What can we learn from the new measures of bank services in national accounts? The case of the US

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Introduction

Countries accounting for most of world GDP have recently adopted or made plans to adopt a reference rate approach for measurement of the implicitly priced output of commercial banks. This change in methods should improve the measurement of GDP and reveal new information about the banking industry's performance and role in the broader economy. This paper examines the performance of the reference rate measures that were introduced in the US national accounts in December 2003. We find that these measures do reflect underlying economic developments.

In calculating GDP, the economic value of a good or service is measured by the price that the buyer pays. In the banking industry, however, sales that take place at explicit prices (or fees) are not intended to cover costs of production, which include labor, the use of fixed capital assets, taxes on production, and intermediate inputs. To obtain a plausible picture of the value added of the banking industry, we must therefore recognize that in this industry adjustments to interest rates substitute for explicit prices for services. The net interest receipts generated by the spread between depositor rates and borrower rates represent sales of implicitly priced output.

The 1993 System of National Accounts (SNA93) terms the implicitly priced output of banks "FISIM" (Financial Intermediation Services Indirectly Measured). It recommends the use of a reference rate to split the FISIM into depositor services and borrower services. The reference rate is based on a transaction type that involves no provision of implicitly priced services. The absence of depositor services makes the reference rate higher than the rate paid to depositors. The absence of borrower services makes the reference rate lower than the rate paid by borrowers.

1. Conceptual framework for measurement of the services of banks

1.1 Price concepts derived from the theory of the user cost of money

The SNA provides no formal theory of the reference rate. However, the concept of the "user cost of money" does provide a theory. It is an extension of the user cost concept that was originally developed to measure the services of fixed capital assets. In a competitive market where economic profits are zero, the rental price for a capital asset must equal the difference between its starting price, p_t, and the present value of its price at the end of the rental period, $p_{t+1}/(1 + r_r)$, where r_r is the reference rate of interest. To derive the user cost formula, set the user cost uc_t equal to the equilibrium rental price $p_t - p_{t+1}/(1 + r_r)$, and let the growth rate of p_t include a depreciation component, δ_t, and an expected general rate of increase in asset prices, π_t:

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[1] US Bureau of Economic Analysis.

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

$= p_t(r_r - \pi_t + \delta_t)/(1 + r_r).$ (1)

Alternatively, if the rental price uc_t is paid at the end of the period, then $uc_t = p_t(r_r - \pi_t + \delta_t)$.

The reference rate represents the opportunity cost of the funds invested in the capital asset. For a bank asset, the reference rate is the rate that the bank earns on an asset that entails no provision of costly services.[2] The bank will earn no economic profit on a loan if the interest received covers the costs of providing services to the borrower plus the value of the foregone opportunity to earn r_r. Similarly, if the marginal return on funds invested (net of costs of providing borrower services) is r_r, then the marginal economic profit on a deposit will be zero if the interest rate paid equals r_r less the cost of providing depositor services. Hence, rate spreads compared with r_r can also be used as guide for decision-making in managing bank assets and liabilities.

An expression for a user cost formula for a financial asset with a rate of return of r_A that is parallel to equation (1) would equal the difference between the asset's immediate cash value in period t, assumed to be y_{At}, and the present value of selling the asset for an expected price of $y_{A,t+1} = (1 + \pi_t) y_{At}$ in period $t+1$ after receiving income of $r_A y_{At}$. Here, π_t represents expected changes in asset prices, including those due to changes in creditworthiness in the case of debt instruments. The user cost of holding an asset with a rate of return of r_A then becomes:

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

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. An alternative formula that values the user cost as of the end of the period is $r_r - r_A - \pi_t$. This user cost formula is also appropriate when data on interest flows that occur throughout a year or quarter are used in conjunction with data on the average stock of the asset during the year or quarter, with interest rates calculated by comparing interest flows to the average stock of the items yielding the flow.

