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Expanding the Definition of Financial Intermediation Services in the US National Accounts

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I. Introduction

Although the credit intermediation industry was the epicenter of the US financial crisis of 2007-2008 and the Great Recession of 2008-2009, in the US national accounts the output of this financial services industry seems too modest for it to matter very much. In addition and as discussed below, input-output linkages between financial services industries and non-financial industries are not strong in the US industry accounts. These facts present a puzzle: How can financial services industries be so insulated from the rest of the economy, and yet play such a critical role in the business cycle?

Part of the answer to this question is that the role of finance in the economy encompasses more than the production and use of financial intermediation services. Banks and other financial intermediaries serve as conduits for transforming saving into funds available for investment, and they support liquidity management through offering lines of credit or payment guarantees that allow transactions to take place. Also the roles of changes in supply and demand for credit in the transmission of financial shocks to the real economy (Gorton and Metrick, 2012, pp. 146-150) may not be well captured by measures of flows of financial services in the national accounts.

Yet it is also possible that financial intermediation services have a larger role in the US economy than is shown by the measures currently used in the US national accounts. As a step towards answering this question, in this paper we address what is perhaps the most important measurement gap for financial services in the US national accounts: the omission of unpriced borrower services not produced by commercial banks. The US national accounts began to measure the production of implicitly priced borrower services by commercial banks as part of the 2003 comprehensive revision, and estimates of intermediate uses of financial services rose significantly as a result (Fixler, Reinsdorf and Smith, 2003). Other important types of direct lenders also produce borrwer services, however. In particular, savings institutions, credit unions and finance companies all fall within the scope of the producers of borrower FISIM (an acronym for "financial intermediation services indirectly measured") recognized in the 2008 SNA. In this paper we change the current measures of FISIM produced by savings institutions and credit unions to include services to borrowers, and we measure the implicitly priced output of finance companies for the first time.

Another puzzle in the picture of financial services in the US national accounts is the recent good performance of the credit intermedation industry. The growth in the nominal value added of this industry substantially outstripped that of overall GDP from 2008 to 2010, suggesting that this industry hardly suffered from the US financial crisis and the ensuing "Great Recession" (figure 1). The financial crisis represented a negative shock both for the supply and for the demand of the services. With inelastic demand and elastic supply, it is theoretically possible for the nominal value of output to rise after negative shocks to both supply and demand because the price rises; and indeed, as shown in figure 2, the price index for financial services rose quickly enough in 2010 to overcome the effect of a fall in the volume of financial services. There is no

obvious reason why the financial services industry should have been an example of this special case, however, and in this paper we will show that correcting the measures of the value and price of borrower FISIM changes the picture of the performance of the credit intermediation industry in the crisis years. This correction adjusts the current measure of borrower FISIM to take account of default costs.

Figure 1. Growth rate of nominal value added of the credit intermediation industry versus nominal GDP in the US National Income and Product Accounts

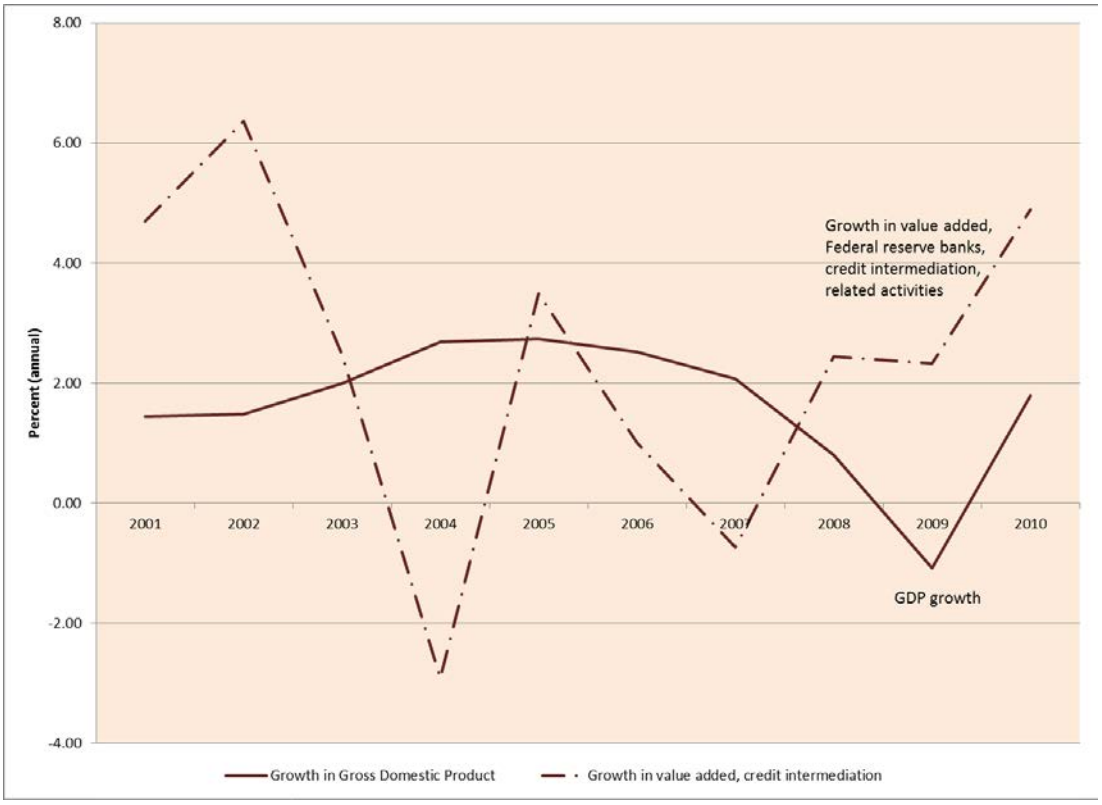
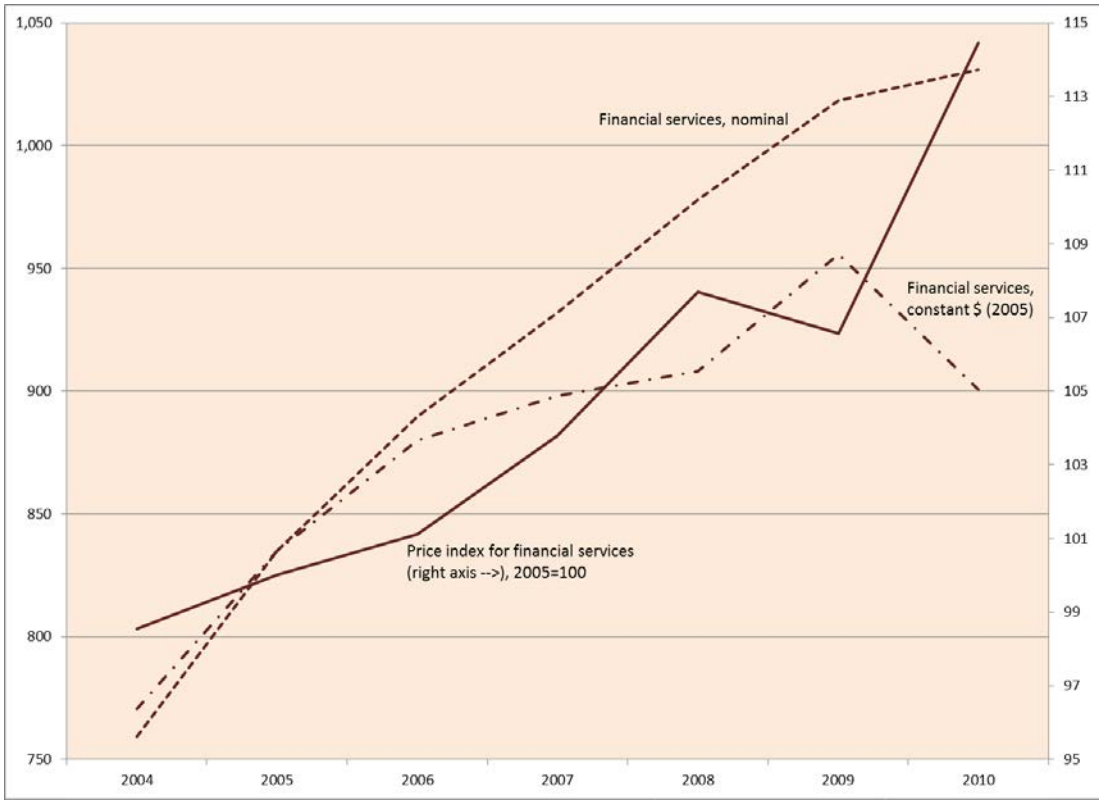


Figure 2. Value, Volume and Price Index for the Output of the Credit Intermediation Industry



By adjusting the current measures of implicitly priced financial intermediation services to borrowers to account for default costs and by extending the measurement of financial services to include implicitly priced services of nonbank lending and leasing companies, we uncover hidden uses of financial services sector by the non-financial business sector, provide a more complete picture of the role of financial services in the overall US economy, and reveal that the output of commercial banks and other depository institutions was indeed affected by the recent recession.

II. Financial Output and the Borrower Perspective

A. Measurement challenges

The recent financial crisis highlighted the need to understand the role of financial institutions in the economy. This requires good measurement of financial output using methods that are transparent. Measuring financial services is, however, challenging because it is surprisingly difficult to describe exactly what financial institutions produce and sell to their clients. A longstanding challenge—that financial institutions do not charge explicit fees for some of their services—is solved by recognizing that interest rate spreads that are paid by borrowers or foregone by depositors are substitutes for explicit fees. National income accountants therefore impute implicit sales of services (known as "FISIM") to borrowers and depositors. Another

challenge is that financial innovation has blurred the line between services provided by different types of institutions and expanded the instruments held on the balance sheets of financial corporations, complicating the estimation of FISIM. Finally, measuring the income from activities that involve routine realization of trading gains (e.g., fund management and proprietary trading) is tricky because holding gains are excluded from measures of income and output in national accounts.[1]

Let's take these issues in reverse order. National accountants exclude realized capital gains and losses from measures of revenue from current production, but without information on the revenue from operations whose object is to realize trading gains, users of the national accounts will be unable to model these real-world financial activities and to obtain meaningful answers to questions such as comparisons of profitability over time and over space (Cette, Durant and Vittelle, 2011). Revenue including these amounts would therefore be a useful supplemental construct for analyzing financial corporations—and also non-financial corportions—even though these amounts are rightfully excluded from the core national accounts and from GDP.

Table 1. Current account for financial corporations (consolidated sector or sub-sectors)

1.	**Revenues as reported**
2.	Less: Trading gains/losses
3.	Plus: Fixed asset production on own account
4.	Plus: Imputed services (FISIM)
5.	**Equals: Gross output**
6.	Services provided to financial business (market)
7.	Services provided to nonfinancial business (FISIM and market)
8.	Services provided to final demand sectors (FISIM and market)
9.	**Less: Purchases of intermediate inputs**
10.	**Equals: Gross value added**
11.	**Less: Consumption of fixed capital**
12.	**Equals: Net value added**
13.	Compensation of employees
14.	Taxes on production and imports less subsidies
15.	Net operating surplus
16.	Less: Net interest (FISIM and monetary), misc. and business transfer payments
17.	Less: Other withdrawals of income (proprietors' and rental income)
18.	**Equals: Corporate profits (w/IVA and CCAdj), domestic**
19.	Less: Taxes on current income
20.	Less: Net dividends paid
21.	**Equals: Net saving**
22.	Undistributed corporate profits
23.	Inventory valuation adjustment (IVA), corporate
24.	Capital consumption adjustment (CCAdj), corporate

[1] ~~Mark-ups that a buyer pays as compensation for services are not excluded, however. For example, financial~~ institutions that originate mortgages in the US often collect payment for this activity by selling the mortgages at a profit. Nevertheless, in most circumstances, the gains from selling a financial asset for more than its acquisition cost should not be viewed as a payment for any kind of service produced by the seller.

The construct that we have in mind is illustrated on the second line of table 1, which also shows how national income accounts derive economic measures of output (line 5) and production (measured by value added on line 10) starting with the revenue concept used in business financial reporting. Line 2, which figures in the relationship between line 1 and line 5, plays an important role in the adjustments that BEA makes to income as reported in financial and tax data to derive the income side measure of GDP (Rassier, 2012). Line 2 also figures in the compilation of corporate profits (line 18); see Petrick (2002, table 1, line 13).

BEA provides some information on gains and losses for major sectors in the integrated macroeonomic accounts (http://www.bea.gov/national/nipaweb/Ni_FedBeaSna/Index.asp) , but the gains and losses on line 2 are not published in the US national income and product accounts (NIPAs), nor are they available anywhere for detailed sectors. Were they to be presented, the picture of the financial sector in the NIPAs would be more complete. For example, during the six quarters beginning in July 2007, which were the financial crisis period, in US domestic broker-dealers had economic output from the production and sale of services of $338 billion, but at the same time they had holding losses of $90 billion, compared with gains of $70 billion in the previous six quarters. [2] Thus the deviation of holding gains from what could be viewed as normal amounted to almost half of the measure of output recorded in the national accounts.

