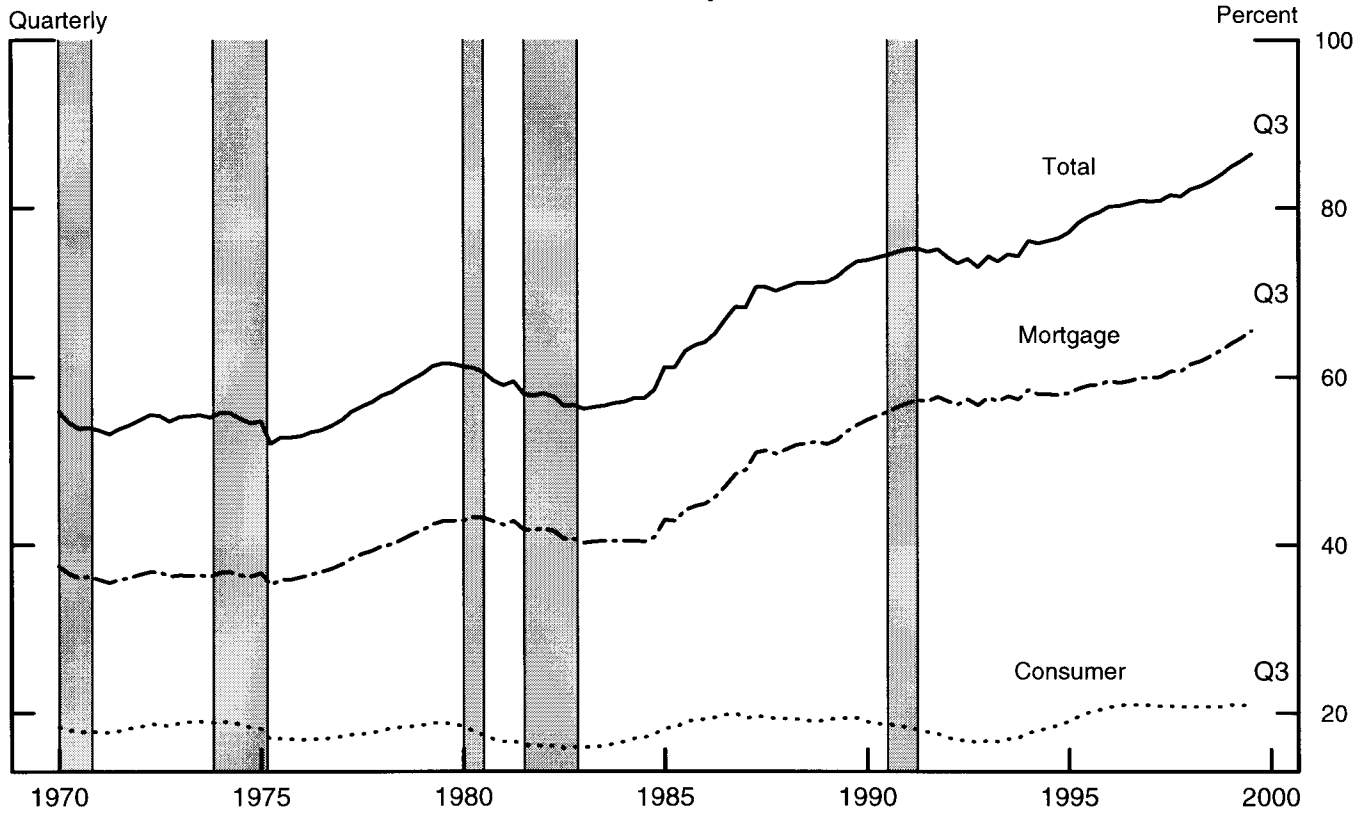
Paquette (1986) previously suggested a method for calculating household debt service burdens, and provided some aggregate estimates for the U.S. The method suggested by Paquette attempted to estimate the dollar amount of loans originated in a given quarter, and estimated the average interest rate and maturity on these loans at the time of origination. The loans were amortized using prepayment data as well as information on loan maturities. Staff at the Federal Reserve Board used this method as a basis for their estimates of debt service burdens that was informally given out to users who requested it. The series was discontinued last year in response to concerns about the data. Specifically, many of the series that the method relied on were discontinued some time ago, and there was no current source of information that could be used as a benchmark. For example, data on the amount of loans originated in a given quarter have not been available for many years. Only the change in the amount outstanding, which is affected by both loan originations and payments, is currently available.

