

Financial engineering, consumer credit, and the stability of effective demand

Abstract: *This paper examines the macroeconomic implications of recent developments in financial engineering, with particular emphasis on the post-1987 growth of markets for securities backed by credit card, installment, student loan, and home equity receivables. Three linkages of financial engineering to effective demand are identified: (1) funding effects, (2) liquidity preference or speculative effects, and (3) balance sheet or Minsky effects. Data from the Survey of Consumer Finances are used to investigate the importance of asset-backed security-related funding and balance sheet (Minsky) effects in the United States. Evidence is shown that financial engineering has boosted borrowing power at all income levels. The liberal use of expanded borrowing opportunities has fueled the growth of consumption—especially since 1995. However, a secularly rising share of U.S. households have entered the categories of “speculative” or “Ponzi” finance units—a factor that raises doubts about the sustainability of the current spending boom.*

Key words: *asset-backed securities, consumer credit, financial instability.*

Financial engineering describes the process of converting hitherto illiquid mortgage and consumer receivables into marketable securities as well as the development of primary and secondary markets for derivative assets of these types. This paper endeavors to shed light on the macroeconomic implications of recent (within the past two decades) achievements of financial engineering. Among the issues that receive attention: Has the securitization of mortgage and consumer loans made credit more widely available, and if so, to what effect? With the deepening of markets for securities backed by mortgage, automobile, credit card, home equity,

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or educational loans, is there a nascent threat of instability arising from speculation? Finally, is financial engineering (partly) to blame for the deteriorating status of a large number of household balance sheets in the United States in the past 10 to 15 years?

What is financial engineering?

Financial engineering is homologous with the process of *securitization*—that is, the reconfiguration of illiquid claims to future cash flows into standardized, marketable assets. The term also applies to the creation of synthetic, derivative instruments that enable institutions (pension funds or university endowments, for example) to hedge positions in securities backed by conventional mortgage or consumer loans. This paper takes aim at two comparatively recent innovations—the mortgage-backed security or MBS (tradable instruments collateralized mortgage loan obligations) and the asset-backed security or ABS (collateralized by consumer debt).

The asset securitization technique can be briefly described as follows: A finance company specializes in the sale of hire-purchase agreements (installment loans to finance cars, motorcycles, boats, or other items). Finance companies historically financed positions taken in consumer receivables through bank loans or the direct issue of commercial paper. Under the new regime, consumer receivables are sold to a *special purpose vehicle* (SPV)—that is, a company created for the express purpose of structuring these pools of future cash flows into homogenous lots that can be placed with large pension funds, insurance companies, and other institutional portfolios. A trust agreement is created at the point of issued that requires the transfer of hire-purchase agreements (or credit card or student loans receivables, as the case may be) to a trust *not* controlled by the loan originator (the finance company) or the SPV. The newly issued securities are “backed” by the assets of the trust—hence, the term *asset-backed securities*. The pool of assets in the trust have been screened by the originator, a rating agency, and in some cases, by an independent guarantor. The new notes issued by the SPV therefore carry an investment grade, making them substitutable with short-dated Treasury issues or commercial paper.¹ The mechanics of placement for ABSs are much

¹ Schwartz explains that “[a] securitization transaction can provide obvious cost savings by permitting an originator whose debt securities are rated less than investment grade . . . to obtain funding through an SPV where debt securities have an investment grade” (1994, p. 137).

the same as for corporate equities or municipal bonds. A prospectus must be circulated. Investment banks take the securities to market (and, as might be expected, competition for the lucrative fees that can be realized through ABS placement is fierce). The issuers of ABSs include *all* major players in the domestic consumer finance industry. A partial listing includes Wachovia Bank, Honda Finance, Nissan Motor Acceptance Corporation, Toyota Motor Credit, Mitsubishi Finance, the Credit Store, Chase Manhattan Bank, Circuit City, Nieman Marcus, Dillards, J.C. Penney, Sears, Dayton-Hudson, Federated Department Stores, Banc One, Capital One, Citicorp, Ford Motor Credit Corporation, General Motors Acceptance Corporation, and Bank of America. Giddy notes that

[t]he asset securitization process, while complex, has won a secure place in corporate financing and investment portfolios because it can, paradoxically, offer originators a cheaper source of financing and investors a superior return. Not only does securitization transform illiquid assets into tradable securities, but it also manages to transform risk by means of the separation of sound financial instruments from a company with little or no loss. (2005)

The ABS market has been buttressed by strong demand in the past several years as new issues have regularly been oversubscribed. In addition to their liquidity and attractive return, these securities appeal to banks, insurance companies, pension funds, and other institutions because the risks of holding them can be hedged with the use of other structured financial products—that is, derivatives.

Structured finance specialists identify two types of risk attached to ABSs (or MBSs)—interest rate risk and default risk. *Prepayment risk* is a special category of interest rate risk and is mainly confined to the MBS segment. Because mortgage debt instruments typically give borrowers the option to pay off their notes at any time, MBSs have “embedded call options” (Lee, 2003, p. A14). Profit margins of leveraged MBS holders (particularly those with substantial long-term debt) are interest-sensitive because a decline in rates will cause a surge in prepayments as homeowners refinance on more favorable terms. The more general form of interest rate risk arises from a mismatch between maturities of liabilities and assets. The default risk affixed to specific categories of ABSs or MBSs is, owing to explicit or implicit federal government guarantees, virtually nil. For example, most of the assets that collateralize student loan asset-backed securities (SLABS) are federally guaranteed pursuant to the Higher Education Act of 1965. The status of securities backed by mortgages is a little murkier. The dominant issuers, Freddie

Mac and Fannie Mae, are now privately owned entities. However, hardly anyone believes the federal government would stand by idly in the event of a systemic default by mortgagees in trust pools underlying Federal National Mortgage Association (FNMA) or General National Mortgage Association (GNMA) issues.

