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Computing Nominal Bank Services: Accounting for Default

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I. Introduction

Banks offer a variety of financial services to customers. For some of these, they levy explicit charges. For others, the charges are implicit. Such services include intermediation (finding borrowers for depositors' funds), recording, bookkeeping, safekeeping, liquidity (making funds available for withdrawal whenever needed and at convenient locations), payment services, loan underwriting, information provision, risk management and advice.[1] Unlike other industries, banks offer these services in bundles that are priced using an interest rate that is either higher (in the case of loans) or lower (in the case of deposits) than the market rate for a similar, service-free instrument. The difference between the rate of return on a service-free instrument and the rate of interest offered or charged by the bank is termed an interest margin. As the interest margin varies, banks' service provision may also vary either over time or in the cross-section (Fixler et al., 2003).

This turns the problem of computing nominal output of banks – trivial for most other industries – into a tricky one. The System of National Accounts (SNA[2]) states that the margin between a "reference" rate of interest and the rate on a loan or deposit account is considered to be the service charge (paragraphs 6.163-6.169).[3] For loans, the entire interest rate margin above the cost of funds as measured by the reference rate is considered remuneration for services provided to borrowers, and is counted as output of commercial banks. This type of output may be termed implicitly-priced financial intermediation services, financial intermediation services furnished without explicit payment, or financial intermediation services indirectly measured (FISIM).

In this paper, I argue that a portion of the interest margin on loans is used as insurance against credit losses (losses of principle due to default), and thus should not be included in measured output. On average, the loss rate from defaults on loans is nearly a third as large as the margin used to compute bank services. The effect on the accounts of excluding losses due to default from measured output of banks depends on how this exclusion is handled, but it may have effects on measures of banks' profits[4], final consumption of financial intermediation services, saving of banks and borrowers, net borrowing and lending of banks and borrowers, and value added for borrowers in the business sector. I include a discussion of five possible treatments of the associated flows.

The SNA and NIPAs exclude the portion of gross insurance premiums that is earmarked to cover the cost of settling claims for insured losses from measured output of the insurance industry. This paper argues that credit losses should be treated in an analogous way. In fact, the 2008 SNA suggests that some loan guarantors be treated analogously to non-life insurance premiums and losses (6.182). I show that banks take default rates into account

[1] Fixler and Reinsdorf (2006) and Fixler, Reinsdorf, and Smith (2003) enumerate services for which banks may charge explicitly.

[2] In general, all references are to the 2008 SNA unless otherwise noted. I generally reference the SNA using a parenthetical containing the relevant paragraph(s).

[3] The U.S. Bureau of Economic Analysis (BEA) computes implicitly-priced financial intermediation services in the National Income and Product Accounts (NIPAs) in a manner that conforms to this SNA prescription, with some minor exceptions.

[4] By "profits," I do not mean "operating surplus" as defined by the SNA, which is the balancing item in the generation of income account (see chapter 7). Instead, "profits" refers to "entrepreneurial income" as defined by the SNA, which is operating surplus or mixed income plus property income receivable on assets owned by the enterprise(s), less interest and rent payable by the enterprise(s) (7.18).

when setting interest rate margins, suggesting that they are treating default analogously to the way in which insurers treat losses.

Wang (2003a, 2003b) and Basu, Inklaar, and Wang (2008) discuss the treatment of risk in measuring bank output. Their main argument is that because returns are noisy, a risk premium is required by holders of bank equity, and a portion of the interest margin on loans serves this purpose. They exclude this risk premium from measured bank output. They also argue that removing expected credit losses from measured output is appropriate. Wang (2003b) does so by subtracting mean charge-off rates from loan interest rates.[5]

The questions of the treatment of risk premiums and the treatment of expected credit losses do not have to be decided at the same time. In particular, a bank charges a default margin as part of the interest rate on risky loans to cover expected costs of future defaults. On the other hand, risk premiums compensate asset holders for holding assets having *high-variance* returns; linking higher moments of asset returns to the first moment of payoffs requires that the model be given additional structure, and it is this structure that has generated controversy.

This paper introduces a justification for exclusion of anticipated losses from defaults from the measure of implicitly-priced bank and considers alternatives for incorporating this exclusion into the SNA and NIPAs. Additionally, it discusses an alternative model for measuring expected default and default margins. This model fits well into the theory of the SNA, is tractable, and follows precedent set by methods for other industries.

Removing anticipated default rates from net interest squeezes the measure of banking output, which has the unwelcome effect of adding substantial volatility to the allocation of the total net interest margin to borrower and depositor services. This practical problem must be addressed when removing the default margin from measured output, so this paper also develops a method for stabilizing the reference rate that is used to split net interest into these two components, borrower and depositor services. This methodology is described in appendix A.

This paper begins with a discussion of the current methods for measuring nominal bank output in the SNA and NIPAs. It then considers the advantages and disadvantages of changing these methods to take credit losses into consideration and argues that anticipated credit losses should be treated as analogous to expected claims in the insurance industry. Finally, it presents estimates of the impact of doing this on measures of banking and borrower value added, saving by banks and borrowers, net lending and borrowing by banks and borrowers[6], and bank and borrower profits.

II. User Cost Theory and Methods for Measuring Bank Output in the NIPAs

The conceptual framework for measuring bank output in the SNA and NIPAs is based on theory of the user cost of capital (Fixler, Reinsdorf, and Smith, 2003, and Fixler, 1993). In this theory, user cost for a capital asset

[5] This suggests modeling defaults (for a particular loan type) as a mean default rate plus a white noise component. Any difference between the current default rate and the mean are unexpected, and thus cannot be reflected in prices. I argue later that this is not the case, that is, that charge-off rates are to some degree predictable, and that banks change their margins to compensate.

[6] Net lending (borrowing) is defined in the SNA as the balancing item of the capital account. Net lending is the sum of saving and net capital transfers (capital transfers receivable less capital transfers payable), less net acquisitions of non-financial assets. Net lending represents the resources that are available for lending. This item is called net borrowing if it is negative, and represents the financial resources that must be obtained to finance spending above disposable income.

equals the value of the asset times its theoretical rental rate, which must cover interest costs plus depreciation, less any increase in the price of the asset. This rate may be expressed as:

$$uc_t = r_t + \delta_t - \pi_t$$

In this expression r_t represents a cost of funds, and is usually equated with a risk-free interest rate, δ represents depreciation, and π represents appreciation in price. When used for financial assets, the expression for user cost omits the term for depreciation.

The user cost rate for loans simply becomes the risk-free rate. For this reason, the services provided to borrowers and lenders can be calculated by subtracting the user cost from the rate paid on these assets or liabilities. In particular, the borrower service margin can be computed as:

$$\begin{aligned} s_t &= r_t^{loan} - uc_t \\ &= r_t^{loan} - r_t^{ref} \end{aligned}$$

Here, the reference rate is written with the superscript "ref."

Implicitly-priced depositor services are calculated as the user cost margin multiplied by the deposit balance. The user cost margin is the difference between the reference rate of interest and the return on deposits, or,

$$s_t = r_t^{ref} - r_t^{deposit} .$$

In the NIPAs, rates paid on deposits are computed by dividing quarterly interest payments by the average quarterly deposit balance for each type of deposit. (For computing the overall output produced by banks, distinguishing deposit types makes no difference; however, for allocating uses of output to sectors and industries, decomposing the components of bank output by deposit type is important.) The reference rate of interest is defined as the effective rate of interest on federal and government agency obligations held by banks, excluding mortgage-backed securities.

The NIPAs compute the user cost margin for borrower services by subtracting the reference rate from the return on each type of asset. Returns on loans are computed by dividing interest receipts by the average loan balance net of the allowance for loan and lease losses.

Returns on all other assets and liabilities are computed by dividing the interest income or expense by the average quarterly or annual asset or liability balance. Total output of each asset and liability type is computed by multiplying the user cost margin by the average quarterly or annual asset balance.[7]

The NIPA methodology does not address default. The guidelines for national accounts in the SNA are also silent on the question of allowing for credit losses in measuring FISIM.

[7] Methods employed by many European countries are similar to those used in the NIPAs, except that they base their reference rate on rates for interbank loans and impute output only from loans and deposits.

III. Rationale for Changing the Treatment of Defaults

For most industries in which prices are observed directly, the 2008 SNA prescribes that output be valued at actual cost to purchasers (2.64). Prices for financial intermediation services cannot directly be observed, however, as was noted above. I argue here that the interest rate charged on loans remunerates the financial intermediary for more than its cost of funds and service provision, but also for losses in principal due to bad debt. This margin should be removed from the computed service margin.

For a financial intermediary to survive, its contractual loan interest rates must cover its service provision, cost of funds, and principal losses due to bad debt. Figure 1 shows charge-off rates[8] by type of loan. For some types of loans, charge-off rates are almost always small. However, for credit cards and other consumer loans (including auto loans), credit losses are quite large on average (2-10%). On average, the default rate on all loans is approximately a third as large as the interest margin computed using current methods. Any bank that does not include in its interest rate a margin to cover these losses will not be able to continue to operate. Indeed, banks are clearly charging different rates for loan that have different rates of default. Figure 2 shows charge-off rates and interest rates for credit card and commercial and industrial (C&I) loans, relative to charge-off rates and interest rates for loans secured by real estate. The interest rate curves represent the differences in margins between C&I loans and real estate loans, and between credit cards and real estate loans; the charge-off rate curves represent the differences in charge-off rates. Credit cards experience higher charge-offs than do C&I loans, and banks charge higher interest rates for credit cards. Thus, banks respond to higher anticipated default by charging higher rates of interest.

In none of the references cited above are bad debt losses mentioned as a type of service provided by a financial intermediary. However, the user cost theory presented above omits a discussion of the margin that covers anticipated future defaults. If loan interest rates are given by $r^{loan} = r^{ref}+s^{loan}+d$ where d remunerates the financial intermediary for anticipated losses in principal due to future defaults, then the currently computed service margin differs from the one that does not include remuneration for default by the default margin, d. That is, the service margin should be computed as $s^{loan} = (r^{loan}-d)-r^{ref}$.

Another way of looking at this is as an attempt to produce a better measure of r^{loan}. Loan output is the difference between the expected after-default loan rate and the reference rate[9] – but the loan rate is currently measured as the rate which banks charge to cover service provision and default. Instead, what should be used is the loan rate that banks expect to receive after defaults. The new loan rate $r^{loan}* = r^{loan}-d$ can then be substituted back into the original method.

[8] Charge-offs represent write-offs of bad debts, and are discussed below.

[9] It should also be noted that the interest income is booked on a cash basis for non-performing loans. The true contract loan rate (which is supposed to be measured above in r^{loan}) should be computed with such interest income in it booked on an accrual basis. An adjustment for this is not done in this paper.

The SNA and NIPAs ignore non-payment of debt in computation of output and profits.[10,11] This is in reference to the treatment of actual bad debt losses, and does not apply to anticipated credit losses present in the interest rate charged by a financial intermediary by whom services are priced implicitly. I argue below that if the margin that remunerates a financial intermediary for bad debt losses is excluded from the measured service spread, a different treatment of actual defaults from the one currently prescribed may offer a preferred picture of a variety of other measures in the sequence of accounts. Nonetheless, even in the absence of such a different treatment, a measure of anticipated credit losses should be excluded from the measure of FISIM.

