

# **The Growth of Modern Finance\***

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## **Abstract**

The U.S. financial services industry grew from 4.9% of GDP in 1980 to 7.9% of GDP in 2007. A sizeable portion of the growth can be explained by rising asset management fees, which in turn were driven by increases in the valuation of tradable assets, particularly equity. Another important factor was growth in fees associated with an expansion in household credit, particularly fees associated with residential mortgages. This expansion was itself fueled by the development of non-bank credit intermediation (or “shadow banking”). We offer a preliminary assessment of whether the growth of active asset management, household credit, and shadow banking – the main areas of growth in the financial sector – has been socially beneficial.

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## 1. Introduction

During the last 30 years there was enormous growth in the financial services sector. This growth is apparent whether one measures the importance of finance by its share of GDP, by the quantity of financial assets, by employment, or by average wages.

At its peak in 2006, the financial services sector contributed 8.3% to U.S. GDP, compared to 4.9% in 1980 and 2.8% in 1950. Figure 1, following Philippon (2008) and constructed from a variety of historical sources, shows that the finance share of GDP increased at a faster rate since 1980 (13 basis points per annum) than it did in the prior 30 years (7 basis point per annum). During the later period, services of all types grew from 53.8% of GDP to 65.9% of GDP; finance accounted for more than a quarter of this growth.

Figure 1 breaks financial services growth into three broad groups of activities: securities, credit intermediation, and insurance. It is securities and credit intermediation that are responsible for the acceleration of growth since 1980; insurance, by contrast, has grown at a steady pace since the 1940s.

Another measure of the growth of the financial sector is the quantity of financial claims and contracts, including stocks, bonds, derivatives, and mutual fund shares. Figure 2, which is based on the *Flow of Funds* accounts, shows that the value of total financial assets across all sectors was approximately five times U.S. GDP in 1980; by 2007, this ratio had doubled. Over the same period there was a similar increase in the ratio of financial assets to tangible assets (e.g. plant and equipment, land, residential structures). This growth was not simply the continuation of a trend that started in the 1950s; rather, something appears to have changed in the early 1980s.

The U.S. was not the only country to experience such dramatic growth in financial services. However, the U.S. is one of a small handful of mostly English speaking countries

where the financial sector grew to over 7% of national output. Figure 3 shows the financial services share of GDP for several countries for which we have data in both 1990 and 2006.

Workers in the financial sector have shared impressively in these gains: in 1980, the typical financial services employee earned about the same wages as his counterpart in other industries; by 2006, employees in financial services earned an average of 70% more (Phillipon and Reshef, 2009). Attracted by high wages, graduates of elite universities flocked into the industry: in 2008, 28% of graduates of Harvard College went into financial services, compared to only 6% between 1969 and 1973 (Goldin and Katz, 2008). And graduates from the Stanford MBA program who entered financial services during the 1990s earned more than three times the wages of their classmates who entered other industries (Oyer, 2008).

The growth in expenditures on financial services raises the question of how much and in what ways society has benefited from these expenditures. Some might suggest that this growth implies that the incremental benefits outweigh the incremental costs, essentially invoking the First Fundamental Theorem of Welfare Economics. Indeed, this line of argument would seem to be a reasonable starting point to assess growth in most industries. And yet, there is something different about finance that makes many skeptical that its growth has benefited society. For one, there is skepticism about the incremental social value of securities trading given that much of it is zero-sum in nature. And many have voiced concerns about the considerable increase in complexity that appears to have come with the growth of the financial sector. This complexity is seen as a source of risk to the broader economy, with some arguing that it only functions to generate additional profits for financial market participants. This view stands in contrast to the more traditional “functional” view of finance, in which a primary function of the sector is to dampen risk by reallocating it efficiently within the economy (Merton and Bodie, 1995).

In this paper, we evaluate whether the skepticism about the value of finance is warranted. We start by identifying the activities that have generated the largest growth in financial sector revenues. We do this by analyzing the detailed activity-level revenues published in the input-output accounts of the Bureau of Economic Analysis (BEA) and the Economic Census, along with our own estimates of activity-level revenues between 1980 and 2007.

Our analysis identifies two areas of significant revenue growth: asset management and, more surprisingly, fees associated with the expansion and refinancing of household debt. The value of assets under professional management grew dramatically, with the fees charged to manage these assets growing at approximately the same pace. Individuals and institutions shifted an increasing share of their assets to investment management firms – first to mutual funds and institutional asset management firms (which mainly manage investments for pension funds and endowments), and then increasingly to hedge funds, private equity funds and venture capital funds, which charge much higher fees. We show that a large part of this growth is a simple consequence of rising asset values without commensurate declines in percentage fees.

There was also enormous growth in household credit, from 48% of GDP in 1980 to 99% in 2007. Most of this growth was in residential mortgages (from 34% to 79% of GDP), although consumer debt (auto loans, credit cards, etc.) also grew (from 13% to 18% of GDP). The growth in household credit contributed to the growth of the financial sector mainly through fees on loan origination and refinancing, securities underwriting, trading of fixed income products and derivatives, as well as asset management. Surprisingly, traditional corporate debt grew by much less, and played little role in the revenue growth of the industry.

The fact that the financial sector profited from household credit mainly through fee income reflects a major shift in the machinery of the financial system, While at the start of the

period the financial system allocated credit largely through deposit-taking banks that earned spreads on the loans they held on their balance sheets, by the end of the period, 61% of home mortgages were in loan pools of mortgage-backed securities (MBS), 72% of which were guaranteed by the Federal Housing Administration (FHA) or one of two Government Sponsored Enterprises (GSEs), Fannie Mae or Freddie Mac.

The securitization of credit was part of the development of the “shadow banking” system whereby many different types of non-bank financial entities performed some of the essential functions of traditional banking. Like traditional banks, shadow banks issued short-term, seemingly-safe and liquid claims to fund the purchase of longer-term, less liquid and more risky loans and securities. But they were more loosely regulated than banks and had few of the safety nets afforded to banks, such as access to the Federal Reserve’s “lender-of-last-resort” credit facilities. The heavy reliance on short-term funding of shadow banking entities proved to be a major accelerant of the financial crisis. Moreover, shadow banking had the effect of lengthening the credit intermediation process, meaning that it introduced more links in the chain connecting household savers with borrowers. We propose a simple index to measure the increase in the length of the credit intermediation chain and the associated increase in complexity.

Whether the growth of the financial sector has been beneficial to society depends in large part on the social benefits of active asset management, the increase in household credit, and the growth of shadow banking. In our view, professional asset management was beneficial in that it facilitated an increase in financial market participation and diversification. This likely decreased required rates of return for investors and thereby lowered the cost of capital to corporations. But, there is likely too much high-cost, active asset management, which creates rents for the financial sector and distorts the allocation of talent away from more productive sectors. We also raise

concerns about whether the potential benefits of households' increased access to credit -- the main output of the shadow banking system -- are outweighed by the risks associated with shadow banking system.

## **2. The Growth of the Securities Industry<sup>1</sup>**

### **A. Components of Growth**

Table 1, which covers the period 1980-2007 and is based on the national income account published by the BEA, shows the contribution to GDP of the industries comprising the financial services sector: securities<sup>2</sup>, credit intermediation, and insurance. The GDP contribution, or "value added," is measured as net revenues of an industry less non-wage inputs to the industry. Equivalently, value added is just profits plus compensation.

The national income accounts reported by the BEA break out components of "GDP" of the financial services sector, rather than "GNP" of the sector. The former includes revenues produced by U.S.-located branches of foreign institutions, while excluding revenues produced by foreign branches of U.S. financial services firms. Prior to 2004, these two time series track each other closely, so the GNP of the sector was approximately the same as its GDP. Starting in 2004, foreign subsidiaries of US financial firms began to generate significantly more revenues than U.S. subsidiaries of foreign financial firms, suggesting that our estimates of the growth of finance are conservative from a GNP perspective. Note that the BEA figures do include net

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<sup>1</sup> Details on all data sources and calculations for this section and the next are provided in the Internet Appendix.

<sup>2</sup> Government statistics make a distinction between "securities" and "funds and trusts," where the latter refers only to the administration of the fund vehicle and not to its investments. However, the funds management industry is quite small and only includes expenses associated with the mutual fund and trust structure, and not any of the fees or costs for portfolio management. Because this distinction is artificial we combine both activities into a broader measure of the securities industry.

direct exports of financial services, meaning financial services sold by U.S.-located institutions directly to foreigners. But even in 2007, net exports were modest – just 0.3% of GDP.<sup>3</sup>

In the next two sections, we focus on the growth of the securities and credit intermediation industries, leaving aside insurance. While insurance activities sometimes interact with securities and credit intermediation (primarily through asset management, reinsurance, and bond insurance), the industry's overall growth since 1980 is less puzzling. Changes in the industry's value added since 1980 have been driven mainly by a slight decline in life insurance revenues as a percentage of GDP, and increases in property and casualty insurance and private health insurance.<sup>4</sup>

Table 1 shows that within financial services, the largest growth was in the securities industry. Revenues grew from 1.1% of GDP in 1980 to 4.8% in 2007 and value added grew from 0.4% of GDP to 1.7% in 2007 (having peaked at 2.0% in 2001 during the internet boom). In fact, the value added statistics slightly understate the growth of activities usually associated with the securities industry – most notably asset management and debt trading – because an increasing share of these activities is being done at commercial banks rather than at securities firms. In 2007, for example, according to data from the Economic Census, banks collected approximately \$13 billion from asset management and financial planning, and approximately \$39 billion from making markets in debt instruments and derivatives.

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<sup>3</sup> The investment bank Morgan Stanley, for example, derived 81% of its 2009 net revenues from the Americas. And, among the ten largest commercial banks based in the US, only Citigroup derived a significant fraction of its revenue from outside the country. The BEA data suggest that the largest financial services export is investment management, with securities-related transaction fees a close second.

<sup>4</sup> Property and casualty insurance tends to grow mechanically with the stock of tangible assets, as households insure more automobiles and larger and more expensive houses. The growth of private health insurance, while important, falls outside the scope of this article.

To get a better sense of the components of growth within the securities industry, we break out industry revenues using data from the input-output accounts and data from the Economic Census. Unfortunately, detailed breakdowns are only available for 1997, 2002, and 2007. We start with a description of these years, and then pan back to 1980, constructing our own estimates of the components of revenue.

Table 2 shows that asset management is by far the largest component of the securities industry, equal to \$341.9 billion in 2007, well over four times the level in 1997. What we call “asset management” includes investment advisory and management (approximately \$250 billion in 2007), the administration of mutual and pension funds, and trust (custody) services. Asset management was 37% of securities industry output in 1997, and rose to 51% in 2002 and 2007. It accounts for 57% of the growth of securities industry output and 26% of financial services sector output growth.

The two other activities that appear to have grown substantially are market-making in fixed income products, with 2007 revenue of \$37 billion,<sup>5</sup> and derivatives trading with revenue of \$45 billion. In 1997, these categories were not even reported, suggesting that they were too insignificant to warrant their own category. Together, these activities account for 18% of revenue growth in the industry between 1997 and 2007.

Further data on profits from derivatives trading and origination are sparse, but a 2011 Goldman Sachs response to a government inquiry suggests that most of the profit in derivatives is related to fixed income products. This is consistent with reports that about half of the gross

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<sup>5</sup> Aggregating across U.S. bond markets, average daily trading volume in 2007 was just over \$1 trillion, which means that we can interpret fixed income revenues as reflecting an average bid-ask spread of 0.015%, roughly twice the spread on U.S. Treasury Securities (Fleming, 2001). This revenue was presumably much higher than it had been in the other Census years given that this number was not even reported in those years.  $37/(252 \times \$1 \text{trillion}) = 0.0154\%$ . Volume is reported in the Securities Industry and Financial Markets Association 2010 Factbook. They rely on FRBNY, the Municipal Securities Rulemaking Board, and NASD TRACE for their estimates of trading volume.

market value of over-the-counter (OTC) derivative contracts in 2007 were linked to interest rates or credit (e.g., credit default swaps), while only 7% were linked to equity, according to the semi-annual statistics on OTC derivatives published by the Bank for International Settlements. Broker-dealers have historically maintained high profit margins on derivatives because they are traded over the counter (not an exchange), giving the individual dealers a degree of pricing power (Goldstein, Hotchkiss, and Sirri 2007).<sup>6</sup>

Fees from trading equities – while the second largest component of securities output – remained essentially flat as a percentage of GDP between 1997 and 2007 even though the level of trading volume on NYSE, NASDAQ, and AMEX exchanges grew from \$10.4 trillion to \$41.4 trillion.

Ideally, we would be able to construct detailed revenue breakdowns from Table 2 going back to the 1980s. The BEA data do not allow for this, and so we use a variety of alternative sources to construct yearly estimates. Panel A of Figure 4 shows annual estimates of the revenues from several key activities: traditional asset management, alternative asset management, and broker-dealer activities. Due to differences in the underlying data, these categories do not correspond exactly to the product lines measured in the Economic Census, but collectively they capture the most important activities of the securities industry. Despite data limitations, Figure 4 shows that we match the level and changes in securities industry output reasonably well.

Fees earned from traditional asset management – mutual funds, exchange-traded funds, and institutional funds – along with administration costs of pension funds are the largest

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<sup>6</sup> A substantial fraction of the revenues from both derivatives and debt trading accrued to parties other than broker-dealers. For example, according to the Economic Census, approximately one third of the revenues from derivatives, and two thirds from dealing debt instruments, were generated by commercial banks.

component of industry output and are generally an increasing share of output until 1998. We estimate total fees using data from Investment Company Institute (ICI) and French (2009). The largest component of these fees comes from mutual funds (including money market mutual funds), which grew from assets under management (AUM) of \$134 billion in 1980 to over \$12 trillion in 2007. Because fees are essentially a constant fraction of AUM, they fell in 2001 with the bursting of the internet bubble, rose to hit their prior peak in 2004 and continued to grow thereafter. Although there were fluctuations, the key point is that between 1980 and 2007 there was huge growth in fees from traditional asset management.