Derivatives enable institutions to insure against the loss of (financial) capital by shifting risk to other parties. For example, an institution seeking to hedge positions in stocks, commodities, currencies, or other assets may purchase an option to sell a market basket of stocks, commodities, and so on, at a specified price at a specified future date. The value of the option is ostensibly “derived” from the value of the underlying assets. The explosive growth of the derivatives trading since the 1980s is usually explained by two factors: (1) the growing concentration of financial assets in professionally managed portfolios; and (2) developments in theory of finance—most importantly the Black–Scholes model of options pricing.²

The most widely used device is the over-the-counter credit default swap.³ This is an arrangement whereby the hedging party makes periodic “coupon” payments to a counterparty that is obligated to make a payment to the first party in the event of a “credit event” (for example, default or a downgrade by rating agencies), the size of the payment being dependent on the market value of the “reference assets” following the credit event.⁴ Total return swaps, or agreements between two parties to exchange the total returns from financial assets, is another means by which agents may insure against prepayment, interest rate, or default risk.⁵

Structural change in the lending industry

The financial innovations explicated above have brought forth a structural transformation of the mortgage and consumer lending industries. Table 1 reveals, for example, that whereas in 1976 traditional mortgage

² See Black and Scholes (1973). For a discussion of the importance of the Black–Scholes theorem in the development of the securities industry, see Rubinstein (1987).

³ For an explanation of different categories of derivatives, see Choudhry (2004).

⁴ Hedge funds were counterparties to derivatives contracts insuring positions in GM and Ford Motor debt and suffered massive losses after downgrades by the rating agencies in May 2005. See Whitehouse (2005).

⁵ Prepayment derivatives were invented in 2003. See Fabozzi (2005) for a description. Freddie Mac (which has immense holding of “retained” MBSs—valued at approximately \$1.5 trillion, or about a quarter of the total outstanding, in 2005) is the single largest user of prepayment derivatives.

Table 1
Mortgage debt outstanding by holder

Type of holder	Year					
	1976		1990		2004	
	Amount (millions of dollars)	Percent of total	Amount (millions of dollars)	Percent of total	Amount (millions of dollars)	Percent of total
All holders	889,202	100.0	3,856,205	100.0	10,507,442	100.0
Commercial banks	151,326	17.0	843,136	21.9	2,594,408	24.7
Savings institutions	404,644	45.5	801,628	20.8	1,058,435	10.1
Life insurance companies	91,555	10.3	267,335	6.9	269,998	2.6
Federal and related agencies	66,753	7.5	250,762	6.5	550,589	5.2
Mortgage pools or trusts	49,801	5.6	1,103,950	28.6	5,037,544	47.9
Individuals and others	125,123	14.1	638,172	16.5	996,468	9.5

Source: Federal Reserve Bulletin, table B-72 (www.gpoaccess.gov/usbudget/fyo5/sheets/b76.xls).

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lenders (commercial banks and savings and loans) held a combined 62.5 percent of mortgage debt outstanding on their books, by 2004 their share had fallen to 34.8 percent. The striking fact is the sharp increase in the proportion of mortgage debt held by “mortgage pools or trusts.”

Figures 1 and 2 illustrate the growth of securities outstanding collateralized by credit card (revolving) and consumer installment (nonrevolving) receivables. Securities of this type have increased 20-fold since 1989. Forty-two percent of the growth of consumer credit outstanding between 1989 and 2005 is accounted for by the growth of ABSs. Sixty-two percent of the growth of revolving credit outstanding since 1989 is accounted for by securities backed by nonrevolving (installment) receivables.

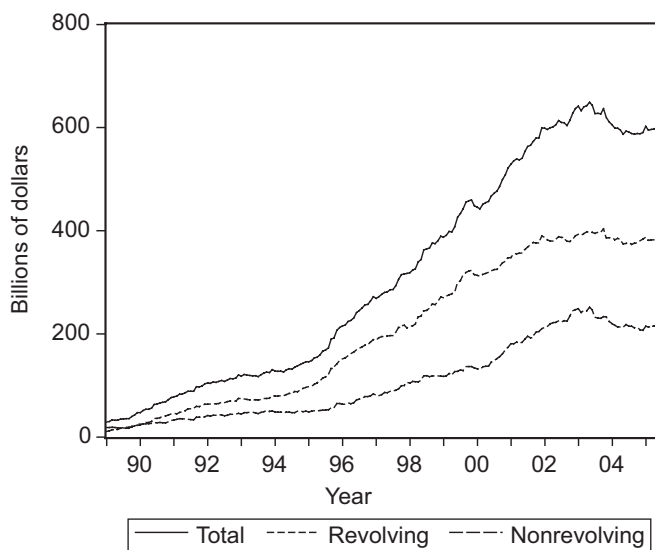
The Bond Market Association reported that in September 2005 the value of ABSs outstanding was \$1.92 trillion. The breakdown by loan category was as follows: \$513 billion (or 26.7 percent of the total) of outstanding ABSs were collateralized by home equity loans; \$360.8 billion (18.8 percent) by credit card receivables; \$226 billion (11.8 percent) by auto loans; \$139 billion (7.2 percent) by student loans, and \$683.8 billion (35.5 percent) by “other.”⁶ Bonds backed by mortgage and consumer receivables together accounted for 32 percent of the bond market in 2004, compared to 27 percent for U.S. government and agency debt and 20 percent for corporate debt.⁷