[10] From the 2008 SNA, paragraph 10.211: "However, the unilateral writing off of debt is not a transaction between institutional units and therefore does not appear either in the capital account or the financial account of the SNA. If the creditor accepts such a write off or default, it should be recorded in the other changes in the volume of assets account of the creditor and the debtor."

[11] According to BEA (2002), "Corporate profits reflects the income earned by corporations as a result of current production; the measure is defined as receipts arising from current production less associated expenses. Receipts exclude income in the form of dividends and capital gains, and expenses exclude bad debts, natural resource depletion, and capital losses."

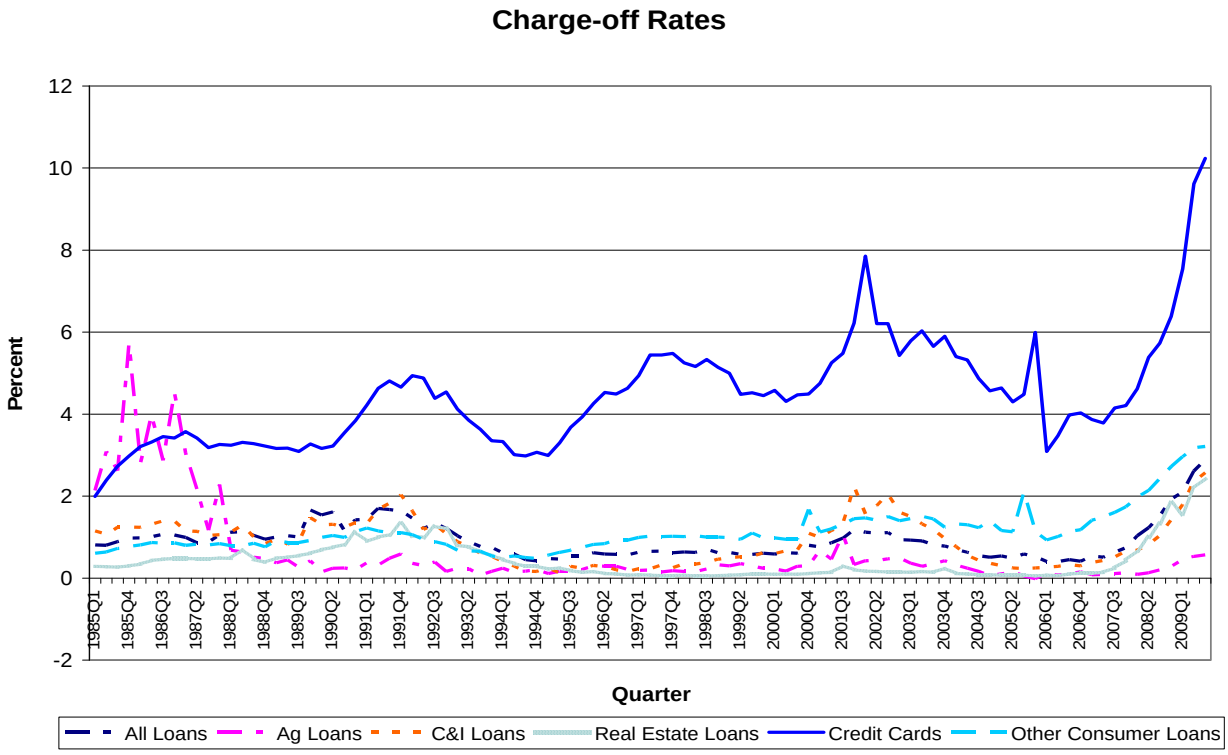

Figure 1: Charge-off rates by category of loan, quarterly. Source: Federal Reserve Board of Governors' calculations from Call Report data.

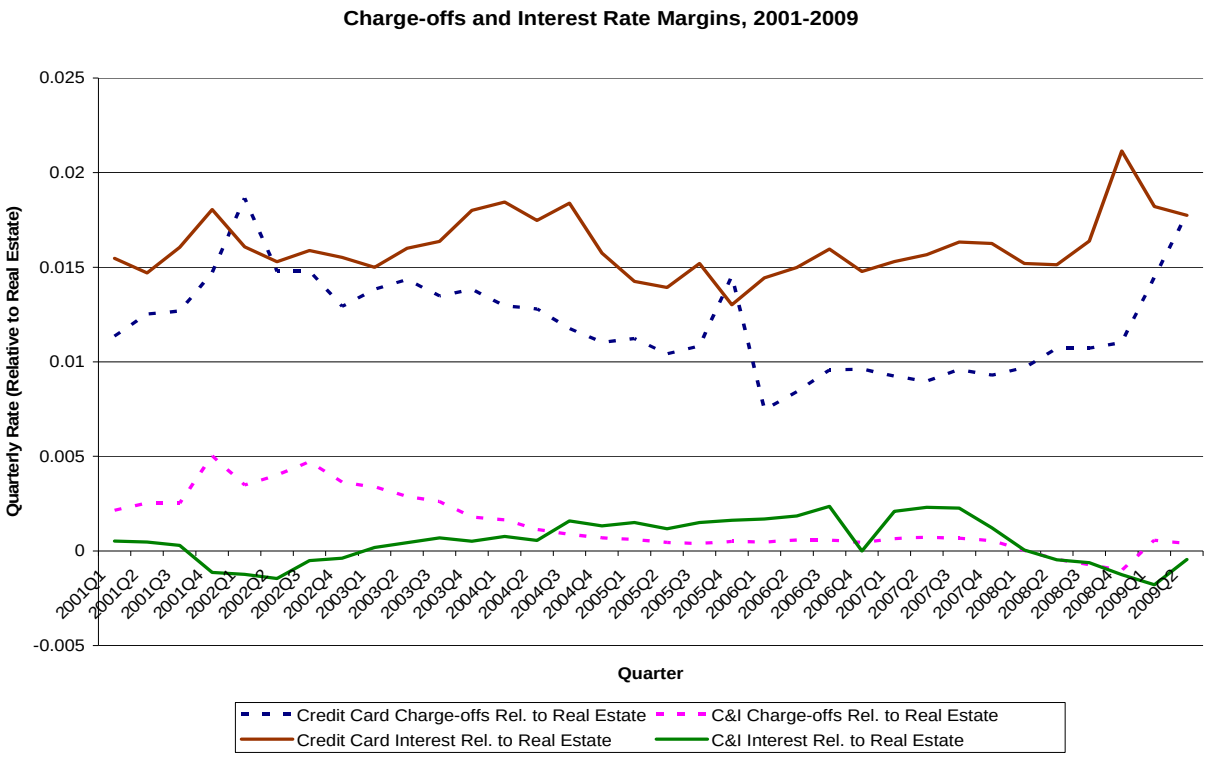

Figure 2: Charge-off rates and interest rate margins, quarterly. Source: Federal Reserve Board of Governors' calculations from Call Report data, author's calculations.

IV. Interest Rate Margins as Insurance

Credit losses could be treated in the national accounts in a way that is similar to the treatment of non-life insurance losses. The portion of the interest rate margin that is used to protect the bank against borrower default is set by the bank based on expected default rates.

The method for measuring the output of non-life insurance in the NIPAs was developed by Chen and Fixler (2003). They suggest that premiums are set in a way that indemnifies the insurance provider against the loss that they expect to experience, with a markup to cover the cost of providing services including risk bearing. Only the markup is counted as output, whereas the portion of gross premiums that covers normal losses is considered a current transfer. A similar treatment is recommended by the SNA (17.26-17.29).

Insured losses and credit losses are analogous. In non-life insurance, an adverse event results in a cash payment by the insurer to the insured (or sometimes it involves a direct purchase of replacement goods by the insurer). Adverse events include, for example, automobile accidents, fires, and thefts. In commercial banking, an adverse event results in the *de facto* forgiveness of a liability rather than a direct cash payment. The adverse event is less well-defined, but often may include an unexpected drop in income. Just as insurers will not be able to pinpoint exactly who is going to experience a loss, banks will not be able to determine which individuals will default.

In addition, the 2008 SNA states that volatility in claims should not directly affect the measure of output of non-life insurance services. According to the 2008 SNA (17.21), "[n]either the volume nor the price of insurance services is directly affected by the volatility of claims." The 2008 SNA (17.26-17.29) recommends employing adjusted claims (implemented as "normal losses" in the NIPAs, following Chen and Fixler, 2003) to compute output of insurance companies, as earned premiums plus premium supplements less adjusted claims. The difference between actual and adjusted claims is considered a current transfer (17.34, 17.39), except in the case of a large natural disaster (17.40). Thus, output should be measured similarly in banking.

Numerous examples of lending to individuals of varying risk categories show that a bank considers expected default probabilities when choosing interest rate margins. Figure 2 shows that margins for different loan types relative to those for real estate loans track charge-off rates. Margins are higher for credit cards, which exhibit higher charge-off rates.

For earlier data, Ausubel (1991) discusses competition in the credit card industry, noting that the relaxation and repeal of various states' usury laws in the early 1980s saw large increases in interest rates charged on credit cards and an opening of credit card markets to riskier borrowers, contributing to rapid growth in this form of debt.[12] Banks were able to expand credit in this way because they were able to charge sufficiently high rates to indemnify themselves against expected credit losses. Although Ausubel (1991) rejects high charge-off rates as the complete explanation for high credit card interest rates, he excludes charge-offs from his profitability calculations. As competition intensified in the credit card industry, margins did not decrease (Stango, 1999), suggesting that these margins had been at least loosely derived from costs.

[12] According to Federal Reserve Statistical Release G.19, there was a doubling of revolving consumer credit relative to non-revolving consumer credit between 1980 and 1990, constituting nearly a four-fold nominal increase in outstanding revolving debt.

An additional example of the relationship between interest rates and default is provided by Adams et al. (2009), who note that interest rates of 25-30% prevail in the subprime auto loan market. A substantial portion of these margins covers credit losses, as only 39% of the loans in their sample are repaid in full. In this market, lenders assume that large credit losses will occur, while consumers are willing to take on these extremely high interest rates in the expectation that they will probably not pay the loan off in full. This suggests tacit understanding by both parties that default is a likely ending to the loan contract.

Currently, such an arrangement would be treated as a large productive service provided by subprime auto lenders, offset by a large, negative below-the-line charge for credit losses.

V. Measures of Default

Banks report two basic accounting measures of credit losses. The first, the provision for loan and lease losses (the provision), is an expense that represents the charge-offs that a bank expects given its current loan portfolio that are not already covered by the allowance for loan and leases losses.[13] The second, the charge-off, represents an *ex post* measure of defaults, when banks recognize bad loans.

