The Measurement of Banking Services in the System of National Accounts

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Abstract

The paper considers some of the problems that are associated with the measurement of banking sector outputs and the System of National Accounts FISIM (Financial Intermediation Services Indirectly Measured) imputations. When imputations for measuring financial services are made in the Finance sector, care must be taken to insure that offsetting imputations are made in other sectors. It is found that there are several plausible accounting schemes that could be used to account for financial services. The paper takes a user cost and supplier benefit approach to determine the price and quantity for various financial services in the banking sector. The alternative accounting frameworks have implications for the labour and multifactor productivity of both the financial and nonfinancial sectors.

Journal of Economic Literature Classification Numbers

C43, C67, C82, D24, D57, E22, E41.

Keywords

User costs, banking services, deposit services, loan services, Total Factor Productivity growth, production accounts, System of National Accounts, FISIM, Financial Intermediation Services Indirectly Measured.

1. Introduction

One of the most difficult to measure parts of the System of National Accounts and the Consumer and Producer Price Indexes is the measurement of the outputs (and the inputs) of the financial sector. The pricing of financial services is so controversial that there has not been general agreement on how to measure the value of various types of financial services like banking and insurance outputs and there is even less agreement on how to measure the quantity (or price) of financial services.2 There is also disagreement on how

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to include financial services in the Consumer Price Index. Most Consumer Price Indexes, including the U.S. CPI, exclude many financial services because CPI methodology regards these services as costs of moving consumption from one period to another period and hence regards these costs as being out of scope. However, Fixler (2009 239-241) makes a case for including these transactions costs in a CPI, arguing that since households are spending their resources on these financial services, they must be getting some benefit or utility from the purchase of these products and hence these products belong in the CPI. However, proponents of excluding these products from the CPI might argue in return that these products seem to be unconnected to this period’s consumption so perhaps they should be regarded as part of the household’s home production sector and hence be excluded from the current period CPI, which is supposed to measure the price of current consumption. This point of view could be accepted except that we need to ensure that these costs are captured somewhere in the household accounts. On the other hand, advocates of Fixler’s position could respond by saying that it is well established that the inputs purchased by households for home production, which in turn produces final consumption services, are generally in scope for a CPI and so we are back to Fixler’s position.

Fixler (2009) constructed a financial services price index for households in the U.S. by using the BEA’s data base on Personal Consumption Expenditures. The two controversial components in Fixler’s experimental household financial services index are imputed household bank deposit services and imputed household loan services. We will explain Fixler’s theoretical user cost framework for modeling these two components of household financial services in a bit of detail (using somewhat different notation than he used) in sections 2 and 3 below because this will help introduce the reader to some of the difficult issues that arise in the banking literature.

Once the user cost approaches to modeling the demand for bank deposits and the supply of loans have been explained, we turn our attention to some of the treatments of bank services that have been suggested in a national income accounting literature. In section 4, we start off by considering two alternative cash flow approaches; i.e., these approaches simply follow the financial flows that the banking sector generates in an accounting period. These cash flow approaches to modeling banking services in a system of national accounts prove to be problematic and so in section 5, the user cost approach to financial flows is introduced into the accounting framework. Section 6 modifies the approaches explained in section 5 by introducing capital services into the accounting framework; the financial flows in the system of accounts are viewed as facilitating the flow of waiting services to the nonfinancial production sector. Section 7 concludes.

2. The User Cost Approach to Valuing the Services of Bank Deposits

Following Fixler (2009), suppose that the household reference rate of return on safe assets is $r_H$ for the period under consideration and the banking sector pays on average an

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interest rate of \( r_D \) on bank deposits. Then the \textit{beginning of the period user cost} \( u_D \) of holding a dollar of deposits (on average) throughout the period is:

\[
(1) \quad u_D \equiv 1 - \frac{(1 + r_D)}{(1 + r_H)} = \frac{(r_H - r_D)}{(1 + r_H)}.
\]

Thus a household that decides to hold one dollar of deposits throughout the accounting period gives up a dollar at the beginning of the period (and this dollar could be spent on general consumption) and in return, the dollar is returned to the consumer at the end of the period plus the rate of interest \( r_D \) that banks pay on deposits. But this end of period benefit of \( 1 + r_D \) is not as valuable due to the postponement of consumption for the period so this benefit must be discounted to the beginning of the period by 1 plus the safe household interest rate of interest that the household faces at the beginning of the period, \( 1 + r_H \). Thus the net cost to the consumer of holding a dollar of demand deposits over the accounting period is \( 1 - \frac{(1 + r_D)}{(1 + r_H)} \).\(^3\) Usually, the household safe reference rate \( r_H \) will be greater than the bank deposit rate \( r_D \).

As mentioned above, the costs and benefits of holding the bank deposit are discounted to the beginning of the period. However, it is possible to \textit{reverse discount} the costs and benefits to the end of the period and this leads to the following \textit{end of the period user cost} \( U_D \) of holding a deposit:\(^4\)

\[
(2) \quad U_D \equiv (1 + r_H)u_D = r_H - r_D.
\]

End of period user costs are more consistent with accounting conventions\(^5\) and they are simpler to interpret so we will work with them in what follows.