The newly estimated household debt service burden series is available from 1980 forward, and payments on consumer and mortgage debt are shown separately. As can be seen from this summary, much of the data needed to calculate the debt service burden must be approximated, and the series will be revised in the future as better data and improved methods of estimation become available. The series is available at the following website: http:///www.federalreserve.gov/releases/housedebt/
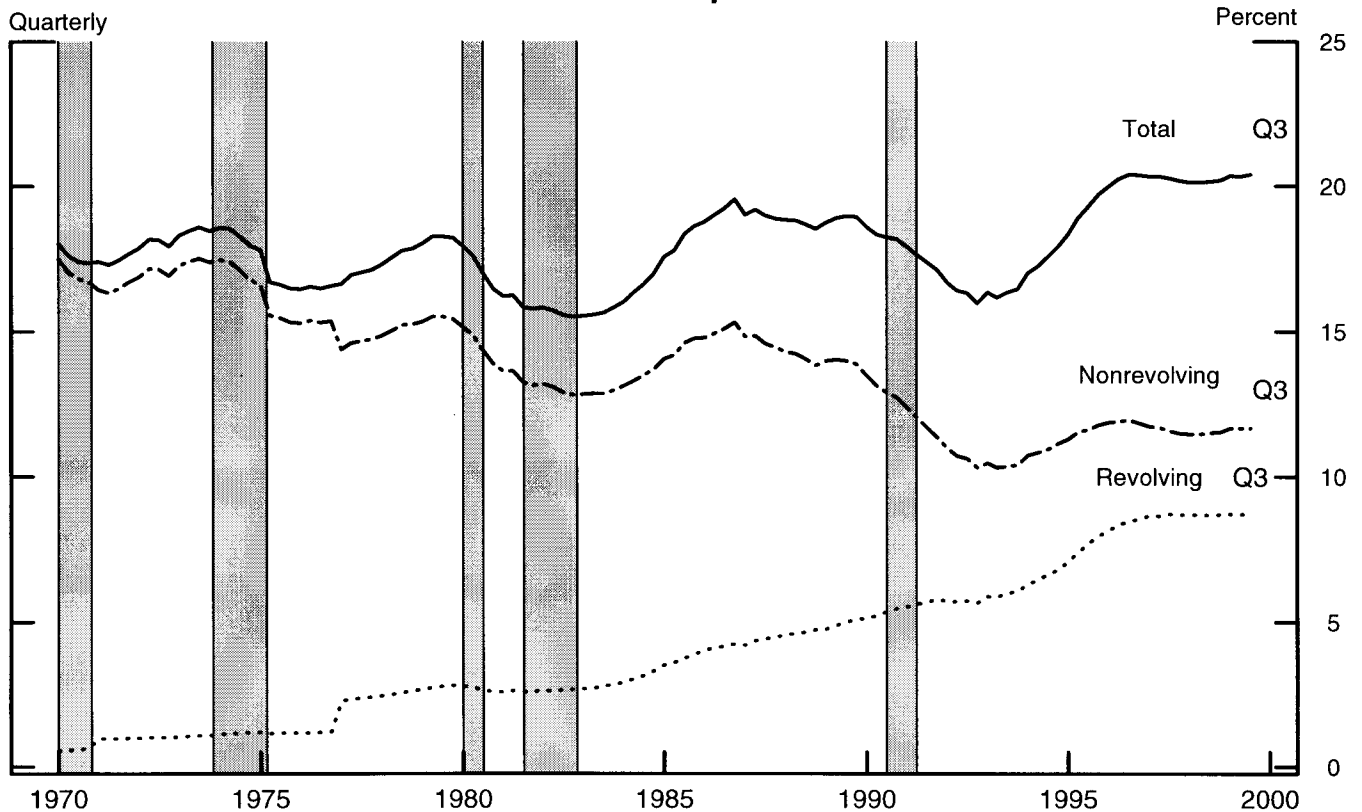
Chart 1