When mortgage or consumer receivables are illiquid, the general availability or “supply” of credit (or finance) is limited by the tolerance of wealth holders (or controllers) for illiquidity. The securitization of consumer receivables removes the constraint on the expansion of mortgage or consumer lending imposed by the general distaste of wealth controllers for nontradable assets. By morphing into securities, consumer debts gain entrance to a vast new market which at present is (approximately) coextensive with the aggregate of professionally managed pools of financial assets worldwide.⁸ Assuming ABSs accounted for an unchanging fraction of holdings for these units, growth of institutional portfolios would bring

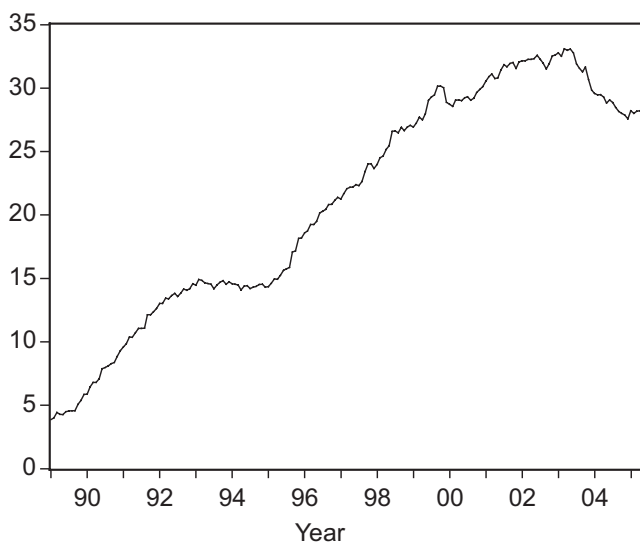
⁶ “Other” includes loans for manufactured housing and equipment leases.

⁷ These figures were supplied by the Bond Market Association and were reported by Luchetti (2004).

⁸ Giddy writes that “securitisation issues are still difficult for retail investors to understand. Hence most securitisations have been privately placed with professional investors. However, it is likely that in [time] to come, retail investors could be attracted to securitised products” (<http://absresearch.com>, July 1, 2005).

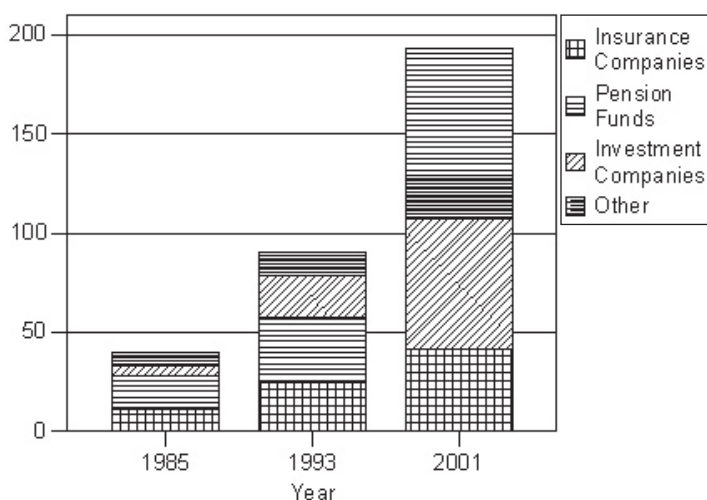
Figure 1 Asset-backed securities outstanding from U.S. issuers

Source: Federal Reserve Board (www.federalreserve.gov/releases).

Figure 2 Asset-backed securities as a percent of total consumer credit outstanding in the United States

Source: Federal Reserve Board (www.federalreserve.gov/releases).

Figure 3 Institutional portfolio assets in the United States (in trillions of dollars)



Source: OECD Institutional Investor Statistics 2003 (<http://puck.sourceoecd.org>).

forth a shifting demand for these instruments, *ceteris paribus*. The prodigious growth of financial asset pools under professional management is a striking development of the past quarter century. Financial assets of “institutional investors” in Organisation for Economic Cooperation and Development (OECD) countries nearly doubled in money terms between 1993 and 2001 (see Figure 3). The market value of assets held in U.S. institutional portfolios increased by a staggering \$102 trillion in the same period, or 112 percent (see Figure 4). It should also be pointed out that the size of institutional portfolios has increased in relative as well as absolute terms. That is, the proportion of total intangible assets under professional management has increased markedly. Institutions account for the lion’s share of daily volume on bourses worldwide.

Although a thoroughgoing treatment of the causes of institutional portfolio growth is not indicated here, a few key factors can be identified.⁹ Demographics are clearly important. The United States, Europe, and Japan have recently seen bulging huddles of postwar cohorts advance through

⁹ See Brown (1998).

educations, and other items.¹⁰ The negative or destabilizing aspects of the new regime are of two types: (1) speculative or *liquidity preference* effects, and (2) balance sheet or *Minsky* effects. The former effect may cause a constriction of the availability of funding, whereas the latter is capable of impinging on the supply or demand for funding.

