

Measuring the Services of Commercial Banks in the NIPAs

Changes in Concepts and Methods

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AS part of the comprehensive revision of the national income and product accounts (NIPAs) scheduled for release on December 10, 2003, a definitional change will be introduced that recognizes the implicit services of commercial banks to borrowers. This change is briefly described in the June 2003 issue of the SURVEY OF CURRENT BUSINESS, and some associated table changes are described in the August 2003 issue.¹ This article provides a more detailed explanation of the new measure of banking output and its effect on the NIPAs.

The revised measures of banks' implicit financial services will improve the consistency of the NIPAs with the recommendations for the treatment of banks in the 1993 System of National Accounts (SNA), the principal international guidelines for national accounts.² The Bureau of Economic Analysis (BEA) continues to be a leader in incorporating major innovations of the SNA, such as chain-type indexes and the recognition of software as investment. For banking, the SNA recommends measuring implicit financial services to depositors using the difference between a risk-free "reference rate" and the average interest rate paid to depositors, and it recommends measuring implicit services to borrowers using the difference between the average interest rate paid by borrowers and the reference rate. To implement this approach, BEA will measure the reference rate by the average rate earned by banks on U.S. Treasury and U.S. agency securities. Measured in this way, the reference rate is consistently above the average rate of interest paid to depositors and consistently below the average rate of interest paid by borrowers.

1. Brent R. Moulton and Eugene P. Seskin, "Preview of the 2003 Comprehensive Revision of the National Income and Product Accounts: Changes in Definitions and Classifications" SURVEY OF CURRENT BUSINESS 83, June 2003: 24–27; and Nicole Mayerhauser, Shelly Smith, and David F. Sullivan, "Preview of the 2003 Comprehensive Revision of the National Income and Product Accounts: New and Redesigned Tables" SURVEY OF CURRENT BUSINESS 83, August 2003: 21.

2. Commission of the European Communities, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, and World Bank, *System of National Accounts 1993* (Brussels/Luxembourg, New York, Paris, and Washington, DC, 1993).

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Background

How to value bank output has been a topic of much discussion in the national accounts literature because banks do not explicitly charge for all the financial services that they provide, relying instead on net receipts of interest for much of their revenue. In national income accounting, interest payments are generally treated as a distribution of income by businesses to investors who have provided them with funds, not as a payment for services. In particular, the domestic portion of the "net interest" component of national income is defined as interest paid by private business less interest received by private business. Applied to banks, the usual treatment of interest flows would yield a negative contribution to national income. Moreover, much of the value of the services that banks provide to their customers would be missed by the NIPAs. To avoid these results, an imputation for implicit financial services produced by banks is included in the NIPAs. Depositors purchase these implicit services with imputed interest income that eliminates the gap between the total interest received by banks and the total interest paid by banks.³

The view that all the implicit services of banks go to depositors is based on the notion that depositors are the ultimate lenders and that the net interest belongs to them. This view, however, does not adequately account for the implicit services of commercial banks to borrowers in their role as financial intermediaries. In that role, banks transform deposits into earning assets by providing many financial services. In particular, banks provide services related to the provision of credit that overcome problems of asymmetric information and that transfer risk to the bank. Banks devote staff time and other resources both to activities that serve depositors, such as clearing checks, and to activities that serve borrowers, such as making loan-underwriting decisions. Historically, banks were virtually the only source of credit to many households and businesses, and burgeoning needs for credit services were a major

3. Many European countries currently treat the implicit financial services of banks as an intermediate input to a fictitious sector, thereby keeping them out of GDP.

impetus for growth of this industry. Accordingly, a measure of bank output should reflect borrower services along with depositor services.

Interest margins as values of implicit services of banks

By treating banks' net interest income as imputed sales of services, the NIPAs recognize that adjustments to interest rates are substitutes for explicit fees to cover the cost of providing services to bank customers. If the reference rate represents the rate that banks earn on their investments after deducting expenses of providing services to borrowers, banks could, in principle, charge depositors explicitly for services and pay them the reference rate of interest. Similarly, banks could charge borrowers explicitly for services that they receive and reduce the rate of interest on loans to the reference rate. Indeed, over the last two decades banks have substituted fee income for net interest income: In 1980, net receipts of interest constituted 80 percent of commercial banks' gross income (which does not reflect taxes, noninterest expenses, loan-loss provisions, and gains or losses on sales of securities), but in 2000, they constituted 58 percent of banks' gross income.⁴ Therefore, the exclusion of implicitly priced services would result in a substantial overstatement of banks' output growth.

Rather than offsetting lower net interest margins by higher revenue from fees for services, banks with low net interest margins may simply provide fewer services. In these cases, interest rate differentials represent an implicit price for financial services. For example, in 2002, an Internet bank with limited services paid an average rate of 4 percent on deposits while small conventional banks paid an average rate of 3 percent.⁵ Depositors who chose the lower average deposit rate in order to obtain more services from a conventional bank thus paid an implicit price of 1 percent per year for those services.

Taking this logic one step further, depositors could dispense with the services of a bank entirely and keep their money in securities paying the reference rate of interest. Depositors who forego the opportunity to earn the reference rate in order to obtain the services of a bank choose to pay an implicit price for depositor services equal to the margin between the reference rate and the deposit rate.

4. The percentages are calculated from data from the Federal Deposit Insurance Corporation at <www2.fdic.gov/hsoe>. The growth of fee income partly reflects banks' entry into new kinds of activities, but the trend predates the repeal in 1999 of the Glass-Steagall Act's restrictions on bank activities.

5. This example is based on individual bank data at <www3.fdic.gov/idas/main.asp>.

The reference rate also represents an opportunity cost in the banks' investment decisions. If a highly liquid security with no credit risk is available to banks, the banks forego the opportunity to earn this security's rate of return—assumed to be the reference rate—when they invest in loans instead. The spread between this reference rate of return and the lending rate is the implicit price that the bank receives for providing financial services to borrowers, which include the cost of bearing risk. The spread must equal the marginal cost of providing borrower services if the bank is indifferent at the margin between investing in the reference-rate asset and investing in higher yielding loans. In a marketplace where competition keeps loans from being priced at levels that yield economic profits (profits in excess of a normal return on capital), we can expect an equilibrium where banks are indifferent between investment opportunities at the margin.