Banks' financial assets usually have negative user costs and their liabilities usually have positive user costs. To make the signs more intuitive, we define the user cost price of an asset as the negative of the user cost, and we define the user cost price of a liability as its user cost. With these definitions, a financial product has a positive price if it contributes positively to economic profits before non-interest expenses. The arbitrary bank asset i has a user cost price equal to:

$p_{Ai} = r_{Ai} - r_r.$ (3)

For liability products, the user cost price is:

$p_{Li} = r_r - r_{Li}.$ (4)

These formulas omit the terms for service charges or other fees because the fees are included elsewhere in the national accounts as explicit sales of bank services. We also omit π_t, the term for expected holding gains or losses, from our user cost price formula for assets

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[2] Most applications of the reference rate, including the 1993 SNA, view the reference rate as a risk-free rate, implying that risk-bearing is in services to borrowers. However, Barnett (1978) describes the reference rate as a minimum rate of return that accounts for risk, and Wang, Basu and Fernald (2004) argue for the inclusion of risk premiums in item-specific reference rates.

because we have not yet developed a method for estimating an appropriate concept of expected credit losses.

In equations (3) and (4), the reference rate of interest represents an opportunity cost that banks consider in their deposit-taking and lending decisions. 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. For loans, the spread must equal the marginal cost of providing borrower services if the bank is to be indifferent at the margin between investing in the reference-rate asset and investing in higher yielding loans.

User cost prices also have interpretations from the point of view of bank customers. Depositors could dispense with the services of a bank and buy a security paying the reference rate of interest. By foregoing the opportunity to earn the reference rate, depositors pay an implicit price for services equal to the difference between the reference rate and the deposit rate. Loan customers of banks are willing to pay a margin over the reference rate because they need services that are not provided to issuers of credit-market instruments paying the reference rate. For many loan customers, borrowing in capital markets would be very costly or impossible because of the problems of asymmetric information noted earlier, and liquidating assets would not be feasible. However, loan customers at the margin between borrowing from banks and alternatives could either liquidate assets that earn the reference rate or borrow at approximately the reference rate in capital markets. For the marginal user of the borrowed funds, the spread between the loan rate and the reference rate represents an implicit price paid for bank services.

1.2 Broad and narrow definitions of includable assets and liabilities

Express the total implicit financial services of banks, *V*, as the user cost price of assets times the volume of assets plus the user cost price of liabilities times the volume of liabilities, or

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\begin{aligned}
V &= \sum_i p_{A_i} y_{Ai} + \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}
\end{aligned}
\tag{5}
$$

In the last line of equation (5), the first term is the value of implicitly priced services provided to borrowers, and the second term is the value of implicitly priced services to depositors and other creditors of the bank.

Banks must use their own funds for acquisitions of assets not funded by the issuance of liabilities, so in the 1993 SNA, the amount by which assets exceed liabilities is termed "own funds". Own funds represent the stockholders' equity that is used to acquire financial assets. In equation (5), *V* equals net interest income minus the user cost of own funds:

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V = \left[\sum_i r_{A_i} y_{A_i} - \sum_i r_{L_i} y_{L_i} \right] - r_r \left[\sum_i y_{A_i} - \sum_i y_{L_i} \right]
\tag{6}
$$

If all other interest-bearing assets and liabilities are included along with loans and deposits, and if inter-bank transactions and uncleared checks are properly netted out on the consolidated balance sheet for the banking industry, the last bracketed term in equation (6) measures the amount of lending of own funds. For the US banks as an aggregate, we can be sure that own funds calculated in this way will be positive.[3] The reduction in the total value of implicit services implied by the positive own funds in the last term in equation (6) reflects the absence of services to depositors in the case of own funds. Profits on lending stockholders'

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[3] In the US, the FDIC Improvement Act of 1991 requires closure of banks with tangible capital below 2 percent of assets. The Basel II Capital Accords use risk-weighted assets to fix capital requirements, with risk-free assets assigned a weight of zero, but every bank holds some of the assets with positive weights.

equity constitute income distributed to the bank, not an implicit payment for services. These profits equal the receipts of interest on lending of own funds less the costs of providing services to borrowers, so they may be calculated by multiplying the amount of own funds by the reference rate.