The provision has the potential to represent an *ex ante* measure of default expectations, albeit one that is at the discretion of banks' management. However, the available data on provisions are insufficiently detailed, as the Call Reports do not ask banks to report the provision by type of loan. Provisions are also unsuitable for measuring the anticipated credit losses that are taken into account when the interest rate on a loan is set because their timing is often *ex post* (see Wall and Koch, 2000, and Laeven and Majnoni, 2003). Generally, provisions will be an unknown mixture of *ex ante* information regarding expected default probabilities at issue and *ex post* adjustments to the allowance as charge-offs occur or conditions change. They also may be contaminated by tax and income smoothing considerations.

Since charge-offs happen only as losses are recognized, they are not a measure of expected future defaults. However, the Call Reports (which are the main data used to estimate FISIM in the NIPAs) collect charge-off data by loan category. In this paper I use actual credit losses as reported (that is, charge-off data) to develop a model of the anticipated credit losses, which I presume to be equal to the default margin.

Figure 1 shows clearly how noisy charge-off rate data are. The methodology discussed below will smooth charge-off rates by loan type. These smoothed charge-off rates will be used as a proxy for expected charge-off rates, and will be termed "anticipated default" to mirror what is done for non-life insurance.

Although charge-offs are quite noisy, banks do make an attempt to respond to changes in anticipated future charge-off rates by increasing or decreasing margins above cost of funds. Figure 3 shows that senior loan officers report increasing spreads when charge-offs are growing and reducing spreads when charge-offs rates are decreasing, within the category of business loans. It also appears that changes in charge-off rates tend to lead changes in

[13] Colangelo and Mink (2009) discuss the possible use of the provision as a measure of default. They reject it for a variety of reasons, but these reasons do not apply in this case. In particular, they reject it based on availability of data and on comparability of accounting measures across EU member states. These are not relevant to the U.S., as data availability is complete and there is no issue with comparisons with other states (the methodologies used are already different). In any case, I do not recommend using the provision (see below).

spreads. Thus, employing a constant charge-off rate in estimates of output would have the potential to distort measured output, as well – in fact, a rate that lags actual charge-offs appears to be the most appropriate.

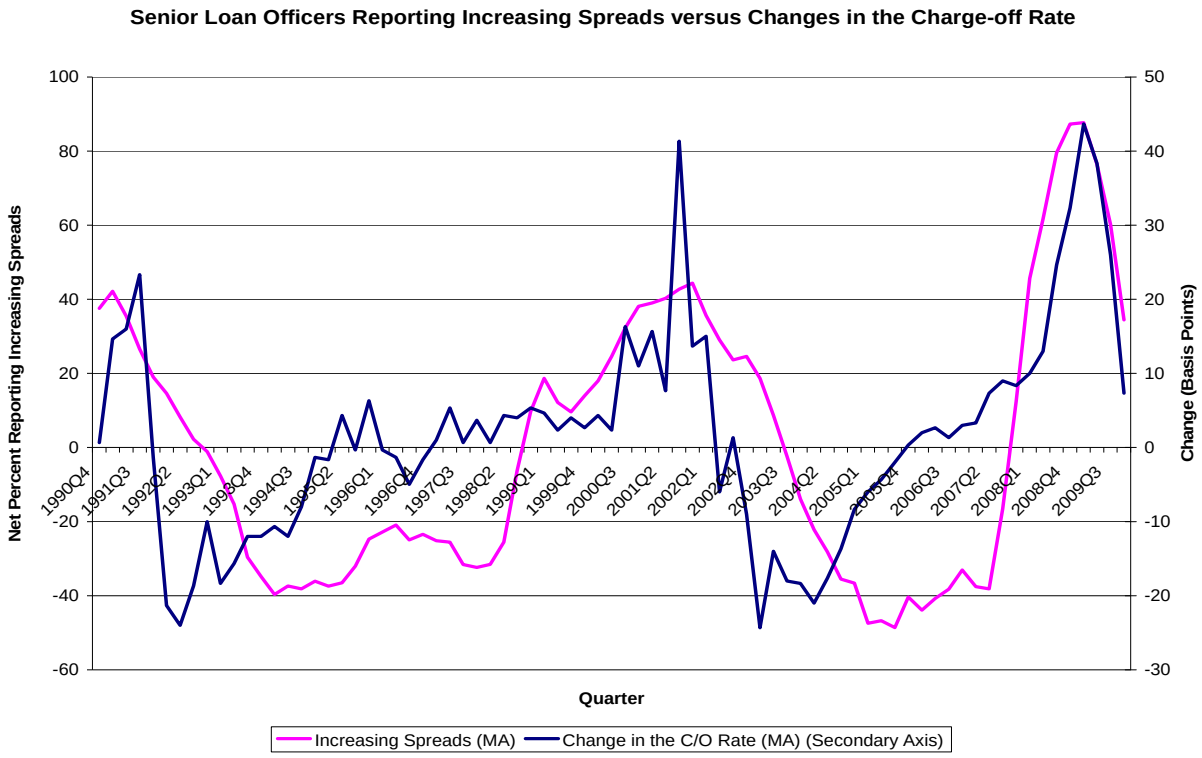

Figure 3: Charge-off rates and interest rate margins from senior loan officer survey. Source: Federal Reserve Board of Governors, author's calculations.

VI. Proposed Methodology

The margins that commercial banks incorporate in loan interest rates to compensate for credit losses reflect anticipated losses, not actual losses. Thus, for the purposes of removing the default margin from FISIM, anticipated defaults must be used.

For default rates I use charge-off rates by loan type, reported by the Federal Reserve Board of Governors.[14] These are expressed using the symbol d_t. Figure 1 above shows that default rates are highly variable during recessions. For this reason, smoothed default rate series will be used. To smooth defaults, an adaptive expectations model will be employed. This corresponds also to the methodology used in the NIPAs for estimating normal losses for insurance other than life insurance. In a similar fashion, these will be termed "anticipated credit losses" or "anticipated defaults."

Default rates are computed as a percentage of net loan balances, so that $d_{lt} = D_{lt}/B_{lt}$ where D_{lt} represents total defaults of loan type l during time period t, and B_{lt} represents average balances of loan type l during time period t. Anticipated credit losses are computed as $d^*_{lt} = d^*_{lt-1} + \lambda_l(d_{lt}–d^*_{lt-1})$. The user cost rate for assets, for example, is then $uc_{lt} = r_{lt} – r_t^{ref} – d^*_{lt}$. The parameters λ_l can be loan-specific, but are fixed over time. They can be estimated, for example, by finding the best one-period-ahead prediction.

I use the adaptive expectations model because it is a simple method for smoothing defaults that has a long history in economics.[15] I do not derive my application of this model from micro foundations, but it may be easily justified. One appeal is that loans with long maturities cannot be re-priced, and geometrically declining weighted averages approximate balances of loans by time of issue. In addition, adjustment costs may induce firms to set prices or rates as geometrically declining weighted averages of past states. Finally, a one-period-ahead prediction for default rates is generally irrelevant to banks; they wish to know default rates over the life of the loan. A weighted average presents a trade-off in the information contained in the current and past rates between short-run fluctuations (noise) and long-run averages (signal) that may be experienced over future loans' maturities.

An alternative to smoothing with the adaptive expectations model would be to use a more sophisticated model.[16] The adaptive model is preferred to a more sophisticated model because there is a precedent of using the adaptive model in the accounts, in the non-life insurance industry. Thus, it is implemented by statistical agencies around the world. The benefits of specifying a sophisticated model of default expectations would not outweigh the advantage of computational simplicity offered by the adaptive model. Such models are difficult to estimate, and it would require substantial effort to map statistical default predictions into changes in default margins that is

[14] Federal Reserve Board of Governors (2010), Federal Reserve Statistical Release: Charge-off and Delinquency Rates on Loans and Leases at Commercial Banks, accessed at http://www.federalreserve.gov/releases/chargeoff/, May 6, 2010.

[15] The macroeconomics literature on adaptive versus rational expectations is large. Evans and Ramey (2006) provide an excellent review. Adaptive expectations were developed by Cagan (1956) and Friedman (1957). Lucas (1972) argued that the parameters of the adaptive model were not invariant to changes in other model parameters (in particular, policy parameters), so that adaptive models were unusable for policy analysis. This led to a period of time in which the adaptive model fell largely out of use. This disadvantage does not apply to banking because there is little interaction between policy and the expectation being generated.

[16] Researchers have developed statistical tools for predicting future default rates. Some have incorporated macroeconomic conditions into these predictions. Examples include Wilson (1997a, 1997b); Hamerle et al. (2004); Virolainen (2004); and Hoggarth et al. (2005).

convincingly more accurate than other methods. Complicated methods also reduce the accessibility of the data and ease of replication.

Adaptive defaults provide a mid-point between actual and long-run average default rates, and can be made to nest both. Figure 3 suggests that average default rates do not appropriately adjust for changes in interest rate margins. Using a constant default rate risks overstating output during recessions (when margins are increasing) and understating output during booms (when margins are decreasing). Actual default rates, however, are not a good proxy for the default margin because of the delay between increases in default and changes in margins. Usually, banks cannot change margins on existing balances, and so have to wait until those balances come due; an adaptive margin captures the approximately geometrically declining importance of past loans in banks' portfolios.

Alternatives for Incorporating Defaults into the NIPAs

Since interest income that is intended to cover anticipated losses of principle from defaults is not available to cover the costs of providing borrower services, implicitly-priced borrower services should be calculated by multiplying the loan balance by the currently employed user-cost margin $(B_{lt})(r_{lt} - r_t^{ref})$ and then deducting anticipated defaults $D^*_{lt}=(d^*_{lt})(B_{lt})$. Deducting anticipated defaults from the definition of borrower FISIM implies the need to adjust either the total amount of interest income that banks report before FISIM is taken into consideration, or the amount of pure interest income that banks are shown as receiving after borrower and depositor FISIM have been subtracted from the interest income that they report (termed "SNA interest" in the SNA, 6.164). The place where this flow is incorporated into the accounts has the potential to affect income, saving, and net borrowing and lending of the affected parties. The SNA does not currently contain a recommendation of what to do with this flow.

The SNA does, however, have a recommendation for actual default, stating that "[u]nilateral repudiation of debt is not a transaction…" and thus must be relegated to a non-transaction flow (10.211). Thus, defaults are currently placed in other flows.[17] Nevertheless, because defaults are large, predictable, and economically relevant, such a treatment has the potential to distort measures of saving, net lending/borrowing, and profit. Thus, several alternative treatments of default are considered.

One must find a place for the following two flows: (1) The portion of interest paid by the borrower to offset anticipated credit losses (the "default margin") and (2) actual defaults. Five treatments for these two flows are considered. In the first four, the default margin is placed in interest income; in the last, the default margin is a current transfer. Actual defaults are decomposed into anticipated defaults and excess defaults. Anticipated defaults are treated as an other flow, a capital transfer, or a current transfer. Excess defaults are treated as an other flow or a capital transfer. The treatments are presented in an order that brings their impact "up" the sequence of accounts.

