Volume Title: Price Index Concepts and Measurement

Volume Author/Editor: W. Erwin Diewert, John S. Greenlees and Charles R. Hulten, editors

Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-14855-6

Volume URL: http://www.nber.org/books/diew08-1

Conference Date: June 28-29, 2004

Publication Date: December 2009

Chapter Title: Comment on "A General-Equilibrium Asset-Pricing Approach to the Measurement of Nominal and Real Bank Output"

Chapter Author: Paul Schreyer

Chapter URL: http://www.nber.org/chapters/c5082

Chapter pages in book: (320 - 328)

Leland, H. E., and D. H. Pyle. 1977. Informational asymmetries, financial structure, and financial intermediation. *Journal of Finance* 32 (2): 371–87.
Modigliani, F. F., and M. H. Miller. 1958. The cost of capital, corporation finance, and the theory of investment. *American Economic Review* 48 (3): 261–97.
Ramakrishnan, R., and A. V. Thakor. 1984. Information reliability and a theory of financial intermediation. *Review of Economic Studies* 51 (3): 415–32.
Schreyer, P., and P. Stauffer. 2003. Financial services in national accounts: Measurement issues and progress. Paper presented at the meeting of the Organization for Economic Cooperation and Development (OECD) Task Force on Financial Services in the National Accounts, October.
Townsend, R. M. 1979. Optimal contracts and competitive markets with costly state verification. *Journal of Economic Theory* 21 (1): 265–93.
Triplett, J. E., and B. P. Bosworth. 2004a. Measuring banking and finance: Conceptual issues. In *Productivity in the U.S. services sector: New sources of economic growth,* ed. J. E. Triplett and B. P. Bosworth, 177–211. Washington, DC: Brookings Institution.
———. 2004b. Price, output, and productivity of insurance: Conceptual issues. In *Productivity in the U.S. services sector: New sources of economic growth,* ed. J. E. Triplett and B. P. Bosworth, 123–77. Washington, DC: Brookings Institution.
United Nations, Eurostat, International Monetary Fund, Organization for Economic Cooperation and Development, and World Bank. 1993. *System of National Accounts, 1993.* New York: United Nations.
U.S. Department of Labor, Bureau of Labor Statistics. 1998. Technical note on commercial banks, SIC 602: Output components and weights. Manuscript, December. Washington, DC: GPO.
U.S. Federal Reserve Board. 2009. Z.1: Flow of funds accounts of the United States. Available at http://www.federalreserve.gov/releases/z1/current/data.htm.
Wang, J. C. 2003a. Loanable funds, risk, and bank service output. Federal Reserve Bank of Boston, Working Paper no. 03-4, July. Available at http://www.bos.frb.org/economic/wp/wp2003/wp034.htm.
———. 2003b. Service output of bank holding companies in the 1990s, and the role of risk. Federal Reserve Bank of Boston, Working Paper no. 03-6, September. Available at http://www.bos.frb.org/economic/wp/wp2003/wp036.htm.
Wang, J. C., S. Basu, and J. F. Fernald. 2004. A general-equilibrium asset-pricing approach to the measurement of nominal and real bank output. Federal Reserve Bank of Boston, Working Paper no. 04-7, October. Available at http://www.bos.frb.org/economic/wp/wp2004/wp047.htm.

Comment Paul Schreyer

Introduction

The topic of banking output has long been a thorny issue for national accountants and analysts of banking performance and productivity. Christina Wang, Susantu Basu, and John Fernald (see chapter 7 of this volume;

Paul Schreyer is head of the National Accounts Division of the Organisation for Economic Cooperation and Development.

WBF in what follows) provide us with an explicit model of the behavior of households, financial firms, and nonfinancial firms, with a view to drawing conclusions for the measurement of implicitly priced output of banks. Such a model is useful, because it spells out the assumptions underlying the statements about measurement, making them transparent and focusing the discussion. The WBF contribution is also timely, because the topic of banking output has attracted renewed attention at the national and international level in the past two or three years: in Europe, member countries of the European Union agreed on a common method and timeline for the treatment of financial intermediation services indirectly measured (FISIM) in their respective national accounts (Commission of the European Communities 2002); the United States recently introduced a revised treatment of FISIM into their National Income and Product Accounts (Fixler, Reinsdorf, and Smith 2003; NIPAs); and the Organization for Economic Cooperation and Development (OECD) discussed the topic in the context of a Task Force on the Measurement of the Production of Financial Institutions (Schreyer and Stauffer 2003). This was complemented by other contributions, such as those of Triplett and Bosworth (2004), who also discuss the measurement of banking output and make several proposals to advance the matter. It is against this background—new developments in the international debate and existing prescriptions in the System of National Accounts (SNA)—that I will discuss WBF's contribution.