Household Debt Relative to Disposable Personal Income

Quarterly

Percent

Total

Q3

Q3

Mortgage

Consumer

Q3

100

80

60

40

20

1970   1975   1980   1985   1990   1995   2000

Shaded regions indicate recessions.
Source: Household debt from Federal Reserve; disposable personal income from Bureau of Economic Analysis.

Consumer Credit Relative to Disposable Personal Income

Quarterly

Percent

Total   Q3

Nonrevolving   Q3

Revolving   Q3

25

20

15

10

5

0

1970   1975   1980   1985   1990   1995   2000

Shaded regions indicate recessions.
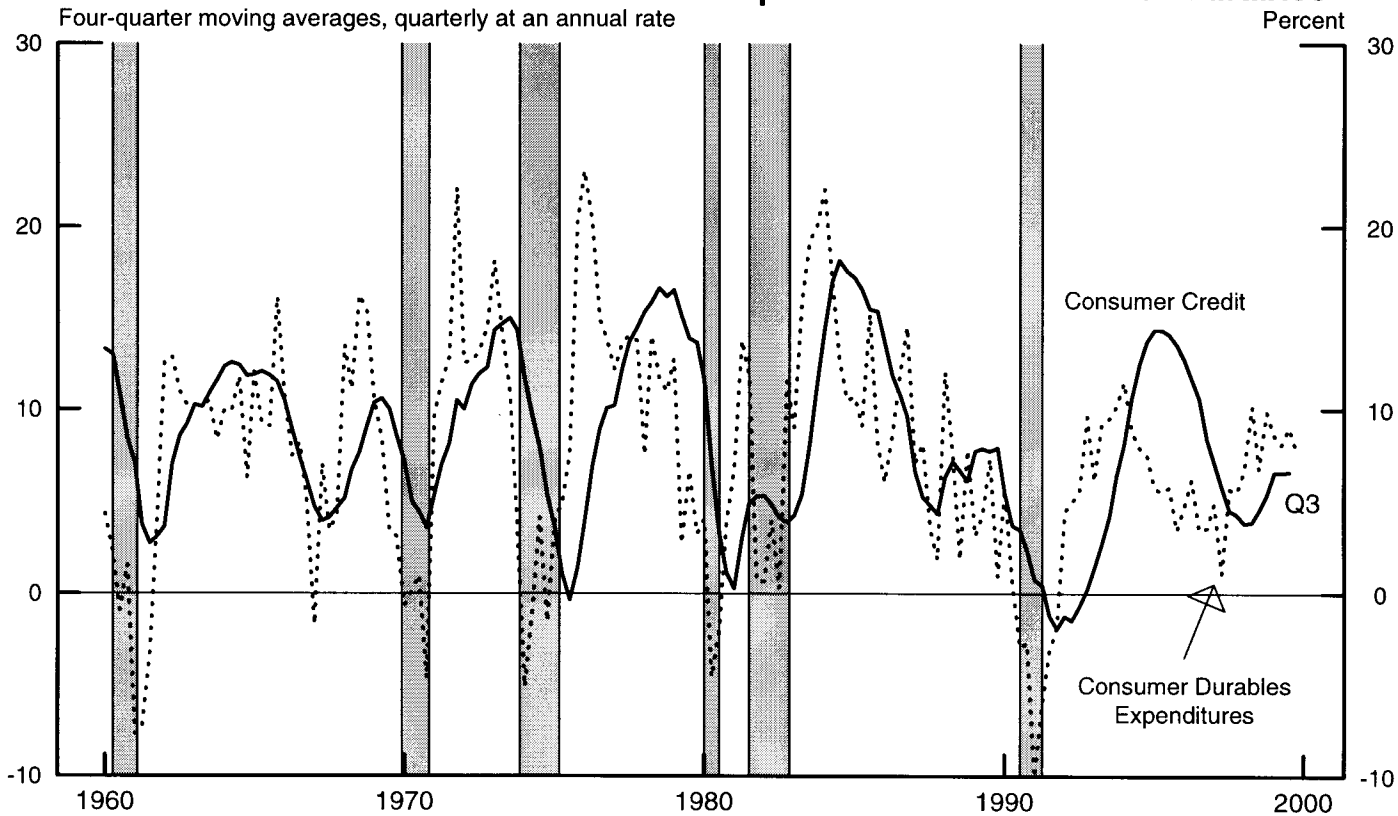Source: Consumer credit from Federal Reserve; disposable personal income from Bureau of Economic Analysis.