Given the end of period user cost for a bank deposit, \( U_D \), and the (asset) value of household bank deposits \( V_D \), the \textit{imputed (nominal) value of bank deposit services}, \( S_D \), is defined as the product of \( U_D \) and \( V_D \):

\[
(3) \quad S_D \equiv U_D V_D = (r_H - r_D) V_D.
\]

However, the above model is not quite a complete one; i.e., we have not specified what the real quantity of deposit services is; (3) just defines the nominal value of deposit services. In order to determine what the real quantity of monetary services is, it is necessary to ask exactly what the purpose of these household deposits are. If the purpose is to buy consumer goods and services, then it seems reasonable to deflate \( V_D \) by the corresponding consumer price index (excluding financial services), \( P_C \) say, and define the \textit{real quantity of bank deposit services}, \( Q_D \), as follows:\(^6\)


\[^4\] See Diewert (2005, 485-486) for a discussion of beginning and end of period user costs.

\[^5\] See Peasnell (1981; 56).

\[^6\] Since prices are discounted to the end of the period, \( P_C \) should be the consumer price index value that corresponds to the end of the period in order to reflect opportunity costs at that time. Feenstra (1986)
(4) \( Q_D \equiv V_D/P_C \).

Using (3) and (4), we see that the final price for bank deposit services must be \( P_D \) defined as follows:

(5) \( P_D \equiv (r_H - r_D)P_C = S_D/Q_D \).

It should be noted that Fixler did not use a consumer price index \( P_C \) in order to form real balances \( Q_D \); instead he used the U.S. gross domestic purchases chain price index as his deflator.\(^7\)

3. The Supplier Benefit Approach to Pricing the Services of a Bank Loan

Fixler went on to derive the net benefit to a bank of a consumer loan. The same user cost methodology that was used in the previous section is now applied to bank loans but now we have a net benefit to the bank rather than a net cost to the household. Fixler assumed that the bank has the same opportunity cost for financial capital as households so that the bank’s reference rate is also \( r_H \)\(^8\) and it makes loans to households and nonfinancial businesses at the rate of interest \( r_L \) which is greater that \( r_H \). Then the beginning of the period supplier benefit \( u_L \) to the bank of making a loan is:

(6) \( u_L \equiv -1 + (1 + r_L)/(1 + r_H) = (r_L - r_H)/(1 + r_H) \).

In this paper, we will concentrate on the case of business loans in order to simplify the intersectoral flows which will be considered in subsequent sections. Thus a bank that decides to make a loan of one dollar at the beginning of the accounting period to a business gives up a dollar at the beginning of the period and in return, the dollar is returned to the bank at the end of the period with an additional payment of \( r_L \), which is net interest rate that the borrower pays for the use of the funds during the accounting period.

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\(^7\) Here is perhaps our first point of controversy in this literature: what exactly is the “right” deflator to be used in (4) in order to form real balances? Basu (2009) in his commentary on Fixler notes that we need an appropriate theoretical framework in order to decide this question and other questions which will follow. The problem is that “practical” price statisticians and national income accountants need answers which are at least approximately consistent with economic theory (and relatively simple so that they can be explained to the public) right now but there is little professional consensus on what the “right” model is. Note also that Christina Wang and her coauthors would disagree with Fixler’s approach to the determination of real monetary services: this group would prefer to form direct estimates for the quantity of monetary deposit services based on the number of transactions and then deflate the user cost value of monetary services by this quantity index in order to obtain an implicit price index. See Wang (2003), Wang, Basu and Fernald (2009), Basu, Inklaar and Wang (2009), Wang and Basu (2010) and Inklaar and Wang (2010). We prefer to follow Fixler and use the model of Feenstra (1986) to justify the price deflation approach rather than the transactions approach.

\(^8\) This assumption will be relaxed in section 5 below.
period.\(^9\) But the end of period benefit to the bank of \(1 + r_L\) is not as valuable as a comparable beginning of the period benefit so this benefit must be discounted to the beginning of the period by \(1 + r_H\). Thus the net benefit to the bank of providing a loan of one dollar over the accounting period is 
\[-1 + (1 + r_L)/(1 + r_H).\]

Instead of discounting costs and benefits to the beginning of the period in order to obtain net present values, we can anti-discount to the end of the accounting period and define *end of the period supplier benefit* to the bank \(U_L\) of making a one dollar loan:

\[(7) \quad U_L \equiv (1 + r_H) u_L = r_L - r_H.\]

Thus the end of the period supplier benefit \(U_L\) of a one dollar loan is the beginning of the period supplier benefit \(u_L\) multiplied by \(1 + r_H\).

Given the end of period household user cost for a bank loan, \(U_L\), and the beginning of the period asset value of business bank loans \(V_L\), the *imputed (nominal) value of business bank loan services*, \(S_L\), is defined as the product of \(U_L\) and \(V_L\):

\[(8) \quad S_L \equiv U_L V_L = (r_L - r_H)V_L.\]

Note that \(S_L\) just defines the nominal value of business loan services. In order to determine what the real quantity of these services is, it is necessary to ask exactly what the purpose of these business loans are. In the case of business loans, it is natural to assume that most loans are made in order to purchase capital inputs. Thus a natural deflator is say \(P_K\), a price index for capital of all types used for business purposes. Although Fixler deflated \(V_L\) by the same deflator that he used to deflate household bank deposits, it is simple enough conceptually to deflate \(V_L\) by the more appropriate deflator, \(P_K\), and to define the *real quantity of bank business loan services*, \(Q_L\), as follows:

\[(9) \quad Q_L \equiv V_L/P_K.\]

Using (8) and (9), we see that the final price for business bank loan services must be \(P_L\) defined as follows:

\[(10) \quad P_L \equiv (r_L - r_H)P_K = S_L/Q_L.\]

In his paper, Fixler (2009) uses the above theory (applied to household loans rather than business loans) in order to construct various alternative financial services price indexes.

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\(^9\) The net loan rate \(r_L\) is equal to the gross interest rate less the expected loss on a dollar’s worth of loans due to default risk. For simplicity, in this paper we will assume that expectations are realized and so ex ante user costs and benefits will always be equal to ex post user costs and benefits.