Borrowers from banks are willing to pay a margin over the reference rate because they require or want lender services that issuers of credit-market instruments bearing the reference rate of interest do not receive. For many, borrowing in capital markets is very costly or impossible because of the problems of asymmetric information noted earlier, and liquidating financial assets as an alternative to borrowing is also impossible. However, for marginal loan customers, liquidating assets that earn the reference rate or borrowing at approximately the reference rate in capital markets are alternative ways to obtain needed funds. In particular, both household and business borrowers often choose to hold financial assets when they could liquidate those assets and reduce their loan balances. For the marginal users of the borrowed funds, the difference between the loan rate and the reference rate represents the net marginal cost borne by borrowers for liquidity management, inducing the bank to accept their risk, and for any other services provided by the lender. This difference can therefore be viewed as an implicit price paid for credit services.

Finally, if the bank's net return on investments funded by deposits equals the reference rate, then the implicit price that the bank receives for providing services to depositors equals the spread between the reference rate and the rate paid on deposits. This spread equals the marginal cost of providing services to depositors if the bank is indifferent to marginal changes in amounts on deposit. In the short run, regulatory constraints on a bank's growth based on the amount of its equity capital could prevent it from accepting deposits until it reaches the point of indifference; however, in a longrun competitive equilibrium for the industry, deposit rates will just permit banks to cover

their costs. In addition, large banks that are perceived as very safe are able to borrow at approximately the reference rate in securities markets, thereby avoiding the costs of providing services to depositors. If these banks are indifferent at the margin between raising funds from depositors and raising funds in securities markets, the spread between the reference rate and the rate paid on deposits must approximately equal the marginal cost of providing services to depositors.

Theoretical framework

According to the "user cost of money" framework set out in Donovan (1978), Diewert (1974), and Barnett (1978) and applied to banking by Hancock (1985), Fixler (1993), and Fixler and Zieschang (1999), the reference rate plays an important role in models of economic decisionmaking by banks. The user cost of financial assets is an extension of a concept originally developed for nonfinancial assets. In a competitive marketplace where renting out a fixed capital asset yields economic profits of zero, the rental payment or user cost, uc_t , must equal the difference between the starting value of the asset, p_t , and the present value of the asset at reference rate of interest, r_r , at the end of the rental period, or $p_{t+1}/(1+r_r)$. If the growth rate of the asset's value from period t to period $t+1$ reflects depreciation, δ_t , and an expected rate of increase in asset prices of π_t , then substituting into the equation $uc_t = (p_t - p_{t+1})/(1+r_r)$ yields:

$$(1) \quad uc_t = p_t [1 - (1 + \pi_t - \delta_t)/(1 + r_r)] \\ = p_t (r_r - \pi_t + \delta_t)/(1 + r_r).$$

Alternatively, if uc_t is to be paid at the end of the period, then $uc_t = p_t(r_r - \pi_t + \delta_t)$. A parallel expression for a user cost formula for a financial asset with a rate of return of r_A would equal the difference between its immediate cash value in period t , assumed to be y_{At} , and the present value of selling the asset for an expected price of $y_{At+1} = (1 + \pi_t) y_{At}$ in period $t+1$ after receiving income of $r_A y_{At}$. Here, π_t represents both changes in asset prices and, if the asset is a debt instrument, expected changes in value due to creditworthiness developments. On the assumption that the opportunity is available to earn a rate of r_r on an asset that requires no costly services to the borrower, including the bearing of credit risk, r_r measures the banks' opportunity cost of financial capital.⁶ Hence r_r can be used as the discount rate to calculate the present value of the future cash flows. The user cost of holding an

6. Barnett (1978) describes the reference rate as a minimum rate of return that accounts for risk, but most applications of the reference rate, including the 1993 SNA, view it as a risk-free rate.

asset with a rate of return of r_A then becomes:⁷

$$(2) \quad y_{At} \left[1 - \frac{1 + r_A + \pi_t}{1 + r_r} \right] = y_{At} \left[\frac{r_r - r_A - \pi_t}{1 + r_r} \right].$$

A modified version of the user cost expression on the right-hand side of equation (2) can be used to measure the implicit services associated with financial assets of banks, such as loans. This version of the user cost formula omits π_t , which represents expected net holding gains. Changes in the market value of a debt instrument usually have no effect on the value of the liability recognized by the debtor, and the NIPAs must treat the creditor and the debtor symmetrically. More importantly, holding gains and losses are excluded from the concept of income measured by the national accounts, which is limited to the income that originates from current production of goods and services. Since credit losses can be treated as a kind of holding loss, the effect of omitting π_t is significant.⁸

The user cost formula in equation (2) assumes that interest is paid at the end of the period and that the asset and its user cost are valued at the beginning of the period. In practice, interest flows occur throughout the year, and measures of economic activity usually do not use beginning-of-year present values for sales that occur at different times over the course of the year. An alternative formula that values the user cost as of the end of the period is consistent with these practices. The end-of-period expression for the user cost of financial assets is $r_r - r_A$ (or, if the holding gains term is included, $r_r - r_A - \pi_t$). In implementing the revised treatment of banks, average interest rates will be calculated as ratios of interest accrued throughout the year to the average value of assets over the course of the year. In effect, these procedures adopt a mid-year perspective to value both interest payments and assets, using a simple sum of interest accruals to approximate a sum of interest accruals that are discounted to the middle of the year. The product of the interest rates and the asset values equals the total interest accrued over the course of the year.

Typically, banks' financial assets have negative user costs and their liabilities have positive user costs because the rate of the return on assets usually exceeds

7. Barnett (1978) uses a different approach to derive equation (2). He considers a consumer who maximizes life cycle utility subject to a set of budget constraints that the change in wealth in any period equals current income received minus current expenditures and who is able to invest in an instrument that earns the reference rate of return.