The revenues accruing to alternative asset managers – hedge funds, private equity funds, and venture capital funds – are shown in Panel B of Figure 4. Estimating these fees is difficult, particularly in the case of venture capital and private equity, because a portion of the fees accrues when the fund exits from its investments. We follow French (2009) to compute hedge fund fees, using AUM data from Hedge Fund Research. For private equity and venture capital, we update to 2007 estimates of dollar fees based on realized returns reported in Kaplan and Rauh (2010). The figure shows a steady growth of fees, with a spike in 1999 corresponding to a record number of exits in both private equity and venture capital. Hedge fund fees grew more steadily over this period, peaking at \$69 billion in 2007. Although percentage fees for alternative investment vehicles vary year to year, they are typically between 3% and 5% of AUM, considerably higher than mutual fund fees.

One limitation of our asset management fee estimates is that we do not capture the growth of investment advisory and managed accounts (although these are included in the Census data shown in Table 2). These services introduce another layer of fees on top of the management fees that go to traditional and alternative investment managers. Historically, investment advisors

charged trade-based commissions, which are captured by FOCUS reports that broker-dealers file with the Securities and Exchange Commission. But, a large number of advisors now mainly charge fees based on assets under management. Increasingly, these services are being provided by investment branches of commercial banks. For example, the U.S. division of UBS Wealth Management reported income of \$6.1 billion on end-of-year AUM of \$764 billion, an implicit fee of 0.79%. In 2007, the total AUM of investment advisors was approximately \$3.6 trillion, suggesting another \$30-\$40 billion of revenues not reflected in Figure 4.

To get some sense of how much of the growth of the financial sector as a share of GDP can be explained by asset management we note that our estimate of the output of asset management was 0.24% in 1980, while the Census numbers imply that asset management was 2.44% of GDP in 2007, an increase of 2.2 percentage points of GDP. During this period, finance output grew from 9.5% of GDP to 15.6% of GDP. Thus, asset management explain 2.2 percentage points of the 6.1 percentage point increase in finance output as a share of GDP, or 36% of the growth in the ratio of financial sector output to GDP. Under the assumption that the ratio of output to value added is roughly constant, this means that asset management explains roughly 36% of the growth of finance as a share of GDP.

By contrast, Figure 4 tells us that broker-dealer activities – commissions, trading, equity market- making, and underwriting – cannot explain the growth of the securities industry. Estimates of aggregate revenues for these activities are based on FOCUS reports. These data show that there was a secular decline in underwriting fees from 1980, even though U.S.-domiciled institutions advise and help underwrite a significant fraction of global securities issuance. By 2007, revenue from underwriting stocks and bonds was a mere 5% of securities industry revenue. Although the FOCUS reports provide quite a bit of detail, a large fraction of

broker-dealer revenue consistently shows up in the category “other,” which is shown as such in Figure 4. We do not have more details on the components of this category, but the earlier numbers in Table 2 hint that much of the “other” category in the later sample years could be coming from market making in debt and derivatives instruments, which are not broken out separately in the FOCUS reports.

To summarize our findings so far, we have shown that the securities industry was responsible for the largest component of financial sector growth and that within securities, growth was driven by asset management. This growth occurred in two stages. In the first stage, from 1980 until roughly 1999, revenues grew in large part because of the growth traditional asset management. In the second stage, alternative asset management (including venture capital, private equity, and hedge funds) generated an increasing share of fees. During this period as well, debt and derivatives trading contributed to the growth of the securities industry.

## **B. What Drove the Increase in Asset Management Fees?**

Total asset management fees are the product of (i) the total outstanding amount of tradable assets; (ii) the share of tradable assets that are professionally managed; and (iii) the percentage fee. In sum, total fees increased because the average percentage fee remained essentially constant, while investment managers came to manage a large share of a larger value of financial assets.

(i) *Increase in tradable assets.* Panel A of Figure 5 shows the value of traded equity and fixed income securities over time. Taken together, tradable assets increased from 107% of GDP in 1980 to 323% of GDP by 2007. The figure shows that scaled by GDP, securities industry output closely tracks the total value of tradable assets.

What drove the increase in tradable assets? In fixed income, much of the growth came from securitization, whereby assets that were once held as illiquid loans on bank balance sheets were pooled into securities that could be traded and managed by professional investors. Fixed income securities grew from 57% of GDP in 1980 to 182% of GDP in 2007; approximately 58 percentage points of this growth came from securitization.<sup>7</sup> While fixed income assets increased dramatically, fees for managing fixed income assets are much lower than for equities, and thus were not a large part of the growth of asset management fees. However, the growth of fixed income generated more fees in other areas, namely market making and derivatives related to fixed income securities.

In equities, much of the growth came from higher equity valuations. Panel B of Figure 5 shows that the value of publicly traded equity relative to GDP closely tracks the price-to-book ratio of the S&P 500. Market capitalization of equities nearly tripled as a share of GDP between 1980 and 2007, growing from 50% to 141% of GDP. At the same time, the market-to-book ratio of the S&P 500 grew from 1.04 to 2.77, almost entirely explaining the growth. By contrast, the *book value* of equity of publicly-traded firms normalized by GDP was essentially flat during this period, as shown in the figure. Thus, the growth in the value of publicly-traded equity relative to GDP – and hence the increase in asset management fees – did not come from an increase in the number of firms or the earnings generated by incumbent firms (as would be reflected in the book value of equity), but rather from an increase in valuation ratios.

(ii) *Increase in share of tradable assets that are professionally managed.* According to the *Flow of Funds*, 53% of household equity holdings were professionally managed in 2007,

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<sup>7</sup> Not all of these assets are held in the United States, or accrue fees to US-based financial intermediaries. See Bruno and Shin (2012) and Shin (2012).

compared with only 25% in 1980. We do not have comparable statistics for fixed income but it is likely that there was a similar increase in the share of assets that were professionally managed.

(iii) *Percentage fees remain approximately unchanged.* A simple way to measure the all-in fees paid for investment management is to compute the ratio of securities industry output to the dollar value of tradable assets. This ratio is not an exact measure of fees both because the fraction of assets that are professionally managed fluctuates over time, and also because the securities industry collects revenues from underwriting and other activities that are not directly related to asset management or trading. Notwithstanding these caveats, Panel C of Figure 5 shows that the average all-in fee per dollar of tradable assets has fluctuated between 1% and 1.5% for the entire period.

The fact that asset management fees have not changed very much is part of a larger puzzle—fees are almost universally computed as a roughly fixed *percentage of assets under management*. If the stock market doubles in value through price appreciation, there is no obvious reason why investment management services in the aggregate would cost more to provide.<sup>8</sup>

The stability of aggregate asset management fees as a percentage of assets under management obscures significant changes in how those fees are spread across different institutions. As shown previously, mutual fund fees as a share of GDP have been rising steadily since the early 1980s. But this is mostly driven by mutual fund companies managing a larger dollar value of publicly traded equities, rather than by an increase in their fees on a dollar of assets. According to French (2009), the all-in fee on equity-related mutual funds (including annuitized “load” which is paid to financial advisors on the sale of a mutual fund) fell from

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<sup>8</sup> Fixed percentage fees can be justified if one believes that a manager has the ability to create alpha, but that alpha exists in a fixed dollar supply (or is increasingly difficult to achieve with higher assets). In this case, larger asset pools should pay higher fees. But this argument does not hold in the aggregate, since alpha is zero in aggregate across investors.

2.19% of assets in 1980 to 1% in 2007. Based on data from ICI, the equivalent fee on bond funds fell from 2.04% to 0.75%. In short, at the retail level, U.S. households have many more passive low fee vehicles available to them, even if they do not take full advantage of them. For example, in 2011 a household with modest investable assets could invest in a U.S. stock index with Vanguard, the largest passive investment manager, for an annual fee of 0.06% of assets. At the institutional level, fees have also dropped. Using data from Greenwich Associates on fees paid by pension funds, French (2009) reports that the dollar-weighted fee on institutional equities fell from 0.34% in 1980 to 0.23% in 2006.<sup>9</sup>

While mutual fund fees per dollar of assets have fallen, fees on alternative investments – hedge funds, venture capital, and private equity – have not. Most funds have consistently charged a management fee of 1.5-2.5% of assets, plus a “carry” on realized gains of 15-25%. The combination of high and stable fees on alternative investments and faster growth in their assets under management means both that they are collecting more fees and that their share of total investment management fees has been increasing. Panel B of Figure 4 provides our estimates of the fees charged by hedge funds, venture capital funds and private equity funds. We estimate that by 2007, approximately \$854 billion of assets was managed by private equity firms, \$258 billion by venture capital firms, and another \$1.46 trillion by U.S.-domiciled hedge funds. Our estimates suggest that together these managers generated over \$100 billion of fee revenue in 2007. This is more than the fees on equity mutual funds, bond mutual funds, and money market funds combined, which collectively manage more than eight times as much in assets.

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<sup>9</sup> These low figures partly reflect the large share of these assets managed passively; fees on actively managed portfolios are considerably higher. On the fixed income side, data from Greenwich Associates suggests that average fees are approximately 0.30% of assets.

To summarize, the average percentage fee paid to investment management has not fallen much over time as high-cost alternative investments have claimed a larger share of assets under management. But the growth in assets under management – much of it coming from higher valuations – has led to enormous growth in the expenditures on investment management.

### **C. Evaluation of the Growth of Professional Asset Management**

Has society benefited from the growth of professional asset management? In our view, the answer is almost certainly yes, but that there are significant distortions in the market for asset management services that may reduce the extent to which society has benefited. The most important distortions stem from investor naiveté (mainly households) and agency problems associated with certain institutional investors (mainly pension funds). Before describing these distortions in more detail, and their implications for social welfare, we describe three potential benefits of professional asset management: (i) an increase in participation and diversification; (ii) an increase in monitoring; and (iii) an increase in the information embedded in securities prices. We consider each in turn.

(i) *Participation and Diversification.* One of the clear benefits associated with the increased use of professional asset management is that households now hold more diversified portfolios. It is much easier to assemble a diversified portfolio through a collection of mutual funds than through direct ownership of individual securities. This is particularly true for foreign stocks. Indeed, as professional asset management has grown so has U.S. residents' holding of foreign equities – from 2.0% of their portfolios in 1980 to 27.2% in 2007 (French, 2008).

Asset management also facilitated an increase in household financial market participation. The share of household financial assets held in marketable securities or mutual

funds grew from 45% in 1980 to 66% in 2007. It is not just that the wealthy increased the exposure to marketable securities. According to the Survey of Consumer Finances, the percentage of households owning stock increased from 32% in 1989 to 51% in 2007.

In theory, this increase in participation and diversification brought with it an increase in households' willingness and capacity to take market risk. As a result, required rates of return should have declined. It is therefore possible (but hard to verify) that asset management was indirectly responsible for the large increase in stock market valuation ratios between 1980 and 2007. This, in turn, may have led to a decline in the cost of capital to corporations. The greatest beneficiaries then would have been young, entrepreneurial firms – those most dependent on equity financing and with more distant cash flows. This may help to explain some of the growth of venture capital after 1980, and the greater ease with which entrepreneurial ventures were able to raise funding. If there was indeed a decline in the cost of capital, the growth of asset management had significant positive effects on the real economy.

(ii) *Monitoring*. A second potential benefit of professional asset management is that some professional money managers are active monitors of management. By pooling resources of many smaller investors, professional managers can afford to incur some of the costs of monitoring management, thereby mitigating the free-rider problem that exists among small investors. This is certainly true of venture capital and private equity firms, which often control corporate boards and have leverage over the actions of management (Gompers 1995; Kaplan and Stromberg, 2003). Hedge funds can also play an active role in monitoring management of public firms (Brav, Jiang, Partnoy, and Thomas 2008; Greenwood and Schor 2009). Unfortunately, the evidence is mixed that such monitoring creates value.

(iii) *Information.* A third potential benefit of the increased use of professional asset management is that it leads to more informative securities prices. As a result, securities trade at smaller deviations from fundamental value. This could be because active asset managers are more adept than individual investors at assessing a security's value, or because there are economies of scale in collecting and interpreting information. Nevertheless, there is little evidence that active managers are able to use this information to outperform passive index funds – i.e., generate alpha. For example, Fama and French (2010) show that U.S. mutual funds underperform the stock market, especially after taking into account fees. At the margin, it seems, investors in aggregate would do better to reduce their allocation to active management.

From a social benefit perspective, however, the critical question is not whether active management leads to excess returns—it does not. Rather what matters is whether the *pursuit* of excess returns produces socially valuable information. The social benefits from efficient markets are difficult to measure. One of the main benefits is that firms can raise new capital at prices that accurately reflect their fundamental value, i.e, that they can raise money in *primary* markets to fund real investments. If prices are closer to fundamental value it encourages firms to invest in the most productive projects, and to choose the appropriate scale of investment over time. One area in which information – and thus professional asset management – is particularly valuable is in the funding of start-up firms, where uncertainty and information asymmetries are large.

Of course, much information discovery is oriented toward trading securities in secondary markets, i.e., trading securities that already exist. Some of this information may spill over to benefit firms issuing new securities, or it may help guide corporate investment as in Tobin's Q-theory of investment (Tobin, 1969). The effect of stock prices on investment appears to be strongest for young, liquidity-constrained firms who are more likely to access the stock market

for funding (Baker, Stein, and Wurgler 2003). There is more skepticism about the effect of stock prices on corporate investment for more mature firms, which do not rely on equity markets for funding (Fischer and Merton, 1984; Morck, Shleifer and Vishny, 1990).

