

The contribution of product mix versus efficiency and technical change in US banking[☆]

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Abstract

Similar to a *Du Pont* analysis, this paper divides the changes in returns on assets of US commercial banks for the period from 2000 to 2005 into conventional measures of bank performance. The contribution of product mix is significant and offsets losses from technical change and operating efficiency. Banks respond to changes in the business environment by switching towards more lucrative traditional and nontraditional products. Large banks are found to benefit more than community banks from the switch to an optimal output portfolio mix including new products spawned by recent financial innovations and deregulation.

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1. Introduction

The passage of the Gramm–Leach–Bliley Act (GLBA) in 1999 enhanced the scope of permissible financial activities for banking organizations. The GLBA sets up a two-tier system for expanding bank activities. A new entity, called the Financial Holding Company (FHC), can have commercial bank subsidiaries and other subsidiaries that engage in activities considered “financial” or “complementary” to financial activities such as securities and insurance underwriting, commercializing insurance, investment management, and brokerage. In addition, subsidiaries of commercial banks are able to engage in nearly all of the financial activities in which FHC subsidiaries can engage, including insurance and brokerage activities and securities

underwriting.¹ The lower information costs and consequent efficiency gains possible from combining related activities are generally believed to be one of the important motivators for the integration of financial services. An important question that arises is whether the recent technological innovations and policy changes translate into performance gains for banks in the form of expanded product mix, efficiency and scale economies, and whether these benefits vary with bank size.

This paper uses the recent developments in the product mix of US commercial banks emerging from changes in technology and deregulation to estimate the contribution of changes in product mix, scale economies, and resource

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¹ These subsidiaries cannot engage in underwriting insurance, providing or issuing annuities, real estate development or investment, merchant banking or complementary activities that are allowed to affiliates of the financial holding company. The size of bank subsidiaries is also restricted by the act: subsidiary assets may not exceed either 45% of the consolidated total assets of the parent bank or \$50 billion. The GLBA aimed a series of reforms toward smaller banks, by allowing them easier access to low-cost Federal Home Loan Bank advances secured by small business- and agricultural-loans as collateral.

mix to bank performance for the period 2000–2005. These measures are compared with contributions coming from changes in productivity, efficiency, and technical change. This paper uses a variant of Grifell-Tatje and Lovell (1999) methodology to relate a multidimensional system of these elaborate measures of performance to the dynamic changes in the profit performance characterized by a simple accounting ratio. Return on assets (ROA) is a key ratio used by managers, investors, and business analysts in evaluating overall firm performance. Similar to a *Du Pont* analysis,² the change in ROA is divided into contributions coming from changes in prices, quantities, productivity, product and resource mix, operating efficiency, and scale economies. This methodology, however, removes the effects caused by differences in output and input bundles, technical change, and so forth, which affect accounting-based performance ratios but are not necessarily related to the efficiency or managerial quality of the organization. To my knowledge, this is the first study to relate the change in ROA to the underlying profit drivers such as product mix and resource mix for the US banks.

The relationship between commercial bank performance and differences in product and resource mix has been the subject of great interest in academic literature. Bound by regulation, during the 1980s and early 1990s, banks could not expand their portfolio mix in response to changes in the market place. Previous studies of US commercial banks (e.g. Mester, 1992; Hughes and Mester, 1993; Pulley and Braunstein, 1992; Pulley and Humphrey, 1993; Berger et al., 1996) found very limited or no benefits coming from scope economies. The scale and product mix effects were dominated by technical inefficiencies (e.g. Berger et al., 1987; Berger and Humphrey, 1991).

Fueled by advances in information, communications, and financial technologies (Berger, 2003; Berger and DeYoung, 2006; DeYoung et al., 2007) and by deregulation implemented during 1990s, banks have enlarged their product portfolio and enhanced service quality. Berger and Mester (2003) suggest that the product mix plays a more important role in providing a competitive advantage and improves the performance of banks. Event studies (Akhigbe and Whyte, 2001; Al Mamun et al., 2004, 2005) indicate that most market participants expected big changes from the expanded scope allowed by the GLBA, in particular for large banks. Yeager et al. (2007) use fixed-effects panel regressions to detect changes in within-firm performance (balance sheet ratios, profitability ratios, and labor revenue productivity ratios) for FHCs relative to their performance

as BHCs. They do not find significant synergies between commercial banking, insurance underwriting, and merchant banking. The synergies between commercial banking and investment banking are much stronger. Yuan (2007) uses the methodology of Pulley and Braunstein (1992) and finds significant cost scope diseconomies (24%) on joint production of banking and insurance products but significant positive revenue scope economies (32%). The larger the firm size, the higher its revenue scope economies.

In this study, the product mix effect is large and dominates the changes in operating efficiency and the technical change effects for all groups of banks. The product mix effect measures the substitution effect arising from production reallocation towards the most profitable portfolio mix, holding input bundles and technology constant. The method used cannot identify cost complementarities related to changes in the regulatory environment. The results show that the expansion into the new product dimensions (e.g. securitization, OBS activities, GLBA products and services) is profitable. The positive product mix effect suggests the existence of benefits from reallocation of product portfolio, consistent with the demand-side scope economies (revenue scope economies) found by Yuan (2007). Consumption complementarities may arise from cross-selling of traditional products and new GLBA products. Similar to the findings of Yuan (2007), the product mix gains are greater for the largest banks.

Large banks also benefit from improvements in production efficiency while most small banks fall behind the best practice frontier. These findings are consistent with the higher profit efficiency of larger banks found by Berger and Mester (2003). The results are also consistent with ongoing “strategic bifurcation” of the banking industry (DeYoung et al., 2004). Large banks benefit from higher production of traditional outputs such as consumer lending, but they complement the low interest margins on these products with increasing amounts of noninterest income coming from new traditional and nontraditional products (GLBA products). The much smaller product mix results for small community banks and micro-banks do not necessarily indicate that their business models are not economically viable. Small banks also benefit from fees on transaction services and sale of GLBA products (cross-selling insurance products) but to a smaller extent than large banks.

This paper is structured as follows: Section 2 describes the estimation technique; Section 3 describes the data; Section 4 reports the results; and Section 5 concludes.

2. Methodology

In this section, I describe the return on assets (ROA) change decomposition methodology based on Grifell-Tatje and Lovell (1999). Assume that at time t , a bank produces a vector of M outputs $Y^t = (Y_1^t, \dots, Y_M^t)$ using a vector of N inputs $X^t = (X_1^t, \dots, X_N^t)$. Given a vector of M nonnegative output prices $p^t = (p_1^t, \dots, p_M^t) \in \mathbb{R}_+^M$ and a vector of

² *Du Pont* analysis is a traditional corporate finance and accounting model used to analyze a firm's performance by incrementally dividing each accounting ratio into underlying profit drivers. In the first step, the return on equity is expressed as a product of return on assets and equity multiplier ratio. The return on assets is further divided into profit margin and assets utilization ratio, which are then related to items in the income statement and balance sheet. For more details see Sinkey (2002).

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