Nevertheless, the suggestion to disclose holding gains does not solve the puzzle of why measured financial output continued to grow during the Great Recession, as holding gains boosted the reported revenue of the industry in 2009 and 2010. We therefore turn to the imputation for unpriced financial intermediation services (FISIM). Table 1, line 4, shows that FISIM is added to revenues to obtain gross output. Based on previous work by Hood (2010), we find that the *trajectory* of imputed borrower services during the financial crisis has been notably overstated. While this goes a long way to explaining why value added in finance grew during the crisis, the finding tells us little about the levels of linkages between the financial and nonfinancial sectors of the economy. Accordingly, we examine the existing business-to-business linkages of financial services (the services in financial sector output shown on lines 6 and 7 of the table) and review whether they are fully capturing services provided to borrowers by financial institutions in the modern US economy.

B. Business-to-business linkages[3]

To investigate business-to-business linkages we used BEA's 2002 benchmark input-output tables. We aggregated detailed industries to five domestic sectors—household business, nonprofit institutions, governments, financial business, and nonfinancial business—and then created an industry-by-industry domestic direct requirements using the instructions in Chapter 12

[2] Statistics for broker-dealers from FOCUS reports are compiled by SIFMA and reported on their website (http://www.sifma.org/research/statistics.aspx).
[3] The analysis in this section is drawn from Corrado and Hulten (2010).

of BEA's IO Manual (Horowitz and Planting, 2006). The result is shown table 2, and the table's notes provide details of the sector definitions.

One of the most important characteristics of financial activity is that much of the sector's business is with itself. Much was made of this characteristic in the recent crisis (as it sets the stage for contagion), but this feature was (and has been) implicit in input-output relationships for some time. The table reveals this characteristic in two ways: First as shown by the highlighted cell, and reading down the financial business column, one can see that the sector's primary intermediate input is its own upstream financial services. Second, reading across the financial business row suggests that, in terms of providing intermediate inputs/services to business, serving itself is the sector's primary function. After multiplying each input coefficient by the gross output of the purchasing sector, we see that the value of financial services provided to financial business is $376 billion, whereas the values supplied to nonfinancial business and household business (which includes owner-occupied housing) are $274 and $126 billion, respectively.

Table 2. Industry-by-Industry Domestic Direct Requirements Coefficients, 2002

	Household business (1)	Nonprofit Institutions (2)	Governments (3)	Financial Business (4)	Nonfinancial Business (5)
1. Households	.00	.00	.00	.00	.00
2. Nonprofits	.01	.00	.01	.00	.00
3. Governments	.00	.01	.01	.01	.01
4. Financial business	.13	.06	.01	.25	.02
Intermediation only	.10			.08	.01
5. Nonfin. business	.12	.35	.33	.14	.39
Memos:[1]					
6. Gross output	972	924	2,076	1,507	13,700
7. Sector output[2]	972	920	2,057	1,136	8,314
8. Value added	716	512	1,270	879	7,296
9. Imported inter-mediate inputs	--	21	59	28	584
10. Domar weight[3]	.086	.081	.181	.100	.732

Notes—Estimates based on BEA input-output tables and import matrix for 2002.

Reading down each column, coefficients are industry-based domestic intermediate inputs expressed as a fraction of own-industry gross output.

Household business is the production of owner-occupied housing services and private employment by households (the NIPA definition). Governments include government enterprises (e.g., the post office and certain utilities). Nonprofit institutions are industries in which nonprofit activity predominates (education, hospitals, and social, membership, and religious services organizations). Financial business is finance and insurance, and nonfinancial business is all other industries.

1. Billions of dollars unless otherwise noted.
2. Gross output less domestic own use, based on the direct requirement coefficient.
3. Individual sector output relative to total economy sector output (GDP, the sum of row 8 + imported intermediates, the sum of row 9).

Relative to the value of production in the nonfinancial business sector (its gross output), $274 billion is very small indeed (in fact the ratio is .02, the direct requirement coefficient shown in the table). Intermediation services (central banking, credit intermediation and related activities) make up about half of this number ($139 billion). Gross output of intermediation services is approximately $683 billion. The $274 billion amount is even smaller when one thinks in terms of conventional nonfinancial business—household owned tenant-occupied real estate is part of the nonfinancial business sector in the NIPAs (and in the table) and services supplied to that activity is included in the $274.

The table also reveals what the industry accounts data say about the Popkin/Hill distinction between services provided to business and services provided to consumers. One might think financial activities are devoted largely to the former, but, after netting services that the sector provides to itself, that is not what the data say. In 2002, more than half ($655 billion) of the sector's net output (called sector output and shown on line 7 in the table) went to final demand, $576 of which was to consumers for finance and insurance services. According to industry accounts data for 2002, then, 62 percent of the financial services supplied to other sectors went to households as consumers and owner-occupiers of homes and somewhat less than 24 percent went to conventional nonfinancial business.[4]

There are two ways to interpret these results. One is that all those critics of the financial sector are correct: Wall Street doesn't serve Main Street (except through home mortgages to households). Another is that the national accounts and industry accounts may understate implicit financial services supplied to conventional business.

C. The Borrower Perspective

FISIM is an important imputation in national accounts. It recognizes that net interest income and fee income of banks are substitutes, and because banks have substituted fee income for net interest income over time, FISIM prevents an overstatement of bank output growth.

Beginning with the 1993 SNA, the international guidelines for measuring FISIM have recognized that implicit financial services are provided to borrowers as well as to depositors. Borrower services are a key part of financial intermediation, i.e., borrower services capture one of the main functions of finance, the channeling of savings to productive investments. FISIM is currently computed as the sum of depositor and borrower services, but as discussed in more detail below, borrower FISIM can be a stand-alone imputation.

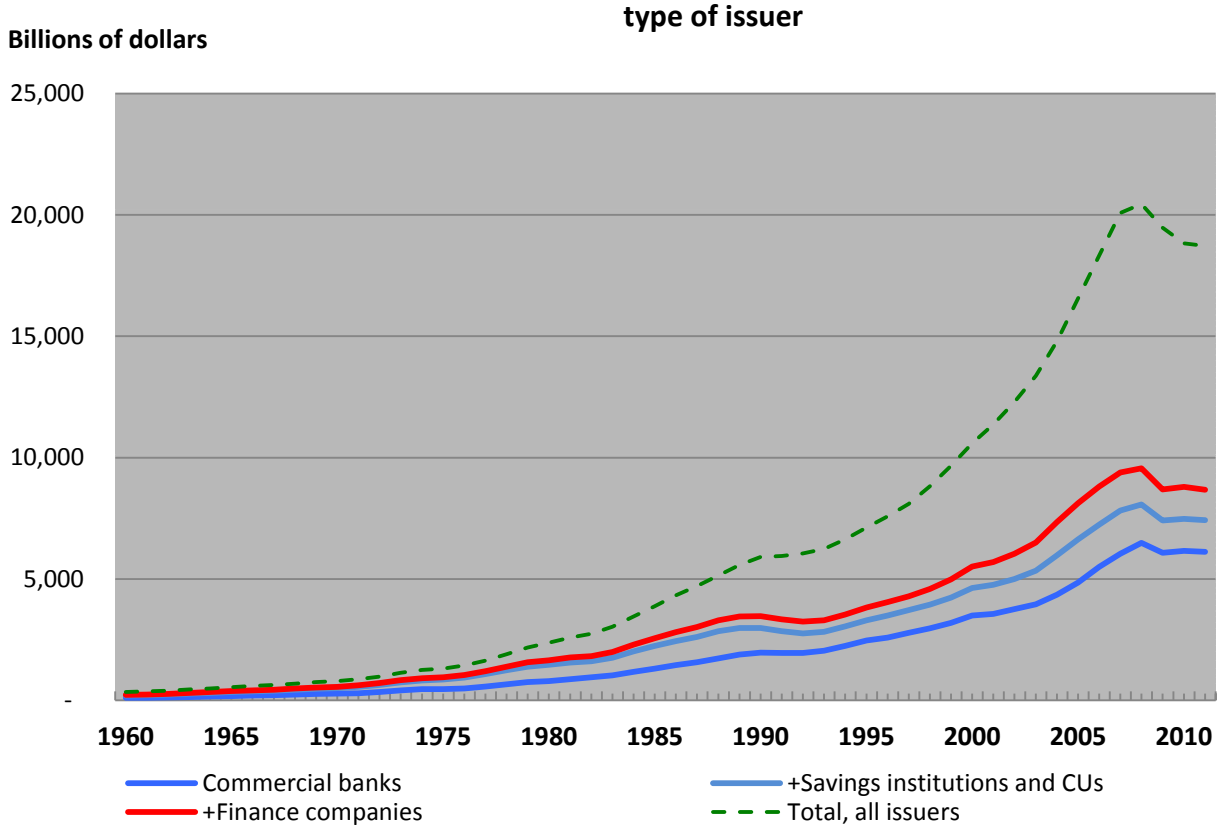
A range of financial services institutions provide implicitly priced borrower services, but at present, BEA only imputes borrower FISIM for commercial banks. Borrower services provided by savings institutions and credit unions are discussed below. Leaving these institutions aside

[4] These percentages are obtained as follows: (576+126)/1136 = .62 and 274/1136 = .24

for the moment, the following questions arise: What about the rise of asset securitization, which pushed loans off bank balance sheets? What about borrower services provided by private nondepository institutions? What about borrower services provided by government sponsored intermediaries (which may raise questions about subsidies)? The presumption is that output associated with the orgination or servicing of securities and loans that have been securitized and sold to investors is fully measured by explicit fee income, as no FISIM is imputed in these cases, but it is unclear whether this presumption always holds true in practice. For example, the output of the company managing a pool of securitized mortgages might be underestimated if that company receives net interest income as compensation for its services.

We can gauge a dimension of the potential understatement by comparing the value of all loan liabilities of the household and nonfinancial business sectors with the value of loans to these sectors by commercial banks using data from Federal Reserve Board (FRB) flow of funds (FOF) accounts. Figure 3 shows the value of total private domestic loan liabilities by type of issuer, with the bright blue line showing the value held by commercial banks. As may be seen, the value held by commercial banks is less than 50 percent of total household and nonfinancial business loan liabilities.

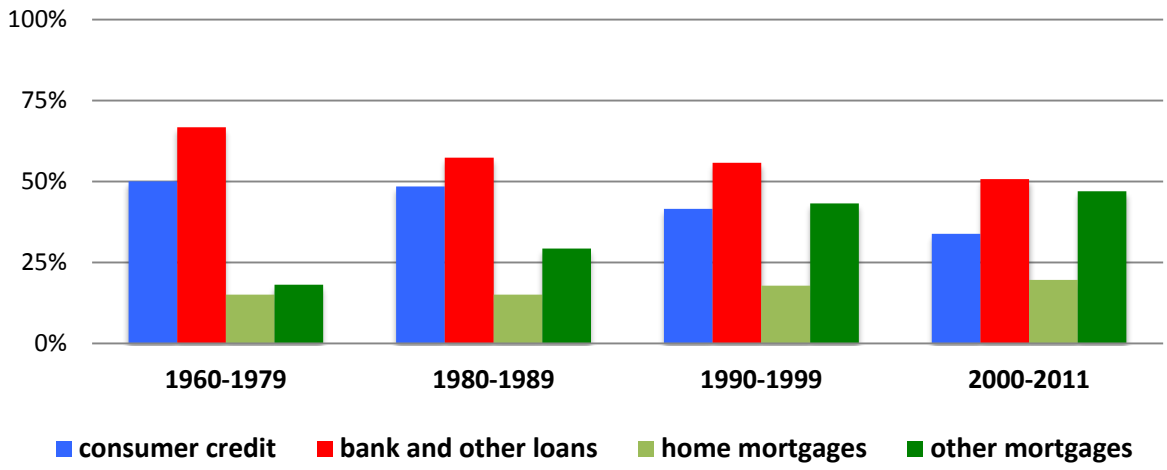
Figure 3. Total domestic consumer and nonfinancial business loans by type of issuer



Source—Authors' calculations based on data from the IMAs and FOFs as of 6/15/2012.

Figure 4 shows these commercial bank shares by type of loan. Consumer credit is essentially a liability of households, which also are the primary holders of home mortgage loans. "Bank and other loans" are primarily liabilities of businesses, as are "other mortgages", which group together multifamily residential and commercial mortgages. In 2000-2011, loan types that tend to be liabilities of businesses are more likely to be held by commercial banks than other types of loans, but even for these loans the coverage of measures that include only commercial banks would only stand at around 50 percent. Besides commercial banks, other important types of issuers of loans or loan-backed securities in the US are finance companies, governments (including agency mortgage pools), private ABS issuers, and foreigners.