A Point to Reemphasize: Financial Institutions Provide Financial Services

An important feature of WBF's model and its conclusions for measurement is the focus on the actual flow of *financial* services provided by banks. More specifically, in WBF's model, banks provide financial services in the form of screening and monitoring to mitigate asymmetric information problems between potential investors and those seeking funds. This differs from a strand of research (e.g., Ruggles 1983) that sees banks as providers of *finance*[1] (to borrowers) and consequently recommends that the output of banks be measured by the flow of revenues from providing *financing* services—note the subtle but important difference between *financing* and *financial* services.

The emphasis of WBF on financial services as the output of financial institutions is a point worth reiterating. According to WBF, banks exist and create value essentially because there are information asymmetries that make it costly for households and investors with surpluses of funds to lend directly to nonfinancial firms with requirements for funds. There is in fact a significant body of literature that has considered information asymmetries as an explanation for the existence and activity of banks, as documented,

1. See Triplett and Bosworth (2004) for a fuller discussion.

for example, in a survey by Gorton and Winton (2002). However, the step from acknowledging this reason for the existence of financial institutions to bringing out the implications for the measurement of output is much scarcer, and this effort is an important merit of WBF's chapter. A similar conclusion—to put forward financial services as the output of financial institutions—has been reached by the OECD Task Force on Financial Services Measurement (Schreyer and Stauffer 2003), albeit in the context of a much simpler accounting model.

Wang, Basu, and Fernald limit their focus to screening and monitoring services. Other services could easily be put forward—in particular, convenience services (say, for depositors—for example, safeguarding, automatic payments, and provision of checks). This makes little difference to their qualitative conclusions, however. And WBF's limitation to screening and monitoring services reflects the trade-off between providing an explicit modeling approach for important services and keeping the model tractable.

Should the Reference Rate Reflect Risk?

One of the central conclusions put forward by WBF is that the reference rate for measuring nominal bank lending services "must be *risk adjusted* (i.e., contain a risk premium reflecting the systematic risk associated with the loans)" (see chapter 7 of this volume). This is in contrast to current practice in the U.S. NIPAs, where the reference rate is an (implicitly) maturity-weighted rate of government bonds and thus a default-free rate. Similarly, the directives for the implementation of the new FISIM measures in the European Union require that countries use an interbank rate; that is, an interest rate that is short-term but also essentially risk free. The choice of the right reference rate is important, because it influences the measured level of banking output and potentially influences gross domestic product, as well as its growth rates. Some more discussion is required to shed light on this point.

The Question behind the Reference Rate: Who Bears Risk?

The first point to make is that it is not the reference rate as such that is at stake; it is the more general question about whether banks assume risk. Consider an investment decision by a bank, say, in a loan. In an efficient market, the value of this financial asset to the bank at the beginning of a year (P^L) will equal the discounted value of expected interest payments at the end of the year (R^L) and the discounted market value of the loan at the end of the year (P_1^L), minus the value of financial services (S^L) that the bank provides to the borrower, where these services are implicitly priced[2] and assumed to be provided at the beginning of the year.

2. We ignore explicitly priced services, because they add nothing to the present debate and can easily be integrated.

The appropriate rate for discounting should be the required return that an investment of equal risk and maturity is expected to yield on the financial market. This is also the definition of a risk-adjusted opportunity cost for the bank's investment. Call this required rate of return r^H, following WBF's notation. We can further decompose this required rate into a risk-free rate and a risk premium: $(1 + r^H) = (1 + r^F)(1 + rp)$, where r^F is a risk-free rate and rp is the risk premium. An asset market equilibrium should then be characterized by the following condition:

$$P^L = \frac{1}{1 + r^F} - S^L. \tag{C1}$$

After inserting $(1 + r^H) = (1 + r^F)(1 + rp)$ and after a few transformations, equation (C1) becomes:

$$(1 + rp)(1 + s^L) = \frac{1}{1 + r^F}\left(r^L + \frac{P_1^L}{P^L}\right), \tag{C2}$$

where $s^L \equiv S^L/P^L$ is the value of financial services implicitly provided per dollar of the value of the asset, and $r^L \equiv R^L/P^L$ is the rate of return that reflects the regular (interest) payments on the asset (loan).