\(^{10}\) The user cost or more accurately, the supplier benefit, of a loan is due to Donovan (1978) and Barnett (1978) (1980) for the case of household loans. For the case of business loans, see Hancock (1985) (1991) and Fixler and Zieschang (1992) (1999).
using BEA quarterly data over the period 1987-2003 and finds (not surprisingly) that the various alternative treatments do make a difference.

Basu (2009; 267), in his commentary on Fixler’s paper, notes the ambiguity in choosing the deflator for converting nominal financial values into real ones:

“But what is the right price index? One might divide by the GDP deflator, on the grounds that it is the most comprehensive, or by the CPI, on the grounds that consumers use bank deposits to buy consumption goods. When issues of this importance are left ambiguous, it is usually a sign that more detailed theorizing is necessary.”

Basu is surely on target in his criticism of the details of the user cost approach to defining nominal and real bank outputs. Two questions arise from the brief exposition of the user cost approach outlined above:

- Should the same reference rate be used for defining the user costs for household bank deposits and for household and business bank loans?
- What are the appropriate price deflators to convert nominal financial service flows into real flows? In particular, should these deflators be the same across the suppliers and users of financial capital?\(^\text{11}\)

We agree with Basu that more detailed theories are required in order to answer the above questions.

Basu goes on to criticize another aspect of the above user cost approach to modeling the price and quantity of financial services in that he is critical of equations (4) and (9) above, which define the real quantity of financial services as being proportional to stocks of financial assets held by banks or households. Basu suggests that direct measures of the services rendered by consuming financial services be constructed and then the nominal service flows would be deflated by these direct measures, yielding an implicit price index for the services, as an alternative to deflating nominal asset holdings by a price index. Basu then completes his commentary by outlining his alternative approach which has been jointly developed by himself and Christina Wang and John Fernald; see Wang, Basu and Fernald (2009). In principle, there can be no objection to Basu’s suggested approach: a value aggregate is equal to the product of price times quantity so if we know the value and either price or quantity, that is all that is required. The devil is in the details; i.e., a detailed model developed by user cost advocates such as Fixler can be compared to the detailed model developed by Basu and his coworkers and users can decide which framework seems more reasonable.

With the above background material on user costs and benefits out of the way, we turn to the treatment of banking services in the System of National Accounts (SNA).

4. Preliminary Approaches to the Treatment of Banking Services in the SNA

In this section, we will discuss how the *System of National Accounts 1993* proposed to measure banking services.

\(^{11}\) The answer to this last question is: probably not. The deflator for the supplier of the funds should be the price of the foregone alternative while the price to the user of the funds should be related to the intended use of the funds.
With the exception of banking services (or financial intermediation services more generally), SNA 1993 treats interest payments as transfer payments in the primary distribution of income accounts; i.e., interest flows are generally treated as primary input flows between sectors. In order to understand the SNA treatment of banking services, it will be useful to construct a very simple model of the value flows in a three sector model of a closed economy (with no government sector). The three sectors are H, the household sector, B, the banking sector and N, the nonfinancial production sector. The price and quantity of explicitly priced banking services are \( P_B \) and \( Y_B \) and the price and quantity of nonfinancial consumption are \( P_N \) and \( Y_N \) respectively. The price and quantity of nonfinancial, nondurable primary inputs (e.g., labour) for the banking sector are \( W_B \) and \( X_B \) and for the nonfinancial sector are \( W_N \) and \( X_N \) respectively. Only consumers hold deposit balances of \( V_D \) dollars at the beginning of the period and the bank interest rate on deposits is \( r_D \). There are no household loans for simplicity. The nonfinancial sector borrows financial capital (to purchase capital stocks) from the household sector and from the banking sector. Households provide \( V_B \) dollars of financial capital to the banking sector and \( V_N \) dollars of financial capital to the nonfinancial sector and earn the net interest rates on these investments of \( r_{HB} \) and \( r_{HN} \) respectively.\(^{12}\) The banking sector provides \( V_L \) dollars of loans to the nonfinancial sector at the net interest rate \( r_L \) (the bank loan rate). With the above definitions, we can now put together a picture of the intersectoral flows in the economy in Table 1.\(^{13}\)

**Table 1: Cash Flow Intersectoral Value Flows with no Imputations**

<table>
<thead>
<tr>
<th>Row</th>
<th>Households</th>
<th>Banking Sector</th>
<th>Nonfinancial Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Net</strong></td>
<td><strong>Output</strong></td>
<td><strong>Flows</strong></td>
</tr>
<tr>
<td>1</td>
<td>( P_B Y_B + P_N Y_N )</td>
<td>( P_B Y_B )</td>
<td>( P_N Y_N )</td>
</tr>
<tr>
<td></td>
<td><strong>Primary</strong></td>
<td><strong>Input</strong></td>
<td><strong>Flows</strong></td>
</tr>
<tr>
<td>2</td>
<td>( W_B X_B + W_N X_N )</td>
<td>( W_B X_B )</td>
<td>( W_N X_N )</td>
</tr>
<tr>
<td>3</td>
<td>( r_{HB} V_B + r_{HN} V_N )</td>
<td>( r_{HB} V_B )</td>
<td>( r_{HN} V_N )</td>
</tr>
<tr>
<td>4</td>
<td>( r_D V_D )</td>
<td>( r_D V_D )</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>(- r_L V_L )</td>
<td>( r_L V_L )</td>
</tr>
</tbody>
</table>

\(^{12}\) These (net; i.e., after expected defaults) interest rates can be thought of as weighted averages of bond and equity rates of return. These rates of return can be interpreted as ex ante expected prices or ex post actual realized prices, depending on the purpose of the accounts.