Figure 4. Commercial bank share of total domestic consumer and nonfinancial business loan liabilities, percent by type of loan



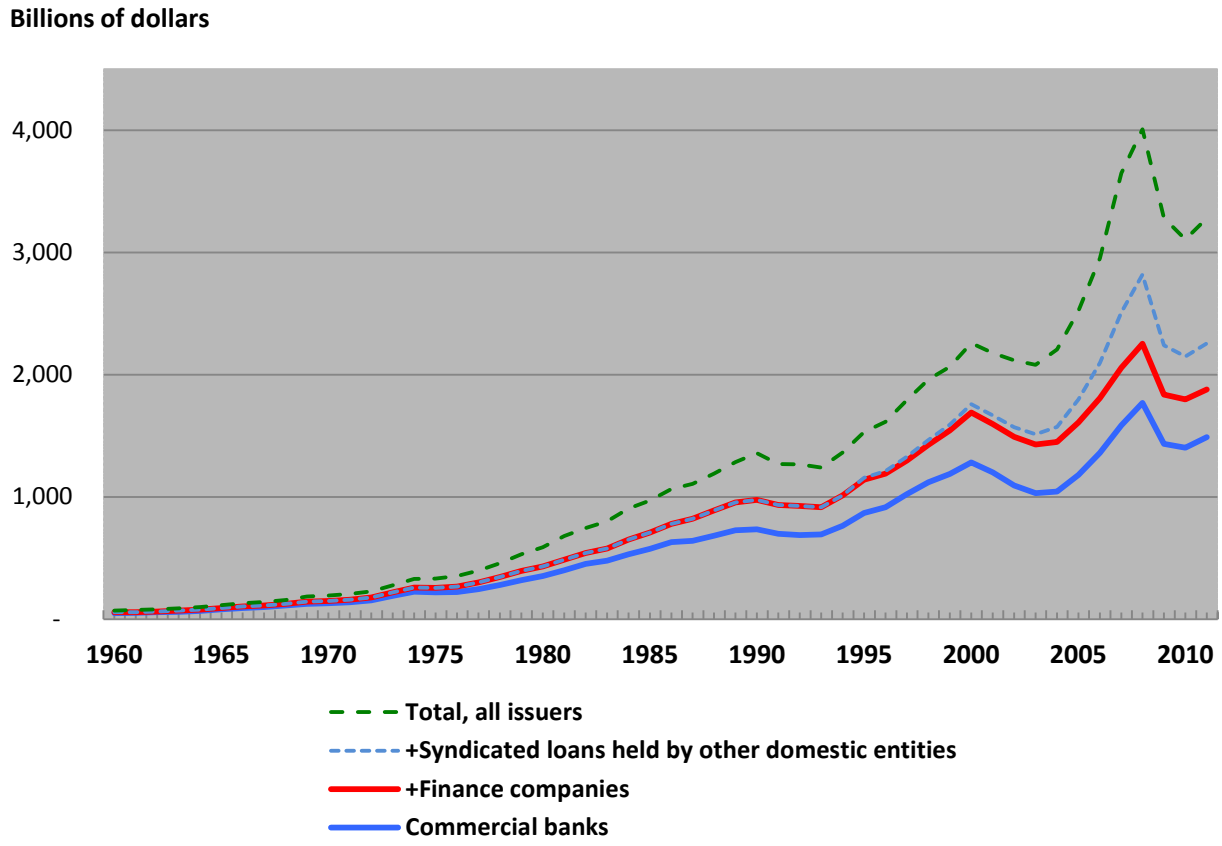
Source—Authors' calculations based on data from the IMAs and FOFs as of 6/15/2012.

Figure 5 shows the growth of bank and other loans by type of issuer. As shown by the red line, finance companies, along with commercial banks (the blue line), have played a notable role in financing and leasing equipment to businesses. Syndicated loans held by other domestic entities (hedge funds, ABS issuers, and the like; see detail on FOF table L216) swelled in the 2000s. Nevertheless, as shown in figure 6, if borrower services on loans by all depository institutions and finance company loans were to be imputed in the national accounts, about 70 percent of consumer credit and bank and other loans would be covered.

The remainder of the paper sets out results that do just that. The approach retains the "institution" focus of the current estimates of FISIM, and avoids the question of loan securitization by excluding all securitized loans from the analysis. The output associated with these loans has been assumed to consist entirely of explicit fee income, but whether this is true in practice has

not been verified.[5] Thus the loan coverage analysis just presented describes an upper bound for the loans that involve unmeasured implicitly priced borrower services.

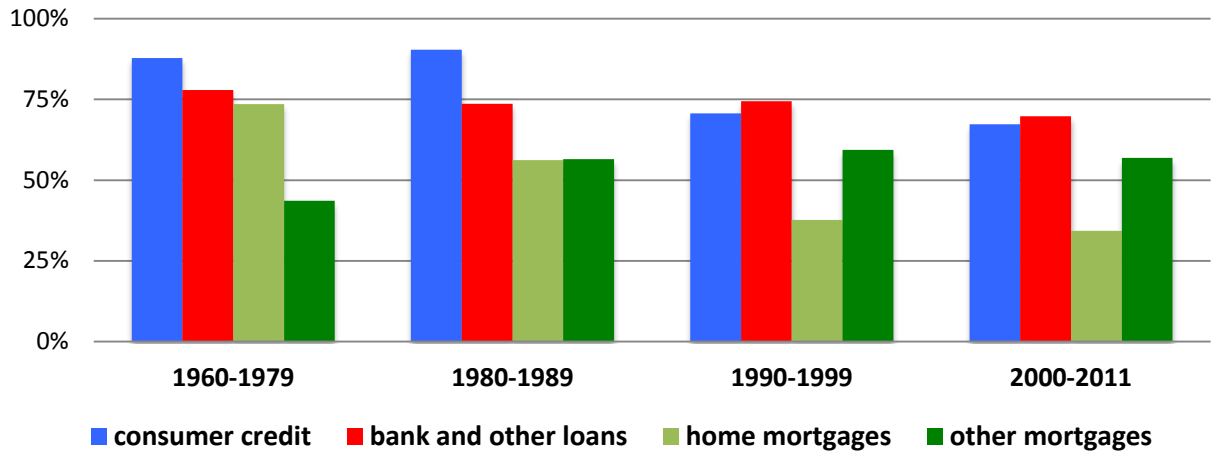
Figure 5. Total domestic bank n.e.c. and other loans to consumers and nonfinancial business, by type of issuer



Source—Authors' calculations based on data from the IMAs and FOFs as of 6/15/2012.

[5] When a loan is securitized, much of the income that until then was counted as part of FISIM is transformed into explicit fees. For example, if a mortgage loan is securitized but the originating bank retains servicing rights, the fees that it earns from servicing result in an explicit payment to the bank and thus will be included in explicitly-priced bank services. If a bank originates a loan at a discount and then sells it at a higher price to a mortgage pool (such as one of the government-sponsored mortgage loan agencies), it will book the gain as income and such income will be counted as explicit output. Thus, the process of securitization replaces borrower FISIM with flows of non-interest income accruing to different agents involved in the origination and servicing of the loans. These flows will then be counted as explicitly-priced output in the national accounts. Unfortunately, it is an open question whether these processes result in the entire user cost margin being transformed into explicit output, or whether ignoring all FISIM on securitized loans entirely misses some output.

Figure 6. Depository institution and finance company share of total private domestic loans to consumers and nonfinancial business, percent by type of loan



Source—Authors' calculations based on data from the IMAs and FOFs as of 6/15/2012.

III. Current Measures of Unpriced Financial Intermediation Services in the US National Accounts

Absent an imputation for implicitly priced output, depository institutions that rely on net interest income to cover much of the operating expenses would not be shown as producing enough output to pay for their labor and other inputs, resulting in persistently negative values for their gross operating surplus. National income accountants have therefore recognized the existence of financial intermediation services that are not paid for in an explicit way since the early days of the field. In the 1953 version of the System of National Accounts (SNA) depository institutions were viewed as providing services to depositors by pooling their savings and finding profitable investment opportunities. The margin between the interest paid by borrowers and the interest distributed to depositors was retained by the bank as an implicit payment for this service to depositors, so the net interest income of depository institutions was viewed as the value of the implicitly priced output consumed by depositors.

If commercial banks can be viewed as institutions that find investment opportunities for funds saved by depositors, they can equally well be viewed as institutions that find the funds that borrowers need for investment and liquidity management purposes. Indeed, historically the development of a funding source for investment and liquidity needs of borrowers was an important impetus for the emergence of the US banking industry, and the academic literature on financial services produced by banks tends to focus on services to borrowers (see, for example, Demirguc-Kunt, Feyen and Levine, 2012). Moreover, other things being equal, a bank with its assets mostly in loans will have higher net interest income than a bank that invests only in

securities that entail no costly provision of services, and under the 1953 SNA approach the loan-making bank would paradoxically be shown as producing more depositor services. To recognize the presence of implicitly priced services to both borrowers and depositors, the 1993 SNA therefore used a reference rate to split banks' implicitly priced output, or FISIM, into depositor and borrower service components.

The "reference rate" approach was implemented for commercial banks but not for other kinds of depository institutions in US national accounts as part of the comprehensive revision of the NIPAs of 2003. The conceptual framework used by the NIPAs comes from the user-cost theory of the measurement of bank output, in which a reference rate of interest represents the opportunity cost of funds for banks and also the rate that depositors forego by depositing their money at the bank rather than investing in a risk-free asset that provides no services (Fixler, Reinsdorf and Smith, 2003). The reference rate also represents the opportunity cost of funds for marginal borrowers who invest in assets that pay the reference rate when they could instead pay down their loan balance.

Using a reference rate to measure FISIM produced by commercial banks has two notable effects in the US national accounts. First, banks normally channel saving by households into financing for investment needs of business, so more deposits are supplied by households than by business, and lending to business or to homeowners in their capacity as owner-occupiers is greater than the non-mortgage lending to households. As a result, depositor services are largely consumed by households, and borrower services of banks are used more as intermediate inputs than for household consumption. Therefore, the adoption of the reference rate approach in the NIPAs resulted in a shift in the uses of bank output from final consumption to intermediate inputs.

The second important effect of the adoption of the reference rate approach was a reduction in the overall measure of bank output by an amount equal to the product of the reference rate and value of own funds used by banks for lending. Own funds represent equity funding supplied by stockholders (who receive no depositor services), so when own funds are used for lending the amount that remains after the margin used to cover the cost of providing borrower services is deducted from the interest paid by borrowers represents pure interest income to the bank, not an implicit payment for any kind of service. Based on the data that was available in 2003, the adoption of the reference rate approach raised the measure of intermediate uses of FISIM in the US in 2001 by $22.8 billion and reduced the measure of the overall output of FISIM in 2001 by US commercial banks by $18.9 billion (Fixler, Reinsdorf and Smith, 2003, 41-42.)