8. Since 1974, commercial banks' provision for credit losses has usually ranged from about 10 percent to about 20 percent of their net interest income. These ratios are calculated using data from the Federal Deposit Insurance Corporation, available at <www2.fdic.gov/hsob>. Realized net credit losses have been slightly lower than provisions for credit losses, partly because of timing differences and survivorship bias.

the reference rate, which in turn exceeds the rate paid on liabilities. To make the signs more intuitive for our purposes, the *user-cost price* of an asset is defined as the negative of the user cost, and the user-cost price of a liability is defined as its user cost. As a result, whenever a financial product contributes positively to economic profits, its price is positive. Because holding gains or losses are not part of the national accounts concept of current production, the term in the user cost expression for expected holding gains or losses is omitted from the user-cost price. The arbitrary asset i then has a user-cost price of:

$$(3) \quad p_{A_i} = r_{A_i} - r_r$$

For liability products, the user-cost price is

$$(4) \quad p_{L_i} = r_r - r_{L_i}$$

These user-cost price formulas do not include a term for service charges and other fees to borrowers or to depositors. For modeling economic decisionmaking by banks, fees to borrowers and to depositors should be included in user-cost prices, but for measuring banks' implicit sales of services, they should be treated as explicit sales.

Effect on the measure of imputed output

User cost of "own funds." The gross output of banks consists of explicit sales of services, which are booked as fee income, and implicit sales of services, which are currently measured by banks' net interest income, or $\sum_i r_{A_i} y_{A_i} - \sum_i r_{L_i} y_{L_i}$. Although the most important effect of the revised treatment of the implicitly priced services is the division of their value between borrowers and depositors, the revised treatment also reduces the total measure of implicit services. This reduction occurs because the difference between the total value of loans and other interest-earning assets and the total value of deposits and other interest-bearing liabilities is generally positive. The SNA terms this difference "own funds" because banks use their own funds to acquire the assets whose acquisition is not funded by the issuance of liabilities. Own funds represent stockholders' equity that is held in financial assets, or money furnished directly or indirectly (via retained earnings) by the banks' stockholders.⁹

To show how the lending of banks' own funds affects the revised measure of implicit financial services, express the total imputed output of banks, V , as the user-cost price of assets times the volume of assets plus

9. However, the measure of banks' lending of own funds differs from the accounting entry for stockholders' equity on banks' balance sheets because own funds do not reflect all the assets and liabilities reflected in stockholders' equity.

the user-cost price of liabilities times the volume of liabilities, or:

$$(5) \quad V = \sum_i p_{A_i} y_{A_i} + \sum_i p_{L_i} y_{L_i} \\ = \sum_i (r_{A_i} - r_r) y_{A_i} + \sum_i (r_r - r_{L_i}) y_{L_i}.$$

In the last line of equation (5), the first term represents the value of implicitly priced services that the bank provides to borrowers, and the second term in equation (5) shows the value of the implicitly priced services that it provides to depositors and other lenders to the bank. A rearrangement of the terms in equation (5) reveals that V equals the current NIPA measure of imputed output minus the user cost of the own funds used to acquire assets:

$$(6) \quad V = [\sum_i r_{A_i} y_{A_i} - \sum_i r_{L_i} y_{L_i}] - r_r [\sum_i y_{A_i} - \sum_i y_{L_i}].$$

The difference between the current measure of banks' imputed output and the revised measure equals the user cost of the assets acquired with banks' own funds. When a bank lends its own funds instead of funds from depositors, it does not need to use a portion of interest that it receives to cover the cost of providing services to depositors. Hence, less of the interest received from the borrower represents implicit fees for services and more of it represents net interest income earned by the bank. The measure of imputed output is reduced by an amount that is broadly consistent with an SNA recommendation that the return to lending of own funds be excluded from imputed output.¹⁰

Defining assets and liabilities. The measure of own funds in equation (6) is sensitive to which types of assets and liabilities are included. Arguments are sometimes made that only loans and deposits should be counted because banks have no control over other interest rates. However, BEA's measures of imputed bank output reflect all bank assets and liabilities that earn interest or imputed interest. (Imputed interest is earned by deposits.) As a result, substitution by banks between different types of assets, or between different types of liabilities, does not directly affect the measure of imputed output. For example, loans rose from about one-third of financial assets in 1951 to about two-thirds of financial assets in 2001, while deposits fell from almost 100 percent of liabilities to about 70 percent of liabilities.

Inclusion of all interest-bearing assets and liabilities also results in a better estimate of own funds used for lending. In particular, banks generally have more deposits than loans, so if only these items were counted, the estimate of own funds would generally be negative. Negative own funds result in estimates of imputed

10. SNA 1993, paragraph 6.125.

output that exceed the net interest received by banks. Since the justification for imputed output rests on net interest being a substitute for fee income, imputed output that is not "paid for" by net interest is hard to justify.

A narrow definition of assets that excludes amounts loaned to other banks or deposited at other banks can also lead to inconsistencies. The estimate of the gross output delivered to the customers of the banking industry should equal the value that could be calculated from a consolidated balance sheet for the industry, which would net out assets and liabilities that represent claims of one bank on another bank. For example, federal funds and repurchase agreements (which are combined in the data sources used for the estimates) are reported both as assets and as liabilities by banks. Like deposits, their interest rates are usually lower than the reference rate. The estimate of the implicit services associated with federal funds and repurchase agreements equals the user cost of the net liability position of the banking industry, but it is calculated by including a negative number for implicit services of federal funds and repurchase agreement gross assets (which consist primarily of interbank transactions) that partly offsets the positive number for implicit services of federal funds and repurchase agreement gross liabilities.

Table 1 shows the assets and liabilities included in an illustrative calculation of banks' imputed output for 2001. In column 1 of the table are average values for the year of major balance sheet items, including those that have no role in the calculations of domestic imputed output. One asset, "cash items in process of collection" is displayed as a negative liability below deposits in order to show that it is netted out from deposits when calculating implicit depositor services. Items in process of collection are deducted from deposits because, in an accrual-accounting framework, these funds belong to the payee, not the check writer.