\(^{13}\) SNA 1993 does not correspond precisely to the flows laid out in Table 1; i.e., neglecting the FISIM imputations, rows 3-5 in Table 1 would be consolidated in SNA 1993 as net operating surplus, which in turn is equal to the row 1 entries less the row 2 entries. We will follow Rymes (1968) (1983) and regard net operating surplus as a repository for interest waiting services, which we regard as a primary input. Thus we have changed net operating surplus from a balancing item in the SNA to a reward for postponing consumption, a service whose price is the interest rate.
The value flows in each row of column H (Households) in Table 1 are equal to the sum of the corresponding value flows in columns B (Banking Sector) and N (Nonfinancial Sector) so that each row reflects the fact that the value of household demand (or supply) for each commodity equals the corresponding aggregate production sector supply (or demand) for the same commodity.\footnote{Since the value flows in rows 1, 2 and 3 of Table 1 are not controversial, we have aggregated the various value flows across commodities to make the table smaller.} We also assume for simplicity that the value flows in row 1 of the table are equal to the sum of the value flows in rows 2-5 of the table for each column so that there are no net savings or profits or losses in the economy. These two sets of adding up assumptions mean that we can estimate Net National Product (NNP)\footnote{We have not introduced a separate investment sector so it can be thought of as being part of the general nonfinancial production sector N. We are implicitly assuming that depreciation is treated as an intermediate input and acts as an offset to gross investment.} in nominal terms in any one of four ways:

- As the value in row 1 and column H (final demand NNP);
- As the sum of the values in row 1 and columns B and N (production accounts sum of value added across industries);
- As the sum of the values in rows 2-5 and column H (household net income), or
- As the sum of the values in rows 2-5 and columns B and N (production accounts distribution of primary factor income generated by production).

There is nothing problematic about the entries in rows 1-3 of Table 1. However, problems arise when we consolidate the interest flows listed in rows 3-5. The total interest income received by households is the sum interest (and imputed equity) income received directly from the banking sector and from the nonfinancial production sector, $r_{HB}V_{HB} + r_{HN}V_{HN}$, plus bank interest paid on household bank deposits, $r_{D}V_{D}$. This is not a problem nor is the fact that the nonfinancial sector pays out interest payments of $r_{HN}V_{HN}$ to households and $r_{L}V_{L}$ to the banking sector. The problem is that the consolidated net interest payments made by the banking sector to other sectors, $r_{HB}V_{HB}$ (interest and imputed equity payments to households) plus $r_{D}V_{D}$ (interest payments to households for the use of their bank deposits) less $r_{L}V_{L}$ (loan interest received from the nonfinancial production sector), will be a negative number in all real life economies.\footnote{Formally, this will be true in our simplified model if explicit fee bank revenue, $P_{B}Y_{B}$, is less than bank nonfinancial primary input payments, $W_{B}X_{B}$.} This negative number will decrease the value added generated by the banking sector and if explicit fee revenue is zero, the value added of the banking sector will turn out to be zero as well. Under these hypotheses, the nonfinancial primary inputs $X_{B}$ being used by the banking sector seem to be contributing nothing to NNP. Thus the contribution of the banking sector to NNP seems to be understated.

The 1993 version of the System of National Accounts (SNA) recognized the above problem that banking sector output seemed to be understated in the SNA production accounts as they were originally designed.\footnote{Earlier versions of the SNA also recognized that there was a problem measuring banking output.} It is worth quoting in some detail the solution that SNA 1993 suggested for this problem:
“Some financial intermediaries are able to provide services for which they do not charge explicitly by paying or charging different rates of interest to borrowers or lenders (and to different categories of borrowers and lenders). They pay lower rates of interest than would otherwise be the case to those who lend them money and charge higher rates of interest to those who borrow from them. The resulting net receipts of interest are used to defray their expenses and provide an operating surplus. This scheme of interest rates avoids the need to charge their customers individually for services provided and leads to the pattern of interest rates observed in practice. However, in this situation, the System must use an indirect measure, financial intermediation services indirectly measured (FISIM), of the value of services for which the intermediaries do not charge explicitly.

“The total value of FISIM is measured in the System as the total property income receivable by financial intermediaries minus their total interest payable, excluding the value of any property income receivable from the investment of their own funds, as such income does not arise from financial intermediation. Whenever the production of output is recorded in the System, the use of that output must be explicitly accounted for elsewhere in the System. Hence FISIM must be recorded as being disposed of in one or more of the following ways—as intermediate consumption by enterprises, as final consumption by households, or as exports to non-residents. ...”

“As can be seen from the above, it is not a trivial matter to make an imputation in the SNA. Unfortunately, the banking imputation solution suggested by SNA 1993 was soon attacked on the details of its implementation; it proved to be difficult to figure out how to do the imputations for banking services, taking into account the exclusion of the property income generated by the banking sector’s own funds. Thus we will not examine the details of the FISIM imputation; instead, we will provide our own solution to the underestimation of banking sector output in the SNA.

As a first step towards a resolution of the banking problem, we could take the loan and deposit interest flows of the banking sector out of the primary input flows and instead, treat them as output or intermediate input flows. Thus in Table 2, we have taken rows 4 and 5 out of Table 1, changed the signs of these entries and inserted the resulting lines into the Net Output flows of the accounts. Note that this reclassification of primary input flows into net intermediate input flows does not change the profitability of each sector and the demand equals supply restrictions on the production and use of commodities are still maintained.