While professional asset management may have increased information collection, not all information collection is socially valuable. For example, a hedge fund may be willing to pay \$20,000 to form a more accurate prediction of a company's earnings to be released in the next week. To the extent that this information allows the hedge fund to profit at the expense of other less informed market participants, the fund earns an excess return. Hirshleifer (1971) calls information production of this type "foreknowledge," but explains that it has no social value in an exchange economy without production. In other words, the \$20,000 expenditure is a social loss because getting this information into prices one week earlier is unlikely to lead to a more efficient allocation of real resources. An extreme but still representative example of this comes from investments in "co-location hosting services," enabling electronic orders to arrive milliseconds faster because of their geographical proximity to trading centers.<sup>10</sup> Thus, to the extent that professional asset management has led to more information collection it has probably brought with it both more socially valuable and more socially wasteful information collection.

As noted above, other inefficiencies stem from distortions in the market for professional asset management arising from investor naiveté (mainly households) and agency problems associated with certain institutional investors (mainly pension funds). These distortions have led to increased use of active asset management, and may also have biased active asset managers away from socially efficient forms of information acquisition and asset allocation.

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<sup>10</sup> See Turley (2012) for a discussion of technological improvements in trading and reductions in transactions costs.

In particular, Capon, Fitzimons and Prince (1996), Alexander, Jones and Nigro (1998), among others, present evidence that households do not understand the financial products they buy. That means they also probably don't understand that it is hard to identify managers who can generate risk-adjusted excess returns ("alpha"). Instead, they chase past performance (Sirri and Tufano 1998) and overpay for active management. Some investors may try to overcome their naiveté by hiring an investment advisor they trust, but Gennaioli, Shleifer, and Vishny (2012) argue that intermediaries exploit this trust to by charging them high fees for "hand-holding" investment advice. Worse yet, Bergstresser, Chalmers, and Tufano (2009) show that financial advisors steer clients to worse performing funds.

Thus, investor naiveté results in more active management and more expensive active management than in a world with sophisticated investors. It may also result in socially inefficient behavior by asset managers. Indeed, a good deal of evidence supports the idea that mutual funds simply channel investor flows into the sorts of securities that investors want to own (internet, value, high-yield bonds and so on) rather than allocating capital to its best use (Frazzini and Lamont 2009). It is noteworthy that over the last 15 years, despite increased resources devoted to asset management, there have been two large and socially costly valuation errors – the internet bubble at the end of the 1990s and the overvaluation of mortgage-backed securities during the 2000s. This lends support to Paul Samuelson's view that modern financial markets display "considerable micro efficiency" while retaining potentially large "macro inefficiency."<sup>11</sup>

Pension fund and endowment managers are presumably less naïve than households, but institutional factors and agency problems may lead them to overpay for active management. For example, Novy-Marx and Rauh (2009) point out that public pension funds have incentives to

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<sup>11</sup> Originally cited in Shiller (2001, p. 243).

invest in riskier asset classes because this enables them to forecast higher returns and thereby discount reported liabilities at a higher rate. This makes pension fund appear to be less underfunded than they really are. And Hochberg and Rauh (2012) show that public pension fund managers overweight local private equity funds in their portfolios and significantly underperform on those investments.

That households and institutions appear willing to overpay for active asset management can be socially costly because it induces more socially useless information acquisition. Overpayment for asset management may even lead to too much socially valuable information acquisition relative to its social cost. A big part of this social cost could be the talent it attracts to asset management and away from sectors that may have more social value on the margin (Murphy, Shleifer and Vishny, 1991). In fact, Philippon and Resheif (2009) show that the securities industry in particular – not credit intermediation and insurance – witnessed steep wage growth from 1980-2006. It is not surprising then that during this period there was an enormous increase in the fraction of students graduating from elite universities that went into finance.

### **3. The Growth of Credit Intermediation**

#### **A. Components of Growth**

Table 1 shows that value added from credit intermediation grew from 2.6% of GDP in 1980 to 3.4% in 2007, having peaked at 4.1% of GDP in 2003. Growth of credit intermediation comprised roughly one quarter of the growth in the financial sector -- less than the growth of the securities industry and about equal to that of the insurance industry.

There are three broad components of credit intermediation output as measured in the national income accounts. The first is the imputed output from lending, measured as the

difference between the interest earned on bank loans and the interest that would have been earned, had the funds been invested in Treasury and Agency securities (using the average interest rate earned on banks' holdings of these securities), i.e.,  $\text{Lending Output} = \text{Bank Loans} \times (\text{Interest Rate on Loans} - \text{Interest Rate on Treasury and Agency Securities})$ . This measure is meant to capture the ongoing services provided by banks in managing and monitoring loans on their balance sheets, as well as the value of identifying the loans in the first place. However, it overstates the value of these services to the extent that it also includes the credit risk premium that banks (or any other investors) earn by holding risky loans.<sup>12</sup> And the measure is confounded by the fact that the maturity of bank loans may differ from the maturity of Treasury and Agency securities.

The second component of output, the imputed output from deposit-taking, is measured as the quantity of deposits multiplied by the difference between the rate earned on Treasury and Agency securities and the rate paid on those deposits, i.e.,  $\text{Deposit Services Output} = \text{Deposits} \times (\text{Treasury Interest Rate} - \text{Average Interest Rate Paid to Depositors})$ . Depositors presumably accept yields below those of Treasuries and Agencies because they use deposits for transactional purposes.

The sum of imputed output from lending and imputed output from deposit-taking can be thought of as the net revenues collected for “traditional banking”; we show it for the years 1997, 2002, and 2007 on the first line of Table 3. The table shows that traditional banking remained roughly flat as a percentage of GDP.

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<sup>12</sup> Fixler, Reinsdor, and Smith (2003), Wang (2003), Basu, Inklaar, and Wang (2006), and Ashcraft and Steindel (2008) discuss adjustments to measured bank output.

The third category of output from credit intermediation includes the fees associated with loan origination, credit card accounts, deposit accounts, and other banking services. Collectively, these fees grew more than revenues from traditional banking, rising from about 2.2% of GDP in 1997 to 3.5% of GDP in 2007. The biggest increase was in origination fees on residential mortgages. In 2002, during the largest mortgage-refinancing wave in U.S history, these fees totaled \$76.8 billion – 0.7% of GDP, or 2.7% of the \$2.8 trillion of residential mortgages issued in that year.

As in the previous section, we now pan back to 1980, forming our own estimates of the sector's outputs. These can be seen in Figure 6. To determine the output, we follow the BEA's methodology and use data from the FDIC Call Reports.<sup>13</sup> As a consistency check, we verify that we can replicate total output numbers in the Census years (every five years starting in 1982).<sup>14</sup>

As can be seen from Figure 6, the imputed output from lending as a share of GDP has fluctuated around its mean of 1.2% of GDP. Much of the variation comes from changes in the ratio of bank loans to GDP, which fell from about 60% at the end of the 1980s to under 50% at the end of 1990s. During the housing boom in the 2000-2006 period, bank loans rose back to about 60% of GDP.

Figure 6 also shows that output from deposit-taking has generally been falling over time. Some of the decline stems from reductions in spreads between securities and deposits, but the main source of the decline is a reduction in deposits relative to GDP – from its peak of about

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<sup>13</sup> See Ashcraft and Steindel (2008) and Alon, Fernald, Inklaar, and Wang (2011) for additional discussion of the BEA's methodology, which we present in simplified form.

<sup>14</sup> Output from lending and deposit-taking is calculated using data from Federal Reserve's *Call Reports*, and FDICs *Historical Statistics on Banking*. Fees on mortgage loans are imputed from BEA benchmark year estimates using annual mortgage origination totals. Fees on credit card accounts are imputed combining *Flow of Funds* data on total credit card debt outstanding with Government Accountability Office data on average credit card fees. Data on service charges on deposit accounts are from FDICs *Historical Statistics on Banking*.

70% at the beginning of the 1980s to under 50% in the early 2000s. This decline mostly reflects a shift of saving into money market funds, bond funds, and the stock market.

One difficulty with the treatment of credit intermediation in the national income accounts is that if a loan is securitized, the interest rate spread does not count towards national output, even though securitized credit is intermediated and some of the output is captured by the fees that banks charge on securitized loans. But given the growth of securitization during this period, this approach could significantly understate the extent of intermediation activity. If instead we count asset-backed securities towards intermediation and assign it the same spread as on other loans, we estimate that imputed output from lending would have been approximately 0.8 percentage points higher in 2007.<sup>15</sup>

Thus, traditional banking – the process by which banks take deposits and originate loans to hold them on their balance sheets – has declined slightly as a share of GDP.<sup>16</sup> In fact, as can be seen in Figure 6, essentially all of the growth in the credit intermediation industry has come from fee income, largely fees that are associated with consumer and mortgage credit. As shown in Figure 7, a good deal of these loans and associated fees come from refinancing of existing mortgages. Moreover, as shown in Figure 8, much of the variation in the industry’s overall value added comes from variation in mortgage origination.<sup>17</sup> And if we strip out origination fees, the

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<sup>15</sup> Specifically, we assume that the ratio of deposits to loans on is the same as it was for loans that are actually on the banks’ balance sheets.

<sup>16</sup> There were also significant changes in who was providing traditional banking services. In 1980, approximately 34% of total imputed banking services could be attributed to savings and loan institutions and credit unions. By 2007, these institutions provided less than 20% of these services. The composition of entities engaged in lending changed dramatically over this time, with financial firms specialized in originating securities to distribute them gaining increasing share.

<sup>17</sup> In 2003, a boom year for refinancing in response to steep declines in interest rates, we estimate from that fees on refinanced mortgages accounted for 0.7% of GDP. To arrive at this number, we use HMDA data for 2003 to calculate the share of refinancing out of total originations, and multiply it by our estimate of total residential mortgage origination fees.

remaining credit-related activities are virtually flat as a percentage of GDP for the entire 1980-2007 period.

Fees associated with household credit, like asset management fees, explain a sizeable portion of the growth of finance. These fees, as shown in Figure 6, grew from 1.1% of GDP in 1980 to 3.4% of GDP in 2007, an increase of 2.3 percentage points. During this period, output of the financial sector grew from 9.5% of GDP to 15.6% of GDP. Thus, household credit fees appear to explain 38% of the 6.1 percentage point growth of finance, when expressed as a share of GDP. Asset management fees and household credit combined explain 74% of the growth in financial sector output relative to GDP.

### **B. Increase in Household Credit and the Development of the Shadow Banking System**

Even though traditional banking declined, corporate and household credit rose as a share of GDP from 1980-2007, as shown in Figure 9. Overall corporate credit grew from 31% of GDP in 1980 to 50% in 2007, while corporate loans on bank balance sheets fell slightly, from 14% of GDP in 1980 to 11% in 2007. Household credit, mainly mortgage debt, grew more dramatically – from 48% of GDP in 1980 to 99%, with the steepest rise occurring during the housing boom of 2000-2006.

Despite this growth, banks held roughly the same share of GDP in the form of household credit (approximately 40%) at the beginning and end of the period. All of the incremental growth in credit as a share of GDP came from securitization. Indeed, by 1995, more than half of all outstanding single-family mortgages and a sizeable share of commercial mortgages and consumer credit were securitized.

Securitization went hand-in-hand with the development of “shadow banking,” in which key functions of traditional banking are provided by a host of non-bank financial entities (though often in conjunction with traditional banks). Poszar, Adrian, Ashcraft and Boesky (2010) define shadow banks as “financial intermediaries that conduct maturity, credit, and liquidity transformation without explicit access to central bank liquidity or public sector credit guarantees.” Like banks, these entities issue short-term, liquid claims and hold longer-term, riskier, and less liquid assets. But unlike banks, they cannot issue insured deposits, and do not have guaranteed access the Federal Reserve’s lender-of-last-resort credit facilities. Examples of shadow banks include structured investment vehicles that hold loans and asset-backed securities (ABS) and are funded with short-term asset-backed commercial paper (ABCP). Money market funds are also shadow banks; they issue short-term claims and hold somewhat longer-term securities. And the GSEs hold mortgages and mortgage-backed securities (MBS), funded, in part, by issuing short-term debt instruments.

Figure 10 shows that over time short-term instruments typically associated with the shadow banking sector, including repurchase agreements (repo), money market funds, and commercial paper rose significantly as a share of GDP. This coincided with the increasing share of loans that were securitized. As we will discuss, while the increased reliance on short-term funding may play an economic role in credit intermediation, it also made the financial system significantly less stable.

Importantly, shadow banks do not operate in isolation, but rather are connected to each other in the credit intermediation process. For example, money market funds hold ABCP, which itself holds ABS comprised of loans that are sometimes guaranteed by other entities. Poszar et. al. (2010) provide a graphical depiction of the shadow banking system, showing how all the

various entities are related to each other. It makes clear that shadow banking has increased the number of steps in the credit intermediation process and as a result there are now more “links” in the “credit intermediation chain.” This change is important because the lengthening of the chain may bring with it an increase in financial system fragility.