Column 2 in table 1 displays either the interest income or the interest expense for the year, depending on whether the item is an asset or a liability. Column 3 shows the book-value interest rate implied by dividing the interest income or expense by the average balance sheet value. Column 4 shows the user-cost prices, calculated as the margin between the item's interest rate and the reference rate shown on line 8. Column 5 shows expansion factors needed to account for domestic output of foreign banks, which are calculated using ratios of balance sheet items for the total domestic banking industry to corresponding items for domestic offices of banks chartered in the United States. Column 6 shows the contribution to imputed output from each included item, calculated as the product of the average

balance sheet value, the user-cost price, and the expansion factor for foreign-owned offices.

The negative values for imputed output for assets associated with interbank transactions on lines 12 to 15 of table 1 prevent the implicit services that banks provide to each other from being included in the output delivered to other kinds of customers. These negative entries are offset elsewhere in table 1 by amounts included in imputed output on liabilities or in implicit services from Federal Reserve Banks. For example, the net output associated with Federal funds and repurchase agreements is the difference between the positive entry in the liability section of the table and the smaller negative entry for the asset.

The implicit borrower services on loans and leases in lines 4–5 of table 1 represent 41.9 percent of total imputed output. Implicit services to depositors, calculated as the sum of the entries on lines 24–30 and the adjustments on lines 13 and 14, represent 54.3 percent of imputed output or \$101.3 billion. Further, the user cost of own funds and foreign office deposits used for domestic lending on line 47 is \$45.7 billion. This \$45.7 billion can be decomposed into \$19.9 billion from the user cost of own funds of U.S. banks, \$23.7 for the user cost of foreign office deposits used for domestic lending, and \$2.1 billion for the user cost of funds from foreign sources that foreign banks lend domestically. Finally, a comparison of estimates of imputed output with and without the adjustment for domestic offices of foreign banks also shows that imputed output of \$11.2 billion out of a total of \$186.6 billion originates in the foreign-owned banking offices.

The assets of commercial banks also include balances due from Federal Reserve Banks, which include required reserves. In exchange for the user cost of these balances due (which equals the amount they would have earned if they had been invested at the reference rate of interest) banks are assumed to receive implicit services from the Federal Reserve Banks of equivalent value. To be consistent, implicit services from the Federal Reserve Banks are also imputed to the Federal Government on Treasury deposits, to the rest of the world on international deposits, and to business in connection with other deposits. Therefore, the total output of the Federal Reserve Banks equals the user cost of their deposit liabilities; no output is imputed in connection with their assets because they consist primarily of securities that earn the reference rate of interest. In the revised measures, the implicit services of Federal Reserve Banks that are consumed by commercial banks are treated as an intermediate input. Currently in the NIPAs, the output of the Federal Reserve Banks is estimated by their expenses, and a

portion of this output is included in implicit services to customers of the banking industry.

Foreign output of U.S. banks and domestic output of foreign banks. The primary data source for the estimates, the Federal Financial Institutions Examination Council's *Call Reports*, cover domestic and foreign offices of banks chartered in the United States.¹¹ Two adjustments to the basic estimates from the *Call Reports* are therefore necessary to estimate the domestic output

11. Beginning with 1985, the *Call Report* data are adjusted by the Board of Governors of the Federal Reserve System to take account of mergers; see Carlson and Perli (2003). *Call Report* data for 1984 and earlier are taken from the Federal Deposit Insurance Corporation, *Historical Statistics on Banking*, at <www2.fdic.gov/hsob>.

of all banks. First, an estimate of the output produced in the foreign offices of U.S. banks must be deducted from U.S. banks' total output. Second, the output of U.S. offices of foreign banks must be added.

The output of foreign offices of U.S. banks is currently measured as the excess of their interest receipts from borrowers over their interest payments to depositors. In recent years, the interest rate on loans in foreign offices has been roughly twice the rate on deposits, and the amount of deposits has been roughly twice the amount of loans. Consequently, interest received has approximately equaled interest paid in the foreign offices, so virtually no imputed output has

Table 1. Revised Computation of Imputed Output, Commercial Banks in the United States, 2001

[Billions of dollars]

Line		(1)	(2)	(3)	(4)	(5)	(6)
		Average balance	Interest income or expense	Average rate of interest	Average user cost price	Ratio of all banks to U.S.-chartered banks in the U.S. ¹	Imputed gross output
		2001	2001	(2) / (1)	(3) - 6.24%		(1 x 4) x (5)
Balance sheet item							
1	Total assets	6,034.5					
2	Loans and leases, net of allowance for losses and unearned income	3,757.8	312.5				
3	Domestic offices	3,487.6	288.1				
4	Loans	3,341.0	278.3	8.33	2.09	1.107	77.3
5	Leases	146.6	9.8	6.72	0.48	1.107	0.8
6	Foreign offices	270.2	24.4				
7	Investment securities, book value	1,042.5	65.2				
8	Treasury and U.S. Government agency securities	736.8	46.0	6.24	0	1.102	
9	Other securities, book value, adjusted for taxable-equivalence	305.7	19.2	6.28	0.04	1.325	0.2
10	Cash and all balances due from depository institutions	251.2					
11	Currency and coin	38.1					
12	Balances due from the Federal Reserve	24.8	0	0	-6.24	1.000	-1.5
13	Other balances due from depository institutions	54.8	0	0	-6.24	1.154	-3.9
14	Interest-bearing balances due from depository institutions	133.5	5.4	4.01	-2.23	1.154	-3.4
15	Federal funds sold and securities purchased under agreement to resell	327.3	12.7	3.87	-2.37	1.097	-8.5
16	Trading account assets	150.4	9.5	6.34	0.10	1.080	0.2
17	Other real estate	3.5					
18	Bank premises and equipment	76.3					
19	Intangible assets	113.1					
20	All other assets	312.4					
21	Total liabilities	5,703.8					
22	Total deposits	4,169.2	132.5				
23	In domestic offices	3,519.5	106.9				
24	Demand deposits	506.6	0.0	0	6.24	1.017	32.1
25	Interest-bearing deposits	3,012.9	106.9				
26	Other checkable deposits	155.9	3.1	1.96	4.28	1.001	6.7
27	Savings (including MMDAs)	1,522.0	33.3	2.19	4.05	1.001	61.7
28	Large time deposits	549.6	27.7	5.05	1.19	1.690	11.1
29	Other time deposits	785.3	42.7	5.44	0.80	1.001	6.3
30	Cash items in process of collection	-129.2	0	0	6.24	1.154	-9.3
31	In foreign offices	649.7	25.6				
32	Borrowed funds	1,131.7	56.4				
33	Federal funds purchased and securities sold under agreement to repurchase	510.7	19.6	3.84	2.40	1.064	13.0
34	Other interest-bearing liabilities	621.1	36.8	5.93	0.31	1.296	2.5
35	Other liabilities	402.8					
36	Total equity capital	330.7					
37	Plus: Implicit services from Federal Reserve Banks		1.5				1.5
38	Equals: Total imputed output						186.6
Addenda:							
39	Assets used to calculate imputed output, U.S. banks ^{2,3}	5,221.0	380.8	7.29	1.05		56.5
40	Liabilities used to calculate imputed output, U.S. banks ^{3,4}	4,522.0	163.3	3.61	2.63		118.9
41	Net interest income or total imputed output, U.S. banks ³		217.5				175.4
42	Plus: User cost of own funds and foreign office funds used for domestic lending, U.S.-chartered banks	699.0			6.24		43.6
43	Equals: Net interest income, U.S.-chartered banks						219.0
44	Assets used to calculate imputed output, including foreign banks ²	5,840.8	425.5	7.29	1.05		62.5
45	Liabilities used to calculate imputed output, including foreign banks	5,108.4	194.6	3.81	2.43		124.1
46	Net interest income or total imputed Output, including foreign banks		230.9				186.6
47	Plus: User cost of own funds and foreign office funds used for domestic lending, including foreign banks	732.4			6.24		45.7
48	Equals: Net interest income, including foreign banks						232.3

