Are Canadian Banks Efficient? A Canada-U.S. Comparison

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A n efficient and productive financial system is important for the development and longer-run growth of the economy. Indeed, a recent comprehensive survey of the research literature suggests that the quality of financial service provision is a key ingredient for economic growth (Dolar and Meh 2002).

To better understand the factors that might contribute to improved economic performance, policy-makers are often interested in cross-country comparisons. In this regard, Canada-U.S. productivity comparisons have become topical, with suggestions of a "productivity gap" in some Canadian industries, including financial services—where Canadian banks play a very prominent role.

Given these various considerations, we recently studied the efficiency of major Canadian banks, and compared it with the efficiency of U.S. banks (Allen, Engert, and Liu 2006). This article presents a summary of that work.

Performance Measures

We begin by considering common performance ratios, comparing the six largest Canadian banks (which account for the vast majority of Canadian banking assets) with total U.S. banks, and with a subset of U.S. bank holding companies (BHCs). (See Box 1 for more on these banks.)

The data that we use are from the balance sheets and income statements reported by these institutions to the banking supervisors in Canada and in the United States. We deflate all variables by the consumer price index, excluding food and energy prices, in the respective country. We also adjust the data for the different purchasing powers of the Canadian and U.S. currencies.[1]

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1. We use the Rao, Tang, and Wang (2004) calculation of a PPP measure for value-added in financial services (1.09 in 1999).

Expense ratio

The expense ratio is often used by analysts to evaluate bank performance. It is defined as the ratio of non-interest expense to net operating revenue (net interest income plus non-interest income).[2]

Chart 1 presents the expense ratio for Canadian banks, the U.S. BHCs, and total U.S. banks. The expense ratio of Canadian banks was lower than that of U.S. banks in the late 1980s and early 1990s. But this measure has been trending up at the Canadian banks and down at the U.S. banks over the sample period, so that the expense ratio of Canadian banks currently exceeds that of U.S. banks.
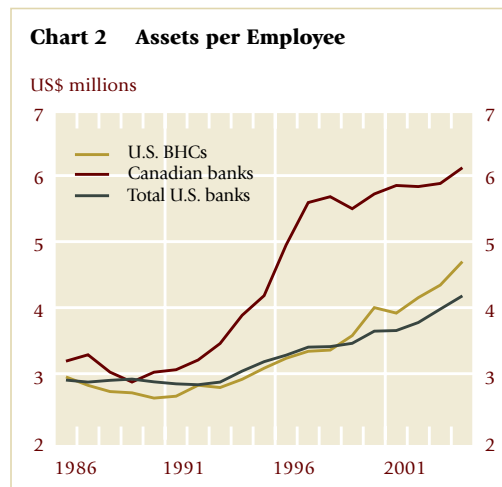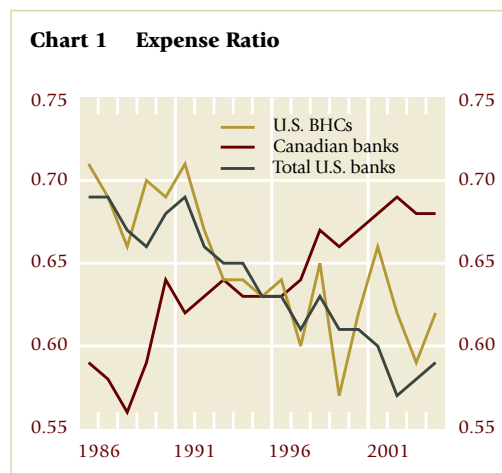
Our analysis indicates that the difference in the expense ratios can be currently attributed to a higher labour cost component (wages and benefits) at Canadian banks. However, this differential does not imply disparities in productivity, which concerns how much output is produced per unit of input (typically, labour).