The nexus of financial engineering (or securitization) to effective demand should be understood in relation to a basic principle of Post Keynesian thought: Navigating in a social environment that is uncertain or nonergodic—that is, that “outcomes on any specific future date [cannot] be reliably predicted by a statistical analysis of past and current market data” (Davidson, 2002, p. 51)—gives rise to the desire for stores of value that are liquid. In a nonergodic, transmutable reality, the future is not merely unknown—it is unknowable.¹¹ Liquidity offers a means of deferring economic decision making, of “[evading] the consequences of such unknowledge” (Shackle, 1989, p. 49).

The fact that income is received in money—that is, in a form that gives agents the power to withhold spending power from real sector circulation—would seem to present a crippling blow to the claim that modern economies exhibit a natural tendency to full employment. The production of liquid assets, in contrast to tangible but illiquid capital goods, requires a minimal employment of real resources. This factor explains why liquidity preference is capable of causing an insufficiency of effective demand. The low elasticity of substitution between indivisible, specialized capital goods and money or marketable securities means that the accumulation of liquid claims to goods (saving) does not automati-

¹⁰ Post Keynesians distinguish between *finance* and *funding*. *Finance* refers to comparatively short-term loans to production units (for example, farmers, building contractors, or small business) needed to bridge the interval between the disbursement of factor cost and receipt of income from the sale of crops, new homes, or other goods and services. Finance is mainly provided by depository institutions. *Funding* is usually defined as demand for liquidity to purchase long-lived, tangible assets, and is accomplished through the issue of new securities. As will be discussed later, a significant component of the spending power created by the issue of ABSs is used for the purchase of nondurable items such as airline tickets or hotel lodging.

¹¹ Reality is transmutable when “future economic outcomes may be permanently changed in nature and substance by today’s actions of individuals or groups (for example, unions, cartels, or governments), often in ways not perceived by the creators of change” (Davidson, 2002, p. 52).

cally result in the employment of economic resources to manufacture tangible stores of value.¹²

The preference for liquid portfolio assets presents a formidable obstacle to capital development. The main contribution of financial engineering lay in transforming owners' or creditors' legal claims to future income streams of business enterprises (the balance sheets of which, after all, consist mainly of specialized capital goods) into financial assets salable at low transactions cost in orderly secondary markets. Securitization makes commitments to produce capital goods that are, from the collective point of view, irrevocable nevertheless reversible for individuals. Securitization and public ownership are innovations that relieve the tension between liquidity preference and the staggering capital requirements imposed by modern production methods.¹³

The existence of orderly, continuous spot markets for previously issued equities and bonds is a necessary condition for a high volume of new issues, the proceeds of which supply the funding for investment. Does it follow that financial engineering exerts an unambiguously beneficial effect on effective demand? Keynes noted that

[i]n the absence of security markets, there is no object in frequently attempting to revalue an investment to which we are committed. But the Stock Exchange revalues many investments every day and the revaluations give a frequent opportunity to the individual (though not to the community as a whole) to revise his commitments. . . . But the daily revaluations of the Stock Exchange, though they are primarily made to facilitate transfers of old investments between one individual and another, exert a decisive influence on the rate of investment. (1936, p. 151)

Price movements of existing securities are causally linked to the pace of new issues (and, hence, investment) because (1) there is near-perfect substitutability between old and new issues; and (2) (in mature economies, at least) the flow of new issues (say, per month) is miniscule in relation to the existing stock of shares or bonds. Soaring valuations improve the

¹² Davidson writes that "[t]he basic message of Keynes's General Theory is that too great a demand for liquidity can prevent 'saved' (that is, unutilized or involuntarily unemployed) real resources from being employed to expand the economy's productive facilities" (Davidson, 2002, p. 10).

¹³ The progress of secondary markets for equities and bonds requires a reliable legal infrastructure to enforce fiduciary standards, transparency, and debt covenants. The institutional prerequisites for viable securities industries appear to have been underestimated by U.S. economic advisers to the Russian government, for example.

terms on which new issues can be floated off, whereas falling prices heighten the risk that new offerings will be undersubscribed.¹⁴ Thus, speculation (or changing liquidity preference) is capable of perturbing the scale of output and employment by virtue of the concatenation of conditions in primary markets to prices prevailing in secondary markets for securities.¹⁵ It is by this mechanism that “bullishness” or “bearishness” impinges on the real economy. Keynes wrote that “[t]he question of the desirability of having a highly organized market for dealing with debts [or equities] presents us with a dilemma” (ibid., p. 172). On one hand, the financial engineering paved the way for the rise to dominance of large-scale business organizations; but it left society more vulnerable to shocks emanating from the financial sector. However, the conventional Keynesian view holds that changing liquidity preference (connected to the speculative motive) mainly affects *business* investment. Taking into account the structural changes in the mortgage and consumer lending industries described in the preceding section, have new channels opened up whereby changing views about an uncertain future condition decisions to employ resources today? That is, has the emergence of secondary markets for MBS and ABS created the opportunity for speculation to shock housing and consumer goods markets?

Balance sheet or “Minsky” effects

Hyman Minsky (see Minsky, 1986) claimed that a key determinant of investment (and, hence, the demand for funding) is the relationship between the firms’ current flow of receipts from operations and their “liability structures”—that is, contractual obligations to pay interest and principal on existing debt. Minsky’s cash flow–debt principle can be extended to consumption if (1) households carry substantial debts, and (2) a nontrivial share of household purchases are funded by the issue of IOUs. Under these conditions, the growth of consumption expenditure depends partly on the willingness of households to layer balance sheets

¹⁴ The sharp decrease in initial public offering (IPO) volume following the dot-com crash provides an excellent recent example.