1. Ratios are for (by line): Loans and leases (4 and 5); Securities other than U.S. government securities in bank credit (9); Cash assets (13, 14, 30); Interbank loans (15); Other assets (16); Transaction deposits (24); Nontransaction deposits other than large time deposits (26, 27, 29); Large time deposits (28); Borrowings from banks in the U.S. (33); Borrowings other than from banks in the U.S. (34).

2. Sum of lines 4–5, 8–9, and 12–16. Imputed interest from Federal Reserve Banks on line 37 is also

included in imputed gross output.

3. Imputed gross output shown excludes the effect of the adjustment for foreign banks using the factors in column (5).

4. Sum of lines 24, 26–30, 33, and 34.
MMDAs Money market deposit accounts

been attributed to them.

In the revised measures of bank output, a significant amount of output will be attributed to foreign offices of U.S. banks. The revised measure of foreign office output equals the user cost of foreign office loans plus the user cost of foreign office deposits. Therefore, the increase in foreign office output equals the reference rate times the excess of foreign office deposits over foreign office loans. The excess deposits represent a source of funds for domestic lending that, like own funds, involve no domestically produced implicit services to depositors.

The output of U.S. offices of foreign banks is also affected by the change in the definition of imputed output. The domestic output of foreign banks is currently measured by scaling up the estimates of the output of U.S. banks using ratios of balance sheet items for all banking offices located in the U.S. to corresponding items for the offices of U.S. banks alone. The implicit assumption—which is made necessary by unavailability of data—is that the U.S. offices of foreign banks pay and receive the same interest rates as other banks in the United States. Rather than scaling up gross interest flows, the new procedure will scale up user costs of assets and liabilities. This will change the estimates of the domestic output of the foreign banks because the assets that are attributed to foreign banks do not exactly equal the liabilities. However, a more important source of revision to these estimates will be revisions to the estimates of the balance sheet ratios to incorporate new source data.

Measurement of interest rates

Estimation of user cost measures of imputed output requires a number of decisions about the specification of key concepts. One of these decisions concerns interest rates. From a theoretical standpoint, the use of either market interest rates or book-value interest rates can be defended. The book-value rates are computed by dividing the interest receipt or payment for a financial product by the book-value of that financial product on the balance sheet.

Market interest rates should be used in conjunction with the market values of assets (whose use is sometimes called the “creditor approach”), and book interest rates should be used in conjunction with the book-value of assets (the “debtor approach”). For most interest-bearing assets, banks report book values rather than market values. Perhaps for this reason, tests using market rates resulted in excessively volatile estimates of implicit services to depositors and to borrowers, including some negative values. In contrast, with book-

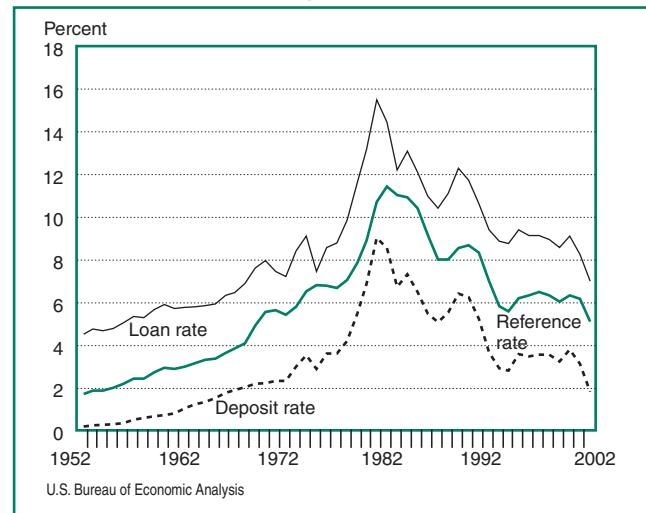
value rates, the user-cost prices of both loans and deposits are consistently positive and behave plausibly. The variation over time in relative positions of the book-value reference rate, loan rate, and deposit rate is shown in chart 1.