Labour productivity ratio

Accordingly, we also consider measures that focus on the output produced by banks, relative to labour input. Bank output is difficult to measure, on both conceptual and pragmatic grounds. Indeed, it is widely believed that official statistics (based on the system of national accounts) on output in financial-services industries are subject to large errors. (See, for example, Triplett and Bosworth 2004 or Diewert 2005.)
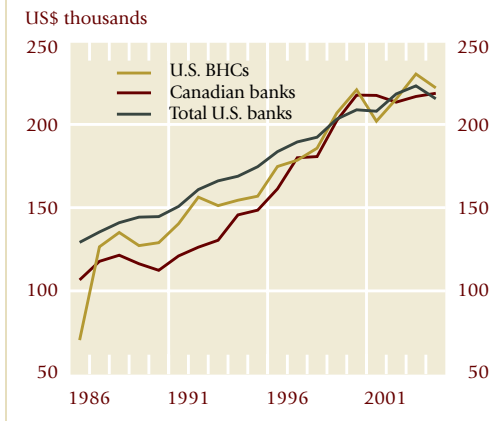
In our study, we do not use national accounts data. As noted above, we draw on data from balance sheets and income statements provided to bank supervisors. To measure productivity, we begin with total assets reported on balance sheets as our measure of output.

Chart 2 compares total assets per full-time equivalent employee of Canadian banks, the

Chart 1   Expense Ratio

Legend: U.S. BHCs; Canadian banks; Total U.S. banks

Chart 2   Assets per Employee

US$ millions

Legend: U.S. BHCs; Canadian banks; Total U.S. banks

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2. The denominator of this ratio—particularly net interest income—depends on the risk differential between assets and liabilities. Therefore, a change in the ratio can be caused by changes in risk taking and not necessarily by changed efficiency. A change in the mix of a bank's services or products (say, towards non-traditional banking services) can also affect this ratio by altering the mix of inputs and expenses. Thus, we prefer the term "expense ratio," and not "efficiency ratio," as it is sometimes called.

Chart 3   Net Operating Revenue per Employee

US$ thousands

- U.S. BHCs
- Canadian banks
- Total U.S. banks

(Chart showing values from 50 to 250 on both axes, years 1986, 1991, 1996, 2001)

U.S. BHCs, and total U.S. banks, in constant 1999 U.S. dollars. This chart suggests that the productivity of Canadian banks has been considerably higher than that of U.S. banks in the past decade.[3]

Next, we consider a measure that effectively internalizes differences in asset generation and management, and focuses on overall results. Specifically, Chart 3 shows net operating revenue per full-time equivalent employee of Canadian banks, the U.S. BHCs, and total U.S. banks.

According to this measure, Canadian bank employees were less productive than their U.S. counterparts in the late 1980s, but started to catch up in the early 1990s. In fact, according to this measure, the three groups of banks have converged since the late 1990s, indicating that Canadian banks are as productive as their U.S. counterparts.[4]

Economies of Scale and Cost-Inefficiency

We also consider another means of gauging bank efficiency, based on econometric methods, using disaggregated bank data. In this case, our analytical framework is the translog cost function (as in Allen and Liu 2005), which has become a standard tool in the research literature.

Methodology

In this framework, a bank's cost-minimization problem can be written as a general cost function:

$$C = f(\mathbf{q}, \mathbf{w}) + \theta + \xi,$$

where C is bank costs; $\mathbf{q}$ is a vector of bank outputs; $\mathbf{w}$ is a vector of input prices that a bank faces; and $f(\mathbf{q}, \mathbf{w})$ is a translog function, consisting of the individual and cross-product terms of $\mathbf{q}$ and $\mathbf{w}$. The term θ represents effects unique to each bank, and the error term ξ represents all other unexplained influences on a bank's cost structure.

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3. Including a measure of non-traditional activities (such as those related to off-balance-sheet assets) in total assets does not change this conclusion.
4. It follows from these various performance ratios that the return on assets of Canadian banks is less than that of U.S. banks, which is what we see in the data. On the other hand, the return on equity of Canadian banks is comparable to (if not greater than) that of U.S. banks.

Inferences regarding economies of scale are drawn from the derivative of C with respect to $\mathbf{q}$; that is, how a bank's costs vary with its scale of output.

The error term ξ provides the basis for the measurement of "cost-inefficiency." We define the efficient frontier as the (benchmark) bank with the lowest inefficiency measure (based on its ξ), and then measure each bank's distance from that efficient frontier. An efficient banking system is represented by relatively small inefficiency measures and convergence over time towards the efficient frontier.