Table 2: Reclassified Intersectoral Value Flows with no Imputations

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19 The Table 2 accounting setup seems to be consistent with the Ruggles and Ruggles (1970) and Triplett and Bosworth (2004: 201) measure of bank output, which regarded banking as a margin industry similar to wholesaling or retailing.
Note that our reclassification of some of the primary input income flows into net intermediate input flows has the effect of decreasing NNP; i.e., the new NNP is equal to the sum of rows 1 and 2 down column H (and of course, there are three other ways of calculating NNP) which is \( P_B Y_B + P_N Y_N \) - \( r_D V_D \), which is less than the Table 5 NNP of \( P_B Y_B + P_N Y_N \). The net output of the banking sector is now the sum of explicit fee income, \( P_B Y_B \), plus its loan interest revenue, \( r_L V_L \), less its deposit interest payments to households, \( -r_L V_L \). Thus the banking sector’s net interest income is the difference \( r_L V_L - r_D V_D \), and thus the industry is treated as a kind of financial margin industry, similar to wholesaling or retailing, except that the product being bought and sold is the use of financial capital for one period instead of specific goods. The net output of the nonfinancial production sector is now the value of nonfinancial goods and services produced less loan interest payments, \( P_N Y_N - r_L V_L \), which is (much) less than the corresponding contribution to NNP in Table 5, which was \( P_N Y_N \). Thus the net effect of the above reclassifications is to:

- Decrease NNP;
- Decrease the contribution of the nonfinancial production sector to NNP and
- Increase the contribution of the banking sector to NNP so that even if explicitly priced bank services are zero, the banking sector will make a positive contribution to production.

The accounting framework defined by Table 2 seems at first sight to be satisfactory but there are some residual problems remaining:

- Household banking deposit services do not contribute anything to NNP; in fact, they are regarded as a *drain* on NNP;
- The output of the banking sector now seems to be too large compared to the output of the nonfinancial production sector, whereas before, it appeared to be too small\(^{20}\) and

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\(^{20}\) Conversely, the output of the nonfinancial sector now appears to be too small. The problem resides with the row 3 entries: all of the waiting services that are provided to sector N by bank loans, \( r_L V_L \), are now regarded as intermediate input services and deducted from the value of output in sector N, leading to a
• Explicit financial services of the banking sector to both households and to the nonfinancial sector (of the type discussed by Fixler (2009)) are not recognized in the above accounting framework.

We can now relate the above material to the contributions to the banking literature in Fixler (2009) and Wang, Basu and Fernald (2009). Fixler suggests that the contribution of deposit services to NNP should be \((r_H - r_D)V_D\) where \(r_H\) is a household reference safe interest rate instead of the present negative contribution of \(-r_DV_D\). Using the user benefit concept applied to the bank loans to sector N, it appears that the banking sector’s service in providing loan services to the nonfinancial sector should be \((r_L - r_H)V_L\) instead of \(r_HV_L\). Wang, Basu and Fernald (2009) would go further and say that Fixler’s suggested measure of banking loan services is still too large; they would replace \((r_L - r_H)V_L\) by \((r_L - r_{RB})V_L\) where \(r_{RB}\) is a reference bank rate which is higher than the household safe interest rate \(r_H\) (but still lower than the bank lending rate of \(r_L\)) due to the inclusion of a risk premium in \(r_{RB}\). Basically, what Wang and her coauthors assume is that households take all the risks in the economy; banks have only a screening and monitoring of loans function, and the price for this service is collected via the (smaller) interest rate margin, \(r_L - r_{RB}\). Can the theory in the previous section cast any light on this controversy? Our answer is yes, and it seems that the user benefit theory from the previous section will provide substantial support to the position of Wang, Basu and Fernald (2009) in this choice of interest rate decision.

5. The Introduction of Financial User Costs and Benefits into the System of National Accounts

Our task now is to show how the accounts in Table 2 can be modified to deal with the three difficulties noted above. We will be more general than Fixler at this stage and assume that the household opportunity cost reference rate for holding bank deposits is the safe interest rate \(r_H\) as before. But now we assume that the bank’s opportunity cost of capital is \(r_{HB} > r_H\) since \(r_{HB}\) is the rate of return required by households to provide financial capital to the (risky) banking sector and hence this rate should be used in place of the safe rate \(r_H\) for discounting purposes when the supplier benefit of a bank loan, \(u_L\), is calculated using equation (6) above. Thus the appropriate household value of deposit services is \((r_H - r_D)V_D\) and the appropriate value of banking loan services is \((r_L - r_{HB})V_L\).

We can obtain the entry \((r_H - r_D)V_D\) in row 2 and column H of Table 3 by adding \(r_HV_D\) to the corresponding entry in Table 2. In order to offset this imputation and to ensure that the value of output is equal to the value of input by sector, we need to also add \(r_HV_D\) as an extra imputed income for the household sector; we do this in Table 3 by adding \(r_HV_D\) to household income in a new row 6, which accounts for our income imputations. But these two imputations to the household column of the accounts have upset the net demand equals net supply restrictions that our system of production accounts should possess. Hence we also need to add \(r_HV_D\) to rows 2 and 6 of the banking column of our accounts. A similar set of imputations will work for bank loans. Thus subtract \(r_{HB}V_L\) from row 3 of

much reduced contribution to NNP from sector N. Waiting services are really a primary input and hence should (perhaps) be classified as a primary input into sector N rather than an intermediate input service.
column B in Table 2 and we more or less obtain the Wang and coauthors suggested measure of nominal banking loan services (since the banking reference rate $r_{HB}$ contains the household risk premium for providing financial capital to the banking sector), $(r_L - r_{HB})V_L$. In order to ensure that the value of banking outputs equals the value of banking inputs, we need to subtract $r_{HB}V_L$ from the income components of the banking column and so we do this in row 6 of Table 3. Again, these two imputations to the banking column of the accounts have upset the net demand equals net supply restrictions that our system of production accounts should possess. Hence we also need to add $r_{HB}V_L$ to rows 3 and 6 of the N column of our accounts. After making these eight imputations, the resulting system of accounts is given in Table 3.\footnote{The two zeros in Table 3 reflect our simplifying assumptions that (i) banks do not make loans to households and (ii) the nonfinancial sector does not hold any bank deposits. However, following our earlier logic, the reader can see how to relax these assumptions. The cost of relaxing these assumptions will be an additional eight imputations.}