[17] "Other flows" refers to flows in the "other changes in assets" accounts in the SNA (12.1). These are further classified as "other changes in the volume of assets" or "holding gains/losses." Because volumes and prices for these assets are not easily distinguished, it is not clear which flow credit losses represent. The NIPAs are not a complete system of accounts that includes revaluation accounts and "other changes in assets" accounts. Excess defaults could be reported as a below-the-line adjustment, similar to how natural disasters appear in insurance output.

No matter how these flows are incorporated into the accounts, removing defaults from the bank output measure will reduce measures of both final consumption of FISIM and intermediate consumption of bank output. This reduces measured bank value added and output, reduces measured bank operating surplus, increases value added of other businesses, and increases the operating surplus of other businesses. This can be seen in the production account and generation of income accounts in all five treatments.

Appendix B contains a set of 5 tables. Each table follows the effects of one of the five treatments through the sequence accounts for U.S. data in 2008. It may be beneficial to the reader to refer to these tables when reading the descriptions of the treatments that follow.

Treatment 1: The default margin is interest and actual defaults are other flows. The treatment that most closely follows the logic of the 2008 SNA counts the default margin as a pure interest payment (part of "SNA interest") rather than as part of borrower FISIM and treats actual defaults as other flows (for example, as an "other change in the volume of assets").

In the language of the 2008 SNA, the reference rate multiplied by the loan balance is defined as SNA interest (6.164). In the first treatment, the default rate can be added to the reference rate, which when multiplied by the loan balance may be used to generate a new measure of SNA interest. Now instead of $int_{lt}^{SNA} = (B_{lt})(r_t^{ref})$, SNA interest is defined as $int_{lt}^{SNA} = (B_{lt})(r_t^{ref} + d^*_{lt})$ where d^*_{lt} is the default margin for loan l and r_t^{ref} is the reference rate of interest.

SNA interest is treated as property income to the bank, so that the new treatment affects measured bank value added, output, and operating surplus, but not profits (that is, entrepreneurial income). As noted above, official BEA methodology excludes default from calculations of profits, so this treatment would not violate that rule, leaving profits unaffected.

This treatment would reduce personal consumption and personal income by an identical amount. Household and business borrowers would consume a smaller amount of implicitly-priced banking services, but would transfer a larger amount to the bank in the form of pure interest payments. For this reason, the measure of their saving would be unchanged. Because measured saving would be unchanged and the treatment does not introduce any capital transfers, measured net borrowing and lending would be unchanged. Whether measured saving should be affected by default could be debated, but not including default in measures of saving by the borrowers at least has the advantage of consistency with SNA definitions of saving.

Since the default margin would no longer be used in the output imputation, measured bank output and value added would be reduced, improving the estimates of those two concepts. In addition, this treatment would improve estimates of the value added of the industries that consume implicitly-priced intermediation services. However, because the default margin would be booked as a pure interest income but actual defaults would be below the line, measured profits would remain the same as under the approach currently used in the NIPAs.

Treatment 2: The default margin is interest and actual defaults are capital transfers. Treatment 2 places actual defaults in capital transfers rather than in other flows. This treatment thus has the same effect on

measures of value added, output, operating surplus, profits, income, and saving as the first treatment does because these values are unaffected by both other flows and capital transfers.

This treatment does, however, increase measured net lending of households and other business and decrease net lending of banks. It brings actual defaults above the line, so they show up as a transaction in the capital account. The balancing item of the capital account, net lending/borrowing, is thus affected.

The case for never considering unilateral repudiation of debt to be a transfer is less clear-cut than the forcefulness of the language of the 2008 SNA would suggest. Unilateral repudiation of debt frequently results from bankruptcy. Cancellation of debt via bankruptcy is a legal right under certain circumstances. Banks realize that they are going to be obligated to accept some debt cancellation when they make loan decisions. Because the laws surrounding debt cancellation are the result of the policy-making process and because banks likely treat some cancellation of debt as "normal," it does not seem unreasonable to treat this flow as a transaction.

The SNA defines a capital transfer as a change in the ownership of an asset, redistributing wealth but leaving saving unaffected (3.60); it is distinguished from a current transfer in that its value is not wholly available for final consumption in the current period. Relinquishing a financial claim is specifically included in capital transfers (8.10). Debt cancellation is tantamount to relinquishing a financial claim.

The intuition is that net lending and borrowing should include principal repayments. Banks charge the default margin to cover the principal payments of defaulters. By including defaults in capital transfers, measured net borrowing and lending will reflect banks' relinquishing of claims on the incomes of other businesses and households, much of which was anticipated in the aggregate and for which the bank is indemnified though the default margin.

A consequence of this treatment is that measured net borrowing and lending will contain both anticipated and excess credit losses (that is, actual credit losses in excess of anticipated credit losses). The argument to consider credit losses to be capital transfers relies on the fact that banks charge a margin to cover the anticipated principal payments of defaulters. Yet actual credit losses in excess of anticipated losses, have no place in capital transfers. The third treatment addresses this issue.

Treatment 3: The default margin is interest and anticipated defaults are capital transfers. In treatment three, only anticipated defaults are included in capital transfers. Excess credit losses are placed in other flows.[18] The effects of this treatment on the accounts are much the same as the effects of the previous treatment. However, measured net lending and borrowing are affected by anticipated credit losses rather than actual credit losses. This ensures the portion of defaults that is noisy both to banks and to borrowers does not enter measures of net lending. In treatments 4 and 5 below, excess defaults are included in other flows, as well.

[18] The idea of breaking up an interest rate into pieces and treating different pieces as different types of flows is present in the 1993 SNA. Vanoli (1999) discusses at length the treatment of interest in a high-inflation environment. This treatment suggests that a portion of nominal interest offsets the loss in the value of principal. In this case, Vanoli (1999) recommends that a portion of interest be counted as a revaluation gain to the lender (loss to the borrower), offsetting the loss to the lender due to the reduction of the value of principal from price changes. This treatment appears in the 1993 SNA (Chapter XIX, Annex B).

Treatment 4: The default margin is interest and anticipated defaults are current transfers. Hicks (1939) suggests that flows that are predictable be included in income, whereas flows that are unpredictable should not. From the perspective of the bank, the amount received from borrowers to cover anticipated credit losses is not available to be distributed to workers, suppliers, or providers of capital or funds. Instead, it must be used to cover credit losses, especially over time. However, if credit losses are placed in the capital accounts or in other flows, measured bank income will appear to be higher than what they are able to distribute to other parties by precisely the level of actual defaults. A more accurate picture of the income that is at the banks' disposal is achieved by placing defaults in current transfers.

If anticipated credit losses are counted as a current transfer, this transfer will increase the measured disposable income of other businesses and of households, while reducing the measured disposable income of banks. This will increase measured saving by other businesses and households, while reducing saving by banks. Such a situation avoids a hiding a large drain on banks' balance sheets that is to some degree regular and predictable, if only from the bank's perspective.

Taking the perspective of the bank in this matter is little different from taking the perspective of the insurance company in the case of non-life insurance losses. From the perspective of the insurance company, losses are regular and to a large degree predictable. From the perspective of the insured, losses are highly irregular and unpredictable. The SNA has decided to consider insurance losses to be current transfers, taking the perspective of the insurance company. The default margin in the banking industry may be thought of as being parallel to the portion of gross premiums set aside to cover insured losses in the insurance industry. Anticipated default is analogous to normal losses (expected claims) and actual credit losses are analogous to claims.

Treatment 5: The default margin and anticipated defaults are current transfers. The positives of the above treatments notwithstanding, they all exclude credit losses from measured entrepreneurial income, which is meant to be analogous to business profits. It would probably be impossible to convince a banker that exclusion of credit losses from measured profits is correct, in an "economic" sense or otherwise. Bankers probably worry more about default than anything else, and have developed a system of underwriting, screening, and monitoring to protect themselves from it. As noted above, credit card default rates may be larger than credit card output. Distortions in profitability numbers will be even larger. Thus, the above methods do not produce estimates of bank profits that accord with the perceptions of bankers.

By counting the default margin as a current transfer rather than an interest payment, the margin is removed from the measure of banks' and other businesses' entrepreneurial income, so that measured entrepreneurial income of banks decreases and measured entrepreneurial income of other business decreases. In addition, because current transfers are not primary incomes, the measured balance of primary incomes of banks decreases, while the measured balance of primary incomes of other businesses and of households increases.

The SNA defines primary incomes as incomes that accrue to institutional units as a result of their participation in production or of ownership of assets that may be needed in production (7.2). The part that results from ownership — property income — includes interest. However, the portion of interest that is used to cover credit

losses can hardly be described as property income arising from making funds available to borrowers. Irrespective of what is done with actual or anticipated credit losses, classifying the default margin as a current transfer to borrowers may most accurately reflect its true purpose.

VII. Results

For the purposes of illustration a stabilization parameter of 0.20 has been chosen for smoothing the charge-off rates. Similar conclusions would be implied by parameters varying from 0.1 to 0.3. (Higher values for λ result in less loss of information and less time-shifting of the smoothed series, but at the cost of leaving more volatility in the smoothed series.) Figure 4 shows actual, anticipated, and excess charge-offs.

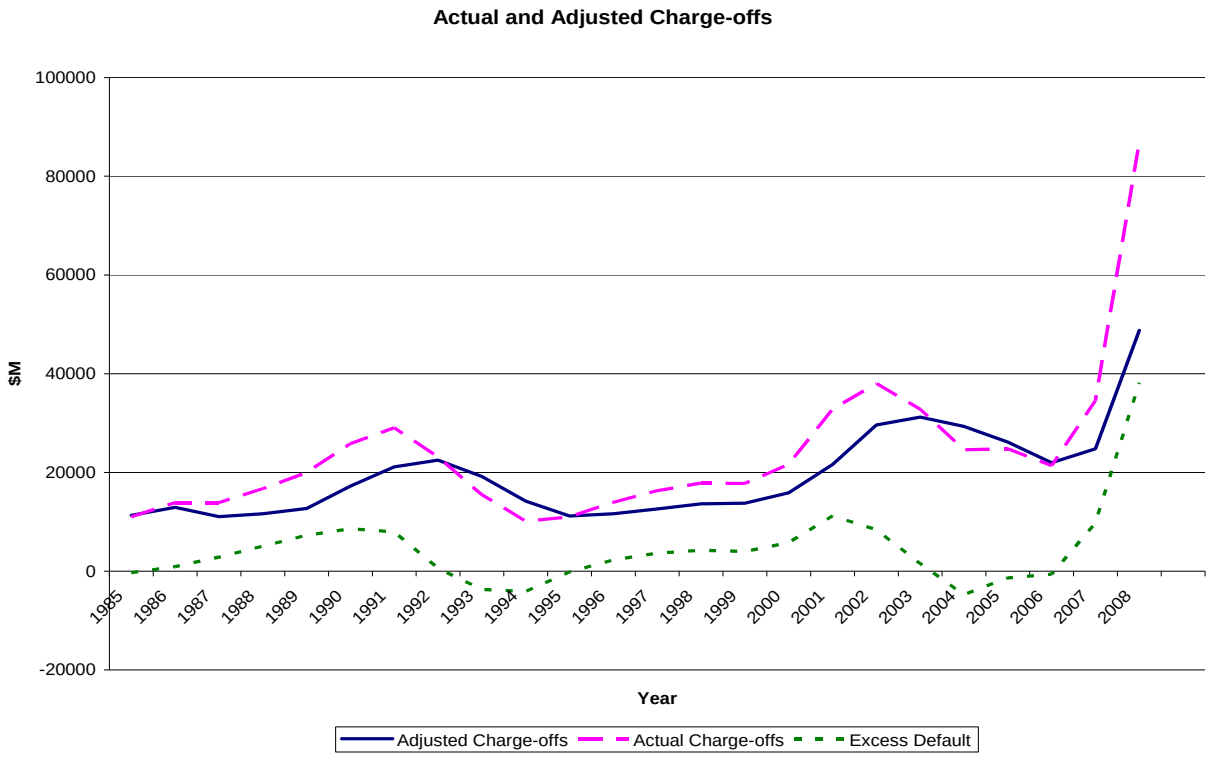

Figure 4: Actual, Adjusted, and Excess Charge-offs. Source: Federal Reserve Board of Governors' calculations from call report data, author's calculations.