The left-hand side of equation (C2) is the discount factor that combines the risk premium and the rate of implicitly priced services. Let us call this combined rate $\tilde{s}^L$, where $(1 + \tilde{s}^L) \equiv (1 + rp)(1 + s^L)$. If one inserts this relation into equation (C2), one gets

$$\tilde{s}^L = \frac{1}{1 + r^F}\left(r^L + \frac{P_1^L}{P^L}\right) - 1 = \frac{1}{1 + r^F}(r^L + \pi - r^F), \tag{C3}$$

where the rate of price change $P_1^L/P^L - 1$ has been labeled π. For simplicity, we shall assume that the loan is not traded and the price change is zero. Thus,

$$\tilde{s}^L = \frac{1}{1 + r^F}(r^L - r^F). \tag{C4}$$

Equation (C4) corresponds to the simplest form of the user cost price that features in the NIPAs calculation of FISIM.[3] What then does one make of all this in relation to the WBF critique of the reference rate?

User cost prices of loans, as in equation (C4), reflect implicitly priced services to borrowers and risk premia. By construction, the reference rate r^F is a risk-free rate; otherwise, the user cost price would not comprise a risk premium. But there is no claim that the risk-free rate constitutes the risk-adjusted required return on investments for financial firms—the latter was assumed to be r^H, and this rate correctly entered as the discount factor in

3. The national accounts measure does not comprise the factor $1/(1 + r^F)$, but this is of secondary importance and depends only on the assumptions about the timing of interest payments during the accounting period.

the equilibrium condition in equation (C1). In equation (C4), the reference rate serves simply as a device to capture the risk premium with a view to reflecting risk-assumption services provided by the bank to the borrower. Thus, it is not the required return to the financial firm that is at issue in the discussion about the reference rate. By challenging the risk-free reference rate, WBF challenge the existence of this service: it is not the bank but is its shareholders who ultimately bear systematic risk, and consequently, measured bank output is overstated. The real question therefore, is, whether there is a risk-assumption service by the financial institution.

Scope of Assets and Liabilities

The discussion so far has been in terms of a loan in isolation, and statements about the right measure of banking output have to consider both the asset and liability side of the bank's balance sheet. And while the source of a bank's funds (equity, deposits, bonds issued, etc.) is without importance in WBF's model, it is not without importance in a national accounts context. In essence, WBF state that the systematic risk of loans is borne by the bank's shareholders and not by the bank itself—hence, the risk-assumption service should not be identified as part of bank output. Indeed, if one brings in shareholder considerations and computes the user cost price of the bank's shares from the perspective of shareholders, a computation parallel to the preceding one can be applied to yield

$$\tilde{s}^{SI} = \frac{1}{1 + r^F}(d^{SI} + \pi^{SI} - r^F). \tag{C5}$$

In equation (C5), $\tilde{s}^{SI}$ is the user cost price for the bank's shareholders, d^{SI} are dividends paid by the bank, π^{SI} are expected holding gains, and r^F, as before, is a risk-free rate. As in WBF, take the simple case, where a bank is only funded by equity and only invests in loans, and where the value of equity equals the value of loans, which we shall call y^L. Then, correcting the user cost price on loans in equation (C4) by the user cost price of shareholders' investment in equation (C5), we get

$$(\tilde{s}^L - \tilde{s}^{SI})y^L = [r^L - (d^{SI} + \pi^{SI})]y^L. \tag{C6}$$

In equation (C6), the rate of return on loans r^L is compared with the expected rate of return on the bank's equity $(d^{SI} + \pi^{SI})$, which in equilibrium would equal the bank's opportunity cost r^H. But if $(d^{SI} + \pi^{SI}) = r^H$, one ends up with a value for bank output that corresponds to WBF's formula with a risk-adjusted reference rate r^H, rather than the risk-free rate r^F.