**Table 3: Reclassified Intersectoral Value Flows with Imputations: Primary Income Generated Presentation**

<table>
<thead>
<tr>
<th>Row</th>
<th>H</th>
<th>B</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net</td>
<td>$P_B Y_B + P_N Y_N$</td>
<td>$P_B Y_B$</td>
<td>$P_N Y_N$</td>
</tr>
<tr>
<td>2</td>
<td>$(r_H - r_D)V_D$</td>
<td>$(r_H - r_D)V_D$</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>$(r_L - r_{HB})V_L$</td>
<td>$-(r_L - r_{HB})V_L$</td>
</tr>
<tr>
<td>Primary</td>
<td>Input</td>
<td>Flows</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>$W_B X_B + W_N X_N$</td>
<td>$W_B X_B$</td>
<td>$W_N X_N$</td>
</tr>
<tr>
<td>5</td>
<td>$r_{HB} V_B + r_{HN} V_N$</td>
<td>$r_{HB} V_B$</td>
<td>$r_{HN} V_N$</td>
</tr>
<tr>
<td>6</td>
<td>$-r_{HB} V_L$</td>
<td>$r_{HB} V_L$</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>$r_H V_D$</td>
<td>$r_H V_D$</td>
<td></td>
</tr>
</tbody>
</table>

The value of banking sector outputs in Table 3 now consists of three output terms instead of the previous two output terms (and one intermediate input term) in Table 3: the sum of explicitly priced services, $P_B Y_B$, bank deposit service margins, $(r_H - r_D)V_D$, and bank loan margin services, $(r_L - r_{HB})V_L$. Assuming that these service margins are positive, it can be seen that the Table 3 NNP is larger than the Table 1 NNP which in turn is larger than the Table 2 NNP. Assuming that gross banking service margins, $r_L V_L - r_D V_D$ are greater than net banking service margins, $(r_L - r_{HB})V_L + (r_H - r_D)V_D$, which in turn are positive, it can be seen that the banking sector makes the smallest contribution to NNP using the Table 1 accounting framework and the largest contribution using the Table 2 framework so that our final framework gives an intermediate sized contribution. The disadvantage of the Table 1 setup is that the banking sector made no contribution to NNP. One advantage of
the Table 3 setup over the Table 2 setup is that the separate contributions of the banking sector to the provision of deposit services and loan services is now explicit whereas in Table 2, we can see only an aggregate services contribution. Of course, a disadvantage of the Table 3 framework is that we now have to specify interest rates for deposits, loans and the provision of financial capital to the two sectors and this may prove to be contentious.

Comparing the income sides of Tables 2 and 3, it can be seen that household nominal income (which is equal to nominal NNP) increases going from Table 2 to 3 by \( r_H V_D \), the product of the household reference interest rate \( r_H \) times the value of household bank deposits, \( V_D \). Turning to the production side of the income accounts, as we go from Table 2 to 3, it can be seen that the net income generated by the banking sector will decrease while the net income attributed to the nonfinancial production sector will greatly increase by the amount \( r_{HB} V_L \), which is the household reference interest rate for supplying financial capital to the banking sector, \( r_{HB} \), times the value of bank loans to the nonfinancial production sector, \( V_L \). Thus it appears that the series of imputations made going from Table 2 to 3 is one way of implementing the Wang and coauthors view of the world where the banking sector mostly acts as a mechanism for transferring income generated by the nonfinancial production sector to the household sector.\(^{22}\)

Perhaps the biggest advantage of the Table 3 imputations framework is that it can be readily integrated with a coherent system of sectoral productivity accounts. The System of National Accounts 2008 makes provisions for capital services to appear in the production accounts. If we attempt to model the provision of capital services using the Table 2 accounting framework, we will have to convert the financial flows in rows 3 and 5 (which are the intermediate and primary input interest flows) into the waiting services part of the user cost of capital,\(^{23}\) so that capital services will appear in both the intermediate and primary input parts of the accounts. On the other hand, if we use the Table 3 framework, the flow of waiting services of capital will be collected together in rows 5 and 6 of the nonfinancial production sector accounts so that all of these capital services will appear only in the primary input accounts of the industries that use the capital services.\(^{24}\)

Note that if the Table 3 accounting framework is used in constructing productivity accounts, then bank deposits held by households should be treated as a capital asset in these accounts.

The presentation of the economy’s value flows of interest earned by the sectors in Table 3 is organized according to the primary income generated by each sector. In particular,

\(^{22}\) As Schreyer (2009; 322) notes in his discussion of Wang, Basu and Fernald (2009), the activities of banks can reduce risks to the household sector; i.e., banks are more than bill collectors and monitors. However, because the cost of raising capital in the banking sector \( r_{HB} \) is greater than the safe rate of return \( r_H \), our approach to modeling the monetary flows of the banking sector seems to be very close to the approach advocated by Wang, Basu and Fernald. However, note that our approach to modeling the real flows of the banking sector is very different; our approach to deflation of monetary flows is based on purpose related deflation whereas the WBF approach is a transaction cost based approach.

\(^{23}\) Recall that we are assuming that the depreciation part of the user cost of capital appears as an intermediate input rather than as a primary input.

\(^{24}\) We will introduce capital services explicitly in the following section.
the entry \( r_{HB}V_L \) in row 6 and in the nonfinancial column N corresponds to the imputed interest income generated by sector N. It is also possible to present the information in Table 3 according to an ownership principle; i.e., only interest flows that correspond to owned capital are listed as primary input flows. Thus the interest flows that correspond to loans in Table 3 (see row 6) can be regarded as intermediate input flows and they can be taken out of the primary inputs category (with a sign change) and added to row 3 of Table 3. The resulting table simplifies to Table 4 below.