We include in our calculations of implicitly priced bank output all bank assets and liabilities that earn interest or imputed interest. An alternative approach (taken in Commission of the European Communities, 2002) would be to include only loans and deposits in the calculation of FISIM. When the definition of in-scope assets and liabilities is narrowed to loans and deposits, the last bracketed term in equation (6) is no longer a measure of own funds, and will often be negative. In practice, however, the treatment of balance sheet items other than loans and deposits usually makes little difference in the results, because the user cost price of such items is usually tiny or zero. (Akritidis, 2007, 31, reports that this is also the case for European countries.) This is not always the case, however: repurchase agreement liabilities to non-bank business customers are the functional equivalent of deposits and have about the same interest rate as a deposit.

Even though the results are mostly insensitive to the choice between the broad and narrow definitions of in-scope assets and liabilities, the broad definitions have some advantages. If just loans and deposits are included, substitution by banks among types of assets or among types of liabilities could distort the measure of change in implicitly priced output. The need to allow for such substitution is more than hypothetical: loans rose from just over 40 percent of interest-earning assets in 1950 to almost 80 percent since the late 1990s, while deposits fell from almost 100 percent of liabilities to about 70 percent. Recently, an important trend has been for banks to bundle loans into tradable securities, some of which are held by banks. Whether or not a loan held by a bank has been securitized should not affect its treatment. Finally, some deposits come from other banks or represent checks that have not yet cleared. These deposits must be netted against the appropriate non-loan class of assets.

1.3   Measures of interest rates

The interest rates used for the estimation purposes can be either market interest rates or book-value rates computed by dividing the interest received on an asset category by the book value of that balance sheet category. The two approaches must not be mixed, however. Market interest rates must be used in conjunction with market values of assets (the "creditor approach"), and book interest rates must be used with book values of assets (the "debtor approach"). Our primary data source (the Call Reports) contains book values for most assets. We found that estimates of depositor and borrower services based on market rates were too volatile and sometimes negative. In contrast, the user cost prices were plausible using book-value rates, as shown in figure 1.

The inter-bank rate of interest is not suitable for use as a reference rate. The main inter-bank lending rate in the US is so low that using it as the reference rate would imply that FISIM is consumed almost exclusively by borrowers. The main type of inter-bank transaction includes an element of liquidity services to the creditor. It is very short term, so the creditor bank can obtain funds from the debtor bank almost without delay. To compute the reference rate, we therefore divide the interest received on Treasury securities by the average book value of these securities in the period during which the interest was received. This method of calculating the reference rate makes implicit borrower services consumed by the Federal government equal to zero by construction. 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.

2.   Effect on estimates of GDP and uses of intermediate inputs

Businesses have the largest share of loans and leases, while individuals have the largest share of deposits. Therefore, the use of the reference rate to allocate to borrowers some of bank output that had previously been treated as services to depositors increased the amount of implicitly priced output of US banks classified as intermediate consumption. This reduced the estimated level of GDP. In 2001, the amount of the reduction in GDP caused by the reclassification of bank output from final uses to intermediate uses was US$ 21.3 billion.[4]

Besides improving the estimate of the level of GDP, the reference rate approach provides a more accurate picture than the previous approach of intermediate uses of banking services, and of the value added of the industries using those services. The total value added of the industries consuming implicitly priced bank services is lower under the reference rate approach than under the previous approach, by the same amount as the fall in the estimate of GDP. The new approach shows that, on average, implicitly priced bank services consumed as inputs by private industries (which include owner-occupied housing) have been about 1 percent of GDP, about the same as the final uses of such services. The use by private industries of implicitly priced services of banks in 2001 amounted to about 0.6 of their gross output or just over 1 percent of their value added. Industries where these services are more than 2 percent of value added are agriculture, utilities, and real estate, including rental and leasing.

International comparability of national accounts will be improved significantly by the widespread adoption of the reference rate approach. Previously, the US, Australia and Canada included at least some implicitly priced services of banks in their measures of GDP and intermediate inputs of nonfinancial business. Many other countries instead used the SNA93 option to count implicitly priced output of banks as an intermediate input of an imaginary industry, thereby keeping it out of GDP. In France, which had formerly followed the SNA93 optional treatment, the implementation of the reference rate approach caused a downward revision of around 2 percent to estimates of nonfinancial industries' value added, but an upward revision to estimates of final consumption also increased the estimated level of GDP by an average of 1 percent in 1993 to 2003. The reference rate approach to FISIM is projected to raise the estimated level of GDP in the UK by an average of 1.7 percent in 1993–2006.