Thus, the two approaches would yield the same result if the national accounts corrected for shareholders' user costs, as specified in equation (C5). However, the national accounts do not perform this correction, as by convention, no user costs are computed on equity. There is thus an underlying issue of scope—which financial instruments are carriers of financial ser-

vices—that needs addressing in the national accounts. In its narrowest form, implemented, for example, in the European Union, the national accounts measure of financial services is solely based on deposits and loans. The U.S. NIPAs takes a wider perspective and considers all assets and liabilities that earn interest or imputed interest. Obviously, the broader the scope of assets and liabilities that the national accounts take into account, the smaller the difference to the WBF results, even if the national accounts employ a risk-free reference rate.

A different way of interpreting WBF's results vis-à-vis the national accounts is to say that the national accounts implicitly take a perspective where a financial firm and its owners constitute one economic entity. Wang, Basu, and Fernald's model sees banks separately from their shareholders, and by implication, any risk premia charged by banks are passed on to shareholders, who bear the systematic risk of investment. The authors conclude that banking output as presently measured is overstated by the risk premium, because financial firms should be considered different entities from their shareholders.

A Practical Point: Choosing the Required Rate of Return for Shareholders

If one accepts WBF's suggestion to use a risk-adjusted reference rate and/or to correct the national accounts computation for user costs to shareholders, the practical question arises: how do we choose the appropriate risk-adjusted rate that reflects the required return to shareholders? As shown in WBF's model, the theoretically correct rate is determined by the representative consumers' expected consumption path, or more specifically, the required rate equals the risk-free rate, plus a risk premium that depends on the covariance between the consumer's intertemporal pricing kernel and the assets in which the bank invests.

The empirical implementation of this risk-adjusted rate is a difficult issue. Typically, the covariance between asset returns and consumption is weak—a finding that is well established in the literature on the equity premium puzzle (see Kocherlakota [1996] for an overview). A weak covariance implies a small adjustment to the risk-free rate, however, and would diminish the empirical impact of the choice. For example, using the components of the Federal Reserve System monetary aggregates, Barnett, Liu, and Jensen (1997) found that risk adjustments were small. Of course, such empirical considerations have no bearing on the theoretical points made by WBF, but they are of interest to statistical agencies that have to implement measures.

Is the Test of "The Bank That Does Nothing" a Valid One?

One test proposed by WBF to substantiate the plausibility of their model is to ask what their measure of production would be for a bank that "does nothing" (see chapter 7 of this volume). More specifically, a hypothetical situation is invoked, where banks are simple accounting devices, only there

to receive households' capital (they buy the bank's shares) and to lend out these funds to entrepreneurs, but not to provide screening or monitoring services—shareholders themselves see right through the bank and are able to screen borrowers and to monitor them. Then, WBF argue, the measure of this bank's output should be zero. The national accounts measure, under the same circumstances, produces a positive value of output, because in the previous notation, it would correspond to the user costs of the loans, $(r^L - r^F)y^L$, and they are positive if there is systematic risk.

This raises again the question about the source of financing. In WBF's model, the Modigliani-Miller theorem applies to banks as well as to nonfinancial firms; therefore, banks' financing structures are of no consequence for the required rate of return. Consequently, allowing for debt financing of banks makes no difference to WBF's argument that national accounts overstate banking output by the risk premium on loans and other assets. This is correct if one accepts the assumptions underlying the Modigliani-Miller theorem (perfect capital markets, equal access, homogenous expectations, etc.), which we shall do for the present argument. Thus, the structure of bank financing has no influence on the bank's required rates of return. However, the structure of financing *does* make a difference when applying the test of the bank that does nothing, because different sources of financing are not treated symmetrically in the national accounts. Take a bank that does nothing—a pure accounting device in WBF's terms—but assume that it is deposit financed, not equity financed. Applying national accounts methodology to this case yields a zero measure of production.

This is easily demonstrated by considering the national accounts' FISIM calculation, where y^D and r^D are the value of deposits and the interest rate paid on them, respectively:

$$\text{National accounts' banking output} = y^L(r^L - r^F) - y^D(r^D - r^F).$$

In WBF's case of a bank that does nothing, there are no implicitly priced depositor services, and the rate that is paid on deposits must equal the loan rate, itself equal to the return required by the financing units, the depositors: $r^L = r^D$. In the absence of equity financing and in the equilibrium situation postulated by WBF, $y^L = y^D$ and the banking output measured by the national accounts equals zero. This makes the relevance of the test of the bank that does nothing dependent on an empirical issue: national accounts fail to register zero output, to the extent that bank loans are equity financed—in the more realistic case of deposit-financed banks, the argument applies to a much smaller extent.