For now, we attempt to measure the lengthening of the chain using a simple summary statistic, which we call the *Credit Intermediation Index*. This measure is an attempt to estimate the average number of steps a dollar takes as it passes from households to the final end-users, with data from the *Flow of Funds* accounts.<sup>18</sup> For example, when a household makes a direct loan to a business, we call this direct finance and say that it takes one step. If a household deposits funds in a bank, which then makes a loan directly to a business, there are two intermediation steps. More broadly, one can show that the ratio of total liabilities (including the financial sector which is not an end-user of credit) to liabilities of the household, government and non-financial business sectors (which are end-users of credit) is mathematically equivalent to the expected number of intermediation steps taken by a dollar on the way to its end-user. We call this ratio the *Credit Intermediation Index*, or *CII* for short i.e.,

$$CII = (Total\ Liabilities\ of\ All\ Sectors)/(Total\ End-User\ Liabilities).$$

Financial sector liabilities, which are a key component of the numerator, include the liabilities of the banking sector -- deposits, commercial paper, long-term debt and gross repo (i.e. agreements to repurchase securities, which are effectively secured loans). They also include money market fund assets, debt of the GSEs, GSE mortgage pools, private MBS and other asset-backed-securities (ABS), and pension funds’ and mutual funds’ investments in credit instruments.<sup>19</sup>

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<sup>18</sup> For related evidence see Adrian and Shin (2010).

<sup>19</sup> Note that we are including securitizations in financial sector liabilities. While one could argue that these securities are a form of direct finance like a corporate bond, they rely much more heavily on the ongoing involvement of a

As constructed, *CII* understates the length of the credit intermediation chain and its growth. First, it relies on the *Flow of Funds* data that are aggregated at the sector level, and thus omits intra-sector intermediation activity. Second, it ignores approximately \$15 trillion of credit derivatives contracts, which transfer risk in the credit intermediation process. Third, it understates the gross size of the so-called repo market in which financial firms borrow and lend using securities as collateral.<sup>20</sup> Fourth, we do not measure key steps in the credit intermediation chain such as origination by mortgage brokers and mortgage insurance.

Despite these limitations, Figure 10 shows that *CII* captures the increasing number of steps involved in credit creation, with most of the increase occurring during the 1990s. *CII* peaks at 2.26 in 2007. This increase is related to the growth of securitization because most ABS are held by financial intermediaries rather than directly by households. For example, in 2007 approximately 73% of outstanding MBS were held by financial intermediaries, including commercial banks (15%), GSEs (16%), and mutual funds (11%). These intermediaries, in turn, often fund their purchases of MBS with debt, thereby lengthening the credit intermediation chain.<sup>21</sup>

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variety of financial intermediaries than would a corporate bond. GSE mortgage pools for example receive a credit guarantee from the GSEs. Other ABS require servicers and collateral managers to make payments to bondholders, deal with defaulted loans, ensure that covenants are not violated, and in some cases move collateral in and out of the securitization vehicle.

<sup>20</sup> While we have a measure of the gross level of repo outstanding of banks and broker-dealers, they also make repo loans to others which are not reflected in our repo estimate. Some of this takes the form of re-hypothecation of collateral (Singh and Aitken, 2010) in which lenders who receive collateral as security for a loan they make can turn around and use that collateral to raise secured financing for themselves. Singh and Aitken define re-hypothecation as “the practice that allows collateral posted by one party to a prime broker to be used again as collateral by that prime broker for its own funding.”

<sup>21</sup> Even if banks do not hold ABS, they may fund the purchase of ABS by others such as hedge funds, perhaps through reverse repos. Banks could in turn use the securities in these reverse repos to raise their own repo financing, often from money market mutual funds.

The details of the construction of *CII* are shown in Table 4. We show total credit, in trillions of dollars. The next two columns show end-user credit, which includes private credit (households, nonfinancial firms, and farms) and public credit (state, local, and federal government borrowing). The difference between end-user credit and total credit is the liabilities of the financial sector, which are broken out individually in the right nine columns of the table. As can be seen, deposits are an important but declining source of funding for the financial sector; the ratio of deposits to net credit falls from approximately 40% in 1980 to about 24% in 2007. This decline is only partly replaced by direct bank borrowing, which grows from 3.3% to 4.9% of end-user credit. The instruments that experienced the largest growth are ABS (from zero to 12.9% of end-user credit), GSE borrowing (from 3.6% to 8.3% of end-user credit), GSE pools (from 2.5% to 12.7% of end-user credit). Many of these securities are in turn held by money market funds, which grew from 1.7% to 8.6% of end-user credit. Repurchase agreements grew from 5.9% to 15.4% of end-user credit.

### **C. Evaluation of Changes in Credit Intermediation**

The last three decades witnessed the advent of shadow banking and, with it, fundamental changes in the way credit is delivered. Did society benefit from these changes? It is tempting to conclude that it did because shadow banking likely decreased the cost of household credit and increased its availability. This would appear to be socially valuable since credit plays an important role in enabling households to smooth consumption and fund investments, such as those in housing and education. Yet, two concerns give us pause. For one, most of the growth in credit associated with shadow banking was in residential mortgages. As is well known, the U.S. tax code – mainly through the mortgage interest deduction – already biases households towards

investments in housing over other types of investments. Making mortgage credit cheaper and more available may have just exacerbated this bias. The other main concern is that shadow banking came with significant social costs – all related to financial stability – that were not internalized by market participants and households.

There were three ways in which shadow banking likely decreased financial stability. First, as noted above, a key attribute of shadow banking is the issuance of short-term financial claims without explicit government guarantees and by entities that do not have access the Federal Reserve’s lender-of-last-resort facilities. While these short-term claims may serve a “money-like” role that facilitates financial transactions, as suggested by Gorton and Metrick (2010) among others, they can also undermine financial stability. In particular, they expose financial entities to run-like behavior when investors become concerned about their solvency or liquidity. As Stein (2012) argues, market participants do not internalize this cost on the financial system, resulting in socially excessive issuance of short-term claims. Indeed, in the lead-up to the financial crisis, short-term financial claims issued by shadow banking entities grew enormously. And runs by holders of ABCP, repo, money market funds, and other short-term instruments amplified the crisis. As Ricks (2012) has shown, almost all of the government interventions during the financial crisis were targeted at stabilizing the market for short-term instruments issued by bank and non-bank financial entities.

A second way in which shadow banking may have impaired financial stability is that it lengthened the credit intermediation chain, as we have documented above. Lengthening the chain creates links between market participants that make it difficult for them to understand the risk exposures of their counterparties, which exacerbates run-like behavior during a crisis. A longer chain also increases the risk that any one link will break (Allen, Babus, and Carletti 2011). While

there may be benefits of a longer credit intermediation chain, including more liquid financial markets during normal times, market participants are unlikely to internalize the impact of a longer chain on financial stability. This may result in an excessively long credit intermediation chain.

Finally, to the extent that shadow banking made household credit both cheaper and more available, it increased household leverage. This can have adverse effects on macroeconomic stability, which households are unlikely to have internalized. Lamont and Stein (1999) show that household leverage increases house price volatility. Mian and Sufi (2011) show that greater availability of mortgage credit led to large increases in durables consumption, followed by large decreases in consumption when house prices fell during the financial crisis.

The main point here is that the financial stability costs of the shadow banking system are not internalized by market participants and households. It remains an open question whether the potential benefits of shadow banking – greater liquidity and the sharing of risk across the financial system – can be achieved without excessive financial stability costs.

## **5. Conclusions**

Our objective in this paper has been to understand the activities that contributed to the growth of finance between 1980 and 2007, and to provide a preliminary assessment of whether and in what ways society benefited from this growth.

Our overall assessment comes in two parts. First, a large part of the growth of finance is in asset management, which has brought many benefits including, most notably, increased diversification and household participation in the stock market. This has likely lowered required rates of return on risky securities, increased valuations, and lowered the cost of capital to

corporations. The biggest beneficiaries were likely young firm, which stand to gain the most when discount rates fall. On the other hand, the enormous growth of asset management after 1997 was driven by high fee alternative investments, with little direct evidence of much social benefit, and potentially large distortions in the allocation of talent. On net, society is likely better off because of active asset management but, on the margin, society would be better off if the cost of asset management could be reduced.

Second, changes in the process of credit delivery facilitated the expansion of household credit, mainly in residential mortgage credit. This led to higher fee income to the financial sector. While there may be benefits of expanding access to mortgage credit and lowering its cost, we point out that the U.S. tax code already biases households to overinvest in residential real estate. Moreover, the shadow banking system that facilitated this expansion made the financial system more fragile.

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## Appendix: Using the Industry Accounts to Understand Finance Sector Output

In the BEA industry accounts, economic activity is classified along two different dimensions—by the type of good or activity produced, and by the type of firm (the *Industry*) producing a given good. For example, “Financial planning and investment management products” is an *activity* that is primarily produced by the *Securities Industry*. However, a small fraction of “Financial planning and investment management products” outputs are produced by the *Banking Industry* as a so-called “by-product.” Output of an industry can be then classified into “primary” output and “by-products.”

The valued added of the “Securities Industry” means the value added of firms mainly producing securities-related output. To calculate it, we start with total output (revenues) of all securities *activities*. This total output this includes securities output produced by other types of firms, so-called “other industry make.” And, this total output does not include by-products of firms in the Securities Industry. To get industry value added, we compute:

$$\text{Value Added of the Industry} = \text{Activity Output} + \text{By-Products} - \text{Other Industry Make} - \text{Industry Inputs.}$$

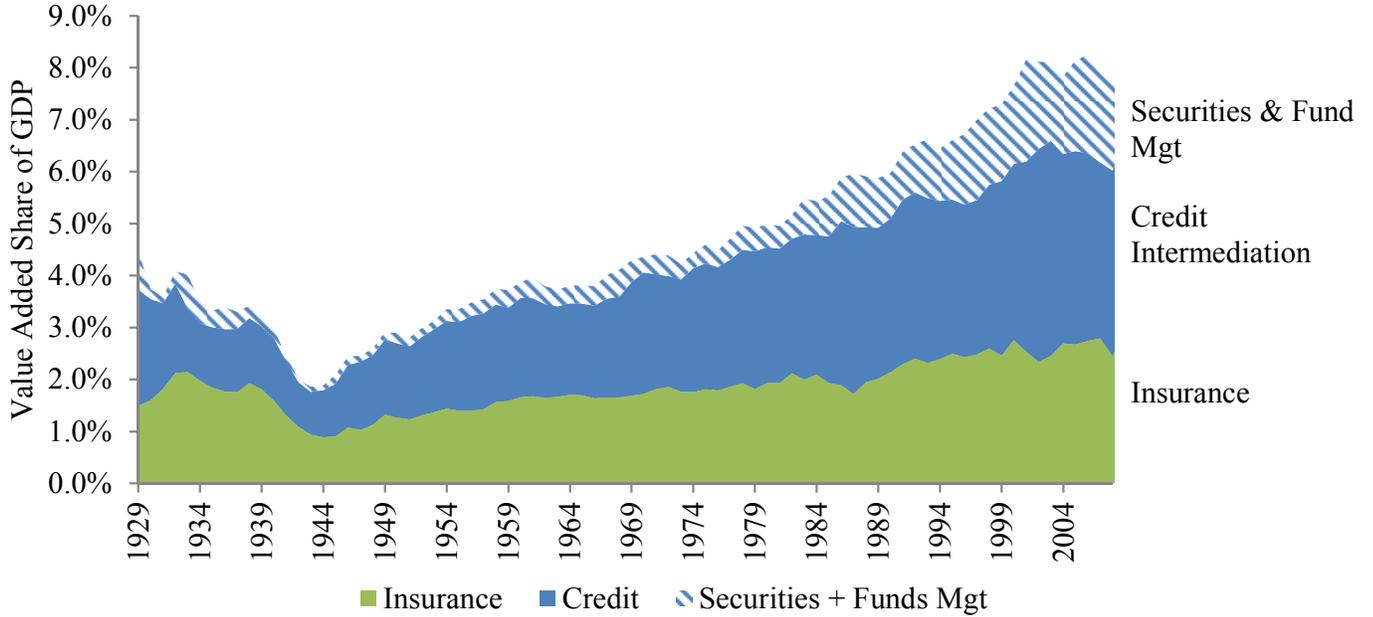
We are also interested in the value added associated with an activity rather than the associated industry. This is not reported directly by the BEA, but we can calculate it as follows:

$$\text{Value Added of an Activity} = \text{Activity Output} - \text{Activity Inputs.}$$

We approximate activity inputs by adjusting industry inputs by their primary output share.