IV. New Measures of Unpriced Financial Intermediation Services from Depository Institutions

A. Adjusting the Measure of Borrower FISIM Produced by US Commercial Banks for Credit Losses

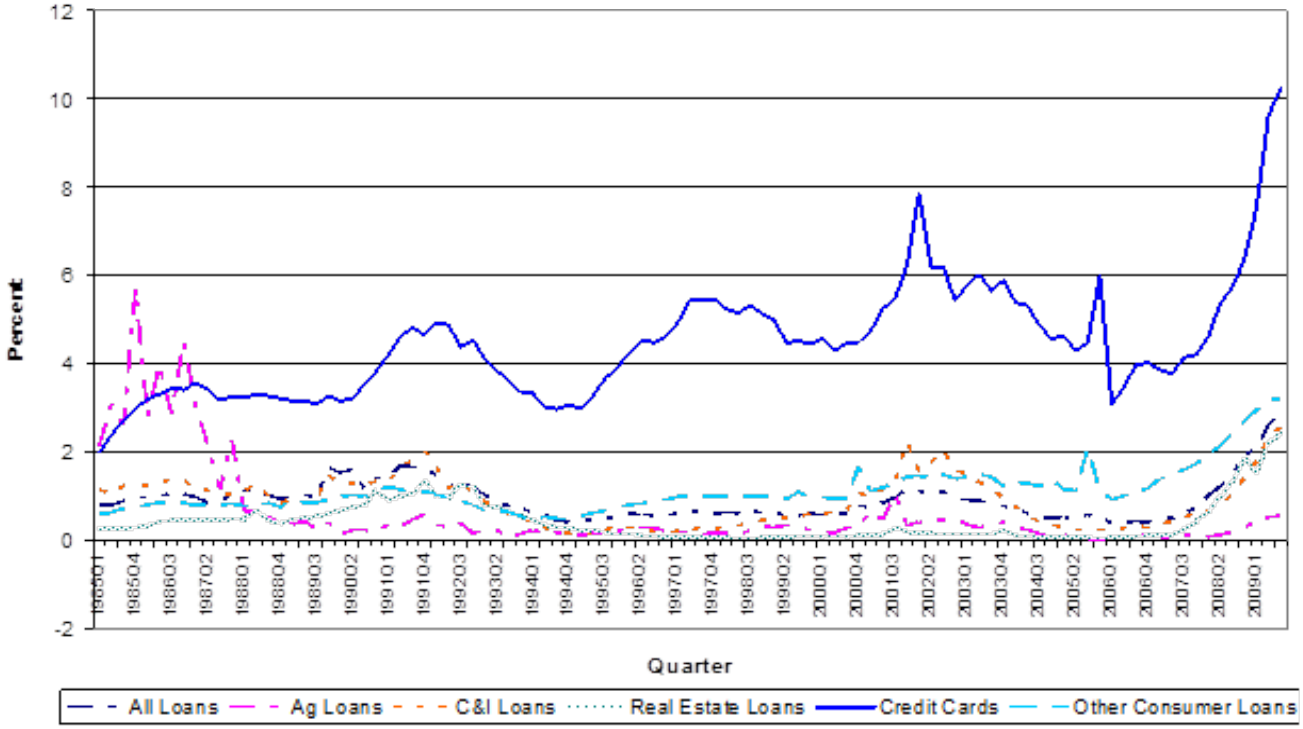
The reference rate approach of the 1993 SNA established the principle that part of banks' net interest income represents property income absorbed by the bank rather than implicit payments for financial services, or FISIM. The 2008 SNA (6.164) provides additional detail on the division of the net interest income reported by banks ("bank interest") into implicit purchases of services and property income components, and introduces the term "SNA interest" for the part of net interest income received by the bank that does not represent an implicit purchase of services.

Hood (2010) argues that a component of the bank's reported net interest income that the 2008 SNA includes in FISIM should be excluded from the measure of implicitly priced borrower services. Basu, Inklaar, and Wang (2011) also exclude this component of "bank interest" from FISIM, but they go further and exclude an additional component as well. In particular, contractual interest rates on loans to risky borrowers include a component to cover expected default costs because the interest received from borrowers who do not default must be high enough to replace the principle that those who fail to repay. Amounts that are set aside to cover credit losses (default costs) are not available to pay the factors of production, such as labor, that are needed to produce services, so they should not be included in borrower FISIM (Hood, p. 13). In nonfinancial industries, credit losses (the cost of which is implicitly included in most prices) are generally insignificant; in the banking industry credit losses are a major concern. On average, for commercial banks in the US national accounts, the loss rate from defaults on loans is nearly a third as large as the spread between loan rates and the reference rate, which is currently used to compute borrower FISIM.[6]

Credit losses of US commercial banks as measured by charge-off (write-off) rates vary substantially by type of loan, and also exhibit variation over time, with sharp rises for the riskier types of loans during or following the recessions of 1991, 2001, and 2007-2009 (figure 7). Furthermore, differences in default costs result in significant differences in interest rates between different types of loans. For example, most of the large gap in interest rates between credit card loans and real estate loans can be explained by a similarly large gap in credit losses (figure 8). On the other hand, commercial and industrial (C&I) loans have only small spreads in their interest rates above real estate loans and they also have only slightly higher credit losses.

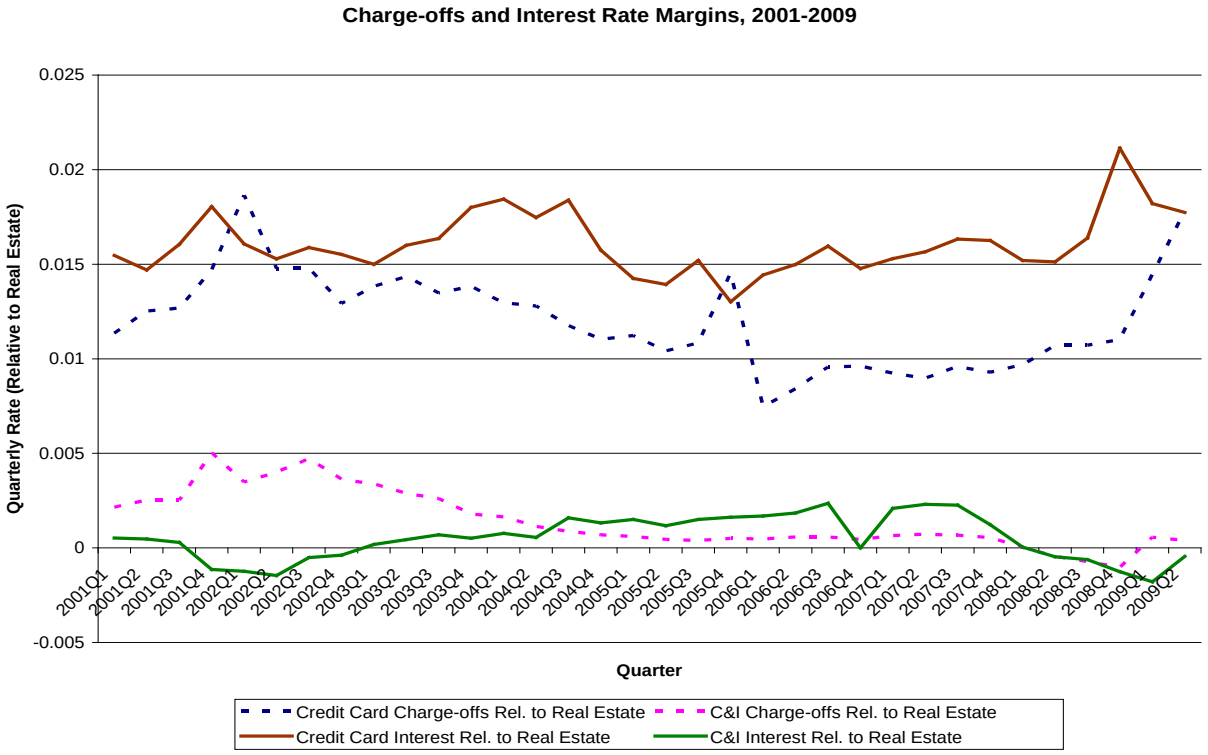
[6] In addition to expected credit losses, Basu, Inklaar and Wang (2011, p. 231) exclude from FISIM the component of the contractual interest rate that compensates the bank for risk bearing. To exclude the return to risk bearing from their measure of borrower FISIM, they increase the reference rate by an amount that depends on the riskiness of the loan type in question. In contrast, Hood (2010) only adjusts the loan interest rate down to reflect the amount set aside to cover expected credit losses.

Figure 7. Charge-off rates by category of loan



Percent per year. Source: Federal Reserve Board of Governors' calculations from Call Report data, as reported by Hood (2010).

Figure 8. Charge-off rates and interest rates for credit card and C&I loans relative to real estate loans



Because of the tight link between interest rate spreads and credit loss rates, a bank that originates loans with high expected credit losses would receive more interest than a bank originating the same balance of loans having low expected default rates, but at the same time experience offsetting default losses. If expected credit losses are not excluded from the FISIM computation, however, the former bank would be shown as producing more services, even though its cost of intermediate inputs and payments to providers of labor, capital, and funds would be the same.

To adjust interest rates on commercial bank loans for expected costs of defaults we use seasonally adjusted merger-adjusted charge-off rates by type of loan from the Federal Reserve Board of Governors (FRB). For each loan type, we smooth the charge-off rates using a geometrically weighted moving average, then calculate *adjusted* total charge-offs by multiplying smoothed charge-off rates with gross loan balances (from Call Report aggregates). Smoothing is necessary to remove the kind of volatility in actual charge-off rates evident in figure 7. We then subtract adjusted charge-offs to obtain the measure of interest income on loans that we use to calculate borrower FISIM. Uses of borrower FISIM are allocated to industries and final consumption of households by type of loan, based on loan balances from the FRB's Flow of Funds Accounts.

Charge-off rates are smoothed via a geometric moving average. This smoothed value is termed the adjusted charge-off rate, denoted *aco_r*. Given a starting value (aco_r_{i0}) and the sequence of charge-off rates $\{co\_r_{it}; t=1,\ldots,T\}$, the aco_r_{it} may be computed via the following equation:

(1) $$aco\_r_{it} = aco\_r_{it-1} + \lambda*(co\_r_{it} - aco\_r_{it-1})$$

for each loan type *i*. Here, λ is a parameter that governs how rapidly the smoothed charge-off rate responds to changes in the actual charge-off rate. Based on average loan maturity data from the call reports, we have selected a quarterly value of $\lambda = 0.075$ for all loan types, implying an approximate average maturity of 13 quarters.

To get a picture of the size of revision implied by the charge-off adjustment, we compute unadjusted borrower and depositor services in 2008 (in which adjusted charge-offs were still relatively low) and 2009 (by which point charge-offs had climbed substantially) along with the implied default adjustment. In 2008, nominal household consumption of FISIM is approximately $110 billion, of which approximately $52 billion is counted as borrower services under the method currently used in the national accounts. The charge-off adjustment amounts to approximately $22 billion, reflecting the high charge-off rates on credit cards and personal loans. In 2009, the total adjustment climbs to $29 billion, and current methods imply approximately $59 billion of household final expenditures on borrower services. Thus, while the method currently used in the national accounts shows an increase in household consumption of borrower services in 2009 of $7 billion, adjusting for expected credit losses shows that final expenditures by households on borrower services that were flat at $30 billion in both years.

The charge-off adjustment also changes the profile of intermediate consumption of borrower services by the owner-occupied housing sector. The adjustments are approximately $5.5 billion and $17 billion in 2008 and 2009 respectively, on pre-adjustment consumption levels of $48 and $57 billion. Thus, intermediate consumption of borrower services by the owner-occupied housing sector decrease slightly after the adjustment instead of increasing by approximately $9 billion. Intermediate consumption by non-farm nonfinancial business shows a similar pattern, in which the adjustment turns a substantial increase into a slight decrease. The combined effect of the charge-off adjustments is shown in figure 9. Table 3 shows a sample calculation of FISIM under these assumptions for a recent quarter.

Figure 9. Estimated effects of excluding expected credit losses from the measure of borrower FISIM