An additional parameter of interest is technological progress, which we approximate initially with a quadratic time trend and then with other variables in different specifications of the model. We also include variables to capture the effects of regulatory changes in Canada and the United States.[5]

Data

Three input prices are included in the model: labour, capital, and deposits. They are measured, respectively, as the average hourly wage of bank employees, the expenses on real estate and fixtures divided by the total stock of these items, and the effective interest rate paid on deposits. A bank's output is divided into five categories: consumer loans, mortgage loans, non-mortgage loans, other financial assets on the balance sheet, and an asset-equivalent measure of non-traditional activities (following the method of Boyd and Gertler 1994).

We estimate the model by panel dynamic least squares using quarterly data from 1983 through 2004 for the Canadian banks, and from 1986 through 2004 for the U.S. BHCs.[6]

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5. The financial systems in Canada and the United States have been affected by a series of legislative changes over the past 20 years regarding bank powers, organization, and regulation. The specific nature and timing of these changes have been different in the two countries. But a cumulative effect has been the development of essentially universal banks in both countries over time.

6. Given the differences in the development of the institutional and regulatory environments (among other things) in Canada and in the United States, separate cost functions and efficient frontiers are estimated for the two countries. (Pooling the data across countries would make interpretation of ξ unreliable.) Also relevant in this regard is the fact that there is a larger size dispersion among the U.S. BHCs than in the Canadian bank sample.

Results

For our sample of Canadian banks, we reject the null hypothesis of constant returns to scale. Instead, we find increasing returns to scale (of about 7 per cent), suggesting that Canadian banks would gain (modestly) from being larger.

As regards the measure of cost-inefficiency for Canadian banks, we find that the gap between the efficient frontier and other banks averages less than 10 per cent, depending on the specification considered. More refined measures of technological change (capturing investment in employee training and automated banking machines, for example) lead to measures of cost-inefficiency among Canadian banks averaging about 6.5 per cent. As well, the estimates indicate that Canadian banks have tended to move closer to the efficient frontier over time.

For the U.S. case, the null hypothesis of constant returns to scale is rejected as well. Increasing returns to scale of about 2 per cent are estimated.

Estimates of cost-inefficiency for the sample of U.S. banks indicate that the gap between the efficient frontier and other banks is greater than 10 per cent, which is a typical result in the academic literature on U.S. bank efficiency (for example, Berger and Mester 1997). In our preferred specification, the average cost-inefficiency measure is about 14 per cent. As well, cost-inefficiency among the U.S. BHCs has not narrowed appreciably over the sample period.

We also find that the estimate of technological progress for Canadian banks is greater than for U.S. banks. Indeed, the results suggest that the effect of technological progress in lowering Canadian bank costs is three times greater than in the U.S. case—a result that we find surprising.[7]

Finally, we find that some of the legislative changes that have occurred in the past 20 years have reduced the cost structures of banks in both countries. For example, in Canada, the financial legislation revisions in 1987 and 1997

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7. Other research, such as Tang and Wang (2004), also suggests that, in the recent past, productivity growth in Canadian financial services has been greater than in U.S. financial services, but not by a large margin. In our work, the time trend used to proxy technological progress is probably capturing the large increase in Canadian bank assets in the 1990s, when banks were expanding into a wide range of financial services.

were particularly beneficial in lowering banks' costs.

Conclusions

This work examines the efficiency and productivity of Canadian and U.S. banks in three ways. First, we compare key performance ratios and find that (i) the average Canadian bank employee produces more assets than the average U.S. bank employee, and (ii) in terms of producing net operating revenue, Canadian and U.S. bank workers are similarly productive.

Second, we investigate whether there are economies of scale in the cost functions of Canadian banks and a sample of U.S. BHCs. We find larger economies of scale for Canadian banks than for the U.S. BHCs. This suggests that Canadian banks are less efficient with regard to the scale of their operations and would have more to gain in terms of efficiency benefits from becoming larger.

Third, we measure cost-inefficiency in Canadian banks and in U.S. BHCs relative to the domestic efficient frontier in each country (the domestic best-practice institution). We find that Canadian banks are closer to the domestic efficient frontier than are the U.S. BHCs, and that they have moved closer to that efficient frontier over time.

Overall, these results do not suggest relative efficiency or productivity gaps in the Canadian banking industry. On the contrary, Canadian banks compare generally favourably.

Finally, as noted above, legislative and regulatory changes have benefited efficiency in Canadian financial services. This shows the importance of removing any remaining restrictions that inhibit competition and efficiency, but provide little (or no) benefit in terms of financial soundness.

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