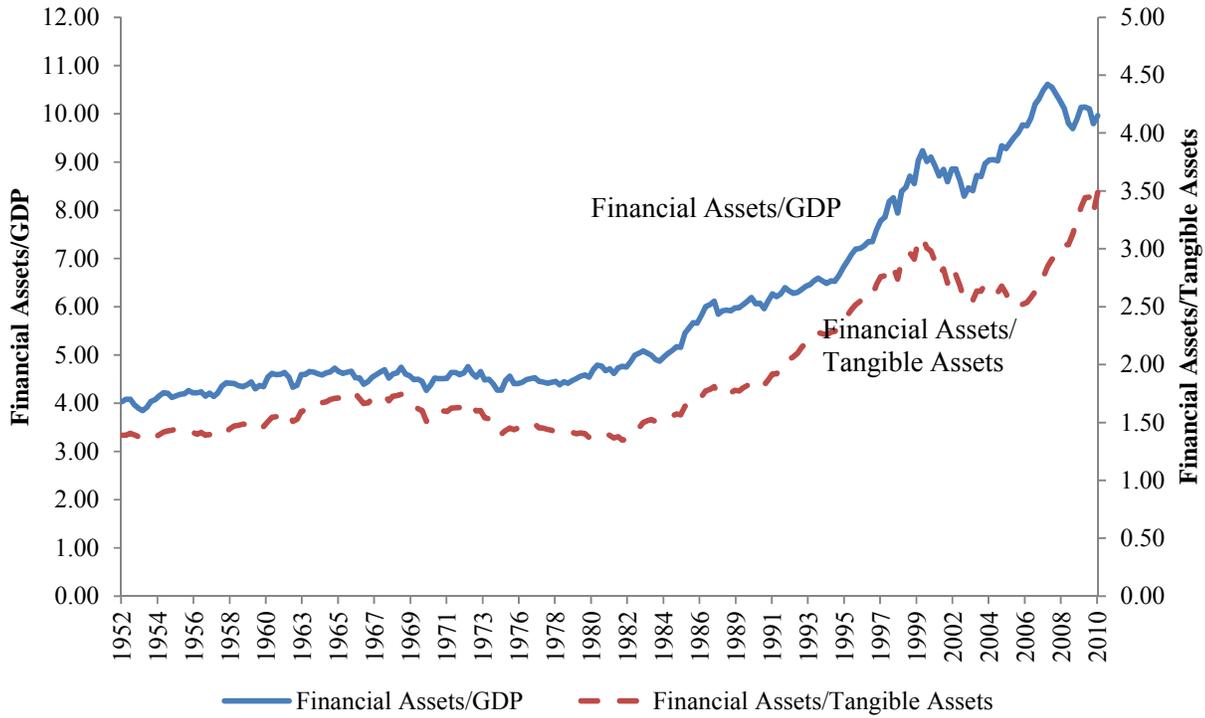
**Figure 1. The Growth of Financial Services**

*Notes:* We use data from the National Income and Product Accounts (1947-2009) and the National Economic Accounts (1929-1947) to compute value added as a percentage of US GDP by activity subtype. Finance includes Insurance, Securities and Funds Management, and Credit Intermediation. Note that Securities and Funds constitute two different categories in later sample years; we combine them into one category for consistency.



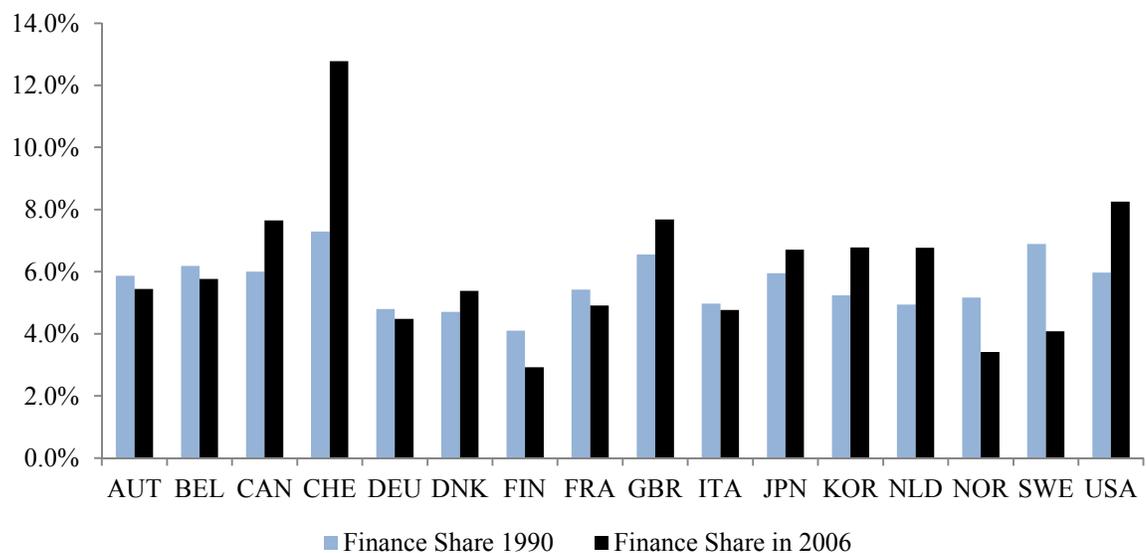
**Figure 2. The Growth of Financial Assets**

*Notes:* Data are from the *Flow of Funds Accounts of the United States*. Financial assets are summed across all sectors.



**Figure 3. The Growth of Financial Services in Different Countries. 1990-2006**

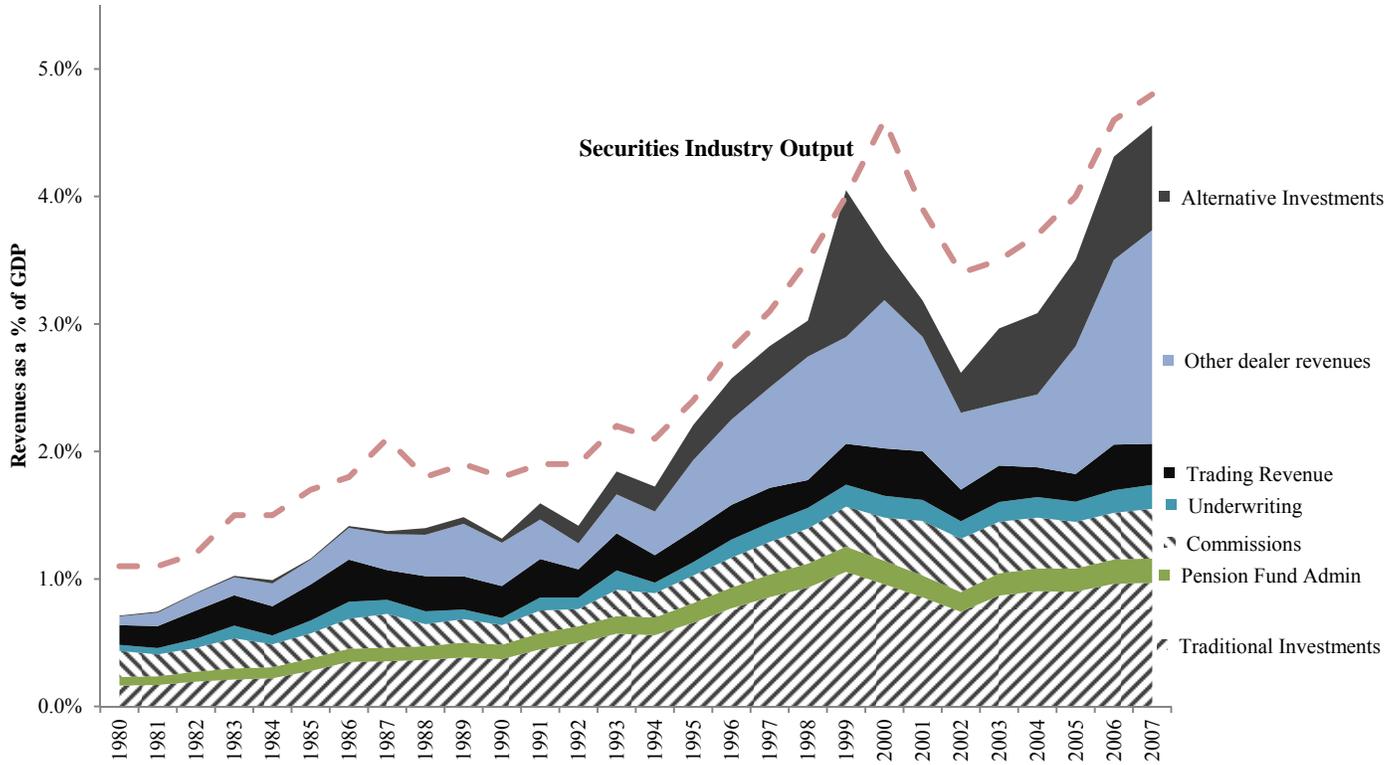
*Notes:* Annual data on financial services as a share of GDP are collected from the OECD and a variety of national sources. Panel A plots, for each country, the financial services share in 1990 and the financial services share in 2006. Panel B plots the difference between the financial services share in 2006 and the financial services share in 1990 (y-axis) against the financial services share in 1990 (x-axis).



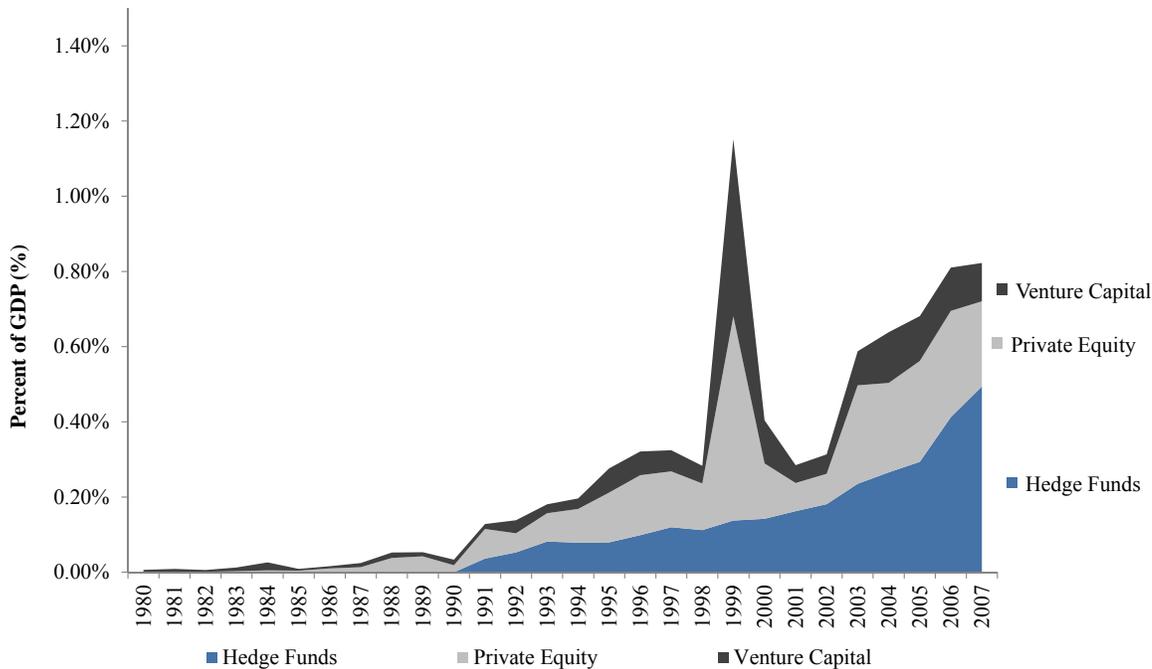
**Figure 4. The Growth of the Securities Industry, 1980-2007**

Notes: Data are compiled by authors and described further in the text. Other broker dealer investments include revenues from derivatives and commodities trading,

Panel A. Major outputs of the industry



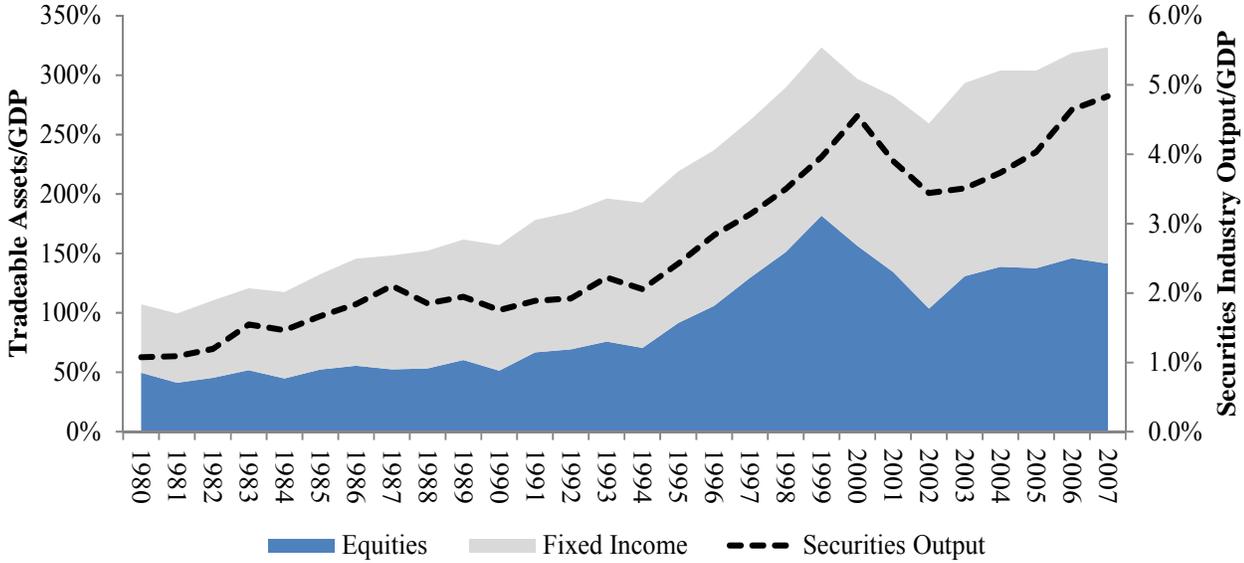
Panel B. Decomposition of Alternative Investments