Table 4: Reclassified Intersectoral Value Flows with Imputations: Ownership Presentation

<table>
<thead>
<tr>
<th>Row</th>
<th>H</th>
<th>B</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Net</td>
<td>Output</td>
<td>Flows</td>
</tr>
<tr>
<td>1</td>
<td>( P_BY_B + P_NY_N )</td>
<td>( P_BY_B )</td>
<td>( P_NY_N )</td>
</tr>
<tr>
<td>2</td>
<td>( (r_H - r_D)V_D )</td>
<td>( (r_H - r_D)V_D )</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>( r_LV_L )</td>
<td>( -r_LV_L )</td>
</tr>
<tr>
<td></td>
<td>Primary</td>
<td>Input</td>
<td>Flows</td>
</tr>
<tr>
<td>4</td>
<td>( W_BX_B + W_NX_N )</td>
<td>( W_BX_B )</td>
<td>( W_NX_N )</td>
</tr>
<tr>
<td>5</td>
<td>( r_{HB}V_B + r_{HN}V_N )</td>
<td>( r_{HB}V_B )</td>
<td>( r_{HN}V_N )</td>
</tr>
<tr>
<td>6</td>
<td>( r_HV_D )</td>
<td>( r_HV_D )</td>
<td></td>
</tr>
</tbody>
</table>

Table 4 turns out to resemble Table 2 above, except that the treatment of household deposits is different (and more appropriate). However, comparing Table 4 with Table 3, it can be seen that the value added of the banking sector is now greatly augmented and the value of added of the nonfinancial sector is correspondingly reduced. There is nothing illogical about the ownership presentation in Table 4 as opposed to the income generated presentation in Table 3 but users should be made aware that not only is sector value added affected by these alternative presentations but also sectoral Labour Productivities and Total Factor Productivities will be affected.

In the following section, we drive home the differences between Tables 3 and 4 by introducing capital services into the picture.

6. Capital Services in the SNA

In order to illustrate that there are some real differences between the uses and ownership presentations of the System of National Accounts, we will assume that the nonfinancial sector N uses its equity and borrowed financial capital to purchase a physical capital input which has the price \( P_K \). Thus the household values of financial capital directly
invested in sectors B and N, $V_B$ and $V_N$, is replaced by their equivalent capital values, $P_KK_B$ and $P_KK_N$ respectively, where the capital quantities, $K_B$ and $K_N$, are defined as $V_B/P_K$ and $V_N/P_K$ respectively. For simplicity, we assume that the capital asset has a zero depreciation rate so that the user cost of capital in the banking sector is $r_{HB}P_K$ and the user cost of directly invested capital in sector N is $r_{HN}P_K$. We further assume that the capital owned by the banking sector is leased out to the nonfinancial sector at the user cost price $r_LP_K$. Thus the value of loans by sector B to sector N is $V_L \equiv P_KK_B$ and the leasing income received by the banking sector is $r_LP_KK_B$.

Now replace $V_B$, $V_N$ and $V_L$ by $P_KK_B$, $P_KK_N$ and $P_KK_B$ respectively and Table 3 above becomes Table 5 below.

### Table 5: Capital Service Flows: Sectoral Income Generated Presentation

<table>
<thead>
<tr>
<th>Row</th>
<th>H</th>
<th>B</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Net</strong></td>
<td><strong>Output</strong></td>
<td><strong>Flows</strong></td>
</tr>
<tr>
<td>1</td>
<td>$P_BY_B + P_NY_N$</td>
<td>$P_BY_B$</td>
<td>$P_NY_N$</td>
</tr>
<tr>
<td>2</td>
<td>$(r_H - r_D)V_D$</td>
<td>$(r_H - r_D)V_D$</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>$(r_L - r_{HB})P_KK_B$</td>
<td>$-(r_L - r_{HB})P_KK_B$</td>
</tr>
<tr>
<td></td>
<td><strong>Primary</strong></td>
<td><strong>Input</strong></td>
<td><strong>Flows</strong></td>
</tr>
<tr>
<td>4</td>
<td>$W_BX_B + W_NX_N$</td>
<td>$W_BX_B$</td>
<td>$W_NX_N$</td>
</tr>
<tr>
<td>5</td>
<td>$r_{HB}P_KK_B + r_{HN}P_KK_N$</td>
<td>$r_{HB}P_KK_B$</td>
<td>$r_{HN}P_KK_N$</td>
</tr>
<tr>
<td>6</td>
<td>$- r_{HB}P_KK_B$</td>
<td>$r_{HB}P_KK_B$</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>$r_HV_D$</td>
<td>$r_HV_D$</td>
<td></td>
</tr>
</tbody>
</table>

Note that the entries in rows 5 and 6 of the B column in Table 5 cancel out and thus the primary input flows of the banking sector are the sum of labour inputs, $W_BX_B$, and the bank’s user cost of holding household bank deposits, $r_HV_D$. By assumption, there are no physical capital service inputs into the banking sector in this income generating picture of the economy; all of the waiting services are generated in the nonfinancial sector and the waiting services accruing to this capital used by sector N, $r_{HB}P_KK_B + r_{HN}P_KK_N$, are distributed back to the household sector. Note that the banking sector plays a modest role in this picture of the economy, earning small margins on its demand deposit activities and on its lending activities.

Now make the same assumptions as above, replacing $V_B$, $V_N$ and $V_L$ by $P_KK_B$, $P_KK_N$ and $P_KK_B$ respectively and Table 4 above becomes Table 6 below; i.e., Table 6 presents a picture of the economy from the viewpoint of the ownership of capital rather than the primary income generated perspective.