Table 1 shows the standard deviations of log differences in output, by treatment of charge-offs (net vs. gross) and by reference rate (not stabilized vs. stabilized). Rate stabilization is discussed in appendix A, and is done because of the effect of removing charge-offs on the variance of output growth. Unadjusted quarterly asset and liability output growth rates have standard deviations of 12.3% and 21.8%, respectively; adjusting for charge-offs increases the asset output growth standard deviation to 26.9%. Using a stabilized reference rate largely erases the effect of netting out anticipated charge-offs.

Table 1: Standard Deviations of Log Differences of Output Measures

Output Category	Loss-Adjusted	Reference Rate*	St. Dev.
Asset	yes	stabilized	0.044
Liability			0.053
Asset		not stabilized	0.269
Liability			0.218
Asset	no	stabilized	0.029
Liability			0.050
Asset		not stabilized	0.123
Liability			0.218

* Reference rate stabilization is discussed in appendix A.

The magnitude of the effect of removing anticipated charge-offs from output is quite substantial. The charge-off expense is on average equal to 38.5% of interest earned.

Table 2: Borrower Services Adjusted for Default, 2004-2008

	2004	2005	2006	2007	2008
Borrower Services (current method)[1]	135800	164100	200300	184100	154300
Plus: Adjustment for default	-35800	-32400	-28700	-32100	-59200
Plus: Adjustment for rate stabilization[2]	-11800	-25700	-35700	-10500	31600
Equals: Borrower Services (proposed method)	88200	106000	135900	141500	126700
Percent impact on revenue	-0.35	-0.35	-0.32	-0.23	-0.18

1. Source: NIPA table 7.11, Interest Paid and Received by Sector and Legal Form of Organization

2. See appendix A

Table 2 illustrates the effect of these two adjustments on annual borrower services, from 2004-2008. Note that borrower services peak in 2007 instead of 2006, which is a result of the rate stabilization. Although the effect of the rate stabilization is negative during 2004-2007, in the long run it is just as likely negative as it is positive unless a trend is pushing it in one direction or another.

Table 3: Illustrative Impact of Charge-off Adjustment on PCE of Borrower Services

Illustrative impact on PCE (Personal Loans and Credit Cards)	2004	2005	2006	2007	2008
PCE of Borrower Services: Original	37637	38794	43654	46577	48987
PCE of Borrower Services: Charge-off Adjustment	17368	17530	24401	26727	23765
Growth in PCE, Original	9.5%	3.1%	12.5%	6.7%	5.2%
Growth in PCE, with Proposed Charge-off Adjustment	8.3%	0.9%	39.2%	9.5%	-11.1%

Table 3 illustrates the impact of a charge-off adjustment on consumption of borrower services. This does not include the reference rate adjustment, and assumes credit card and personal loan services are not used as intermediate inputs. The 38.2% growth in 2005-2006 may be worrying; however, note that (a) we are working from a smaller base and (b) 2006 saw record profits on credit cards. This increase in nominal expenditures reflects a reduction in charge-off rates and an increase in the realized rate of return. Together, these constitute a surge in the price of credit card services which in 2005 were relatively cheap.

Figure 5 shows a graph of quarterly log loan depositor services from the first quarter of 1985 to the second quarter of 2009, under three assumptions: No credit loss adjustment, the adaptive credit loss adjustment, and a

constant credit loss adjustment. In this case, the adaptive credit loss model shows a clearer downturn in the banking industry in 1991-1992 and 2007-2009. These downturns are not apparent in either of the other two series.

Figure 6 shows a graph of quarterly depositor services for all assets and liabilities, during the same time period. Under the proposed methodology, most of the quarterly variation in the output of commercial banks results from variation in depositor services.

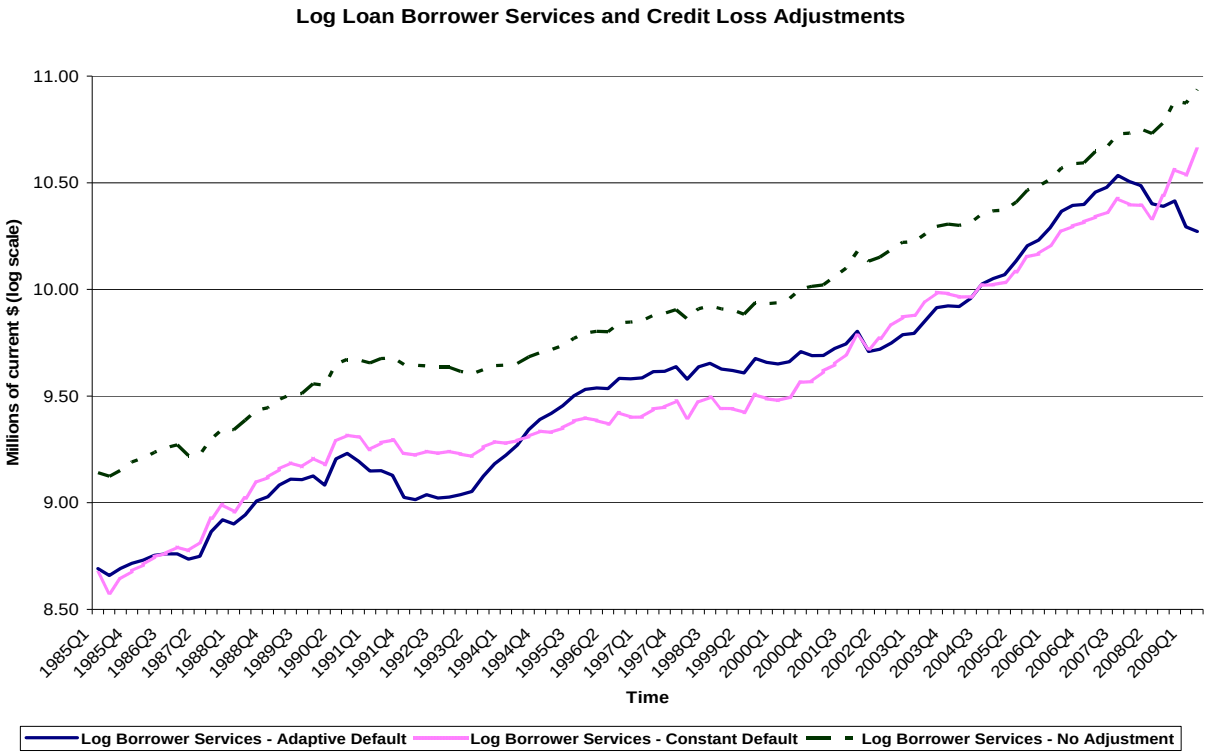

Figure 5: Log loan services with credit loss adjustments: No credit loss adjustment, adaptive credit loss adjustment, and constant rate credit loss adjustment. Source: Federal Reserve Board of Governors' calculations from Call Report data, author's calculations.

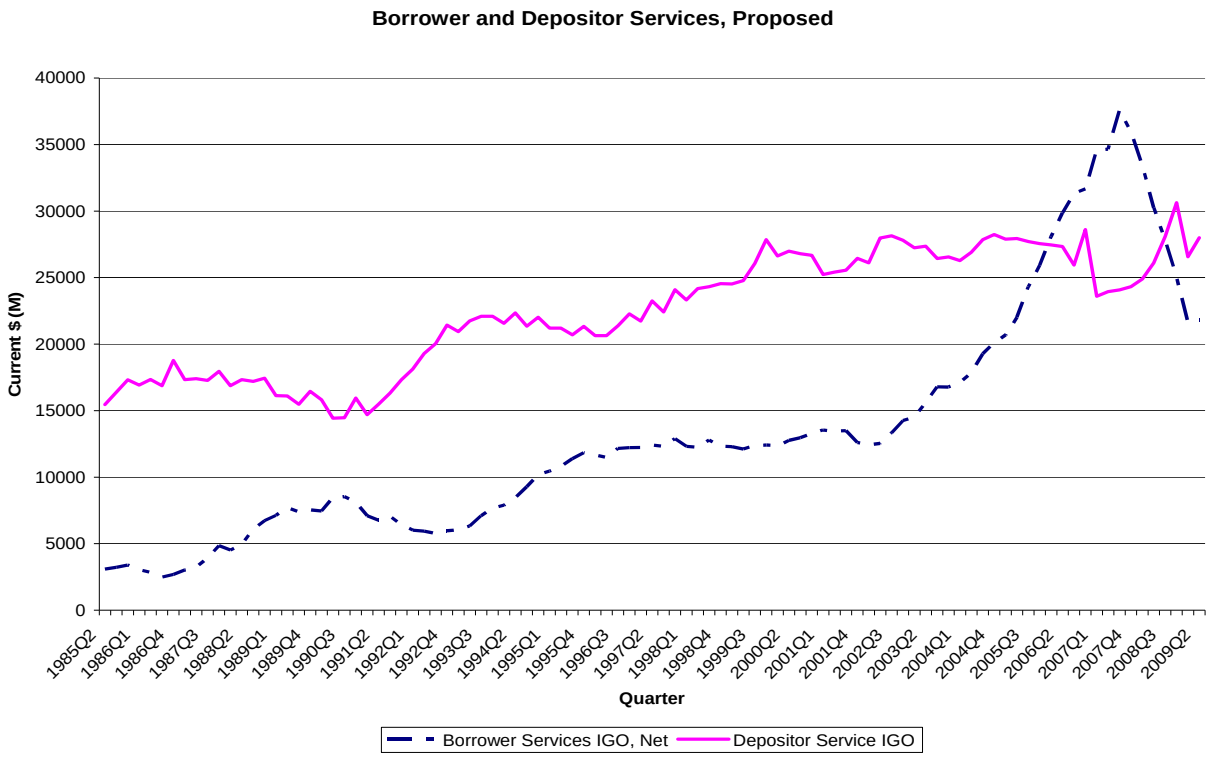

Figure 6: Service flows consumed by borrowers and depositors, net of anticipated default and using stabilized reference rate. Includes service flows from all assets. Source: Federal Reserve Board of Governors tabulations of Call Report data, author's calculations.