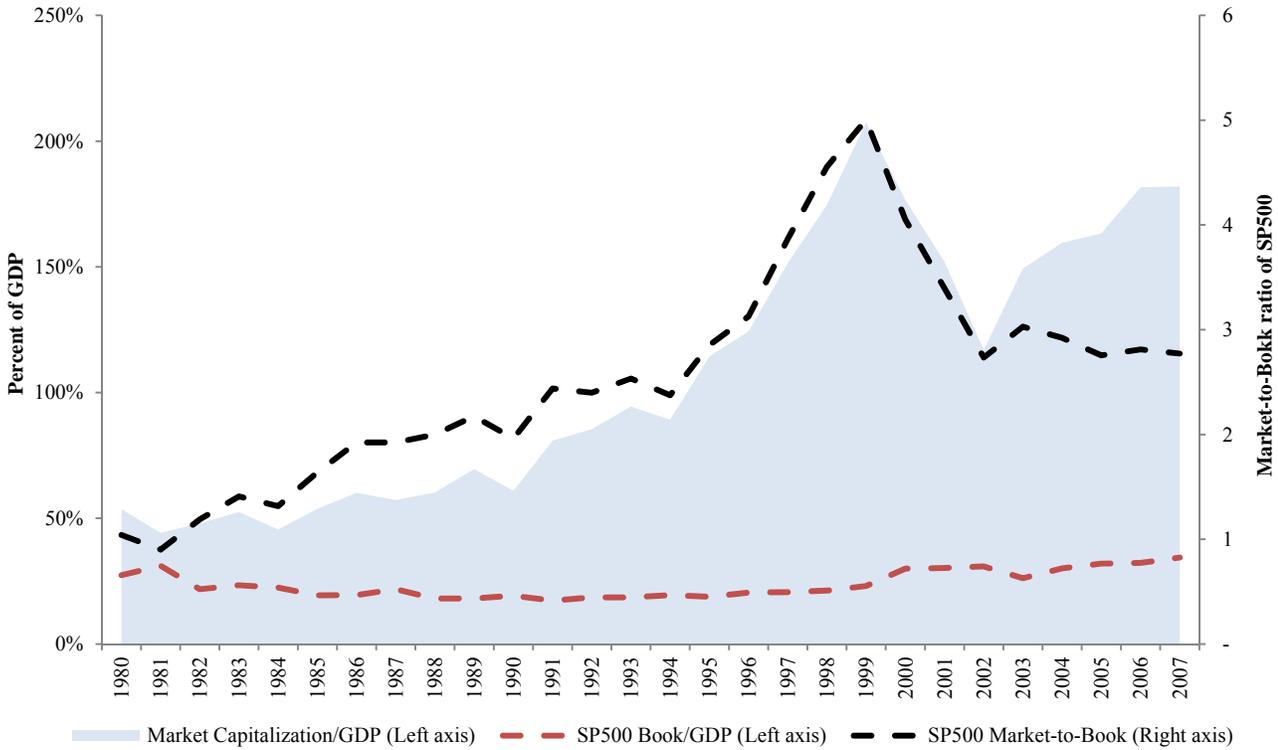
**Figure 5**  
**Tradable Assets and Securities Industry Output**

Source: Flow of Funds Accounts of the United States, Bureau of Economic Analysis, and authors' estimates.

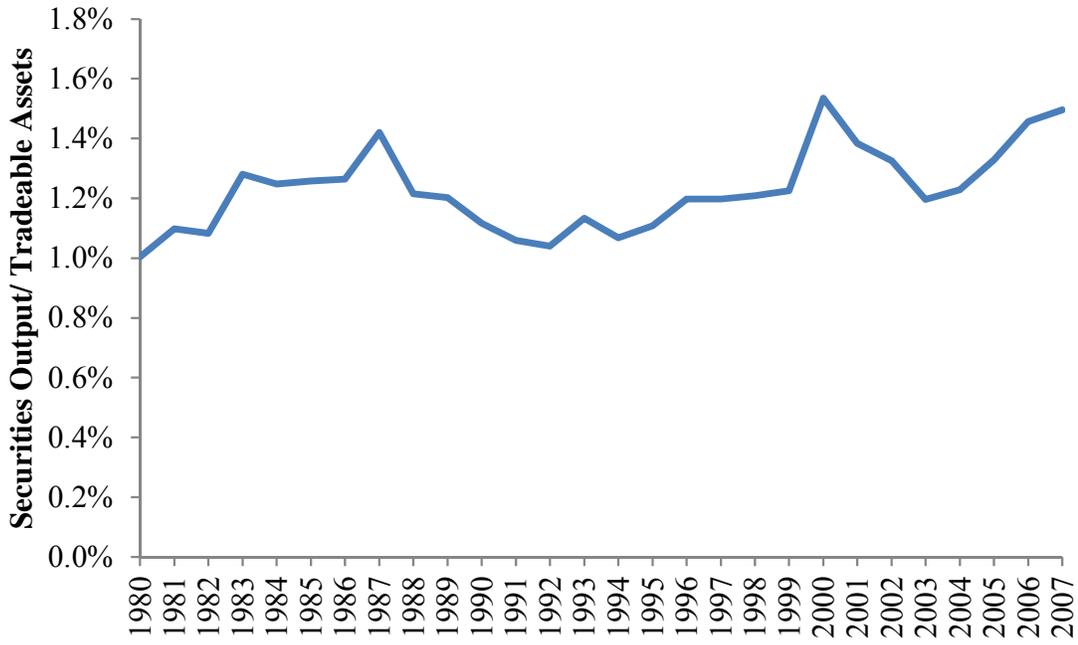
Panel A. Tradable assets and securities industry output



Panel B. S&P 500 Market-to-book and market value of equities to GDP

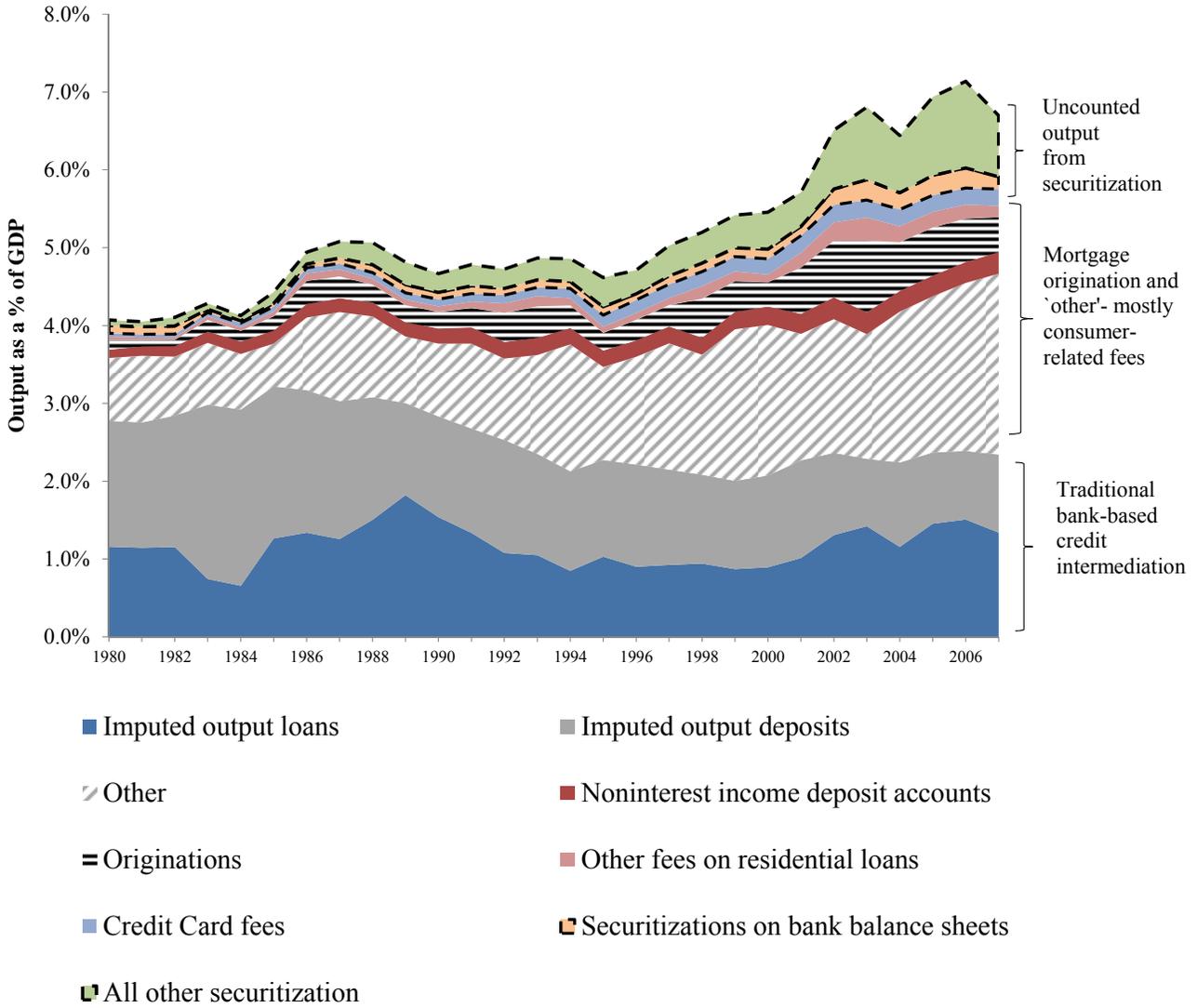


Panel C. Ratio of Securities Industry Output to Tradeable Assets



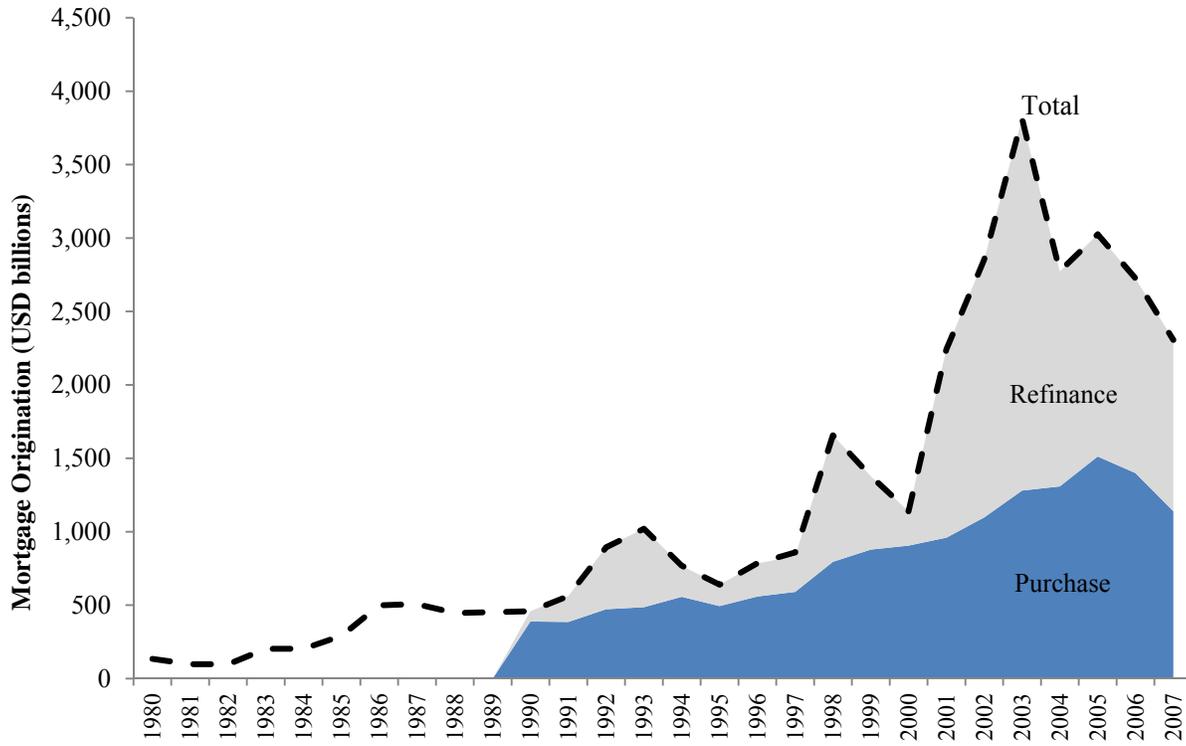
**Figure 6. Credit Intermediation Output 1980-2007**

Source: Call Reports, Flow of Funds Accounts of the United States, Bureau of Economic Analysis, and authors' estimates. For imputed output, we follow the BEA's methodology.



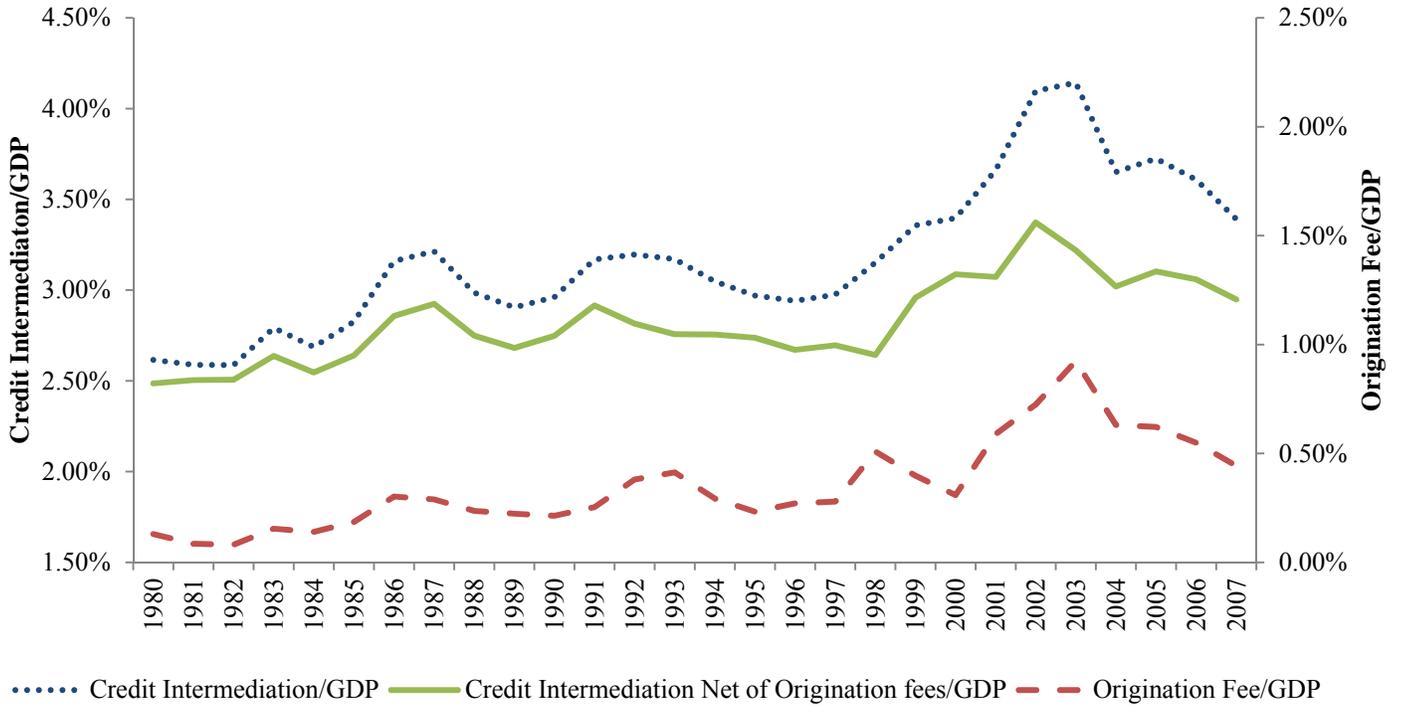
**Figure 7. Mortgage Origination**

Source: Mortgage Bankers Association and US Department of Housing and Urban Development.