Timing of Provision and Measurement of Financial Services

Wang, Basu, and Fernald's model assumes that screening services are provided at the beginning of a contractual relationship between banks and

borrowers, and the authors rightly point out that there is an issue of timing when the flow of services is measured via flows of interest that are observed during the life of the loan. This is not a contentious issue, and the accrual principle, one of the cornerstones of the SNA, suggests that efforts be made to enter payments for a service at a time as close as possible to the provision of the service. The tricky empirical issue of implementing this principle in the context of a flow of service payments that cannot be directly observed remains!

Another Point Worth Emphasizing: Holding Gains

The authors rightly observe, "If interest income is often employed as implicit compensation for financial services provided without explicit charge, then in principle, capital gains can be used in place of interest for the same purpose" (see chapter 7 of this volume). To illustrate, WBF use the example of a loan that is sold off and argue that only expected capital gains should enter the computation of financial services output, whereas capital gains or losses purely due to the random realization of asset returns should not be counted as financial output.

This is an important observation that lines up with a suggestion made by Fixler and Moulton (2001) and the discussion in Schreyer and Stauffer (2003). At the same time, any consideration of holding gains or losses in measures of production turns out to be highly controversial in the context of national accounts, because the SNA does not consider holding gains to be production. But the basic issue remains: there are many items on a bank's balance sheets with remunerations other than interest payments, and if an argument can be made that financial services are somehow associated with these assets and liabilities, expected holding gains cannot be ignored. Thus, WBF have raised another important and valid point here.

Conclusions

There are many advantages to having an explicit model when devising proposals for measurement, and WFB should be commended for that. Explicit statements of assumptions and behavior of economic agents and the use of a model to bring things together are most valuable to make informed choices about measurement.

A core issue that arises from the discussion and that probably deserves further research is the role of risk and the question of whether, from an accounting perspective, banks or their shareholders bear the risk involved in lending.

Generally, WBF's model is relevant, raises the right issues, and treats them in a rigorous way: (a) we should view banks as institutions that provide financial services and then should be clear about what these services

are and how they should be measured; (b) the choice of the reference rate is important, and its theoretical foundations need to be clearly put down; (c) measuring service flows at the time when they are produced and consumed can be difficult; (d) expected holding gains are an integral part of the return of certain financial instruments and should not be ignored in measuring financial services; and (e) interest rates are not normally the appropriate measures of financial service prices.

References

Barnett, W., Y. Liu, and M. Jensen. 1997. CAPM risk adjustment for exact aggregation over financial assets. *Macroeconomic Dynamics* 1 (2): 485–512.

Commission of the European Communities. 2002. Report from the Commission to the Council and the European Parliament concerning the allocation of financial intermediation services indirectly measured (FISIM). Unpublished manuscript, June.

Fixler, D. J., and B. Moulton. 2001. Comments on the treatment of holding gains and losses in the national accounts. Paper presented at the Organization for Economic Cooperation and Development (OECD) Meeting of National Accounts Experts, October.

Fixler, D. J., M. B. Reinsdorf, and G. M. Smith. 2003. Measuring the services of commercial banks in the NIPAs: Changes in concepts and methods. *Survey of Current Business* 83 (9): 33–44.

Gorton, G., and A. Winton. 2002. Financial intermediation. NBER Working Paper no. 8928. Cambridge, MA: National Bureau of Economic Research, May.

Kocherlakota, N. R. 1996. The equity premium: It's still a puzzle. *Journal of Economic Literature* 34 (1): 42–71.

Ruggles, R. 1983. The United States national income accounts, 1947–77: Their conceptual basis and evolution. In *Studies in income and wealth,* vol. 47, *The United States national income accounts: Selected topics,* ed. M. F. Foss, 15–107. Chicago: University of Chicago Press.

Schreyer, P., and P. Stauffer. 2003. Measuring the production of financial corporations. Background report on the OECD Task Force on Financial Services in National Accounts, presented at the workshop on Rethinking Total Factor Productivity, October, Ottawa.

Triplett, J. E., and B. Bosworth. 2004. *Productivity in the U.S. services sector: New sources of economic growth.* Washington, DC: Brookings Institution.