To compute the book-value reference rate, the interest received from Treasury and Federal agency securities is divided by the average book value of these securities over the period during which the interest was received. This method of calculating the reference rate results in estimates of zero for implicit borrower services consumed by the Federal Government. Although imputing no borrower services to Federal Government debt may seem inconsistent with imputing services to other types of bond issuers, Federal debt imposes virtually no liquidity or credit-risk costs on the bank. Letting implicit services for Federal debt equal zero makes GDP invariant to the proportion of Federal debt held by the banking sector.

Book-value interest rates for other assets and liabilities are calculated similarly to the reference rate. However, interest income from securities issued by state and local governments must be adjusted to reflect its tax-exempt status. The interest expense on liabilities used to fund purchases of these securities may be completely deductible, 80-percent deductible, or nondeductible, depending on the nature of the issuer and the data of purchase of the security. If the interest expense is completely deductible, then:

$$\text{taxable-equivalent rate} = \frac{\text{book-value rate}}{1 - \text{bank's marginal income tax rate}}$$

Chart 1. Relative Positions of the Reference Rate, the Loan Rate, and the Deposit Rate



Beginning with 1985, adjustments for taxable equivalency are from the Federal Reserve Board. For earlier years, adjustments are calculated using the above formula, with banks' average tax rate serving as a proxy for their marginal rate and an assumption that the user-cost price of state and local securities is nonnegative.

Effect on GDP and on gross domestic income

As discussed above, the revised measure of banks' imputed output will be lower than the current measure. The amount of the reduction caused by the change in the definition of the imputed output equals the sum of (1) the user cost of own funds; (2) the user cost of foreign office deposits available for domestic lending; and (3) part of the change in the estimate of imputed output of domestic offices of foreign banks.

GDP will fall more than the imputed output of banks will fall, because intermediate consumption will absorb some output that is currently counted in final demand. Implicit services count as intermediate consumption when consumed by businesses, household owner-occupiers, or nonprofit institutions serving households, and these sectors are the primary borrowers from banks. Consequently, when imputed output

that is currently allocated to depositors is instead allocated to borrowers, some imputed output will shift from final demand to intermediate consumption.

While the recognition of borrowers' implicit services reduces the importance of banks' imputed output to GDP, it also opens up a new channel of influence on the rate of change of current-dollar GDP. In chart 1, the reference rate is sometimes closer to the asset rate, implying that borrowers received a smaller share of implicit financial services, but at other times, it is closer to the liability rate. Although trends in the split of implicit services between borrowers and depositors are meaningful, shortrun fluctuations of this split may not reflect equilibrium behavior. Because the reference rate demonstrates more inertia than the other rates, abrupt declines in interest rates tend to result in a temporary reclassification of imputed output from intermediate consumption (by borrowers) to final demand (by depositors), first raising and then lowering the growth rate of GDP. Abrupt increases in interest rates have the opposite effect. The Treasury and Federal agency securities that furnish the reference rate tend to have rates that are fixed for longer periods than the rates paid on liabilities and the rates earned on loans. Nevertheless, this troublesome effect is expected to be

Effect on GDP by Industry and on Gross State Product

The changes in the methods for measuring banks' imputed output and for allocating it to bank customers will affect the estimates of GDP by industry. GDP by industry measures the contribution of each private industry and of government to the Nation's GDP. It equals an industry's value added. For any private industry, GDP by industry is defined as gross output (which consists of sales or receipts and other operating income, commodity taxes, and inventory change) less purchases of intermediate inputs (which consist of energy, raw materials, semi-finished goods, and services, including services of banks).

Identifying inputs and outputs is less straightforward for banking than it is for most industries.¹ In the NIPA treatment, banks use primary and intermediate inputs to produce the financial services that constitute their output. Financial products such as deposits and loans are packages of financial services; thus deposits, though an inflow to banks, are not an input. The implicitly priced services associated with financial products are the banks' output, along with the services that carry explicit fees.

The changes in the treatment of the banking industry will not affect banks' purchases of intermediate inputs, so the change in this industry's value added will equal the change in its gross output. For other private industries, intermediate inputs will rise, reducing value added. Private industries consume relatively more borrower services than households and government, so their consumption of implicit services of banks will be higher when services currently shown as going to depositors are allocated to borrowers. Under the new treatment of government (described in Moulton and Seskin (2003, 30–31)), GDP by industry for general government will not change, but government consumption expenditures and government gross output will fall by an amount equal to the reduction in governments' final purchases of banks' imputed output. For the economy as a whole, the increase in intermediate consumption of private industries will generally have a larger affect on GDP than the reduction in banks' total imputed output.

These revisions to GDP by industry will be reflected in revised estimates of gross state product (GSP). GSP measures the value added in production by the labor and property located in a state, and is controlled to national estimates of GDP by industry. GSP for a state is derived as the sum of the GSP originating in all industries in the state.

1. There is a considerable literature on the identification of inputs and outputs in banking, and the choice of a classification framework depends on the measurement question to be addressed. For examples of different frameworks, see Allen Berger and David Humphrey (1992).

small, and it will have almost no effect on real growth rates.

The revision in the measure of imputed output will change gross domestic income (GDI) by the same amount as it changes GDP. Imputed expenditures on financial services by households, by government, and by the rest of the world, which raise GDP, are matched by imputed interest flows, which raise GDI. Imputed expenditures by business have no effect on GDP because they are intermediate inputs, and imputed net interest payments by businesses to banks do not affect GDI because banks are also in the business sector.

Even though the balance between GDI and GDP will be unaffected by the revision, some elements of the calculation of the interest component of GDI will change. To be consistent with the guidelines of the SNA, the implicit services provided by banks to borrowers will be shown as a negative amount of imputed interest paid by borrowers.¹² The sum of monetary interest and imputed interest paid by borrowers, which is the total amount of interest paid by borrowers, will therefore decline. In effect, a portion of the interest paid by borrowers will be reclassified as a payment for implicit services; borrowers' imputed expenditures on services will rise by the same amount that their payments of interest fall. Note that negative imputed interest paid by nonbusiness borrowers to banks increases the "net interest" component of GDI in the same way as positive imputed interest paid by banks to nonbusiness customers.