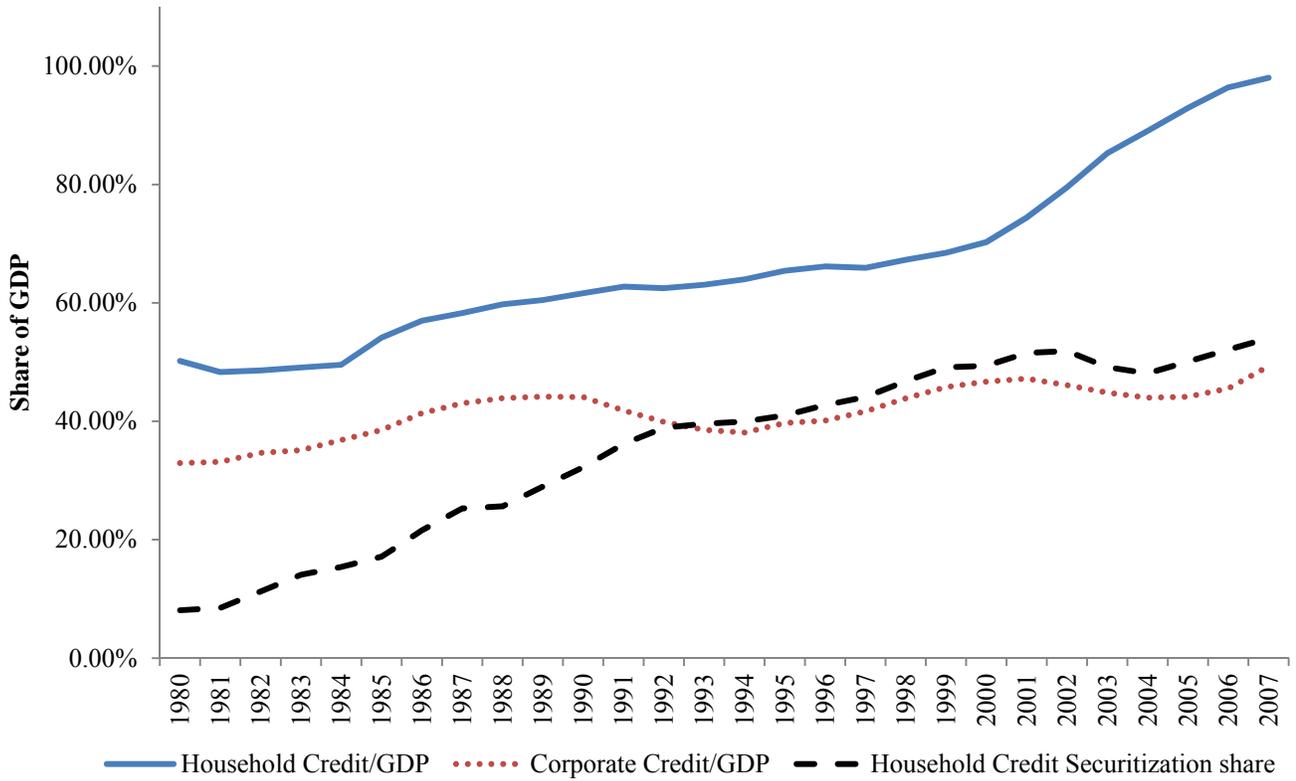
**Figure 8. Credit Intermediation and Mortgage Originations**

*Notes:* Mortgage originations are from the US Department of Housing and Urban Development. We assume an origination fee of 2.7 percent on the face value of the loan. This is approximately the sum of origination costs and secondary markup, according to data from Mortgage Bankers Association.



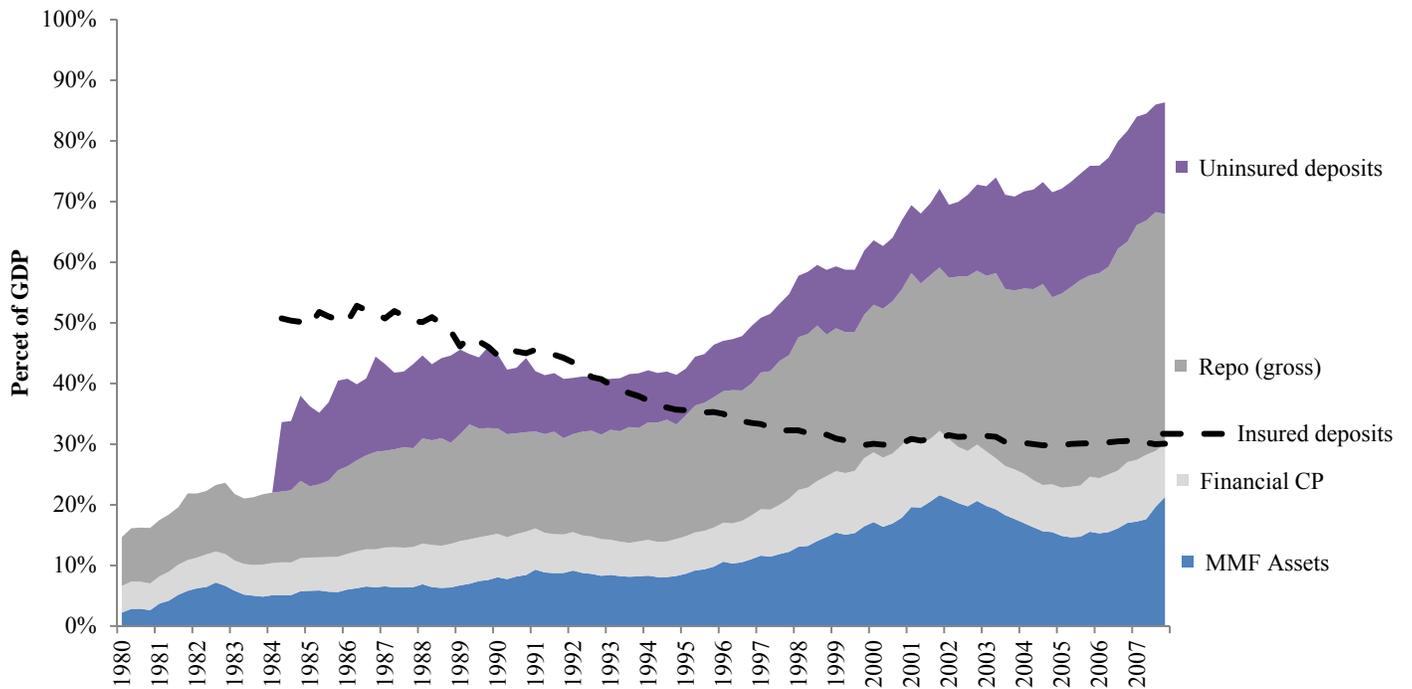
**Figure 9. Household Credit, Corporate Credit, and Securitization**

Sources: Data are from the *Flow of Funds Accounts of the United States*. Household credit are listed in Table L1, Credit Market Debt Outstanding. The household credit securitization share is the fraction of household credit held in securitized form.



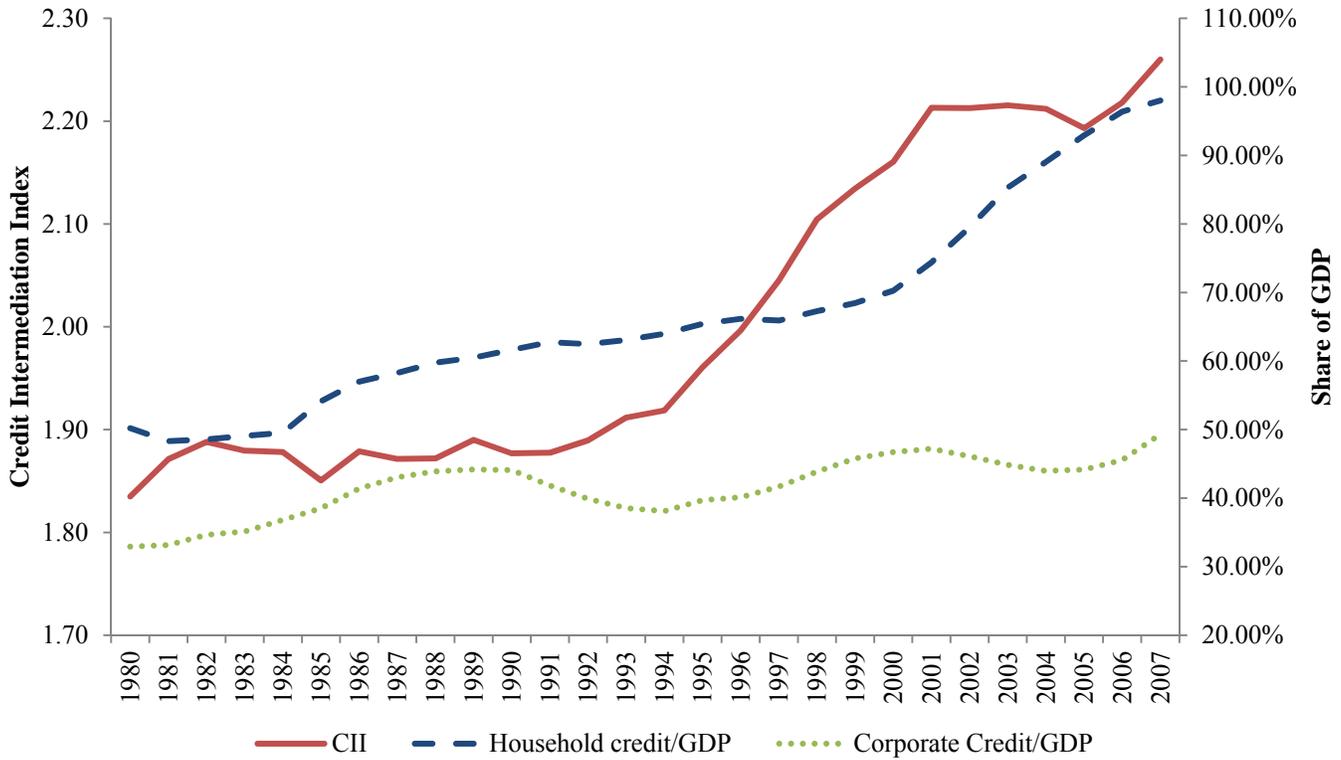
**Figure 10. Short-term funding of the financial sector**

*Notes:* Insured deposits and uninsured deposits are only available starting in 1984. MMF refers to money market mutual funds. Financial CP refers to commercial paper issued by financial institutions.



**Figure 11. Credit Intermediation Index**

*Notes:* The Credit Intermediation Index is equal to the ratio of gross credit to net credit to end users (government, households, and nonfinancial firms). Household credit and corporate credit are from Table L1 of the Flow of Funds.



**Table 1: Value Added from Financial Services Sector**

*Notes:* We merge securities, funds, and trusts. Our merge accounts for the fact that funds and trusts is an input securities. The original source of the data is the Bureau of Economic Analysis.