¹⁵ The term *rising liquidity preference* connotes a general increase in the desire for assets that provide insurance against what Robinson called “capital uncertainty” or potential loss of (financial) capital due to interest rate or share price fluctuations (see Robinson, 1979, p. 138). Rising liquidity preference describes a “flight to safety” or a shift into asset groups characterized by low capital uncertainty. Included among these is money proper but also near-monies such as commercial paper and short-dated, gilt-edged securities. For a reexamination of liquidity preference, see Brown (2004).

with additional debt obligations and partly on the readiness of consumer lending agencies to accommodate credit demand. The willingness to borrow or lend is, in turn, conditioned by the sufficiency (or lack thereof) of current income with respect to debt service.

Minsky developed the following taxonomy for borrowing units:

1. Hedge units: Cash receipts (or income) are sufficient to repay interest and principal.
2. Speculative units: Cash receipts (or income) are adequate to repay interest but not principal. These units must roll over existing debts.
3. Ponzi units: Cash receipts (or income) are insufficient to repay interest or principal. Ponzi units must add debts (or sell assets) merely to pay interest on existing debt obligations.

The “financial instability” hypothesis posits a tendency to decay of overall balance sheet quality in the course of business cycle expansions. A boom underpinned by debt must inevitably result in the migration of many spending units from “hedge” to “speculative” and “Ponzi” status. Widespread financial deterioration may precipitate an episode of what Minsky termed *debt deflation*. Debt deflation is potentially catastrophic because (1) it chokes off new borrowing to finance spending for tangible, reproducible things (such as producer and consumer durables); and (2) it entails a massive redirection of income flows from product markets to debt servicing. The severity of economic contractions is intensified as a consequence of this process of balance sheet adjustment.

The following is the main question of interest here: Has financial engineering increased the risk of debt deflation by easing the borrowing constraint faced by the household sector? Applying the Minskian logic to the household sector, we may hypothesize that the likelihood of debt deflation is directly proportional to the fraction of households that at a particular point in time can be classified as speculative or Ponzi units. Thus, financial engineering may be said to be harmful if its effect is to diminish the share of consumers that practice hedge finance—an issue taken up in the following section.

Funding effects and consumption

A primary effect of the securitization of mortgage and consumer receivables is to boost the borrowing power of households situated across a wide band of the income scale. Cross-sectional data reveal that spending–income ratios tend to be higher for lower-income households

and vice versa—that is, the marginal propensity to consume out of the marginal increment of income is (on average) diminishing. Thus, widened credit availability has an effect comparable to that of reduced income inequality—that is, it makes the aggregate propensity to consume higher than it would be otherwise.¹⁶

If the thesis articulated above is correct, the consumption functions should exhibit structural instability—that is, regression coefficients for the pre-ABS era should be different than those for the post-ABS era. To examine this question, an ordinary least squares estimation of a standard consumption model was performed using monthly U.S. data for 1972–2005. The model posits consumption (C) as a function of personal disposable income (DY), wealth as estimated by the opening monthly value of the Standard and Poor's Index of 500 stocks (SP), and interest rates as measured by the average rate of interest charged on loans issued by automobile finance companies (r). C and DY are measured in billions of dollars at seasonally adjusted, annual rates. The data were partitioned into two subsamples—one set for the pre-ABS era (January 1972 to December 1987) and another for post-1988 (see estimates in Table 2). In technical terms, the structural relationships between time series variables are stable if the subsets of coefficients are equal. The estimates reported above show substantial differences. Results of a Chow “breakpoint” test are displayed in Table 3 (see Chow, 1960). The F -statistic is used to test the null hypothesis that both samples belong to the same regression—that is, the coefficients are not time varying. The hypothesis of structural stability can be rejected at the 0.001 level.

The presence of structural instability is not by itself sufficient to establish the importance of ABS-related funding effects. The case for funding effects would be strengthened if it could be shown that (post-1987) (1) many households have experienced an increase in their ability to obtain credit for reasons *unrelated* to their creditworthiness; and (2) a sufficient number of households have availed themselves of expanded options to borrow such that the growth of aggregate consumption has come to be increasingly credit driven. With respect to (1) above, an indi-

¹⁶ This argument is developed at length in Brown (2004). With respect to the connection between distribution and the propensity to consume, Keynes stated that “[s]ince I regard the propensity to consume as being (normally) as such to have a wider gap between income and consumption as income increases, it naturally follows that the collective propensity for the community as a whole may depend . . . on the distribution of incomes within it” (Keynes, 1939, p. 129).

Table 2
Least squares estimates of consumption specifications using monthly U.S. data

Variable	Sample	
	1972–1987 (<i>n</i> = 193)	1987–2005 (<i>n</i> = 214)
Constant	60.7668 (2.988)	–663.18 (–9.898)
<i>DY</i>	0.8501 (163.530)	1.0264 (133.205)
<i>SP</i>	0.4723 (5.366)	–0.0220 (–0.962)
<i>r</i>	–5.3724 (–3.990)	9.5379 (2.836)
Adjusted <i>R</i> ²	0.999	0.999

t-statistics are shown in parentheses.