Effects on quantity and price indexes

To estimate changes in the real value of imputed output, BEA will continue to use the method that it adopted in 1999. Thus, the rates of change of real total output and of real explicitly priced output will not be revised because of the change in the treatment of banking. However, the level of real total output and real imputed output will be revised for all years to reflect the revised level of current-dollar imputed output in the base year. In addition, the revisions to the weight of explicitly priced output will cause revisions to the rate of change of real imputed output because real imputed output is estimated as a residual.

Beginning with 1968, annual changes in the real value of banks' imputed output are estimated by assuming that banks' total output grows at the same rate as the output of the banking industry in the Bureau of Labor Statistics (BLS) estimates of productivity by industry. The BLS estimate of banks' total output is based on a weighted average of various indexes of bank activity, including bank transactions (for example,

checks cleared, ATM transactions, and electronic funds transfers), the number of outstanding loans of various types, and the number of trust accounts.¹³ To estimate chain-dollar real imputed output, BEA calculates a Fisher aggregate of a Laspeyres constant-dollar measure and a Paasche constant-dollar measure. Each constant-dollar measure of banks' imputed output equals (a) the constant-dollar value of banks' total output, estimated by extrapolating the base-year current-dollar estimate of banks' total output by the BLS estimate of the growth in banks' total output less (b) the constant-dollar real value of banks' explicitly priced output, estimated by deflating banks' service charges on deposit accounts and other noninterest income with the CPI for checking account and other bank services and then adding an estimate of banks' real fiduciary activities based on the growth of the number of trust department discretionary accounts.

Prior to 1968, annual changes in the real value of imputed output will continue to reflect the rate of growth in the hours worked by banks' employees with no adjustment for changes in these employees' productivity. Annual changes in the real value of explicitly charged output will continue to reflect the post-1968 methodology, and annual changes in the real value of total output will continue to equal the sum of changes in real imputed output and real explicitly priced output.

Results for 2001

Table 2 shows the breakdown by sector and by legal form of organization of the consumption of commercial banks' imputed output. As a result of the revision, the imputed output of commercial banks included in GDP falls by \$91.9 billion. A rise in intermediate consumption from about a fourth to about half of the total consumption of implicit services accounts for \$22.8 billion of the fall in GDP. Borrower services to household owner-occupants and nonprofit institutions account for much of this rise, but borrower services to corporations and to sole proprietorships and partnerships also contribute.

The remaining \$69.1 billion of the fall in GDP reflects a fall in imputed domestic output. One source of the fall in imputed domestic output is a \$13.0 billion fall in imputed output of U.S. offices of foreign banks attributable to revisions in estimates these offices' assets and liabilities.¹⁴ The other source is a \$56.0 billion change in imputed domestic output attributable to the

13. The BLS methodology is explained in Kent Kunze, Mary Jablonski, and Mark Sieling (1998). BLS does not have a separate measure of the imputed output of banks.

14. Note that this revision would have occurred even without the change in the treatment of banks.

Table 2. Consumption of Imputed Output of Commercial Banks by Sector and Legal Form of Organization, 2001
[Billions of dollars]

	Based on user costs	Currently published	Revision in level
Total.....	186.6	255.7	-69.1
Final consumption	93.6	185.5	-91.9
Persons	78.8	156.9	-78.1
Federal Government ¹	0.3	0.8	-0.5
State and local governments ¹	5.1	9.6	-4.5
Rest of the world	9.4	18.3	-8.9
Intermediate consumption	93.0	70.2	22.8
Corporate	52.5	51.3	1.7
Financial.....	7.3	9.9	-2.6
Nonfinancial	45.2	41.3	3.9
Sole proprietorships and partnerships.....	20.3	18.8	1.5
Farm.....	1.6	1.0	0.6
Nonfarm	18.6	17.8	0.8
Other private business	2.4	0.1	2.3
Households and nonprofit institutions	17.8	0	17.8

1. In the comprehensive revision, the value of the services produced by general government, which represents governments' contribution to final demand, will be estimated by the cost of inputs, including purchases of implicit output of banks. The revised treatment of banking will indirectly reduce the services produced by general government because purchases of implicit output of banks will be reduced. Final demand of general government, which will equal the services produced by governments less their sales of services in the market, will also reflect the downward revision to governments' purchases of implicit output of banks.

adoption of the reference rate approach, which consists of (1) a \$13.4 billion fall in imputed output of U.S. offices of foreign banks; (2) an \$18.9 billion fall in the total imputed output of U.S. banks; and (3) a \$23.7 billion rise in the portion of the imputed output of U.S. banks allocated to their offshore offices.

Table 3 shows how the downward revision to GDP and GDI for 2001 affects the new seven-account summary of the NIPAs.¹⁵ The product side of account 1 shows that the \$91.9 fall in GDP consists of a reduction of \$78.1 billion in implicit services to persons, a reduction of \$8.9 billion in net exports of implicit services, and a reduction of \$4.9 billion in implicit services to governments. On the income side, the net operating surplus of private enterprises falls by \$91.9 billion.¹⁶

Account 2 shows the effect on the sources and uses of private enterprise income, which includes income of private businesses, imputed income from owner-occupied housing, and net interest paid by nonprofit institutions serving households. Imputed interest paid by banks to depositors falls by \$147.5 billion, and private enterprises borrowers pay -\$64.8 billion in imputed interest to banks. (As is explained above, implicit banking services to borrowers are shown as negative

15. In the comprehensive revision of the NIPAs, the traditional five summary accounts will be expanded to seven accounts; see Mayerhauser, Smith and Sullivan (2003, 8–15).

16. Net operating surplus is a measure of business income that equals gross value added less the costs of compensation of employees, taxes on production and imports—that is, indirect taxes such as sales and property taxes—less subsidies and consumption of fixed capital; financing costs, such as net interest, and business transfers are not subtracted.

imputed interest paid by borrowers.) Private enterprises will also receive \$120.4 billion less in imputed interest, consisting of a reduction of \$42.0 billion in imputed interest received by private enterprises on deposits and a new entry of -\$78.4 billion representing imputed interest received by banks from borrowers. Hence, net interest paid by private enterprises falls by \$91.9 billion, and GDI also falls by this amount.