	Value Added								Gross Output							
	All Finance		Credit Intermediation		Insurance		Securities		All Finance		Credit Intermediation		Insurance		Securities	
	\$bn	%GDP	\$bn	%GDP	\$bn	%GDP	\$bn	%GDP	\$bn	%GDP	\$bn	%GDP	\$bn	%GDP	\$bn	%GDP
1980	138	4.9%	73	2.6%	54	1.9%	11	0.4%	264	9.5%	110	4.0%	129	4.6%	25	0.9%
1981	155	5.0%	81	2.6%	60	1.9%	14	0.4%	296	9.5%	122	3.9%	145	4.6%	28	0.9%
1982	168	5.2%	84	2.6%	69	2.1%	15	0.5%	325	10.0%	127	3.9%	165	5.1%	32	1.0%
1983	194	5.5%	99	2.8%	71	2.0%	25	0.7%	364	10.3%	149	4.2%	169	4.8%	45	1.3%
1984	213	5.4%	106	2.7%	82	2.1%	26	0.7%	405	10.3%	160	4.1%	197	5.0%	48	1.2%
1985	233	5.5%	119	2.8%	81	1.9%	33	0.8%	434	10.3%	180	4.3%	195	4.6%	58	1.4%
1986	262	5.9%	141	3.2%	84	1.9%	37	0.8%	483	10.8%	213	4.8%	202	4.5%	68	1.5%
1987	282	6.0%	152	3.2%	82	1.7%	49	1.0%	509	10.7%	230	4.9%	196	4.1%	83	1.8%
1988	302	5.9%	152	3.0%	99	1.9%	50	1.0%	541	10.6%	243	4.8%	219	4.3%	79	1.5%
1989	322	5.9%	159	2.9%	110	2.0%	52	1.0%	574	10.5%	246	4.5%	239	4.4%	89	1.6%
1990	347	6.0%	172	3.0%	124	2.1%	51	0.9%	596	10.3%	254	4.4%	257	4.4%	85	1.5%
1991	382	6.4%	190	3.2%	137	2.3%	55	0.9%	629	10.5%	267	4.5%	268	4.5%	94	1.6%
1992	414	6.5%	203	3.2%	152	2.4%	59	0.9%	663	10.5%	282	4.4%	280	4.4%	101	1.6%
1993	441	6.6%	211	3.2%	155	2.3%	75	1.1%	728	10.9%	303	4.5%	302	4.5%	123	1.9%
1994	456	6.4%	216	3.0%	169	2.4%	71	1.0%	766	10.8%	321	4.5%	324	4.6%	121	1.7%
1995	490	6.6%	220	3.0%	185	2.5%	84	1.1%	830	11.2%	347	4.7%	333	4.5%	150	2.0%
1996	527	6.7%	231	2.9%	190	2.4%	106	1.4%	910	11.6%	386	4.9%	339	4.3%	185	2.4%
1997	582	7.0%	248	3.0%	206	2.5%	128	1.5%	1000	12.0%	429	5.1%	353	4.2%	218	2.6%
1998	635	7.2%	277	3.2%	228	2.6%	129	1.5%	1104	12.6%	469	5.3%	378	4.3%	256	2.9%
1999	682	7.3%	314	3.4%	230	2.5%	138	1.5%	1227	13.1%	520	5.6%	398	4.3%	309	3.3%
2000	762	7.7%	338	3.4%	274	2.8%	150	1.5%	1378	13.8%	561	5.6%	432	4.3%	385	3.9%
2001	839	8.2%	377	3.7%	260	2.5%	202	2.0%	1405	13.7%	614	6.0%	451	4.4%	341	3.3%
2002	864	8.1%	436	4.1%	249	2.3%	179	1.7%	1458	13.7%	676	6.4%	471	4.4%	311	2.9%
2003	903	8.1%	462	4.1%	273	2.5%	169	1.5%	1573	14.1%	729	6.5%	512	4.6%	332	3.0%
2004	929	7.8%	433	3.7%	320	2.7%	176	1.5%	1697	14.3%	760	6.4%	561	4.7%	376	3.2%
2005	1,029	8.1%	471	3.7%	338	2.7%	220	1.7%	1889	14.9%	835	6.6%	600	4.8%	454	3.6%
2006	1,106	8.3%	484	3.6%	367	2.7%	255	1.9%	2067	15.4%	890	6.6%	624	4.7%	554	4.1%
2007	1,110	7.9%	477	3.4%	392	2.8%	241	1.7%	2199	15.6%	932	6.6%	661	4.7%	606	4.3%
$\Delta$ 1980-2007	973	3.0%	404	0.8%	339	0.9%	230	1.3%	1,934	6.1%	822	2.6%	532	0.1%	581	3.4%

**Table 2: Value Added and Output from the Securities Industry, selected years.**

*Notes:* Bureau of Economic Analysis, Economic Census of the United States. Asset Management consists of financial planning and investment management services, direct expenses associated with mutual funds and pension funds, and Trust services. Other broker-dealer revenue include brokering and dealing investment company securities, foreign currency, brokerage correspondent fees, and other fees. Missing cells indicate that the item was either zero or grouped into another category.

<b>Activity</b>	<b>\$ billions</b>			<b>% of GDP</b>		
	<b>1997</b>	<b>2002</b>	<b>2007</b>	<b>1997</b>	<b>2002</b>	<b>2007</b>
Asset Management	82.8	199.2	341.9	0.99%	1.87%	2.43%
Fees and commissions from trading equities	55.6	57	74.1	0.67%	0.54%	0.53%
Trading gains	33.8	19	45.1	0.41%	0.18%	0.32%
Profits from derivative contracts		16.3	45.3		0.15%	0.32%
Securities origination	28.3	22.1	35.1	0.34%	0.21%	0.25%
Brokering and dealing debt products - debt instruments			36.5			0.26%
Other broker-dealer revenue	18.4	40.6	56.2	0.22%	0.38%	0.40%
Management of financial market and clearing products			22.9			0.16%
Other	2.6	1.7	19.0	0.03%	0.02%	0.14%
<b>Total Securities Outputs</b>	<b>221.5</b>	<b>355.9</b>	<b>676.1</b>	<b>2.66%</b>	<b>3.34%</b>	<b>4.81%</b>
By-Products	5.5	7.6	11.7	0.07%	0.07%	0.08%
<b>Total Inputs</b>	<b>89.4</b>	<b>131.8</b>	<b>364.6</b>	<b>1.07%</b>	<b>1.24%</b>	<b>2.59%</b>
Other industry make	9.4	52.8	82.1	0.11%	0.50%	0.58%
<b>Value Added by Industry (All Value Added by Securities Firms)</b>	<b>128.1</b>	<b>179.0</b>	<b>241.2</b>	<b>1.54%</b>	<b>1.68%</b>	<b>1.72%</b>
<b>Value Added (All Securities-related Activities)</b>	<b>129.2</b>	<b>206.4</b>	<b>284.0</b>	<b>1.55%</b>	<b>1.94%</b>	<b>2.02%</b>

**Table 3: Value Added and Output from Credit Intermediation, selected years**

Source: Bureau of Economic Analysis, Economic Census of the United States, and Authors' estimates.

<b>Activity</b>	<b>\$ billions</b>			<b>% of GDP</b>		
	<b>1997</b>	<b>2002</b>	<b>2007</b>	<b>1997</b>	<b>2002</b>	<b>2007</b>
Imputed gross output of commercial banks, credit unions, and savings institutions	179.1	253.9	328.9	2.15%	2.39%	2.34%
Service charges on deposits and cash management	24.7	57.5	78.4	0.30%	0.54%	0.56%
Service charges and fees on credit card accounts	23.8	23.7	29.6	0.29%	0.22%	0.21%
Other products supporting financial services	17.8	55.0	76.3	0.21%	0.52%	0.54%
Loan origination fees, non-residential	14.0	20.2	27.9	0.17%	0.19%	0.20%
Loan origination fees on consumer residential	11.3	76.8	62.3	0.14%	0.72%	0.44%
ATM and electronic transaction fees	3.0	6.2	8.6	0.04%	0.06%	0.06%
Other	91.5	88.6	204.6	1.10%	0.83%	1.46%
<b>Total Credit Outputs</b>	<b>365.2</b>	<b>582.0</b>	<b>816.6</b>	<b>4.38%</b>	<b>5.47%</b>	<b>5.82%</b>
By-Products	67.3	109.0	130.3	0.81%	1.02%	0.93%
<b>Total Inputs</b>	<b>180.8</b>	<b>239.9</b>	<b>455.2</b>	<b>2.17%</b>	<b>2.25%</b>	<b>3.24%</b>
Other Industry Make	3.8	15.2	14.9	0.05%	0.14%	0.11%
<b>Value Added by Industry (All Value Added by Banks)</b>	<b>247.9</b>	<b>436.0</b>	<b>476.9</b>	<b>2.97%</b>	<b>4.10%</b>	<b>3.40%</b>
<b>Value Added (All Banking-related Activities)</b>	<b>211.2</b>	<b>374.7</b>	<b>415.1</b>	<b>2.53%</b>	<b>3.52%</b>	<b>2.96%</b>

**Table 4: The Credit Intermediation Index**

*Notes:* Data are from the *Flow of Funds Accounts of the United States, 1980-2009*. End-User Liabilities is from Table L1 and is defined as domestic nonfinancial sector debt plus trade payables. We further break this down into private and public credit below. Total Liabilities is end-user liabilities plus financial sector liabilities. CII is the credit intermediation index, and is the ratio of Total Liabilities to End-User Liabilities. The last nine columns of the table break down components of financial sector liabilities and express them as ratios of end-user liabilities. Banks refers to commercial banks plus savings institutions. GSE refers to Government Sponsored Enterprises; ABS refers to asset backed securities. Repurchase agreements are reported gross. Other includes liabilities of life insurers, credit unions, broker dealers, funding companies, REITs, and security credit.

Year	Credit Intermediation Index	Total Liab. (\$tr)	End-User Liabilities (\$tr)			Ratios of Selected Financial Sector Liabilities to End-User Liabilities (%)								
	CII	Total	Total	Private Credit	Public Credit	Banks	Deposits	ABS	GSE	GSE Pools	MMFs	Pension Funds	Repurchase Agreements*	Other Fin Sector
1980	1.83	8.2	4.5	3.4	1.1	3.3%	39.9%	0.0%	3.6%	2.5%	1.7%	17.2%	5.9%	21%
1981	1.87	9.3	4.9	3.7	1.2	3.7%	39.0%	0.0%	3.9%	2.6%	3.8%	17.7%	7.1%	21%
1982	1.89	10.2	5.4	4.0	1.4	3.8%	39.1%	0.0%	3.9%	3.3%	4.1%	18.6%	7.2%	20%
1983	1.88	11.3	6.0	4.4	1.6	3.7%	39.1%	0.1%	3.5%	4.1%	3.0%	18.6%	7.1%	19%
1984	1.88	12.8	6.8	5.0	1.9	3.9%	38.2%	0.3%	3.5%	4.2%	3.4%	18.2%	7.5%	19%
1985	1.85	14.6	7.9	5.6	2.3	3.8%	35.9%	0.5%	3.4%	4.7%	3.1%	17.0%	7.7%	19%
1986	1.88	16.4	8.7	6.2	2.6	3.8%	35.1%	0.9%	3.2%	6.1%	3.3%	17.1%	8.2%	19%
1987	1.87	17.8	9.5	6.7	2.8	4.0%	33.4%	1.2%	3.2%	7.0%	3.3%	16.9%	8.3%	19%
1988	1.87	19.4	10.4	7.4	3.0	3.9%	32.6%	1.5%	3.4%	7.2%	3.2%	17.3%	8.3%	19%
1989	1.89	21.1	11.1	8.0	3.1	3.5%	31.4%	1.9%	3.4%	7.8%	3.8%	18.4%	8.8%	19%
1990	1.88	22.3	11.9	8.4	3.5	2.8%	29.6%	2.3%	3.4%	8.6%	4.2%	18.8%	8.0%	19%
1991	1.88	23.3	12.4	8.5	3.9	2.3%	28.3%	2.6%	3.3%	9.3%	4.3%	19.1%	7.7%	20%
1992	1.89	24.5	13.0	8.8	4.2	2.2%	26.8%	3.0%	3.5%	9.8%	4.2%	19.3%	8.5%	20%
1993	1.91	26.0	13.6	9.1	4.5	2.3%	25.4%	3.4%	3.9%	10.0%	4.1%	19.7%	9.3%	22%
1994	1.92	27.4	14.3	9.7	4.6	2.4%	23.9%	3.8%	4.9%	10.3%	4.2%	20.0%	9.5%	22%
1995	1.96	29.6	15.1	10.4	4.7	2.4%	23.5%	4.4%	5.3%	10.4%	4.9%	20.4%	10.7%	24%
1996	2.00	31.9	16.0	11.1	4.9	2.5%	23.5%	4.9%	5.6%	10.7%	5.6%	20.6%	10.9%	25%
1997	2.05	34.5	16.9	12.0	4.9	2.8%	23.5%	5.4%	5.9%	10.8%	6.2%	21.3%	11.9%	27%
1998	2.10	37.9	18.0	13.1	4.9	3.3%	23.6%	6.5%	7.1%	11.2%	7.4%	21.6%	11.6%	28%
1999	2.13	41.3	19.3	14.5	4.8	3.7%	22.9%	6.9%	8.2%	11.9%	8.2%	21.6%	11.7%	29%
2000	2.16	44.5	20.6	16.0	4.6	3.9%	22.9%	7.3%	8.9%	12.1%	8.8%	20.6%	12.6%	31%
2001	2.21	47.9	21.7	17.0	4.7	4.0%	23.9%	8.1%	9.8%	13.1%	10.3%	20.1%	12.9%	30%
2002	2.21	51.2	23.2	18.1	5.1	3.9%	23.8%	8.6%	10.1%	13.6%	9.6%	19.2%	13.3%	30%
2003	2.22	55.2	24.9	19.3	5.6	3.9%	23.9%	8.9%	10.4%	13.4%	8.1%	19.3%	13.5%	30%
2004	2.21	60.0	27.1	21.0	6.1	4.3%	24.2%	9.8%	9.9%	12.5%	6.9%	18.8%	13.8%	31%
2005	2.19	65.3	29.8	23.2	6.6	4.3%	23.9%	11.4	8.7%	11.9%	6.7%	17.8%	14.4%	30%
2006	2.22	71.8	32.4	25.5	6.9	4.1%	23.7%	13.0	8.1%	11.9%	7.1%	17.5%	15.2%	31%
2007	2.26	79.3	35.1	27.8	7.3	4.9%	23.6%	12.9	8.3%	12.7%	8.6%	17.1%	15.4%	32%

\* Gross Repurchase agreements = Flow of Funds items f1792150005-f1702150005-f1662150005+f1724135000+f1754135000+f1442150003+f1752150000+f1662150003+f1663168063