Table 3
Chow breakpoint test (breakpoint is December 1987)

<i>F</i> -statistic	143.484	Probability	0.000000
Log likelihood ratio	362.492	Probability	0.000000

vidual may find his or her borrowing power augmented as a result of an increase in his or her income, length of employment, or a change in other factors weighed in credit scoring algorithms. The term *expanded credit availability* describes a different phenomenon—specifically, the secularly enlarged borrowing opportunities of a person with a given credit score. Financial engineering boosts aggregate demand because it effectively raises the maximum amount that could be borrowed by households at virtually every tier of the creditworthiness hierarchy.

What empirical evidence is available to verify the hypothesis of expanded credit availability in the post-1987 United States? The tri-annual Survey of Consumer Finances (SCF; www.federalreserve.gov/pubs/oss/oss2/scfindex.html) provides information about many financial variables for a sample of approximately 22,000 U.S. households. By employing sample weights, it is possible to draw inferences about key measures for the U.S. population. Two questions contained in the survey are relevant to the issue of credit availability. Respondents are asked to list the number of Visa, Mastercard, Discovery, and Optima card accounts they have open. Also, respondents report the combined credit limit they have been

extended by issuers of these cards. Evidence about credit availability may be found by examining changes over time in the average number of credit cards held and credit limits of households in the same income categories. The information in Table 4 comes from microdata extracted from the SCF of the years 1989, 1995, 2001, and 2004.¹⁷ The income levels selected are \$5,000 ranges at the center of income quintiles for the year 2004.¹⁸ Thus, the bracket ranging from \$41,727 to \$46,727 is located in the third quintile and extends across the midpoint of the 2004 distribution. It should be noted that the variables “average number of credit cards” and “average credit limit” figure in households that do not carry these credit cards. The change in credit availability in the post-ABS era, at least as measured by the percentage increase in the average credit limit of a household within a given (narrow) income bracket, is most striking for low- and middle-income households. Observe that the average combined credit limit on Visa, Mastercard, Discovery, and Optima card accounts for the income range \$6,750–\$11,750 (bottom quintile) rose to \$3,590 in 2004 from a value of \$854 in 1989—an increase of 320 percent. Those in the \$23,492–\$28,492 bracket saw their credit limits expand by \$5,022 or 177 percent. It should not be surprising that, in absolute terms, high-income families saw the greatest expansion in borrowing power.

Precisely how does financial engineering make credit easier to obtain for low-income households? Note that securitization is a technique for achieving diversification. The collateral for an ABS consists of many thousands of comparatively small loans and thus is “granular”—meaning no large exposure to a single borrower. The granularity of ABS collateral, combined with the fact that many low-income individuals are prepared to pay dearly to obtain credit, eases the difficulty with which loan originators may bundle high-risk loans with better-quality receivables for transfer to SPVs.

There is no disputing the fact that a vast number of individuals have converted aggrandized borrowing privileges into spending for goods and services. The evidence takes the form of aggregate-level data on the time path household debt outstanding (in absolute terms and relative to

¹⁷ The survey questions regarding number of Visas, Mastercards, and so on, as well as combined credit limits on those accounts was included for the first time in the 1989 SCF.

¹⁸ These data were obtained from the U.S. Census Bureau Historical Income Tables and can be found at www.census.gov/hhes/www/income/histinc/inchhtoc.html.

Table 4
Average number of credit cards, average total credit limit by income level, selected years (2004 dollars)

Income range	Year					
	1989		1995		2001	
	Average number of credit cards	Average credit limit	Average number of credit cards	Average credit limit	Average number of credit cards	Average credit limit
\$6,750–\$11,750	0.078	\$854	0.488	\$1,876	0.538	\$2,575
\$23,492–\$28,492	0.565	\$2,835	1.194	\$5,861	1.244	\$7,296
\$41,727–\$46,727	0.967	\$5,175	1.667	\$10,757	1.810	\$12,210
\$68,160–\$73,160	1.133	\$9,936	2.270	\$15,368	2.056	\$18,993
\$120,107–\$125,107	1.561	\$14,644	2.732	\$23,190	2.030	\$32,524
					2.748	\$28,160

Source: Author's calculations from the Survey of Consumer Finances.

Notes: Average number of credit cards is the average number of Visa, Mastercard, Discover, and Optima card accounts open. Average credit limit is the combined total credit lines on aforementioned accounts.

income and consumption; see Figures 5 and 6). Further verification is provided by public access micro data pertaining to the status of household balance sheets.

Much has been made of the decrease in the saving rate of U.S. households (it fell from 15 to near 0 percent between 1985 and 2005). This is a surprising development in light of the rather sharp increase in income inequality that occurred in the United States during the period.¹⁹ The theorem that, *ceteris paribus*, the propensity to consume is a decreasing function of inequality is implicitly based on the assumption that income exerts a “hard” constraint on consumption. The practical effect of widened and deepened credit availability is to soften the budget constraint—that is, to free spending from the discipline imposed by current income. Viewed in a Veblenian light (see Veblen, 1898), borrowing is an expedient by which individuals are able to maintain their consumption status vis-à-vis other social classes in the face of rising income disparities.²⁰ The softening of budget constraints has important implications with respect to the time path of the saving rate. Specifically, the saving rate has declined mainly due to substantial cross-sectional changes in saving-income ratios. The prevalence of deficit spending is much greater today than 15 years ago. Moreover, the incidence of deficit spending is much higher for families in the bottom half of the income distribution. These factors taken together lead to the conclusion that consumption expenditure is appreciably more credit dependent than a cursory look at the statistics would suggest. Aggregate debt-to-income ratios do not reveal the underlying distribution of debt and income. If, over time, increases in income accrue disproportionately to wealthy individuals, and increases in debt are disproportionately distributed to the balance sheets of lower-income, deficit-spending units, then the aggregate debt-to-income ratio can remain roughly constant even when a greater share of consumption expenditure is debt financed.