Chart 2

Growth Rates of Components of Consumer Credit

Four-quarter moving averages, quarterly at an annual rate   Percent

Shaded regions indicate recessions.
Source: Federal Reserve.

Growth Rates of Consumer Credit and Expenditures on Consumer Durables

Four-quarter moving averages, quarterly at an annual rate   Percent

Shaded regions indicate recessions.
Source: Consumer credit from Federal Reserve; consumer durables expenditures from Bureau of Economic Analysis.

Chart 3

Household Debt Service Burden

Quarterly

Percent

Q3
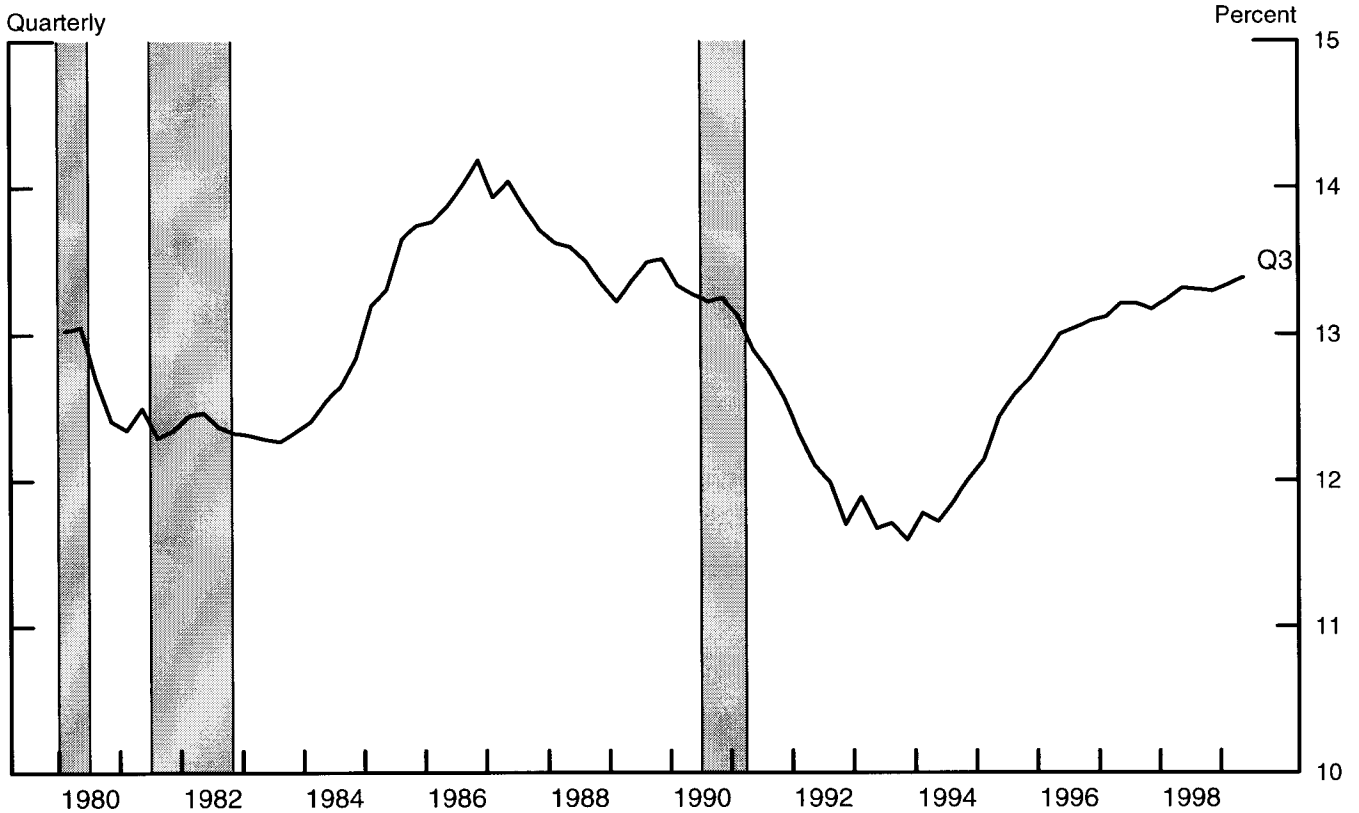
Shaded regions indicate recessions.
Source: Federal Reserve.