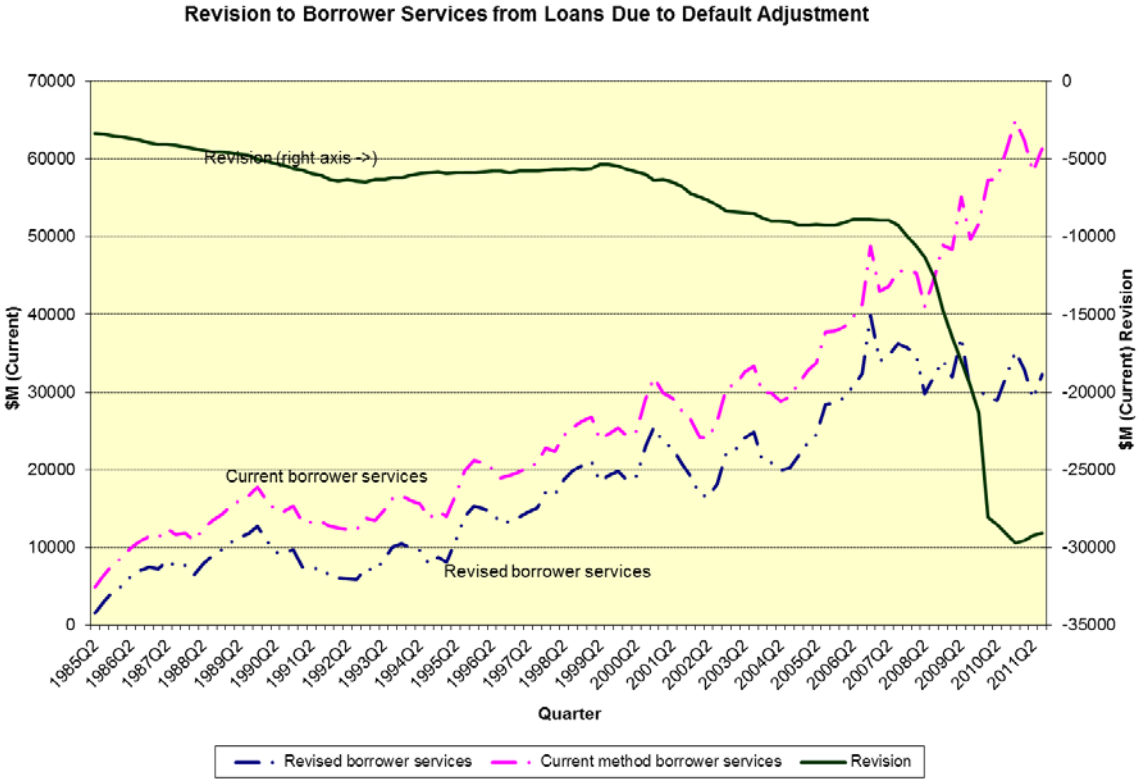


Table 3. Sample FISIM calculation, 2011Q4

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Balances[1]	Income/ expense[1]	Charge-offs (adjusted)[1]	Income/expense (adjusted)[1]	Rate (annualized)	User cost rate	Services[2]
					(2)-(3)	(4)/(1)*4*100%		(6)*(1)/1,000
1	**Financial assets/borrower services**	**13242446**	**118560**	**26782**	**91778**			**133.7**
2	Loans (net of allowance)							**128.9**
3	Real estates	**3349740**	**41837**	**11077**	**30760**	**3.67**	**2.06**	**69.0**
4	Agricultural	**54807**	**749**	**52**	**697**	**5.09**	**3.47**	**1.9**
5	Commercial and industrial	**1034185**	**12731**	**3080**	**9651**	**3.73**	**2.12**	**21.9**
6	Lease financing receivables	**89898**	**1197**	**127**	**1070**	**4.76**	**3.15**	**2.8**
7	Credit cards	**535177**	**16622**	**8787**	**7835**	**5.86**	**4.24**	**22.7**
8	Other consumer loans	**528962**	**7639**	**2467**	**5172**	**3.91**	**2.30**	**12.2**
9	Other loans	**344085**	**2165**	**1191**	**974**	**1.13**	**-0.48**	**-1.6**
10	Other Assets							
11	Securities (total)	**2916674**	**20582**		**20582**			**35.3**
12	Treasury and agency securities*	**1740624**	**11067**		**11067**			**16.2**
13	MBS*	**1381506**	**9620**		**9620**	**2.79**	**1.17**	**16.2**
14	Agency excluding MBS*	**359118**	**1447**		**1447**	**1.61**	**0.00**	**0.0**
15	Investment Account - Other*	**737324**	**6559**		**6559**	**3.56**	**1.95**	**14.4**
16	Trading Account	**438726**	**2956**		**2956**	**2.70**	**1.08**	**4.8**
17	Cash and Balances							
18	Currency and Coin*	**54468**	**0**		**0**	**0.00**	**-1.61**	**-0.9**
19	Cash in the process of collection**	**75226**	**0**		**0**	**0.00**	**-1.61**	**-1.2**
20	Interest-bearing Balances at DIs**	**924485**	**1331**		**1331**	**0.58**	**-1.04**	**-9.6**
21	Other Balances**	**27886**	**0**		**0**	**0.00**	**-1.61**	**-0.4**
22	Fed Funds Sold**	**484165**	**1309**		**1309**	**1.08**	**-0.53**	**-2.6**
23	**Liabilities/depositor services**	**9036483**	**13558**		**13558**			**84.2**
24	Domestic Deposits	**7699993**	**7826**					**92.8**
25	Demand Deposits	**1019394**	**0**		**0**	**0.00**	**1.61**	**16.4**
26	Other Checkable Deposits	**310913**	**230**		**230**	**0.30**	**1.32**	**4.1**
27	Savings (incl MMDAs)	**4861289**	**2516**		**2516**	**0.21**	**1.40**	**68.3**
28	Time Deposits (Large)	**710746**	**2170**		**2170**	**1.22**	**0.39**	**2.8**
29	Time Deposits (Other)	**797651**	**2910**		**2910**	**1.46**	**0.15**	**1.2**
30	Other Interest-Bearing Liab							
31	FF Purchased	**463579**	**559**		**559**	**0.48**	**1.13**	**5.2**
32	Other*	**872911**	**5173**		**5173**	**2.37**	**-0.76**	**-6.6**

*Services for this asset/liability are computed for illustration purposes, but not used in FISIM calculation

**Services for this asset netted against liabilities and included in depositor services

[1]Millions of current $

[2]Billions of current $ (annual rate)

B. Borrower and Depositor FISIM Produced by Thrifts and Credit Unions

Although commercial banks account for the bulk of loans and deposits in the United States, the US has two other important kinds of depository institutions. Savings and loan associations and savings banks, which are also known as thrifts or savings institutions (SIs), were regulated by the Office of Thrift Supervision (OTS) until 2011. The savings and loan associations of the US, which resemble the building societies of the UK, originated in the Depression as a new source of

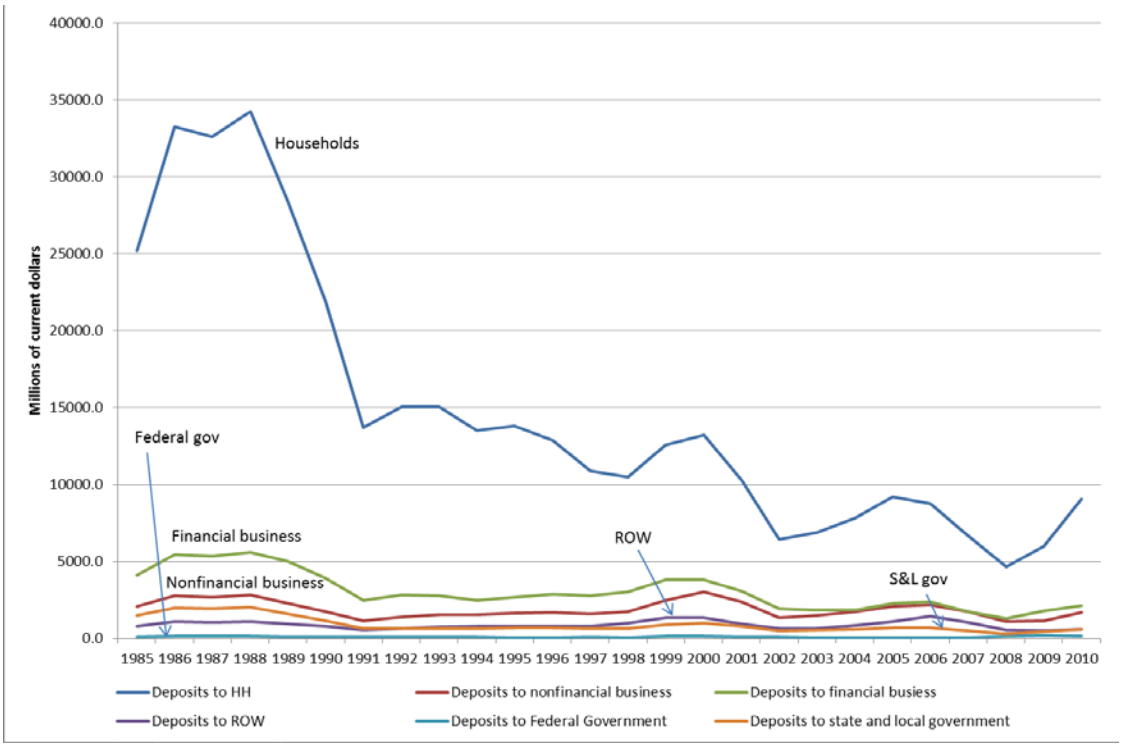
mortgage lending for homebuyers. Credit unions (CUs) are another kind of depository institution. They are member-owned not-for-profit associations that accept deposits from members and make loans to members. In 2009, commercial banks had $7.3 trillion in deposits, thrifts had $0.9 trillion and credit unions had $0.7 trillion.

After restrictions on the activities of thrifts were relaxed during the 1980s and 1990s, SIs began to resemble commercial banks to such an extent that most customers for banking services are now unlikely to perceive any real differences between them. Indeed, before the OTS was absorbed into the main national regulatory agency for commercial banks, it was not usual for a commercial bank or an SI to "flip" its charter to the other kind of institution in order to change to a more friendly regulator or to complete a merger. And recently, a few small banks have even switched to a credit union charter, thereby sacrificing some powers in exchange for lighter regulation. Nevertheless, in the US national accounts, the reference rate approach for measuring FISM has not yet been extended to SIs and CUs despite their similarity to commercial banks. Instead, their implicitly priced output is still measured by the net interest income and is treated as services to depositors.

Because the US national accounts treat all FISIM of SIs as implicitly priced services to depositors, special adjustments are needed to prevent distortions in the measured growth of GDP when large institutions change from a thrift charter to a commercial bank charter, or vice versa. Yet the most important disadvantages of the current measurement method used for SIs and CUs are: underestimation of borrower services produced by depository institutions, overestimation of depositor services, underestimation of intermediate uses of financial intermediation services in general, and overestimation of final uses of financial intermediation services.

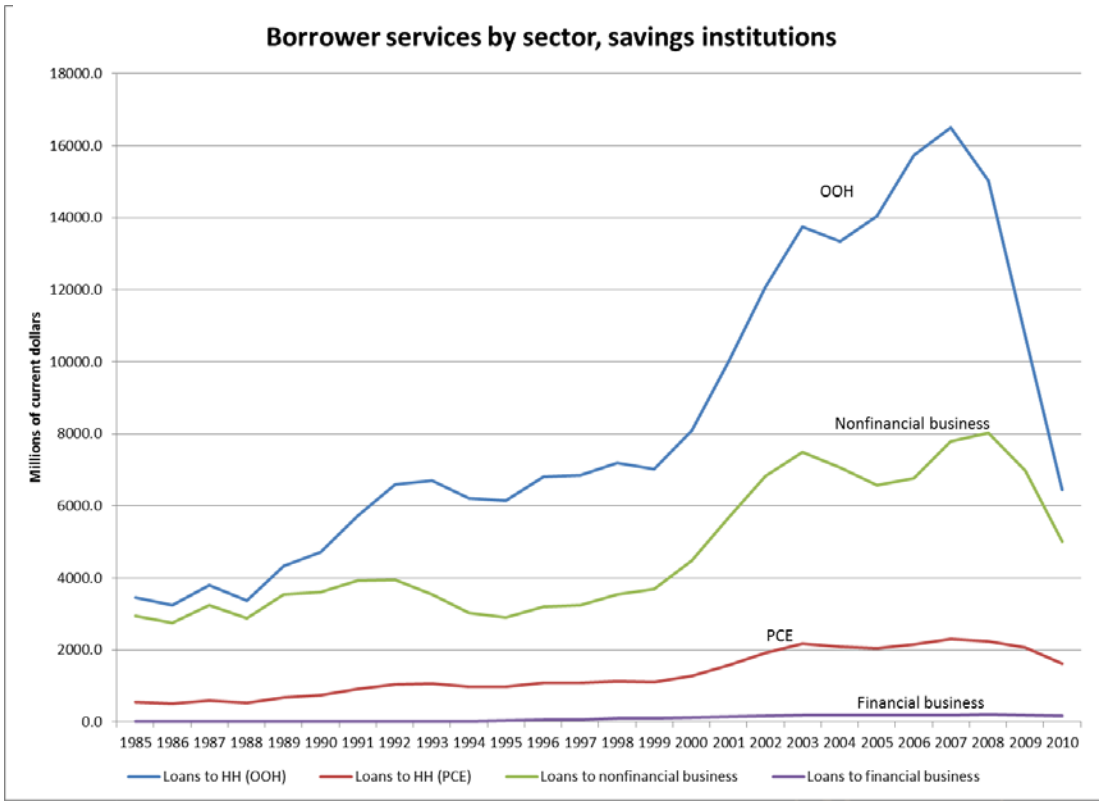
To estimate depositor and borrower FISIM for SIs and credit unions we computed the rates that these institutions earn on loans and leases and pay on deposits (and deposit-like liabilities), then multiplied spreads between these rates and a reference rate by average balances of loans and deposits. The data for our SI calculations come from OTS Thrift Financial Reports, Federal Deposit Insurance Corporation (FDIC) data on Call Reports filed by savings banks, and Historical Statistics on Banking published by the FDIC. For credit unions, our data come from the NCUA and include Financial Progress Report filings, form 5300 Call Report filings, and NCUA year-end statistics report. The starting year for our analysis is 1985; changing variable definitions and data gaps make estimation of complete and consistent series for prior years more difficult.