¹⁹ The U.S. Census Bureau reports that the Gini ratio for household (market) income increased every year after 1981 (from 0.403 to 0.496 in 2004). These data are taken from the U.S. Census Bureau Historical Income Tables, E-6 (www.census.gov/hhes/www/income/histinc/ineqtoc.html).

²⁰ Bob Davis of the *Wall Street Journal* reported that “[m]ore and more Americans are turning to debt for lifestyles their current income cannot support. They are determined to live a better life than their parents, seduced by TV shows like ‘The O.C.’ and ‘Desperate Housewives’ which take upper-class life for granted, and bombarded with advertisements for expensive automobiles and big-screen TVs. . . . For Americans who aren’t getting a big boost from e workplace raises, easy credit offers a way to get ahead, at least for the moment” (2005, p. A1).

Much has been written about the importance of home price appreciation in explaining the recent consumer spending boom. Two points need to be raised here. First, taking into account the relatively inelastic supply of owner-occupied housing, a sharp increase in the availability of mortgage finance is capable of generating substantial upward pressure on real estate values. Second, escalating real estate values have the potential to boost consumer spending mainly to the degree that homeowners are able to convert their hypothetical new wealth to spending power. Whereas the MBS has been instrumental in enlarging the pool of mortgage money and holding down its price, the ABS has effectively made home equity a more liquid asset.

A large number of variables drive home prices. However, the evidence suggests that cheap, widely available mortgage money may be the most important factor in explaining rising home prices in the past 10 to 15 years. As was noted earlier, the MBS is an instrument that trims funding costs by giving holders diversification across a large number of mortgage borrowers. Also, the *de facto* federal guarantee carried by Ginnie Mae and Freddie Mac makes their yields (and thus mortgage interest rates) lower than they would be otherwise. The phenomenal growth of demand for MBSs in the past decade swelled the ranks of home buyers. It also increased the average amount that mortgage borrowers could qualify for.²¹ These developments produced a consequential market externality—a massive rise in the estimated value of home equity available to be “cashed out.” Although a few households may be able to accomplish this through the sale of their homes, a generalized movement to realize or “lock-in” real estate capital gains through the sale of property is subject to the fallacy of composition.

Looking back, it is difficult to imagine how new products such as home computers, DVD players, flat screen TVs, MP3 players, digital cameras, or SUVs could have achieved such stunning levels of market penetration during the past several years *sans* financial engineering. Moreover,

²¹ The *Wall Street Journal* reported that “[i]nvestor’s strong demand for mortgage debt, besides allowing lenders to offer many borrowers better terms, has also made it easier to offer mortgages to borrowers who might not easily qualify for a loan. The growth of mortgage markets spreads the risk around. But some mortgage-industry analysts say lenders have become less stringent in their loans terms because they can sell almost any type of loan to those who package mortgage securities to investors” (Simon et al., 2005, p. A1).

ABS-related funding effects have contributed to the U.S. import boom and current account deficits.

Evidence of Minsky effects

By selling their IOUs, households are pledging a stream of future income in exchange for spending power today. Thus, consumer finance effectively shifts spending from the future to the present. But debt-financed spending has obvious balance sheet consequences or what were earlier termed *Minsky effects*. Thus, the question arises: To what degree is a debt-bolstered consumer spending boom sustainable?

The purpose of this section is to assess the implications of financial engineering for the quality of household balance sheets in the United States. Precisely, we are interested in statistics that track changes over time in the capacity to service debt obligations. It is not possible (at least without arbitrary assumptions) to give precise estimates of the distribution of household units in a given year between the categories of hedge, speculative, and Ponzi finance. There are statistics that enable one to make reasonable inferences about the general direction and sinew of movement among these divisions.

The debt service ratio is the Federal Reserve's estimate of the required minimum payment on consumer borrowing. It is determined by the amount of debt outstanding (excluding home equity and mortgage debt) and hire-purchase terms (payment schedules, interest rates, and other fees). The financial obligations ratio adds other consumer obligations (automobile lease payments, rental payments on tenant-occupied property, homeowners' insurance, and property tax payments) to the debt service ratio. The decline of these time series after 1986 is partly explained by the substitution of home equity loans for conventional consumer loans after the elimination of the tax deductibility of interest paid on the latter type of debt. But the record shows a more or less uninterrupted rise in these ratios between 1994 and 2002, followed by a brief moderation and then another surge beginning in the fall of 2003 (see Figure 7). Both indicators are presently near their peak levels, and well above historic averages. The behavior of these variables certainly does not serve to falsify the hypothesis that a large cohort of families is more financially distressed today than 10 years ago. The debt service and financial obligations ratios are nevertheless of limited usefulness for our purposes. For one thing, they omit home equity debt. Second, they are aggregate ratios and thus give no information about the underlying distribution of debt or income across households. As was mentioned earlier, the time

Table 5
Debt-to-income ratios by quintile

Quintile	Year				
	1983	1989	1995	2001	2004
Bottom	0.384	0.236	0.291	0.491	0.427
Second	0.153	0.179	0.200	0.258	0.354
Middle	0.150	0.239	0.180	0.250	0.282
Fourth	0.140	0.221	0.160	0.206	0.260
Top	0.138	0.178	0.092	0.140	0.145
Top 5 percent	0.126	0.201	0.047	0.107	0.088
All	0.181	0.215	0.192	0.264	0.304

Source: Author's calculations from the Survey of Consumer Finances.