Components of Household Debt Service Burden

Quarterly

Percent

Consumer

Q3

Mortgage

Q3
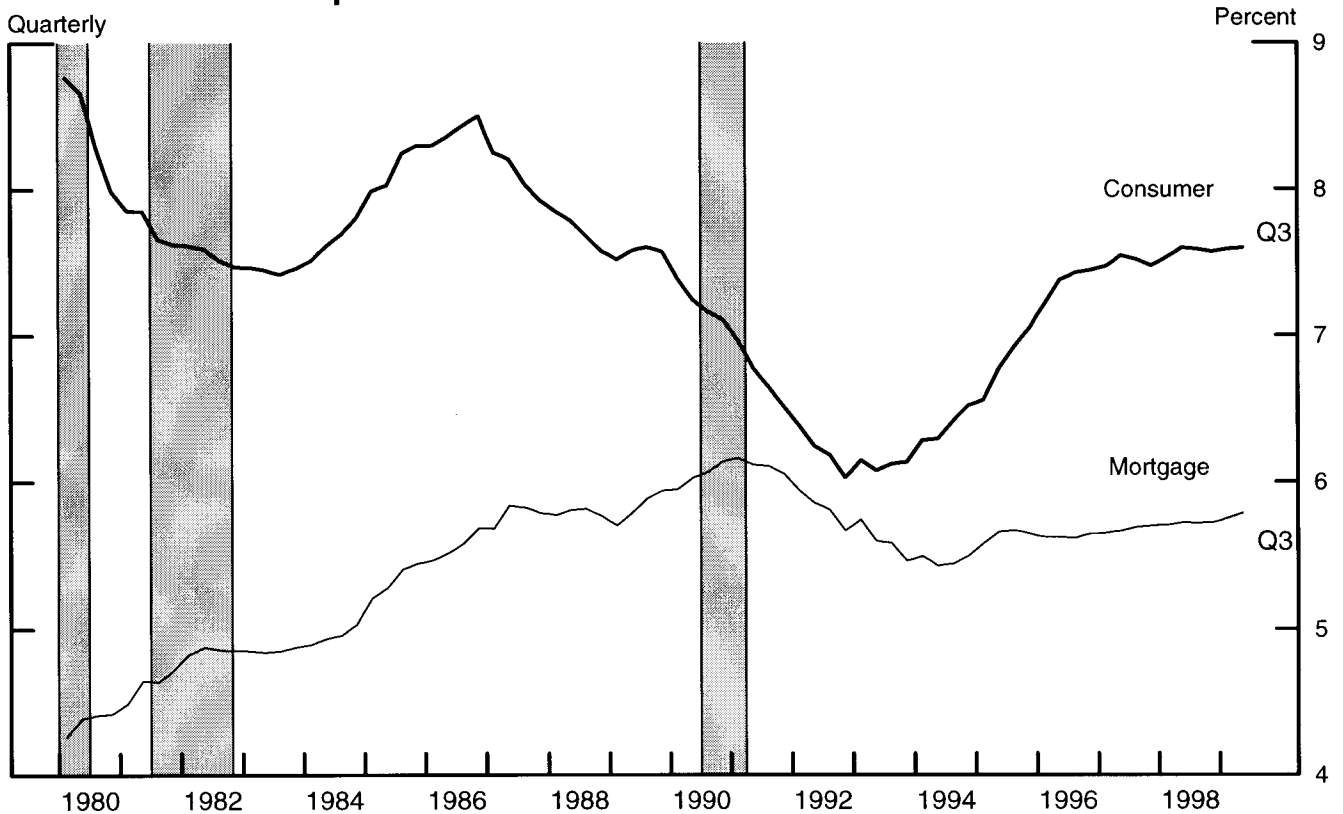
Shaded regions indicate recessions.
Source: Federal Reserve.