Account 3, the personal income and outlay account, shows that the \$78.1 billion reduction in personal consumption expenditures consists of a \$90.1 billion reduction in implicit services to depositors that is partly offset by the new entry for implicit services to borrowers of \$12.0 billion. Account 5, the foreign transactions current account, shows that the \$8.9 billion decrease in net exports of implicit services shown in account 1 consists of a decrease of \$10.3 billion in imputed interest received by foreign depositors that is partly offset by imputed interest of -\$1.4 billion received from foreign borrowers. (Imputed interest on foreign borrowing excludes loans booked in foreign offices of U.S. banks because production in these foreign locations does not belong in U.S. domestic product.) Accounts 6 and 7 show that measures of saving, investment, and net lending to the rest of the world are unaffected by the revised treatment of implicit services of banks.

Future Research

The new measures of implicit services to bank borrowers are an important advance for the NIPAs. Nevertheless, many questions remain for future research. One question is how to treat off-balance sheet commitments, such as derivatives. A second is whether improvements are possible in the measures of real bank output. A third concerns the treatment of expected holding gains and losses and of credit losses.¹⁷ An allowance for credit losses is deducted from the value of loans and leases in calculating imputed output in order to place the timing of the recognition of these losses on an accrual basis. However, credit losses are not directly reflected in the measures of interest income that are used to calculate imputed output. If banks use a portion of interest income to offset credit losses, that portion is not available to pay for financial services. Furthermore, estimates of expected losses will be excluded from the measure of imputed output elsewhere in the revised NIPAs; see the discussion of insurance in Moulton and Seskin (2003, 19–21).

17. See Fixler and Moulton (2001).

Table 3. Revisions to Summary National Income and Product Accounts, 2001

[Billions of dollars]

Account 1. Domestic Income and Product Account, Proposed Less Published Estimates

Net operating surplus	-91.9	Personal consumption expenditures	-78.1
Private enterprises	-91.9	Implicit services furnished by banks	-78.1
Imputed interest paid	-212.3		
By banks to depositors	-147.5		
By borrowers to banks ¹	-64.8		
Less: Imputed interest received	-120.4		
By depositors from banks ¹	-42.0		
By banks from borrowers	-78.4		
Gross domestic income	-91.9	Net exports of goods and services	-8.9
Statistical discrepancy	0.0	Exports	-8.9
GROSS DOMESTIC PRODUCT	-91.9	Implicit services furnished by banks	-8.9
		Government consumption expenditures and gross investment	
		Federal	-4.9
		Implicit services furnished by banks	-0.4
		State and local	-0.4
		Implicit services furnished by banks	-4.4
		GROSS DOMESTIC PRODUCT	-91.9

1. Includes domestic business, owner-occupied housing, and nonprofit institutions serving households.

Account 2. Private Enterprise Income Account, Proposed Less Published Estimates

Income payments on assets	-212.3	Net operating surplus, private enterprises	-91.9
Interest and miscellaneous payments	-212.3	Income receipts on assets	-120.4
Interest payments	-212.3	Interest receipts	-120.4
Imputed interest	-212.3	Imputed interest	-120.4
By borrowers to banks ¹	-64.8	By banks from borrowers ¹	-78.4
By banks to depositors	-147.5	By other private enterprises on deposits	-42.0
USES OF PRIVATE ENTERPRISE INCOME	-212.3	SOURCES OF PRIVATE ENTERPRISE INCOME	-212.3

1. Includes domestic business, owner-occupied housing, and nonprofit institutions serving households.

Account 3. Personal Income and Outlay Account, Proposed Less Published Estimates

Personal current taxes	0.0	Personal income receipts on assets	-90.1
Personal outlays	-90.1	Personal interest income	-90.1
Personal consumption expenditures		Imputed interest income	-90.1
Implicit services furnished by banks		On deposits	-90.1
Personal interest payments			
Imputed interest paid	-12.0		
To banks on borrowed funds	-12.0		
Personal saving	0.0		
PERSONAL TAXES, OUTLAYS, AND SAVING	-90.1	PERSONAL INCOME	-90.1

Account 4. Government Receipts and Expenditures Account, Proposed Less Published Estimates

Consumption expenditures	-4.9	Income receipts on assets	-5.0
Implicit services furnished by banks	-4.9	Interest and miscellaneous receipts	-5.0
Federal	-0.4	Interest receipts	-5.0
State and local	-4.4	Imputed interest received	-5.0
Interest payments	-0.2	On deposits	-5.0
Imputed interest paid	-0.2	Federal	-0.4
To banks on borrowed funds	-0.2	State and local	-4.6
Federal	0.0		
State and local	-0.2		
GOVERNMENT CURRENT EXPENDITURES AND NET SAVING	-5.0	GOVERNMENT CURRENT RECEIPTS	-5.0

Account 5. Foreign Transactions Account, Proposed Less Published Estimates

Exports of goods and services	-8.9	Income payments to the rest of the world	-10.3
Services	-8.9	Income payments on assets	-10.3
Implicit services furnished by banks	-8.9	Interest payments	-10.3
Income receipts from the rest of the world	-1.4	Imputed interest received by the rest of the world	-10.3
Income receipts on assets	-1.4	On deposits	-10.3
Imputed interest paid by the rest of the world	-1.4		
To banks on borrowed funds	-1.4		
CURRENT RECEIPTS FROM THE REST OF THE WORLD	-10.3	CURRENT PAYMENTS TO THE REST OF THE WORLD AND BALANCE ON CURRENT ACCOUNT	-10.3

Account 6. Domestic Capital Account, Proposed Less Published Estimates

GROSS INVESTMENT, CAPITAL, TRANSFERS, AND NET LENDING	0	GROSS SAVING AND STATISTICAL DISCREPANCY	0
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Account 7. Foreign Transactions Capital Account, Proposed Less Published Estimates

BALANCE ON CURRENT ACCOUNT, NIPAs	0	CAPITAL TRANSFERS (NET) AND NET LENDING, NIPAs	0
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Note. Components may not add up to totals shown because of rounding.

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