Note: Debt includes consumer and home equity debt.

Table 6 provides estimates for various years of the fraction of households within income quintiles (and the top 5 percent) with debt-to-income ratios exceeding 0.4 and 0.6. Note that for the entire population, slightly more than 10 percent had debt-to-income ratios greater than 0.4. The number was 12.4 percent in 1995 and then rose to 23.2 percent in 2004. Note also that debt-to-income ratios for the top quintile and top 5 percent actually decreased in the same period. This is not surprising given that the top quintile (and top 5 percent) saw its share of total income increase from 44.7 to 50.1 (16.4 to 22.4) percent from 1983 to 2001.²² The story is much different for the remaining 80 percent of households, and especially the bottom two quintiles. Notice, for example, that the proportion of units within the lowest quintile with a debt-to-income ratio exceeding 0.4 rose from 14.5 to 40 percent between 1995 and 2004. Notice also that while approximately 9 percent of second quintile units had debt-income ratios in excess of 0.6 in 1995, the comparable figure in 2004 was 26.2 percent. In summary, the evidence of Minsky effects related to financial engineering is quite overwhelming. Moreover, it is highly questionable as to whether the pace of borrowing (and consumer spending) achieved in the past decade can be sustained in light of the deterioration of household balance sheets.

As was noted earlier, Minsky effects can induce a decrease in the supply or demand for credit card, installment, student, or home equity

²² These data were taken from the U.S. Census Bureau Historical Income Tables, IE-3 (www.census.gov/hhes/www/income/histinc/inchhtoc.html).

loans. One consequence of the developments highlighted in Tables 5 and 6 is an increase in lenders' risk. The likelihood of default is mainly regulated by the sufficiency of income flows in relation to debt servicing requirements. A systemic rise in debt-income ratios must therefore be accompanied by falling credit scores (and, hence, decreased access to credit) for a great number of individuals. Balance sheet degradation also means a rise in bankruptcy-related charge-offs for lenders.²³ A standard reaction is to toughen credit standards. Korea furnishes a recent example of this phenomenon.²⁴

Minsky effects also heighten the risk of *household debt deflation*—the term used to describe a sudden and pervasive effort by consumers to reduce the share of current income flows claimed by debt servicing. Debt deflation has two dimensions—both of which are potentially deleterious with respect to effective demand. First, debt deflation brings about a sharp contraction in the pace of credit expansion and hence debt-financed expenditure. Second, households, in the short run, may actually increase the share of income allocated to debt servicing or retirement. The U.S. record reveals an increase in the ratio of repayments to existing consumer debt in 1930, 1980, and 1990 (all recession years).²⁵ The borrowing binge of the past 10 years has left a plethora of households in a weakened financial state, and made the prospect for debt deflation a near certainty. It is likely not a matter of if, but only when.

Concluding remarks

Hamilton wrote:

One of the difficulties in the industrial economy is the failure of its ceremonial system of distribution, based on imputed productivities, to redistribute

²³ Standard & Poor's Rating Group reported 500,000 bankruptcies (30 times the normal amount) filed three weeks prior to the deadline for new U.S. bankruptcy law to take effect October 2005. See Mollenkamp (2006).

²⁴ The *Economist* reported in 2004 that "South Korea's consumers are still suffering a financial hangover from a credit-card borrowing binge, but the banks that encouraged them are recovering. Weighed down by bad consumer debts, their earnings fell 63 percent last year" ("Hangover Curve," 2004).

²⁵ For example, I estimated that the ratio of "voluntary" repayments (repayments in excess of the minimum required to remain in compliance with the terms of hire purchase contracts) to "total" repayments on consumer debt increased from 0.312 to 0.435 between July 1929 and March 1930 (see Brown, 1997, especially p. 632, table 2). The first half of 1980 saw a very steep decline in "revolving" use of credit cards (see Brown, 1993, p. 123, table 6-3).

sufficiently to keep the reciprocal flow of goods and money at a constant or increasing rate. It is precisely this aspect of the industrial system to which J.M. Keynes addressed himself. (1991, pp. 944–945)

Maldistribution is the root cause of the (paradoxical) disparity between society's physical capacity to deliver goods and the ability of many of its members to afford them. A main theme developed in this paper is that the puissance of the U.S. consumer amid growing income inequality, decreased job security, and the wholesale offshoring of jobs that once provided decent livelihoods is testament to the achievements of financial engineering. Improved credit availability (as defined above) has made it possible for families of comparatively modest means to own home computers or send their children to college. The innovations described in the preceding pages have also assumed a key role in the maintenance of expenditure flows required to validate market valuations of corporate equities.

Another argument pursued above is that the costs to society related to financial engineering are substantial and require further analysis by economists and policy makers. The debt-financed consumption boom of the late 1990s and early 2000s is a material factor underpinning the U.S. merchandise trade deficit. It has also created the illusion that the hollowing out of the income distribution function need not have detrimental macroeconomic consequences. Innovations such as the MBS or ABS do not solve the problem of the insufficiency of effective demand—they merely postpone it.

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