3.   Measuring the evolving role of banks in the economy

Although the share in US GDP of the value added of the commercial banking industry rose during most of the period from 1960 to 2005, after 1975 weakness in the implicitly priced portion of bank output prevented the industry from keeping up with the financial services sector as a whole (see figure 2). The weak growth of implicitly priced bank output did not occur simultaneously in depositor and borrower services. We can therefore ask whether the differences in behavior between the user cost measures of depositor and borrower services are consistent with the history of the banking industry. If the reference rate provides a meaningful breakdown of banks' implicitly priced output, the timing of the periods of weakness in the user cost measures of depositor and borrower services should reflect historical industry developments.

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[4]   This figure excludes intermediate inputs of US$ 1.5 billion used by nonprofit institutions serving households and the reductions for the user cost of own funds and for foreign office deposits used to fund domestic lending.

The period of weakness of deflated depositor services depicted in figure 3, 1975 to 1981, was a time when fierce competition with non-banks for the funds of savers caused disintermediation in the channeling of funds from savers to borrowers. In the mid-1970s, a large gap emerged between regulated rates paid on deposits and prevailing market interest rates, which raised the user cost price of deposits. Investors responded with stepped-up direct purchases of Treasury notes and other debt securities. At the same time, volatility in stock and bond mutual funds generated pressure on mutual fund companies to offer a more stable type of fund. They therefore introduced the money market mutual fund, which was similar to deposits but paid high rates.

To retain deposits, banks needed to lower the user cost price of depositor services. A gradual process of deregulation of deposit rates began in the mid-1970s, and culminated with the abolition of interest rates ceilings on money market deposit accounts in 1982. But since the rebuilding of deposit service volumes was accomplished by a reduction in the price received for those services, the nominal value of depositor services stayed weak.

The timing of the periods of weakness in the reference rate measure of borrower services (1982–1986 and 1990–1992) is also consistent with historical industry events. In the mid-1980s, the profitability of lending was pressured by regional recessions arising from major downturns in locally concentrated industries such as petroleum, agriculture and defense, by adverse effects of the 1986 tax reform on commercial real estate markets, and by poor loan underwriting decisions. Soon after these problems had depleted banks' capital, stringent capital standards were enacted. Many banks were therefore obliged to curtail lending. A sharp downturn in commercial real estate in New England also contributed to the weakness in borrower services in the early 1990s.

The measures of borrower services and depositor services behave differently over the business cycle. Bank services are pro-cyclical but the borrower component of these services is not (figure 4). One element of borrower services, explicit services excluding trading revenue, leads changes in real GDP rather than coinciding with them. (A regression of the change in real GDP on the change in deflated explicit borrower services has a slope coefficient of 0.143 with a t statistic of 3.4). Changes in explicit borrower services also tend to lead changes in implicit borrower services, probably because many explicit borrower fees are charged at the time of loan origination. The correlation of explicit borrower services with future GDP growth is consistent with the effect of loan supply shocks on the business cycle that has been found in investigations of theories of credit crunches or the lending channel effects of monetary policy.
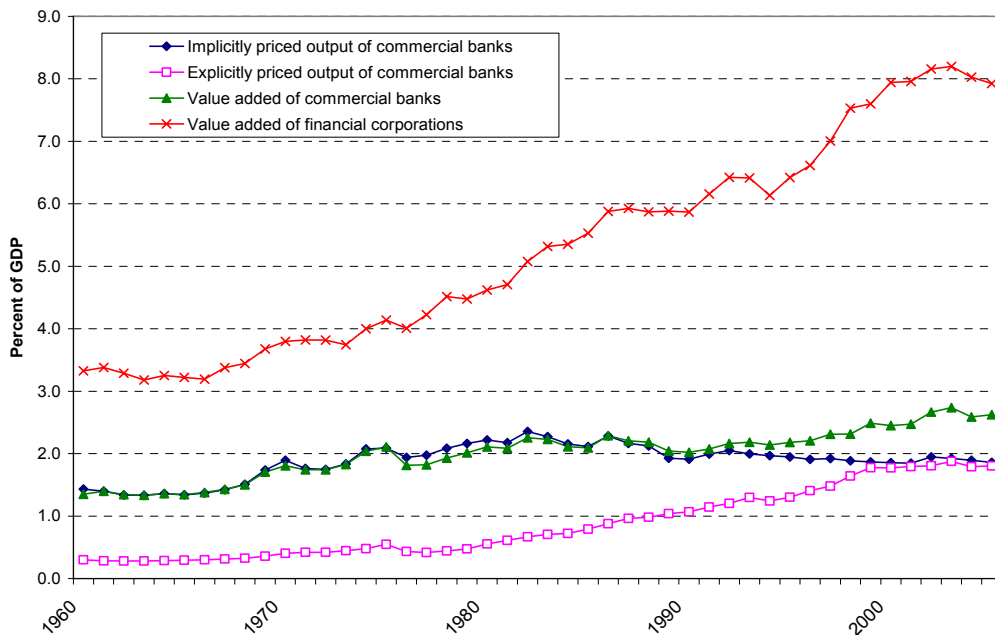
Figure 1