Figure 10. Depositor services by sector for savings institutions



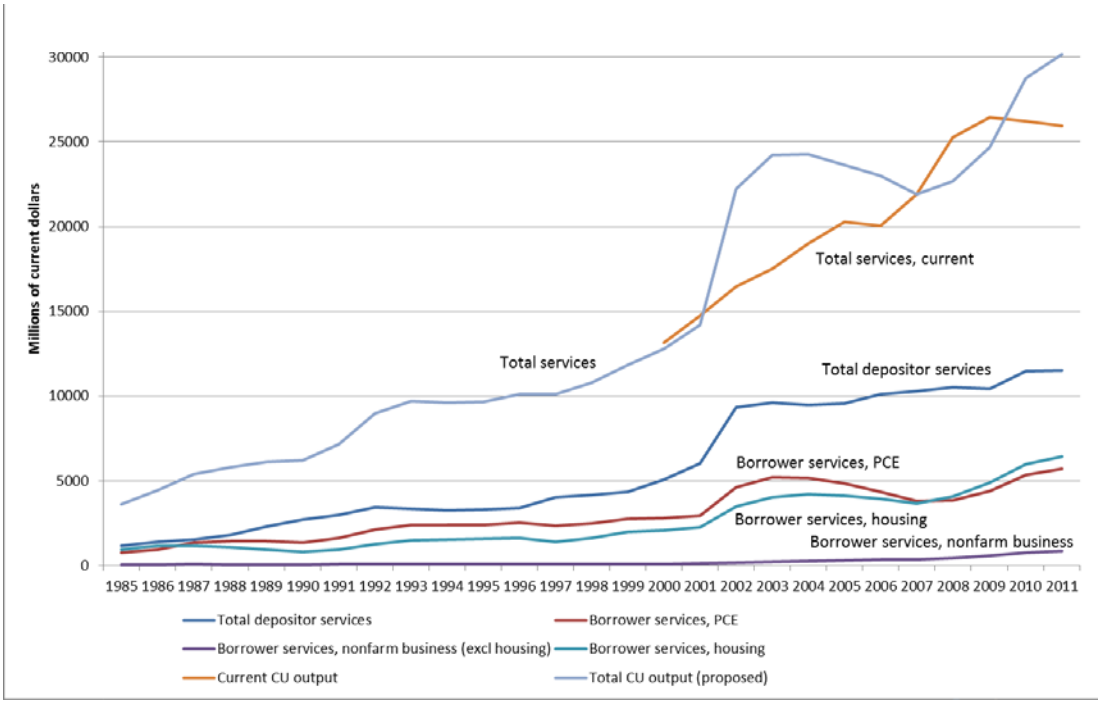
Source: OTS, FDIC, authors' calculations. Annual rate.

Figure 11. Borrower services by sector for savings institutions.



Source: OTS, FDIC, author's calculations. Annual rate.

Figure 12. Credit union services by consuming sector



Source: NCUA, author's calculations. Annual rate.

Because of source data limitations, we cannot compute the reference rates for SIs and CUs using the average effective rate received from Treasury and Federal agency debt, as we do for commercial banks. For CUs, we use a weighted average of the rate on borrowings (25%), the rate on investments (25%), and a 5-year treasury rate (50%). For SIs, we use a simple average of the rate on Federal Home Loan Bank advances and a 5-year Treasury bond rate. Based on these reference rates, loan/deposit rates for each type of institution, and charge-off rates, we compute user cost margins. User cost margins are multiplied by loan and deposit balances to estimate implicitly-priced gross output of services to borrowers and to depositors.

In the present NIPA methodology, uses of total FISIM from SIs and CUs are allocated to sectors based on their holdings of deposits. Our implementation of the reference rate approach for splitting FISIM into depositor and borrower services continues to allocate SI and CU depositor services to using sectors based on their holdings of deposits. Borrower services produced by SIs and CUs are, however, allocated based on the loan liabilities of using the sectors (by type of loan when possible) except for mortgages, for which borrower FISIM is allocated to using sectors based on interest flows.

Measuring the production and use of borrower FISIM substantially raises the estimates of how much of the output of SIs and CUs used by nonfinancial business and by the owner-occupied housing sector. This is particularly true for CUs, all of whose output was previously allocated to

persons (a sector that includes households and nonprofit institutions serving households). Figures 10, 11 and 12 show the sectoral breakdown of uses of depositor and borrower services for SIs and CUs, as well as the total revision to use by nonfinancial business of the financial services produced by SIs and CUs.

Table 4 shows the estimated levels of FISIM supplied by all depository institutions (DIs) using current methods. The upward trend in output of financial intermediation services continues unabated after the beginning of the 2008-2009 recession. The second panel reports on just credit unions and savings institutions, the third panel shows just commercial banks. These panels show that commercial banks dominate the supply of FISIM to non-farm nonfinancial businesses, with credit unions and thrifts producing only about 6 or 7 percent of the total. On the other hand, credit unions and thrifts produce about a third of the FISIM included in personal consumption expenditures until 2007, but after some large savings institutions failed during the 2008 phase of the financial crisis, this share fell.

Table 4. Depository institution FISIM, current method[1]

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total output all DIs[2]	230.6	236.9	252.5	261.7	276.8	298.1	318.3	329.0	335.8	362.9	410.6
PCE, all DIs	113.8	119.5	136.2	130.5	146.8	146.7	145.1	150.7	160.5	169.0	207.2
To non-farm nonfinancial business, all DIs	69.1	66.8	63.4	71.2	68.7	79.2	88.5	92.1	88.8	102.6	109.9
Total output CU & SI	41.8	48.1	53.6	56.5	61.3	65.0	59.8	61.8	59.2	63.6	60.9
PCE, CU & SI	36.9	41.4	45.0	46.7	49.2	50.6	46.4	50.5	48.0	52.5	49.4
To non-farm nonfinancial business, CU & SI	2.9	3.9	5.0	5.8	7.2	8.5	7.9	6.7	6.6	6.5	6.8
Total output banks	188.9	188.7	198.9	205.2	215.5	233.1	258.6	267.2	276.6	299.3	349.7
PCE, banks	77.0	78.1	91.2	83.7	97.6	96.1	98.7	100.3	112.5	116.4	157.7
To non-farm nonfinancial business, banks	66.2	62.8	58.3	65.5	61.5	70.8	80.7	85.4	82.2	96.1	103.1

[1]Commercial bank figures based on authors' calculations

[2]$1,000,000,000s (current)

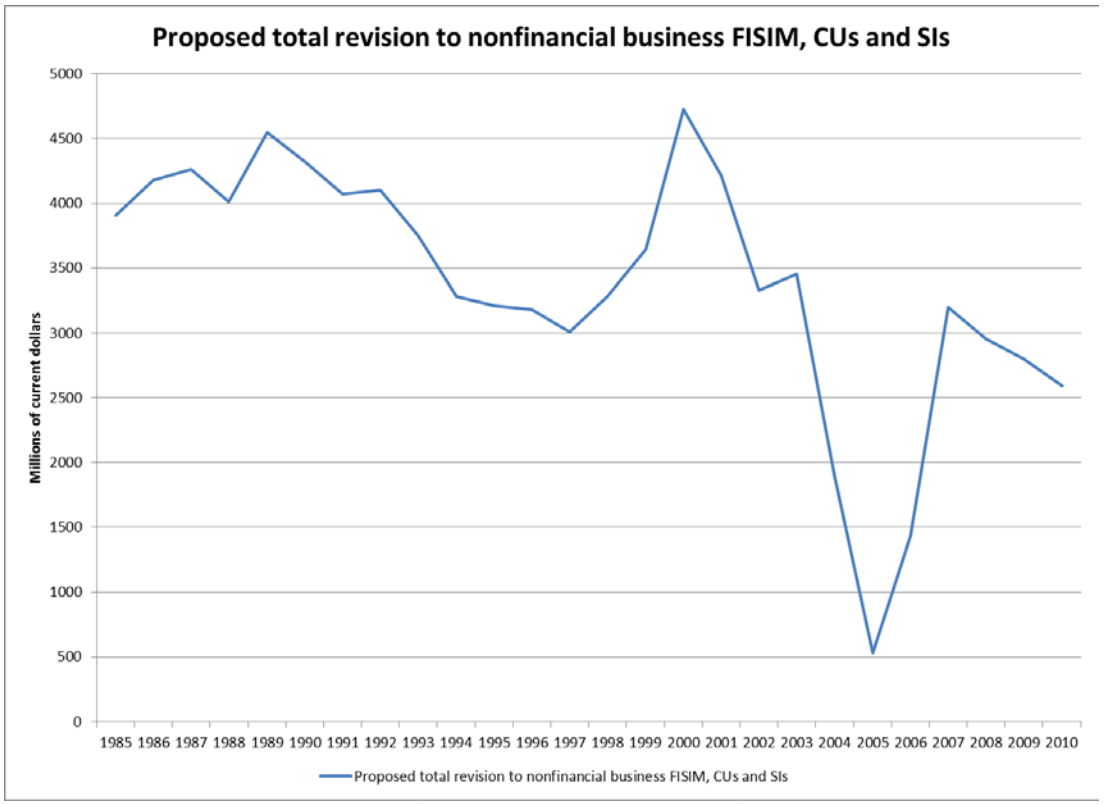
Table 5. Depository institution FISIM, proposed

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total output all DIs[1]	213.8	210.8	221.2	230.8	238.3	258.0	286.1	290.3	283.7	279.0	290.6
PCE, all DIs	89.4	87.4	94.1	94.0	98.4	100.9	106.5	103.4	108.4	111.9	130.0
To non-farm nonfinancial business, all DIs	64.1	60.1	58.5	62.0	62.5	70.1	79.3	84.8	77.9	77.0	77.0
Total output CU & SI	49.3	49.3	54.2	59.2	59.8	61.9	63.4	60.4	56.3	54.7	56.2
PCE, CU & SI	22.4	20.8	22.3	23.8	24.6	25.7	25.3	23.1	21.2	22.9	27.4
To non-farm nonfinancial business, CU & SI	7.9	8.5	8.9	9.9	9.8	9.7	9.8	10.3	10.1	9.3	8.3
Total output banks	164.5	161.5	167.0	171.6	178.5	196.1	222.7	229.9	227.4	224.3	234.3
PCE, banks	67.0	66.6	71.8	70.2	73.8	75.2	81.1	80.4	87.1	89.1	102.6
To non-farm nonfinancial business, banks	56.1	51.6	49.6	52.1	52.7	60.4	69.5	74.5	67.8	67.6	68.7

[1]$1,000,000,000s (current)

Estimates of FISIM for depository institutions calculated using our proposed methods, including the adjustment for credit losses and the new treatment of credit unions and thrifts, appear in table 5. A reduction in FISIM consumed by business causes the new measure of total output of implicitly-priced financial services to taper off in 2008-2009. Yet, despite the reduction in the estimates of FISIM supplied to business that result from the charge-off adjustment, the proposed estimates of the supply of FISIM to business by credit unions and savings institutions are almost always much higher than the estimates implied by current methods (figure 13).

Figure 13. Proposed total revision to FISIM consumed by non-financial business.



Annual rate. Source: OTS, FDIC, NCUA, author's calculations.

IV. Borrower FISIM Produced by Finance Companies

In defining the boundary of what to include in unpriced output of banks and other depository institutions, we assume that services are produced if and only if there is a direct interaction between the depository institution and a customer. Owning a bond, for example, involves no direct interaction between the bank and the debtor, but originating and servicing a loan or a lease does, so borrower FISIM is recorded only on the latter.

The criterion used to decide which bank assets belong in calculations of FISIM also imply that finance companies (which have no funding from deposits) produce FISIM in connection with the loans and leases that they originate and service. Moreover, some commercial banks obtain most of their funding not from deposits but by borrowing in credit markets or from other financial institutions. If FISIM is provided in connection with the loans and leases that these banks make, by extension FISIM is also provided in connection with the loans and leases from finance companies.

One possible justification for treating nondepository lenders differently is that depository lenders are less susceptible to runs than lenders who rely on short-term financing from credit markets, and hence create less risk of contagion for the financial system. This was illustrated in dramatic fashion in the financial crisis of 2007-2008 by the collapse of the "shadow banking system", which funded long-term assets by short-term nondeposit liabilities (Brunnermeier, 2009, and Gorton and Metrick, 2012a and 2012b). Yet even if, as Diamond and Dybvig (1983) imply, liquidity transformation (the financing of long term loans by short term liabilities that are continually rolled over) is only a safe activity when done by a depository institution, national income accountants do not ask whether products are safe or free of negative externalities before including them in GDP. The national accounting production boundaries have always been orthogonal to concerns about externalities. Indeed, a complete picture of where borrower FISIM is being produced can provide useful information on the changing structure of the economy that may be relevant for assessing the resiliency of the financial sector to shocks. In this section we therefore attempt to estimate borrower FISIM produced by finance companies and to allocate its consumption between final uses and intermediate uses.

To our knowledge, no attempt has hitherto been made to impute FISIM for non-depository financial intermediaries in the US. One practical problem with doing this is unavailability of data. While all depository financial intermediaries are required to provide detailed information to regulators, finance companies and other non-depository financial intermediaries are not so tightly monitored. Thus, any attempt to measure their output will require a larger data collection effort and more assumptions. Nevertheless, we have developed estimates that at least provide insight into the magnitude and trend of their output over the last 25 years.