Assessing the Estimates

To assess the performance of the alternative methods, the correlations between real GDP growth and growth rates of these estimates (adjusted for growth in prices) are compared. Table 4 reports these correlations, as well as the variances of the different methods for computing bank output. Borrower services computed with the proposed method exhibits a correlation with GDP of 34.6% and a variance of 6.9%. This may be compared with 5.1% and 12.4% respectively for borrower services computed with the current method. Thus, the new method produces a greater co-variation between bank output and GDP, and also lower volatility overall. This is true for both borrower and depositor services. Neither removing charge-offs from output not stabilizing the rate alone can have such an impact.

Table 4: Correlations of real GDP growth with real borrower and depositor services growth computed using various methods. Real borrower and depositor services are deflated with a GDP deflator.

	Correlation with GDP Growth	Variance
Borrower Services IGO		
Current Method	5.1%	12.4%
Stabilized Reference Rate Only[1]	6.6%	3.5%
Remove Charge-offs Only	-3.3%	88.7%
Ref rate stabilized and charge-offs removed	34.6%	6.9%
Depositor Services IGO		
Current Method	-4.7%	8.7%
Ref rate stabilized and charge-offs removed	10.9%	4.9%

1. See appendix A.

VIII. Discussion

The inclusion of expected credit losses in the measure of implicitly-priced borrower services results in an overstatement of bank output. A portion of output that is imputed is derived from a margin that banks charge to indemnify themselves against expected losses in their loan portfolio due to borrower default. This paper proposes a methodology for estimating expected credit losses by loan type, and then removes these losses from imputed output of banks. Over the entire time series, the default margin appears to account for more than a third of interest receipts, suggesting that bank output is being substantially overstated.

In addition, banks appear to increase margins in times of high default, suggesting that measures will overstate bank output growth during downturns. A measure of adaptive default is shown to correct this problem. The adaptive model is simple to implement, has good properties, and enjoys precedent in national accounting.

Output growth from each of these methods may be compared with real GDP growth. Such an exercise shows that adjustment for charge-offs and reference rate stabilization produces the largest positive correlation with real GDP growth. Unless there is compelling evidence that implicit bank output should be countercyclical, this may be taken as evidence of the validity of this approach.

In addition, I have included a discussion of the ways in which defaults and default margins may be incorporated into the SNA, as interest income, current transfers, capital transfers, or other changes in the volume of assets. I have highlighted the advantages and disadvantages of each of these methods. The treatment of these flows determines how the new methodology affects measured business and household primary income, disposable income, saving, net lending, and profits. Which is preferable is a matter for further debate.

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Appendix A

The way the reference rate is calculated in the NIPAs sometimes results in excessive volatility in the split between borrower and depositor services. The problem is helped by basing the reference rate on the rate of return of some asset in the same data set that is used to compute the returns on loans and deposits. This is because the returns that are reported in the data are subject to measurement error from complications related to appropriately adjusting for mergers and acquisitions, particularly when merging banks change their charters so that they fall under a different regulatory agency. If the reference rate is computed from returns that banks report from assets, the same noise will be present in the reference rate data, muting high-frequency spurious variation in the apportionment of services output between borrowers and depositors.

Using a single data set to calculate all the interest rates does not complete solve the volatility problem, however. In practice the NIPAs use returns on federal and agency securities as the reference rate for both loans and deposits. Returns on these securities do not fluctuate with market interest rates in the same way that other assets and liabilities fluctuate. Instead, they tend to exhibit some momentum at turning points in the interest rate environment because they tend to have longer maturities than loans and deposits. Such momentum can cause large spurious fluctuations in relative nominal borrower and depositor services.

The reference rate volatility problem is exacerbated when we adjust loan rates for charge-offs, because this adjustment squeezes the interest rate spread. When the spread is squeezed, the momentum in the reference rate has a leveraged effect on relative borrower and depositor services. To mitigate the additional variability that is introduced by removal of defaults prior to computation of rates of return on loans, the position of the reference rate in between the loan and deposit rates must be smoothed.

Figure 7 shows output of interest-bearing assets and interest-bearing liabilities using the current NIPA methodology, by quarter. Large swings in the relative output are generated by same-direction movements in interest rates of assets and liabilities that are not reflected in the reference rate. This causes the "scissors" effect. Figure 8 shows how this effect may be made worse by the introduction of a charge-off adjustment.

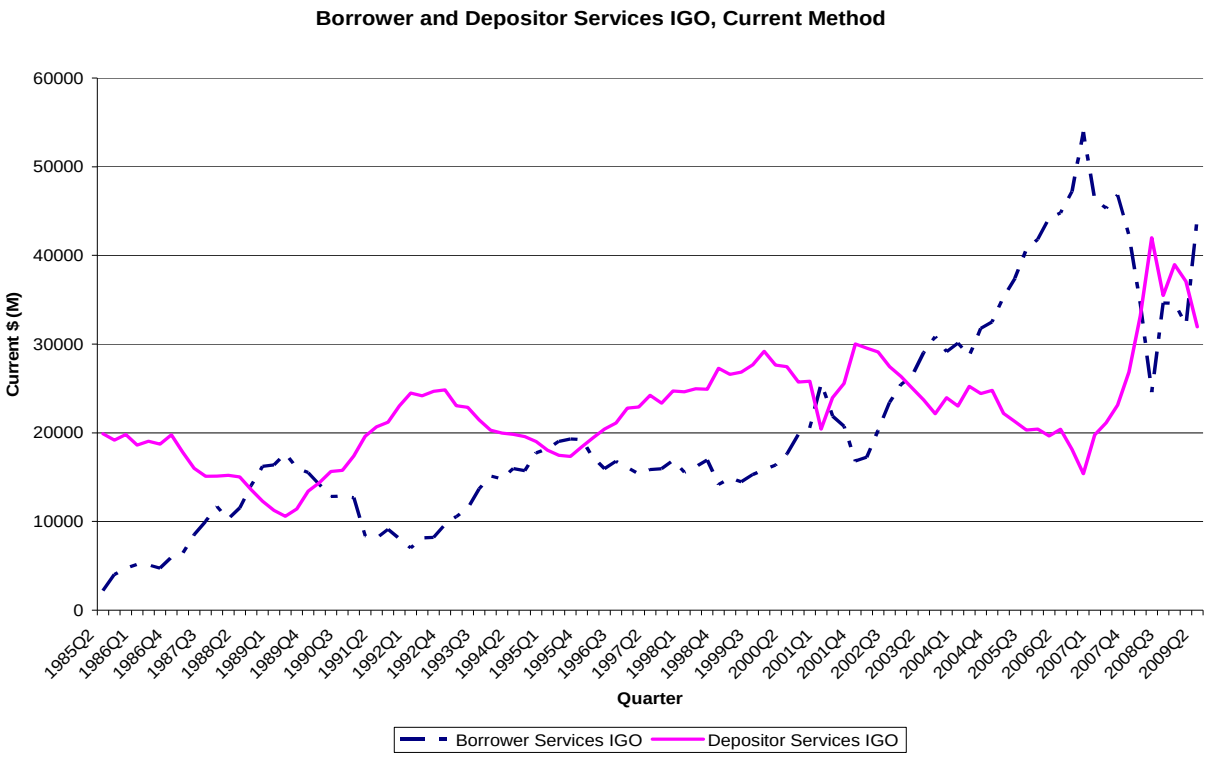

Figure 7: Bank service flows from assets and liabilities using current reference rate methodology, gross of charge-off rates. Source: Federal Reserve Board of Governors' calculations from Call Report data, author's calculations.

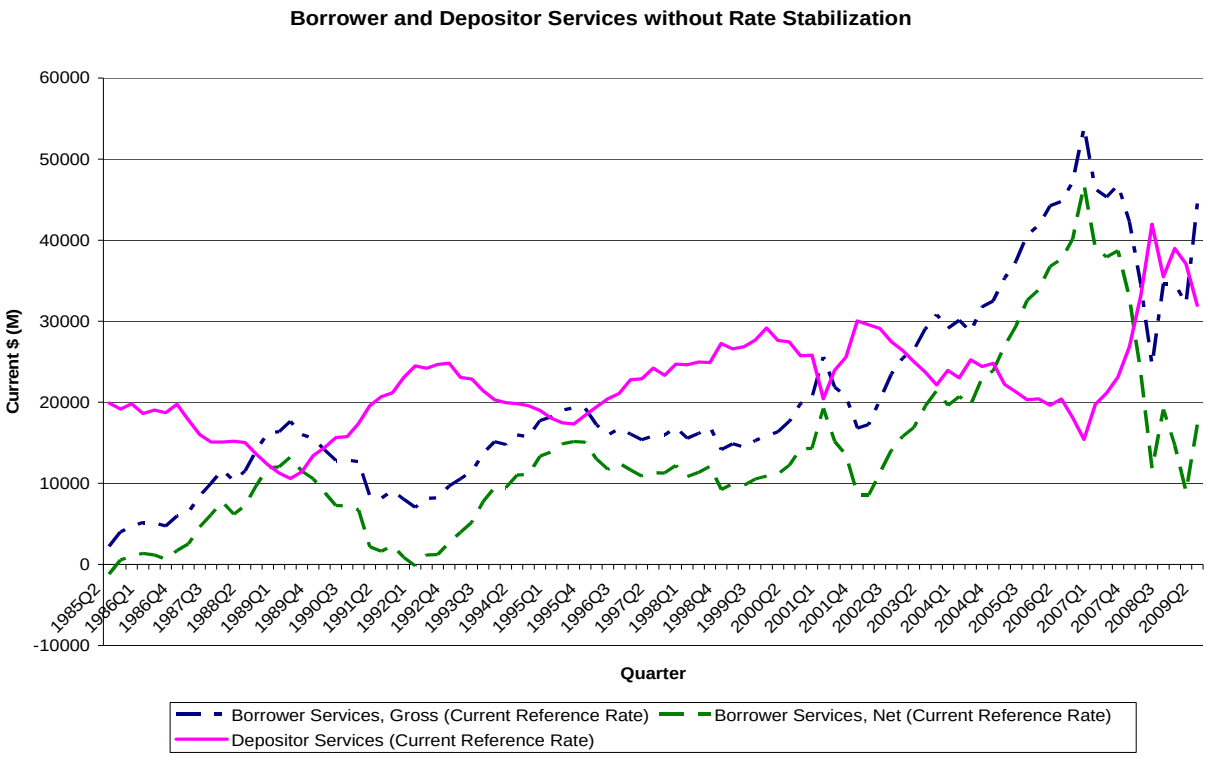

Figure 8: Service flows consumed by borrowers and depositors, both gross and net of anticipated default. Source: Federal Reserve Board of Governors, author's calculations.