**Relation between the reference rate,
the loan rate, and the deposit rate**
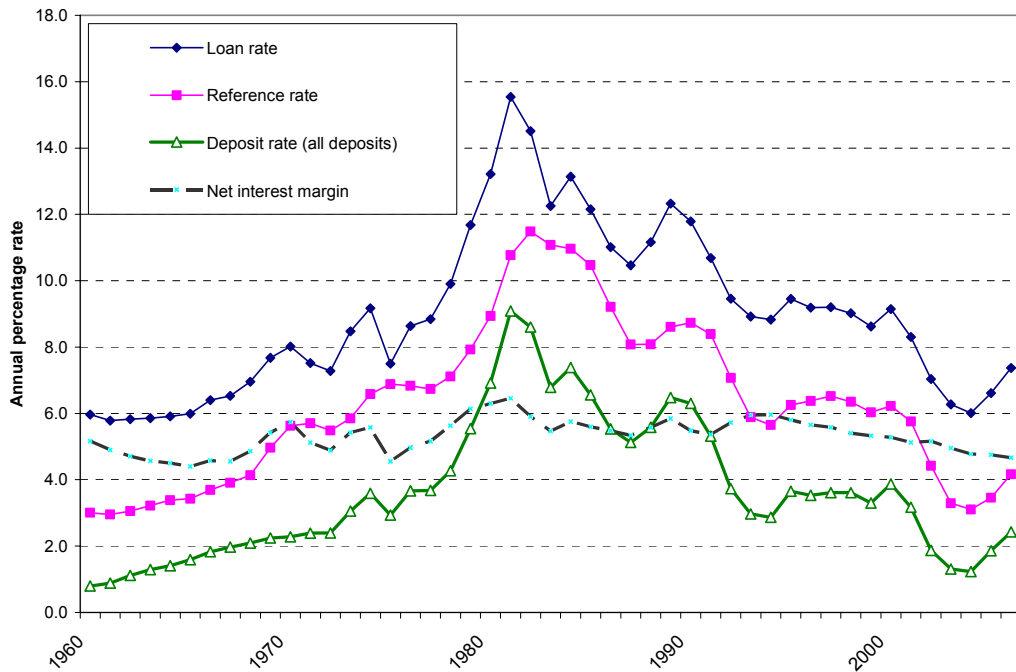
Source: author's calculations from unpublished underlying detail of the US National Income and Product Accounts.