Chart 4

Household Debt Service Burden and Closed-end Consumer Loan Delinqencies

Percent

Debt Service Burden
(left scale)

Closed-end Loan Delinquencies
(right scale) *

Percent
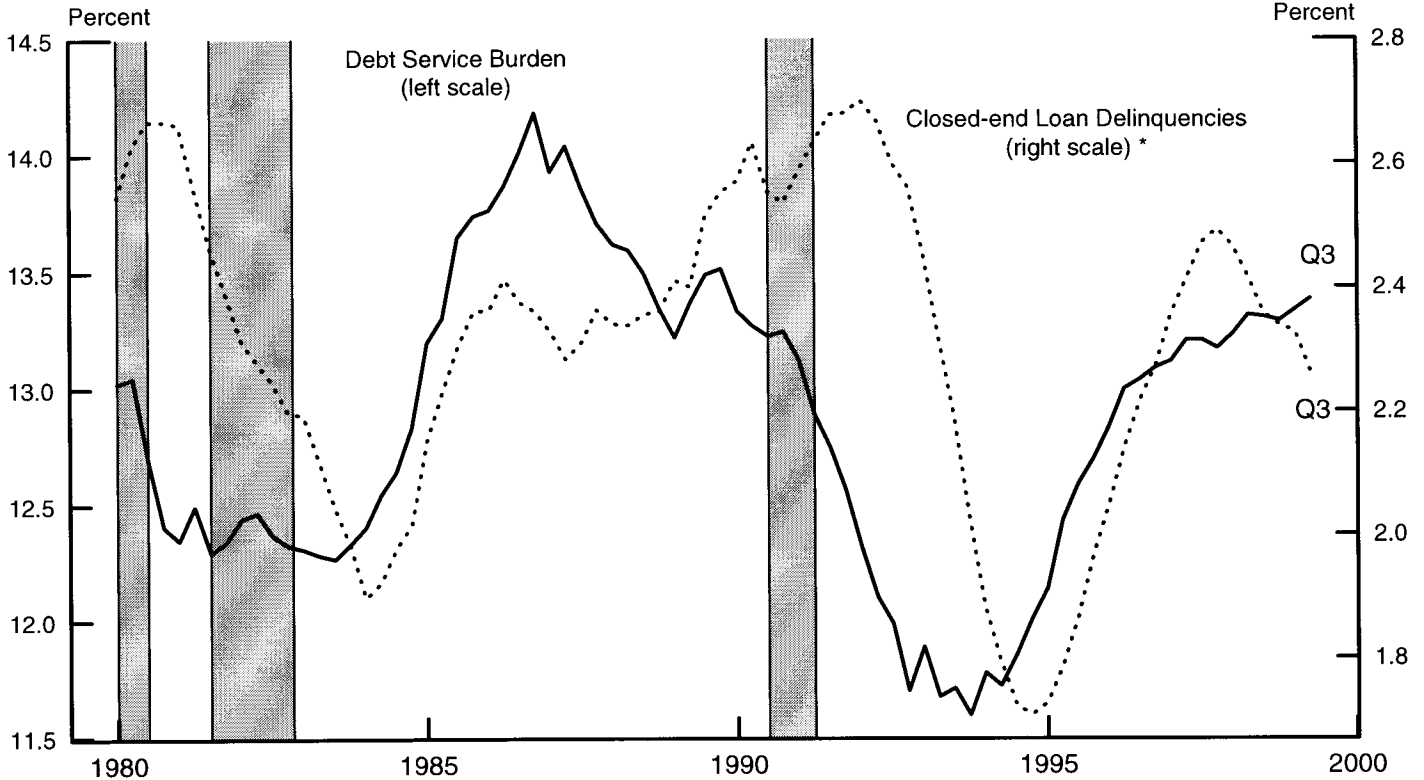
Shaded regions indicate recessions.