We begin by separating finance companies into three sub-sectors: consumer credit providers, auto loan companies, and business loan and lease companies. The Federal Reserve Board also

classifies finance companies in this way in table G.20 of its household finance series, and in its flow of funds accounts (table L125). Our results make heavy use of these data, which are based on a quarterly survey with a sample drawn from a census of finance companies conducted approximately every 5 years. The methods that we employ are discussed below by sub-sector.

The estimates below (excluding auto loans) employ a procedure for smoothing user cost margins similar to the one discussed in Hood (2010). The rationale for smoothing is that most loan terms cover multiple time periods, with rates that may be constant or adjust infrequently even though market rates may be changing rapidly. The ideal measurement approach would be to compute the user cost margin for each loan at the time of origination and then maintain the user cost margin through the life of the loan. This is generally impractical, so we have to make do with a single reference rate and a blended average loan rate for each category of loan. However, the spread between the interest rate on a loan originated at one point in time and a reference rate that reflects conditions at another point in time can be volatile and quite different from anticipated average user cost margin over the life of the loan. To avoid spurious fluctuations in the user cost margins that do not represent actual price changes we smooth our estimated user cost margins, allowing them to adjust only 7.5% of the difference between the current user cost and the previous one. Such smoothing should capture any medium-term and long-term trends of user costs, while not attempting the impossible task of measuring short-term movements.

A. Consumer Credit

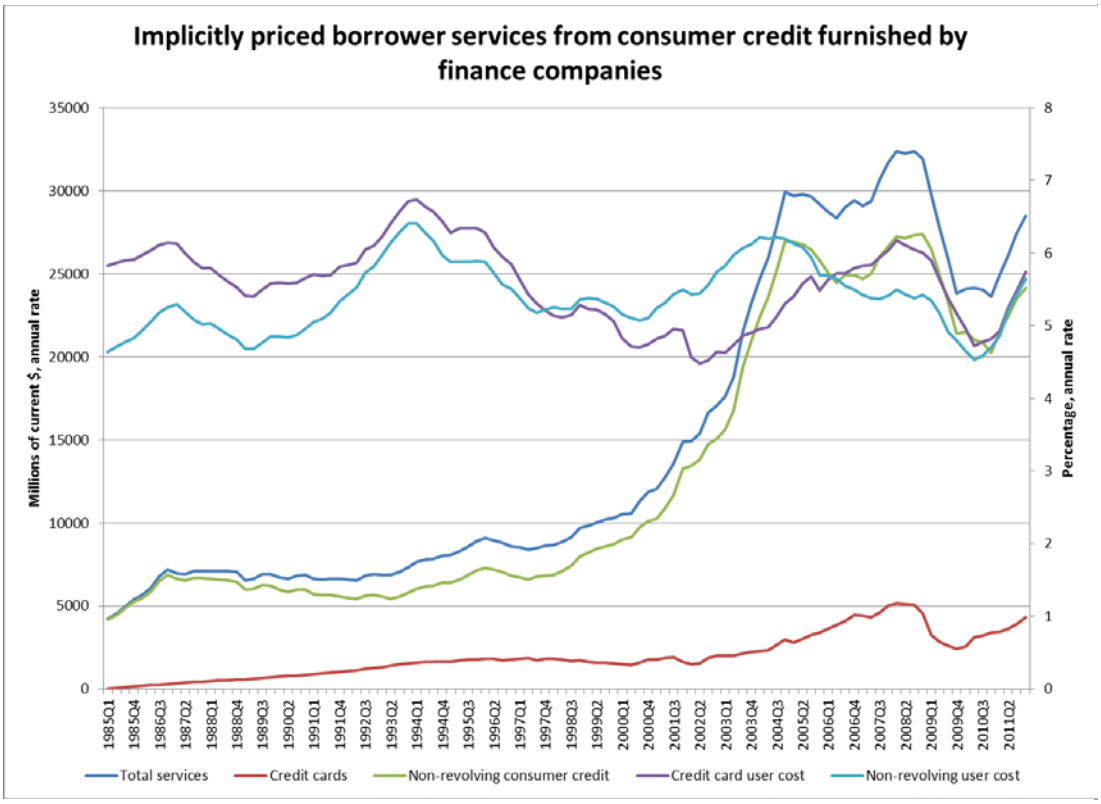
Non-auto consumer credit furnished by finance companies is divided into two sub-categories: Revolving and non-revolving consumer credit. Revolving consumer credit consists mostly of non-bank credit cards. Non-revolving consumer credit consists mostly of consumer term loans other than auto loans. Finance company loan balances in these two categories, along with terms of credit (interest rates), are shown in the FRB G.20 statistical release.

We use commercial bank charge-off data for credit cards as a proxy for charge-off rates on revolving consumer credit (bank credit card charge-off rates are similar to total credit card charge-off rates, according to the S&P/Experian default index for credit cards and call report data). However, personal loans are aggregated together with auto loans in the call reports filed by banks; because bank auto loans are generally provided only to safe customers and are collateralized by automobiles, we cannot use charge-off rates on non-revolving consumer loans of banks as a proxy for non-revolving consumer loans furnished by finance companies. However an average of the bank charge-off rate on non-revolving consumer loans and the bank charge-off rate on revolving consumer credit seems to be a good proxy for the finance company default rate on non-revolving consumer loans, as it generates a margin on non-revolving consumer loans that is on average close to the margin on credit card loans. After subtracting our measure of the expected default rate on each type of loan from the interest rate on that type of loan, we use the 2-year Treasury rate (based on an assumption that average consumer loans are rather short) as the reference rate to arrive at a user cost margin. This margin is multiplied by the balance of

consumer loans of each type to measure consumer loan services. User cost margins range between 4.5 and 7.5 percentage points, which is larger than for any other type of finance company or bank loan.

Figure 14 shows consumer loan FISIM. Credit cards are relatively small, accounting for a maximum of perhaps $5 billion. Non-revolving credit, however, experiences a substantial increase over the series, reflecting large increases in balances (so it is not a price-driven phenomenon). This increase is most pronounced in the late 1990's and early 2000's. Peak non-revolving credit about exceeds $25 billion at an annual rate.

Figure 14. Finance company borrower FISIM, consumer loans.



Annual rate. Source: FRB G.20 release, author's calculations.

B. Auto loans

Auto loans represent a separate category from consumer loans in the FRB G.20 statistical release, and so we maintain this distinction. Computing auto loan services presents two problems: First of all, we do not have a good measure of default rates on auto loans at finance companies. The FRB G.20 data contains two distinct types of finance companies: Captive auto finance companies and independent auto finance companies. A quick search of auto finance news suggests that while captive auto finance companies (having more than twice the market

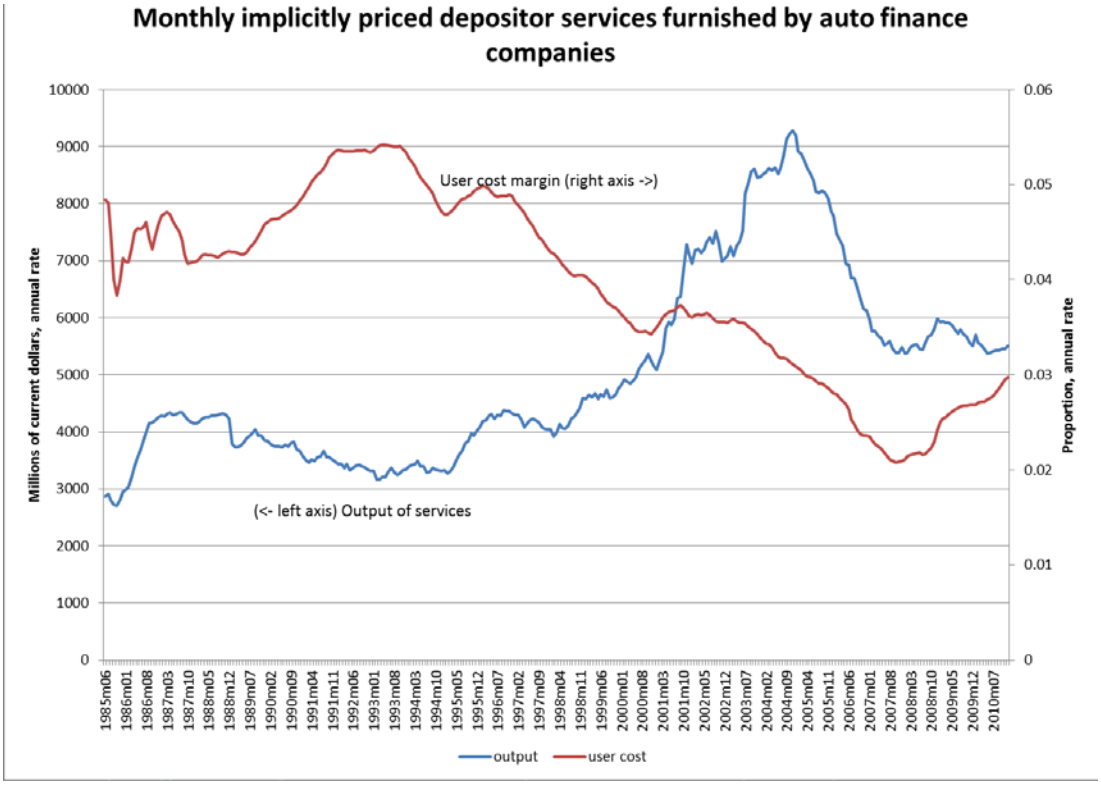
share of other finance companies) experience defaults that are close to the overall average default rate, independent finance companies fare more poorly with regard to default, experiencing 30-day delinquency rates that are double that of captives and 60-day that are triple.[7] Captive auto finance companies have a much higher market share in the new car loan market, but a lower market share in the used car loan market. We make the assumption that the default rate for finance company loans is about 20% higher than national averages, that the difference between default rates on new and used car loans is approximately 40 bp, and that 40% of the value of the defaulted loan is charged off. The national average default rate is drawn from the S&P/Experian auto loan default index. Changing these assumptions affects the measured level of services, but has minimal effect on the overall picture.

The second problem associated with computing auto loan services is that we do not have a good measure of the average interest rate associated with auto loans, but just the terms of auto loans that are originated each month. Without knowing the terms of outstanding loans, we cannot just multiply the current user cost margin with the current outstanding balance to arrive at a services figure, as such a figure would be highly volatile (and this volatility would not represent anything of interest). Rather, in each month, we use data on average maturities of new and used vehicle loans originated in that month (from the G.20 release), data on the number of new and use car purchases in that month (from the US Department of Transportation), and data on average default rates (above), to determine the expected principal balances of these loans over their lifetime. Then over this lifetime, we maintain a constant user cost margin based on the current new and used auto loan rates (from the G.20 release), our estimated default rates, and a treasury reference rate that matches the maturity of these loans (we interpolate between the 3-year, 5-year, and 7-year treasuries based on the weighted average maturity of auto loans in the sample). In any given month, then, we compute a weighted average user cost based on the principal balances of the different loan vintages and their associated user costs. We multiply this weighted average user cost by total outstanding loan balances from the FRB G.20 release.

While this procedure is a bit more complex than the normal procedure for computing FISIM, it has the benefit of producing smooth user costs (user cost margins are held fixed over the loan life). Thus, no extra smoothing is necessary. We can also be relatively sure we are appropriately matching the loan rate to the reference rate, because we have data on loan maturities.

[7] http://www.subprimenews.com/spn/news/print_story.html?id=1692

Figure 15. Finance company FISIM, auto loans (monthly)



Annual rate. Source: FRB G.20 release, department of transportation, S&P/Experian, author's calculations.