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25 For an accounting framework in a more complete intertemporal model of the temporary equilibrium with depreciable capital, see Diewert (1977; 84)
Table 6: Capital Service Flows: Ownership of Capital Presentation

<table>
<thead>
<tr>
<th>Row</th>
<th>$H$</th>
<th>$B$</th>
<th>$N$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$PBY_B + PN_Y_N$</td>
<td>$PBY_B$</td>
<td>$PN_Y_N$</td>
</tr>
<tr>
<td>2</td>
<td>$(r_H - r_D)V_D$</td>
<td>$(r_H - r_D)V_D$</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>$r_LP_KK_B$</td>
<td>$- r_LP_KK_B$</td>
</tr>
<tr>
<td>4</td>
<td>$WBX_B + WN_X_N$</td>
<td>$WBX_B$</td>
<td>$WN_X_N$</td>
</tr>
<tr>
<td>5</td>
<td>$r_{HB}V_B + r_{HN}V_N$</td>
<td>$r_{HB}P_KK_B$</td>
<td>$r_{HN}P_KK_N$</td>
</tr>
<tr>
<td>6</td>
<td>$r_HV_D$</td>
<td>$r_HV_D$</td>
<td></td>
</tr>
</tbody>
</table>

Table 6 seems close to the present SNA, *System of National Accounts 2008*, in its treatment of capital services that correspond to capital owned by the Finance, Insurance and Real Estate sector; i.e., the leasing and rental income that is generated by these owned assets appears as a counterpart to row 3 in the above Table and so the primary input capital services that enter into the nonfinancial sector include only the services of capital inputs that are owned by sector N. As was mentioned in the previous section, there is nothing wrong with this treatment from a logical point of view and an advantage of the Table 6 setup over the corresponding Table 5 presentation is that Table 6 has fewer imputations. But there is a very large problem with the ownership presentation of the SNA: the value added of the banking sector becomes very large relative to the rest of the economy and this largeness factor becomes bigger the more leased and rented capital that there is in the economy. The ownership presentation of the accounts makes international comparisons of value added or Total Factor Productivity on a sectoral level virtually impossible across countries where the propensity to lease or rent capital can differ substantially. On the other hand, if the income generated version of the accounts is used, then an international comparison of sectoral productivity levels makes sense: real value added per unit of primary input services used by the sector is comparable across countries. Note also that if the nonfinancial sector switches from using owned capital to generate capital services to leasing capital services, its nominal and real value added will

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26 Schreyer (2001) showed that if the primary input base for a sector is made smaller by shifting an input out of the primary input category and into the intermediate input category, then TFP growth (if initially positive) will become larger. Note that this criticism does not apply to economy wide comparisons of Labour and Total Factor Productivity since the Household columns in Tables 5 and 6 are identical. It is only comparisons of sectoral productivity and productivity growth which will be affected by the form of presentation.
change if the ownership version of the accounts is used whereas if the income generated version of the accounts is used, value added will remain virtually unchanged.\textsuperscript{27}

7. Conclusion

There are many other issues which are raised by the measurement of bank output and input and the FISIM imputations. Schreyer (2009) noted that some researchers focus on the flow of financial services whereas other researchers focus on banks as providers of financial capital to borrowers. These differences show up even in a user cost framework where Wang and her coauthors take a transactions approach to the determination of the real quantities of financial services whereas other user cost advocates prefer a deflation approach to the construction of real financial services where the deflator is related to the purpose of the financial transaction. Both points of view appear to have some merit. Schreyer also raised a number of other interesting issues that arose out of the Wang Basu and Fernald (2009) paper:

- Do financial institutions take on any risk themselves or do the risks simply flow through to householders (or more generally, the sectors that make up final demand)?

- What is the scope of financial services? In the European Union, Schreyer notes that the SNA measure of financial services is based solely on bank deposits and loans whereas the U.S. national accounts takes a wider perspective and considers all assets and liabilities that earn interest or imputed interest. We favour the wider perspective.

- The issues of imputed interest flows on equity capital and capital gains on assets arise. We agree with Wang, Basu and Fernald (2009), Schreyer (2009) and Schreyer and Stauffer (2010) that expected holding gains are an important part of the return to capital on many financial instruments and these expected holding gains should be included in income measures.

- There are some subtle issues involving the accounting treatment of loan services. According to Wang, Basu and Fernald (2009), the loan services provided by a bank are monitoring and screening services. However, the screening service occurs just before the loan occurs. If banks were able to charge a specific fee for this screening service, then there would be no accounting problems for the bank (but there would be accounting problems for the borrower since this transactions cost should probably be spread over the life of the loan, leading to an accounting problem). However, since banks are usually not able to charge a specific fee for their screening services, in this case, the imputed fee is equal to the discounted present value of the excess interest margins that they earn on the loan times the declining value of the loan. It will not be straightforward to calculate this expected present value in the period when the loan will be made and thus again, there is an accounting problem.

\textsuperscript{27} There will be a small change due to the markups charged by the financial sector.
• The final problem that Schreyer (2009) raised is how to estimate the size of the risk premium. Empirical estimates of the risk premium seem to be too small but these estimates are based on expected utility maximization problems. Research has shown that we need to move to non-expected utility maximization frameworks in order to obtain more realistic estimates of the equity risk premium.

It can be seen that the measurement of banking sector outputs and inputs raises many significant methodological problems, not only for price measurement, but also for the System of National Accounts. We showed that the uses and ownership perspectives to the treatment of banking services can lead to some problems of comparability when the productivity of particular sectors of the economy are compared across countries; i.e., if the ownership perspective is adopted, then sectoral value added and productivity will vary substantially depending on the ratio of leased and rented capital to owned capital across the economies being compared.

References