Methodology

Instead of employing returns on federal and agency obligations as the reference rate directly, the reference rate can be computed using a stabilized split of borrower and depositor services computed using the return on federal and agency obligations. This split is computed by dividing the current rate on borrower services by the net interest rate, to get the borrower proportion of net interest. A geometrically declining weighted average of this split and the splits in previous periods are used to generate an adjusted split.[19] This adjusted split is then used to compute a reference rate. That is, the split is given by

$$adjsplit_t = adjsplit_{t-1} + \lambda\left(split_t - adjsplit_{t-1}\right).$$

where r_t^{agency} is the return on federal and agency obligations. Then the adjusted split is computed using the adaptive expectations model:

$$split_t = \left(r_t^{loan} - r_t^{agency}\right)/\left(r_t^{asset} - r_t^{deposit}\right).$$

Finally, the adjusted split is used to reconstitute the reference rate

$$r_t^{ref} = r_t^{loan} - adjsplit_t\left(r_t^{loan} - r_t^{deposit}\right).$$

The reference rate of interest computed in this way matches the fluctuations in the cost of funds, while stabilizing the split between borrower and depositor services. The disadvantage of this approach is that it creates a lag in the timing of shifts in the reference rate. I argue below, however, that such a timing mismatch is unlikely to be very noticeable.

This procedure is done on a quarterly basis; the annual reference rate is computed from the product of the four quarterly adjusted reference rates. As in Chen and Fixler (2003), there are several ways to approach choosing a value for the parameter λ. These include minimizing the average one-period-ahead squared prediction error, for example. This paper does not go into any detail regarding the choice of λ, but simply chooses a value of 0.1 – close to the one chosen by Chen and Fixler (2003) – that provides a smooth appearance of the reference rate.

The reference rate smoothed in this way avoids to a large degree the problem of momentum that was mentioned above. Any changes in the return on treasury and agency obligations will have only a minor effect on the split between borrower and depositor services. However, long-term shifts will appear. Figure 9 shows the reference rate under both methodologies, by quarter. Here, high-frequency variations in the asset and liability rates are mirrored in the stabilized reference rate.

This methodology does have some drawbacks. If the short-run changes in the reference rate vis-à-vis borrower and depositor rates have economic meaning, they will be ignored or at least substantially muted, and the reference rate will exhibit a lag in the timing of such shifts. In this case, the methodology is sacrificing precision for smoothness. Changes in the net interest margin may sometimes result from changes in the margin that banks receive

[19] This is the adaptive expectations model. See Chen and Fixler (2003) for a discussion of how it is applied to non-life insurance.

on one of assets or liabilities, but not the other. Substantial credit losses may squeeze margins on loans without affecting deposit margins, for example. Such shifts will not be captured if the reference rate is stabilized.

Nevertheless, it seems unlikely that high-frequency shifts in the reference rate reflect changes in the allocation of measured bank output from depositor to borrower services or *vice versa*. I have argued that substantial momentum appears in the reference rate, causing shifts in its relative position between borrower and depositor rates; if there is a lag in changes in the reference rate due either to incomplete marking to market or to the maturity structure of agency securities, changes in the relative position of the reference rate will be spurious. Such spurious fluctuations are likely to swamp any short-run fluctuations in the relative reference rate that do contain useful information. Moreover, even if margins on one type of asset or liability are shifting, it is not clear that lower or higher margins on this particular asset should affect our estimate of its contribution to bank output. The margins on many of the assets and liabilities on banks' books represent remuneration for services provided over the long term; short-run fluctuations in the margin that banks receive on one type of asset probably do not cause large shifts in the amount of activity that is involved in the generation of that output. In addition, the concept of intermediation services relates to the idea that banks are connecting depositors with borrowers, both of which are needed for intermediation services to be meaningful. Banks may subsidize one or the other when margins are squeezed. Finally, the picture of depositor and borrower service "scissors" under current methods suggests that the fluctuations in the relative rates are spurious.

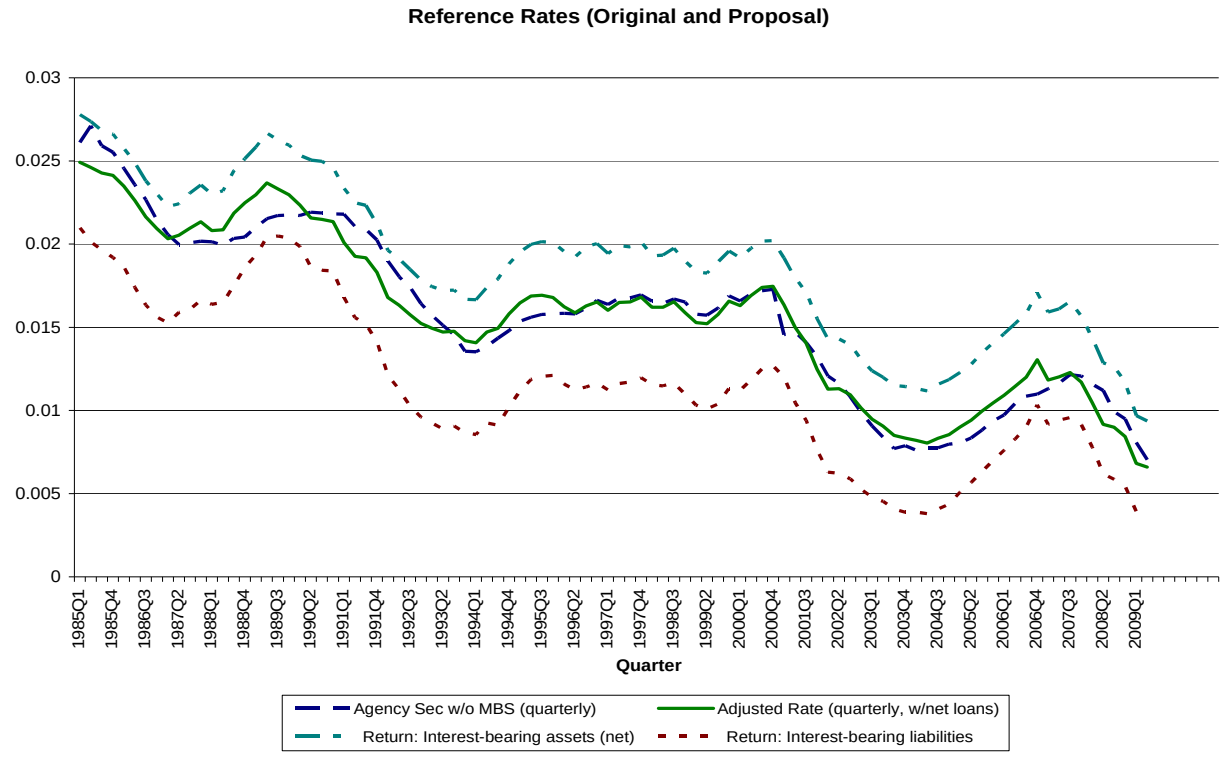

Figure 9: Reference rate, stabilized and not stabilized. Source: Federal Reserve Board of Governors, author's calculations.

Results

Figure 10 shows a direct comparison of three methods. These are the current method, the method using net interest rates, and the proposed method. The effect on volatility is obvious when the direct comparison is made. When the rate is stabilized but no charge-off adjustment is made, the resulting series is much smoother than the original. The charge-off adjustment allows measured output to better match cyclical fluctuations.

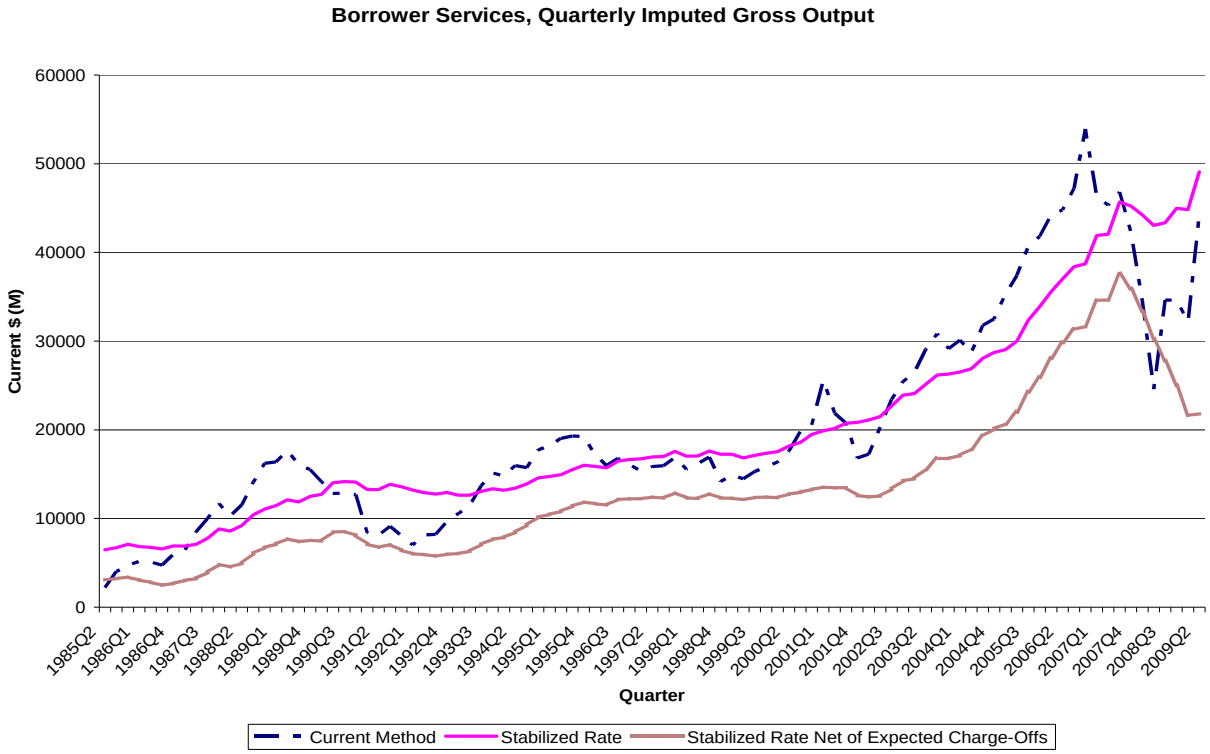

Figure 10: Direct comparison of methods for computing borrower services. Current method, gross borrower services with rate stabilization, and net borrower services with rate stabilization. Source: Federal Reserve Board calculations from Call Report data, author's calculations.

Appendix B

On the following pages are SNA-style tables showing the effect of the proposed treatments on the sequence of accounts. In each of these, the changes from the previous table are highlighted in yellow. These use 2008 numbers, and represent changes from current NIPA methodology.