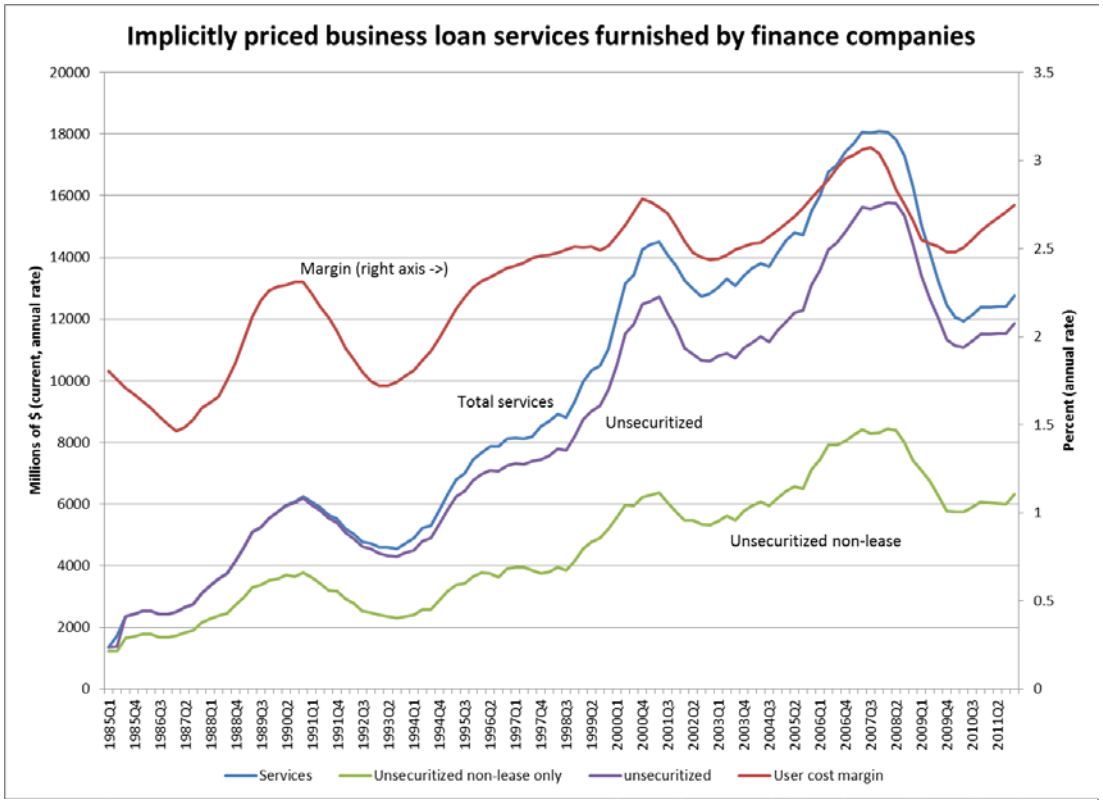
Figure 15 shows auto loan FISIM. Note that we see a tripling of output between 1992 and 2005, all while user cost margins are decreasing. Margins continue to decrease through 2008, undoubtedly reflecting subsidies of captive finance companies by the auto industry. All in all, auto loan FISIM peaks at approximately $9 billion (annual rate) in mid-2004. These estimates are for consumer auto loans and thus represent final consumption of borrower services by households. Business loans (below) include loans to business to purchase automobiles.

C. Business loans

The final category of finance company loans for which we make FISIM estimates represents all loans to businesses. Unfortunately, this is the category of loans for which the least amount of information is available. The FRB does not survey finance companies that serve businesses regarding the terms of these loans, and so we have no information on interest rates or maturity. Because data sources covering finance company business loans are so limited, we have opted to simply employ the user cost margin on business loans that is earned by commercial banks. This is a fairly conservative approach: User cost margins on business loans are some of the lowest margins that banks earn. We compute this user cost margin by dividing bank interest income on business loans by net business loan balances, subtracting the net charge-off rate on business loans, and subtracting the rate banks earn on holdings of treasury and GSE securities. We smooth this margin in the way discussed above.

Figure 16 shows business loan services. Note that leases appear to make up about half of business services. By the end of the sample, about 10-15% of loans are securitized, and to avoid potential double counting, we will focus on unsecuritized total services. Over the sample, we see substantial growth in business loans, from less than $2 billion to more than $15 billion at its peak. Although margins appear to be increasing over the sample, most of the increase in output is the result of an increase in loan balances.

Figure 16. Finance company FISIM, business loans.



Annual rate. Source: FRB G.20 release, FDIC, author's calculations.

D. Totals for Finance Companies and for All Financial Intermediaries

Taken together, these results suggest that FISIM may be undercounted by as much as $57 billion at the peak of the cycle. FISIM consumed by non-financial businesses may be undercounted by approximately $15 billion or more. To put these numbers in perspective, in 2008 non-financial business consumed approximately $120 billion of FISIM from CBs, less than $7 billion of FISIM from SIs and none from CUs, based on current methods; all these institutions together furnished about $78 billion in services to nonfarm non-financial business based on the proposed method. (Tables 4 and 5 above show levels.) Thus, we see an increase in total FISIM furnished

to business of approximately 10-15% above current methods and nearly 20% under the proposed method, by including finance companies.

Table 6 shows all revisions to estimates of FISIM implied by our proposed changes in methods. The revisions to commercial bank, credit union and savings institution FISIM are reflected in reduced measures of personal consumption of borrower and depositor services. Downward revisions to personal consumption expenditures (PCE) would be about $52 billion in 2008, compared to a total PCE on FISIM from all depository intermediaries of around $160 billion (see tables 4 and 5 above). However, this is largely erased by an increase in PCE on borrower services from finance companies of approximately $42 billion. This suggests that for personal consumption, finance companies produce about 40% of the amount of FISIM that is produced by all banks and nonbank depository intermediaries.

Table 6. FISIM for all financial intermediaries - revisions

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total output all DIs[1]	-16.8	-26.1	-31.3	-30.9	-38.5	-40.1	-32.3	-38.7	-52.1	-83.9	-120.0
PCE, all DIs	-24.5	-32.1	-42.1	-36.4	-48.4	-45.9	-38.7	-47.3	-52.1	-57.0	-77.1
To non-farm nonfinancial business, all DIs	-5.0	-6.7	-4.9	-9.3	-6.2	-9.2	-9.2	-7.2	-10.8	-25.6	-32.9
Total output CU & SI	7.6	1.1	0.6	2.7	-1.4	-3.0	3.6	-1.4	-3.0	-8.9	-4.7
PCE, CU & SI	-14.5	-20.6	-22.7	-22.9	-24.6	-25.0	-21.1	-27.4	-26.8	-29.7	-22.0
To non-farm nonfinancial business, CU & SI	5.1	4.6	3.9	4.1	2.6	1.2	1.9	3.6	3.5	2.8	1.5
Total output banks	-24.4	-27.2	-31.9	-33.6	-37.0	-37.0	-35.8	-37.2	-49.2	-75.0	-115.3
PCE, banks	-10.0	-11.5	-19.3	-13.5	-23.9	-20.9	-17.6	-19.9	-25.3	-27.4	-55.2
To non-farm nonfinancial business, banks	-10.1	-11.3	-8.8	-13.4	-8.8	-10.4	-11.2	-10.9	-14.3	-28.4	-34.4
Total output, finance companies	27.3	32.5	34.5	39.8	47.2	49.5	47.8	50.5	57.2	48.0	43.5
PCE, finance companies	15.7	20.2	23.7	28.9	35.8	37.1	33.5	35.0	41.9	35.7	32.3
To non-farm nonfinancial business, finance co.	11.6	12.3	10.8	10.9	11.4	12.4	14.3	15.5	15.3	12.4	11.3
Total output, nonbank	34.8	33.6	35.1	42.5	45.8	46.5	51.3	49.1	54.3	39.1	38.8
PCE, nonbank	1.1	-0.4	0.9	6.0	11.3	12.2	12.4	7.5	15.1	6.0	10.3
To non-farm nonfinancial business, nonbank	16.7	16.9	14.7	15.0	14.0	13.6	16.2	19.2	18.8	15.2	12.8
Total output, all sources	10.4	6.3	3.2	8.9	8.7	9.4	15.5	11.8	5.1	-35.9	-76.5
PCE, all sources	-8.8	-12.0	-18.4	-7.5	-12.6	-8.7	-5.2	-12.3	-10.2	-21.4	-44.9
To non-farm nonfinancial business, all sources	6.6	5.6	6.0	1.6	5.2	3.2	5.0	8.3	4.5	-13.3	-21.6

[1] $1,000,000,000s (current)

F. Mortgage Lending Excluded from our Estimates

The analysis in this paper excludes real estate loans held by non-depository intermediaries. Such holdings are large, and the decision to exclude them was not made lightly. These loans undoubtedly generated services to consumers and businesses, but we are unable to determine how much of these services were priced and, consequently, how much should be imputed. A rough calculation of what is "missing" follows: According to the Flow of Funds (the Federal Reserve Board Z.1 release), US-chartered depository institutions excluding CUs held approximately 30.5% of all mortgages in 2009. About 17% of mortgages were commercial

mortgages, but commercial mortgages are highly overrepresented in commercial banks' balance sheets at about 55% of the total. Using the methods introduced in this paper, we estimate that approximately $79 billion and $67 billion in real estate loan services were furnished by commercial banks in 2009 and 2010, respectively. Thus, we can make a rough calculation of total mortgage services as 1/.305*100%=328% of total commercial bank mortgage FISIM. That is, total services may be about $260 billion in 2009. Table 7 shows these calculations for 2001-2011. Line 9 shows total non-depository IGO of commercial mortgages. In 2002, for example, non-depository institutions account for approximately $11.4 billion in commercial mortgage IGO.

The remaining part of the excluded real estate loans consists of home mortgages. The financial industry has dealt with illiquidity of the secondary market for home mortgages by pooling mortgages, chopping these pools into different pieces for sale to different investors, and by separating servicing rights from ownership of a mortgage's income stream. Some of these activities such as servicing and origination costs for loans that are immediately sold are already captured in the accounts for some loans (i.e., loans that are sold into the secondary market). However, as alluded to above, this is unlikely to represent the entire service margin, and thus, a portion of FISIM provided to homeowners is still "missing." Pinning this down is an important topic for later work. The overall magnitude of FISIM generated by home mortgages at non-depository institutions is given by line 10 in table 7.

Table 7. Computation of non-DI mortgage IGO based on Flow of Funds data

Line		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1	DIs % of total mortgages	0.336	0.334	0.328	0.338	0.336	0.328	0.321	0.316	0.305	0.304	0.300
2	DIs % of commercial mortgages (CMs)	0.543	0.551	0.549	0.553	0.548	0.544	0.526	0.547	0.552	0.550	0.542
3	CM % of total mortgages	0.170	0.163	0.159	0.157	0.159	0.162	0.169	0.176	0.173	0.168	0.166
4	Total DI loan output (CB, SI)*	44,961	52,010	57,040	60,832	69,905	79,224	84,301	84,788	79,373	66,963	67,791
5	CU home mortgage output	2,228	3,460	4,028	4,178	4,097	3,912	3,660	4,082	4,873	5,959	6,443
6	Total loan output (4)/(1)	133,872	155,633	173,690	179,790	208,345	241,506	262,770	268,402	260,148	220,527	225,612
7	Total CM output (6)*(3)	22,732	25,446	27,686	28,153	33,030	39,226	44,296	47,149	44,990	36,938	37,371
8	DI CM output (2)*(7)	12,343	14,018	15,194	15,576	18,097	21,327	23,285	25,796	24,825	20,324	20,261
9	Non-DI CM output (7)-(8)	10,389	11,428	12,492	12,578	14,933	17,899	21,010	21,353	20,165	16,614	17,110
10	Non-DI home mortgage output (6)-(4)-(5)-(9)	78,523	92,195	104,158	106,380	123,507	144,382	157,458	162,262	160,611	136,949	140,710

*$1,000,000s (current)

V. Conclusion

As shown in table 2 above, in 2002 $274 billion in financial services were consumed by non-financial firms, or about 2% of the gross output of non-financial firms. Updating the method for computing output for SIs and CUs suggests an upward revision of $3.9 billion. Computation of finance company FISIM suggests an upward revision of approximately $10.8 bilion. Taken together, these suggest an upward revision of approximately 5.4% in FISIM consumed by non-

financial firms. Addition of $11.4 billion in uncounted commercial mortgage IGO consumed by non-financial firms brings this proportion to about 9.5%. Thus, as a result of expanding FISIM to non-depository institutions and updating methodologies for non-bank DIs, we show a modest upward revision to total financial services consumed by non-financial firms.

This paper fills an important measurement gap in national accounts by introducing methods for estimating borrower services provided to consumers and businesses by non-bank financial intermediaries. The methods are applied to US finance companies whose services we find grew substantially over the period we analyze (1985 to 2010) and reached nearly $50 billion in borrower services per year from 2005 to 2009. Following Hood (2010), another important step in this paper is to adjust the reference rate used in the user cost margin to remove default risk. This move lowers the level of FISM and substantially alters its trajectory during the second half of the 2000s.

The deep recession that followed the financial crisis of 2007-8 showed that disruptions in the supply of finance can have major implications for the real economy, but conventional measures of the production and intermediate use of financial services present several puzzles for which this paper provides some modest answers. The meager size of the linkages between financial and nonfinancial business is due, in part, to an understatement of borrower services provided by nonbank financial institutions. The divergent growth patterns of overall value added and finance value added is due, again in part, to an overstatement of the "price" used to impute borrower services. Although we believe we are better equipped to measure financial output with the advances introduced in this paper, financial innovation will undoubtedly continue to contribute challenges to measurement in national accounts.

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