Source: Debt service burden from Federal Reserve; closed-end loan delinquencies from American Bankers Association.

* Four-quarter moving average.

Table 1--Consumption Regressions

	(1)	(2)	(3)	(4)	(5)
Constant	-0.083	-0.085	-0.071	-0.082	-0.109
	(-3.489)	(-2.252)	(-2.817)	(-3.334)	(-4.579)
Log (C_{t-1}/Y_{t-1})	-0.132	-0.146	-0.123	-0.129	-0.192
	(-2.784)	(-2.115)	(-2.601)	(-2.655)	(-4.009)
Δ Log (C_{t-1})	0.045	0.153	0.016	0.040	-0.103
	(0.503)	(1.202)	(0.178)	(0.426)	(-1.085)
Δ Log (Y_{t-1})	0.065	0.013	0.053	0.065	0.023
	(0.942)	(0.129)	(0.760)	(0.942)	(0.341)
Real Fed Funds Rate$_{t-1}$	-0.133	-0.102	-0.131	-0.131	-0.146
	(-5.557)	(-2.331)	(-5.468)	(-5.190)	(-6.316)
Log (Net Worth$_{t-1}$/Y_{t-1})	0.051	0.049	0.047	0.051	0.064
	(4.107)	(2.385)	(3.694)	(3.954)	(5.143)
Debt Service Burden$_{t-1}$		0.020			
		(0.157)			
Delinquencies$_{t-1}$			-0.220		
			(-1.579)		
Δ Bankruptcies$_{t-1}$				-0.003	
				(-0.278)	
Δ Consumer Credit$_{t-1}$					0.155
					(3.811)
R-Squared	.255	.174	.268	.256	.324
Number of observations	150	78	150	150	150

Note: Numbers in parentheses are t-statistics. Sample period in columns 1, 3, 4, and 5 is from 1962:Q2 to 1999:Q3; sample period in column 2 is 1980:Q1 to 1999:Q3. Dependent variable is the change in the log of real consumption. C_t is real consumption, and Y_t is real disposable personal income. Delinquencies refer to the percent delinquent on closed-end loans as reported by the American Bankers Association. Bankruptcies refer to personal bankruptcy filings reported by the Administrative Office of the U.S. Courts.

Table 2--Distribution of Debt Service Payments by Household Net Worth, 1995

	Household Net Worth (Thousands of Dollars) (1)	Debt Service to Income (Percent) (2)	Debt Service to Net Worth (Percent) (3)	Share of Total Debt Service (Percent) (4)	Payments 60 Days Past Due (Percent) (5)
1.	< 25	14.2	65.4	16.6	16.1
2.	25-100	18.7	11.6	29.0	6.9
3.	> 100	13.5	1.9	54.4	2.8

Source: Survey of Consumer Finances.