Figure 2

**Value added of banks and of financial corporations,
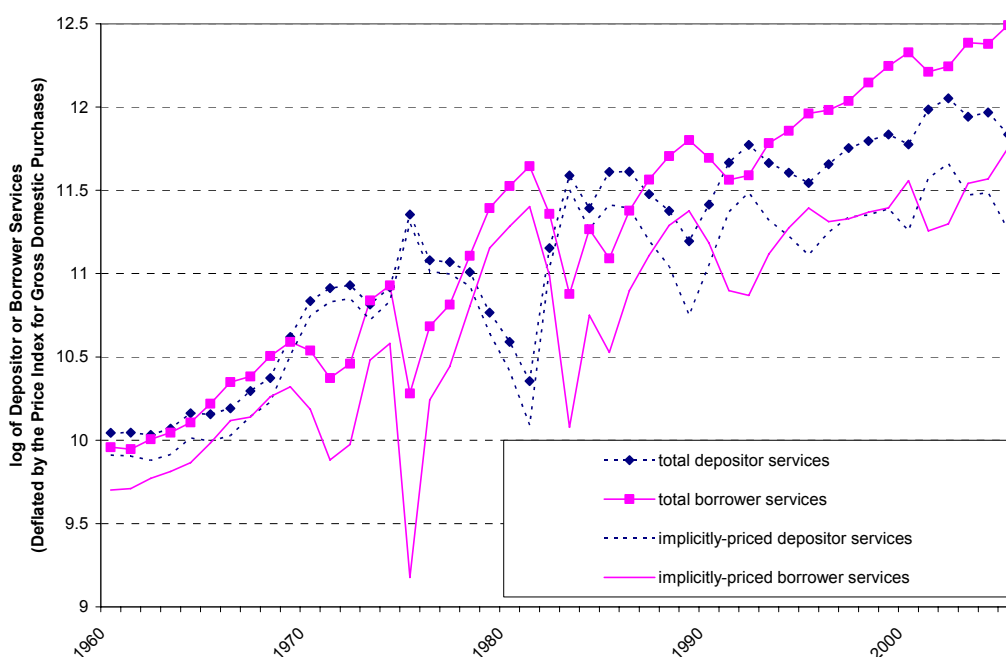and implicitly and explicitly priced bank services**

Source: author's calculations from unpublished underlying detail of the US National Income and Product Accounts.

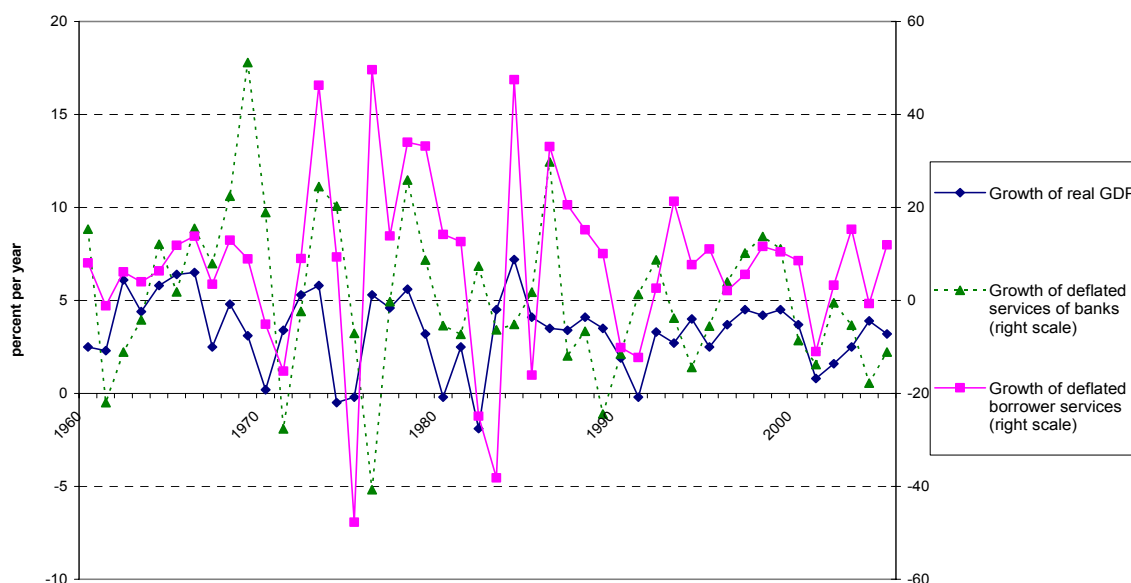Figure 3

Growth of depositor and borrower services

Deflated by the price index for gross domestic purchases

Source: author's calculations from unpublished underlying detail of the US National Income and Product Accounts.

Figure 4

Borrower services are coincident with real GDP

Note: Correlation with real GDP growth is 0.5 for borrower services and 0.0 for all services of banks.

Source: author's calculations from unpublished underlying detail of the US National Income and Product Accounts.