Treatment 1: Default margin is included in interest, credit losses are excluded from transaction accounts. The changes reduce bank value added, increase other businesses' value added, reduce household income, reduce household consumption expenditure, do not affect enterpreneurial income of any party, do not affect saving of any party, do not affect net lending of any party, and do not affect other flows

Production account

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Output	0	0	-59,188	-59,188
-33,967	0	-33,967	0	Intermediate consumption				
-25,221	-59,188	33,967	0	*Value added*				

Generation of income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Valued added	0	33,967	-59,188	-25,221
-25,221	-59,188	33,967	0	*Operating surplus*				

Allocation of primary income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Operating surplus	0	33,967	-59,188	-25,221
59,188	0	33,967	25,221	Property income	0	0	59,188	59,188
59,188	0	33,967	25,221	Interest	0	0	59,188	59,188
-25,221	0	0	-25,221	*Balance of primary incomes*				

Primary distribution of income - entrepreneurial income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Operating surplus	0	33,967	-59,188	-25,221
33,967	0	33,967	0	Property Income	0	0	59,188	59,188
33,967	0	33,967	0	Interest	0	0	59,188	59,188
0	0	0	0	*Entrepreneurial income*				

Secondary allocation of income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Balance of primary incomes	-25,221	0	0	-25,221
0	0	0	0	Other Current Transfers	0	0	0	0
-25,221	0	0	-25,221	*Disposable income*				

Use of disposable income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Disposable income	-25,221	0	0	-25,221
-25,221	0	0	-25,221	Final Consumption Expenditure	0	0	0	0
0	0	0	0	*Saving*				

Capital account

Changes in assets					Changes in liabilities and net worth			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Saving	0	0	0	0
				Capital transfers, receivable	0	0	0	0
				Capital transfers, payable	0	0	0	0
0	0	0	0	*Net lending (+) / net borrowing (-)*				

Other changes in volume of assets

Changes in assets					Changes in liabilities and net worth			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
0	0	0	0	Financial assets and liabilities	0	0	0	0
				Changes in net worth due to other changes in volume of assets	0	0	0	0

Notes

1. Revisions compared to current approach, 2008, millions of current U.S. dollars.
2. Rows that are always zero are omitted.
3. Assumptions: All services from credit cards and personal loans are for final consumption. All other loan services are used as intermediate inputs.

Treatment 2: Default margin is included in interest, actual credit losses are capital transfers. Compared to treatment 1, these changes increase net lending of households and other businesses and reduce net lending of banks; the effects on net lending are of the magnitude of *actual* defaults.

Production account

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Output	0	0	-59,188	-59,188
-33,967	0	-33,967	0	Intermediate consumption				
-25,221	-59,188	33,967	0	*Value added*				

Generation of income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Valued added	0	33,967	-59,188	-25,221
-25,221	-59,188	33,967	0	*Operating surplus*				

Allocation of primary income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Operating surplus	0	33,967	-59,188	-25,221
59,188	0	33,967	25,221	Property income	0	0	59,188	59,188
59,188	0	33,967	25,221	Interest	0	0	59,188	59,188
-25,221	0	0	-25,221	*Balance of primary incomes*				

Primary distribution of income - entrepreneurial income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Operating surplus	0	33,967	-59,188	-25,221
33,967	0	33,967	0	Property Income	0	0	59,188	59,188
33,967	0	33,967	0	Interest	0	0	59,188	59,188
0	0	0	0	*Entrepreneurial income*				

Secondary allocation of income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Balance of primary incomes	-25,221	0	0	-25,221
0	0	0	0	Other Current Transfers	0	0	0	0
-25,221	0	0	-25,221	*Disposable income*				

Use of disposable income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Disposable income	-25,221	0	0	-25,221
-25,221	0	0	-25,221	Final Consumption Expenditure	0	0	0	0
0	0	0	0	*Saving*				

Capital account

Changes in assets					Changes in liabilities and net worth			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Saving	0	0	0	0
				Capital transfers, receivable	31,501	66,760	0	98,261
				Capital transfers, payable	0	0	-98,261	-98,261
0	-98,261	66,760	31,501	*Net lending (+) / net borrowing (-)*				

Other changes in volume of assets

Changes in assets					Changes in liabilities and net worth			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
98,261	98,261	0	0	Financial assets and liabilities	31,501	66,760	0	98,261
				Changes in net worth due to other changes in volume of assets	-31,501	-66,760	98,261	0

Notes

1. Revisions compared to current approach, 2008, millions of current U.S. dollars.
2. Rows that are always zero are omitted.
3. Assumptions: All services from credit cards and personal loans are for final consumption. All other loan services are used as intermediate inputs.

Treatment 3: Default margin is included in interest, anticipated credit losses are capital transfers. Compared to treatment 2, these changes affect net lending differently; the effects on net lending are now of the magnitude of *anticipated* defaults, rather than actual defaults. Because of this, other changes are also affected.

Production account

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Output	0	0	-59,188	-59,188
-33,967	0	-33,967	0	Intermediate consumption				
-25,221	-59,188	33,967	0	*Value added*				

Generation of income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Valued added	0	33,967	-59,188	-25,221
-25,221	-59,188	33,967	0	*Operating surplus*				

Allocation of primary income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Operating surplus	0	33,967	-59,188	-25,221
59,188	0	33,967	25,221	Property income	0	0	59,188	59,188
59,188	0	33,967	25,221	Interest	0	0	59,188	59,188
-25,221	0	0	-25,221	*Balance of primary incomes*				

Primary distribution of income - entrepreneurial income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Operating surplus	0	33,967	-59,188	-25,221
33,967	0	33,967	0	Property Income	0	0	59,188	59,188
33,967	0	33,967	0	Interest	0	0	59,188	59,188
0	0	0	0	*Entrepreneurial income*				

Secondary allocation of income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Balance of primary incomes	-25,221	0	0	-25,221
0	0	0	0	Other Current Transfers	0	0	0	0
-25,221	0	0	-25,221	*Disposable income*				

Use of disposable income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Disposable income	-25,221	0	0	-25,221
-25,221	0	0	-25,221	Final Consumption Expenditure	0	0	0	0
0	0	0	0	*Saving*				

Capital account

Changes in assets					Changes in liabilities and net worth			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Saving	0	0	0	0
				Capital transfers, receivable	25,221	33,967	0	59,188
				Capital transfers, payable	0	0	-59,188	-59,188
0	-59,188	33,967	25,221	*Net lending (+) / net borrowing (-)*				

Other changes in volume of assets

Changes in assets					Changes in liabilities and net worth			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
59,188	59,188	0	0	Financial assets and liabilities	25,221	33,967	0	59,188
				Changes in net worth due to other changes in volume of assets	-25,221	-33,967	59,188	0

Notes

1. Revisions compared to current approach, 2008, millions of current U.S. dollars.
2. Rows that are always zero are omitted.
3. Assumptions: All services from credit cards and personal loans are for final consumption. All other loan services are used as intermediate inputs.

Treatment 4: Default margin is included in interest, anticipated credit losses are current transfers. Compared to treatment 3, these changes increase saving of households and other business; the effects on saving are of the magnitude of *anticipated* defaults. They also increase disposable income of households and other businesses, and reduce bank disposable income.

Production account

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Output	0	0	-59,188	-59,188
-33,967	0	-33,967	0	Intermediate consumption				
-25,221	-59,188	33,967	0	*Value added*				

Generation of income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Valued added	0	33,967	-59,188	-25,221
-25,221	-59,188	33,967	0	*Operating surplus*				

Allocation of primary income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Operating surplus	0	33,967	-59,188	-25,221
59,188	0	33,967	25,221	Property income	0	0	59,188	59,188
59,188	0	33,967	25,221	Interest	0	0	59,188	59,188
-25,221	0	0	-25,221	*Balance of primary incomes*				

Primary distribution of income - entrepreneurial income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Operating surplus	0	33,967	-59,188	-25,221
33,967	0	33,967	0	Property Income	0	0	59,188	59,188
33,967	0	33,967	0	Interest	0	0	59,188	59,188
0	0	0	0	*Entrepreneurial income*				

Secondary allocation of income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Balance of primary incomes	-25,221	0	0	-25,221
0	59,188	0	0	Other Current Transfers	25,221	33,967	0	0
-25,221	-59,188	33,967	0	*Disposable income*				

Use of disposable income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Disposable income	0	33,967	-59,188	-25,221
-25,221	0	0	-25,221	Final Consumption Expenditure	0	0	0	0
0	-59,188	33,967	25,221	*Saving*				

Capital account

Changes in assets					Changes in liabilities and net worth			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Saving	25,221	33,967	-59,188	0
				Capital transfers, receivable	0	0	0	0
				Capital transfers, payable	0	0	0	0
0	-59,188	33,967	25,221	*Net lending (+) / net borrowing (-)*				

Other changes in volume of assets

Changes in assets					Changes in liabilities and net worth			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
59,188	59,188	0	0	Financial assets and liabilities	25,221	33,967	0	59,188
				Changes in net worth due to other changes in volume of assets	-25,221	-33,967	59,188	0

Notes

1. Revisions compared to current approach, 2008, millions of current U.S. dollars.
2. Rows that are always zero are omitted.
3. Assumptions: All services from credit cards and personal loans are for final consumption. All other loan services are used as intermediate inputs.

Treatment 5: Default margin is included in current transfers, anticipated credit losses are current transfers. Compared to treatment 4, these changes reduce bank enterpreneurial income and increase other businesses' entrepreneurial income. They also increase other businesses' primary income, reduce bank primary income, and increase household primary income.

Production account

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Output	0	0	-59,188	-59,188
-33,967	0	-33,967	0	Intermediate consumption				
-25,221	-59,188	33,967	0	*Value added*				

Generation of income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Valued added	0	33,967	-59,188	-25,221
-25,221	-59,188	33,967	0	*Operating surplus*				

Allocation of primary income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Operating surplus	0	33,967	-59,188	-25,221
0	0	0	0	Property income	0	0	0	0
0	0	0	0	Interest	0	0	0	0
-25,221	-59,188	33,967	0	*Balance of primary incomes*				

Primary distribution of income - entrepreneurial income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Operating surplus	0	33,967	-59,188	-25,221
0	0	0	0	Property Income	0	0	0	0
0	0	0	0	Interest	0	0	0	0
-25,221	-59,188	33,967	0	*Entrepreneurial income*				

Secondary allocation of income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Balance of primary incomes	0	33,967	-59,188	-25,221
0	59,188	33,967	25,221	Other Current Transfers	25,221	33,967	59,188	0
-25,221	-59,188	33,967	0	*Disposable income*				

Use of disposable income

Uses					Resources			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Disposable income	0	33,967	-59,188	-25,221
-25,221	0	0	-25,221	Final Consumption Expenditure	0	0	0	0
0	-59,188	33,967	25,221	*Saving*				

Capital account

Changes in assets					Changes in liabilities and net worth			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
				Saving	25,221	33,967	-59,188	0
				Capital transfers, receivable	0	0	0	0
				Capital transfers, payable	0	0	0	0
0	-59,188	33,967	25,221	*Net lending (+) / net borrowing (-)*				

Other changes in volume of assets

Changes in assets					Changes in liabilities and net worth			
Economy	Banks	Other businesses	HH	Transactions and balancing items	HH	Other businesses	Banks	Economy
59,188	59,188	0	0	Financial assets and liabilities	25,221	33,967	0	59,188
				Changes in net worth due to other changes in volume of assets	-25,221	-33,967	59,188	0

Notes

1. Revisions compared to current approach, 2008, millions of current U.S. dollars.
2. Rows that are always zero are omitted.
3. Assumptions: All services from credit cards and personal loans are for final consumption. All other loan services are used as intermediate inputs.