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Iftekhar Hasan - Katherin Marton

Development and Efficiency of the Banking Sector in a Transitional Economy: Hungarian Experience

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Contents

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Iftekhar Hasan - Katherin Marton*

Development and Efficiency of the Banking Sector in a Transitional Economy: Hungarian Experience**

Abstract

The paper analyzes the experiences and developments of Hungarian banking sector during the transitional process from a centralized economy to a market-oriented system. The paper identifies that early reorganization initiatives, flexible approaches to privatization, and liberal policies towards foreign banks' involvement with the domestic institutions helped to build a relatively strong and increasingly efficient banking system. Banks with higher foreign bank ownership involvement were associated with lower inefficiency.

Key words: Banking, transition, efficiency, privatisation, Hungary

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1 Introduction

The importance of financial sector development and privatization received renewed attention in the context of economic restructuring of transition economies [Dornbusch and Reynoso (1989); Hetzel (1990); Sundararajan (1992); Saunders and Sommariva (1993); Szego (1993); World Bank (1996); Sachs (1997); Popov (1999); Hermes and Lensink (2000), and Scholtens (2000)]. Consequently, in the countries of Eastern and Central Europe (ECE) with the economic and political changes of 1989, the newly elected governments prioritized establishing effective banking and financial systems. In the new era, banking regulatory and supervisory institutions were to be established, market-oriented financial institutions needed to develop from centralized state-owned banking systems and initiatives were to be taken for the entry of privately owned banks.

So far, only a few of the 27 transition economies have made substantial progress toward establishing a market-oriented banking sector. All these countries that have been successful are in the process of totally privatizing their banking institutions and have been involved in opening up their markets to foreign participants. Hungary, for example, took the lead in inviting foreign banking institutions to the country during the late 1980s and within a short period of time, the foreign banking sector has become a dominant force in the industry as well as in the economy. In fact, by 1998, Hungary became the first country in the region to establish a privately owned banking sector that successfully overcame the burden of bad debts, massive under-capitalization, and high concentration [National Bank of Hungary (1998)].[1] Today, Hungarian banks are mostly profitable despite maintaining a high capital standard and are close to meeting the requirements set by the European Union (EU) in respect to its bank regulatory and supervisory measures.

Despite the growing role of banks in transitional economies, financial researchers have paid less attention to evaluating the performance and strategies adopted by these institutions.[2] In fact, a survey [Berger and Humphrey, (1997)] documented studies on the bank performance and efficiency of 21 countries, but none of these were from among the transition economies. This paper further aims to fill the gap in the literature by introducing the experiences of Hungarian banks, both domestic and foreign institutions, during the transition process from 1993 to the 1997. During this period, a predominantly private-owned banking sector was established where privatization of

all the large commercial banks was completed and newly formed small- and medium-sized banks grew rapidly. The development of this private banking sector had been paralleled by a major increase in the share of capital held by foreign multinational banks.

This paper trails the dynamics of profit efficiency of Hungarian banks and further analyzes the factors correlated to their performance. The paper explores the role of foreign banking institutions as competitors and partners of domestic banking institutions in shaping the new environment of Hungarian banking market. Such understanding is important from the perspective of banking policy-making in transition economies; moreover, the Hungarian experience may be of additional importance to regulators and policy-makers in regions that are yet to experience similar stages of banking and financial sector developments. The overall findings reveal a decreasing trend of profit inefficiency during the sample period partly due to an effective decrease in cost inefficiency, increased capital infusion, and involvement of multinational banks through joint ventures and establishing affiliates.

2 Banking in Hungary: Transition to a New System

Following the Soviet Union's system, the Hungarian banking system was established in 1948 when the National Bank of Hungary (NBH) assumed the monopoly of money circulation and all credit functions in the economy. Despite the centralization of monetary functions with it, the NBH had only limited power to make decisions on credit allocation. Its main role was to allocate credit to enterprises according to the mandate of the plan. The National Savings Bank was responsible for collecting deposits from the population while the Hungarian Foreign Trade Bank dealt with foreign-trade-related transactions. All were state-owned institutions with monopoly in their respective specialization.

The reform started relatively early in Hungary when the government permitted a number of foreign banks to set up offshore operations in the early 1980s, even though these banks competed with state-owned banks in the areas foreign exchange and trade-related transactions. In 1987, the centralized mono-banking system was replaced by a two-tier banking system as NBH assumed the role of central bank and transferred its commercial activi-

ties to three new commercial banks. In addition, a number of new specialized banks were established; these banks had very narrow functions. In 1989, when the newly elected democratic government assumed leadership, it inherited a banking sector that was more decentralized than the classical socialist system of most other Eastern European countries.With the exception of the foreign offshore banks, however, ownership and control rested with the state. Yet the reforms of the 1980s were significant as they enabled the post-socialist government to initiate fundamental reforms.

The democratic government established a market-economy type regulatory framework in 1991. It required that banks meet the 8 percent capital adequacy ratio norm of the Bank of International Settlement (BIS) and that banks provide reserves against their bad or doubtful loans. The framework also set minimum capital requirements for new banks and called for the reduction of state ownership in all commercial banks to no more than 25 percent by 1997.

But in the actual industry scenario during the early years, several of the large state-owned banks had huge negative equity with a high percentage of loans nonperforming at a time period when the existing accounting laws did not require provisions for bad loans. Once the compliance of provision requirement surfaced, the quality of loan portfolios became apparent as banks suffered major losses. In 1992, 15-28% of the credits extended were nonperforming loans and were primarily borrowed by the state-owned enterprises during the pre-1989 era. The structural reform initiatives in the country during the early 1990s caused a major drop in GDP, resulting in heavy losses by the state-owned enterprises and were further unable to service their existing debt to banks. It became evident that unless the state-owned banks are privatized, political decisions will continue to determine their lending practices. However, prior to privatization, the deteriorating loan portfolios of banks needed attention.

Within a year the government undertook two subsequent programs. A loan consolidation program was announced in 1993, which allowed banks to swap their “bad loans” or “old debts” for government bonds known as consolidation bonds, with a coupon equal to 90-day treasury bills. In total, 14 banks participated in the scheme and contributed HUF105 billion face value of bad debt for exchange [National Bank of Hungary (1996)]. It helped to remove the nonperforming loans from the balance sheet but did not provide new capital in the banking sector. In its next initiative, a year later, the gov-

ernment recapitalized nine state-owned banks and helped attain the minimum 8% requirement. It cost the authority more than U.S. $2 billion - almost 7% of the country's GDP. This high cost to the government created an urgency to cease accumulation of new nonperforming loans and accelerated the importance and need of privatization.

Entry of New Banks

In the two-tier banking system of 1987, the five large state-owned commercial banks accounted for more than 90 percent of corporate and household loans, deposits, and foreign exchange trading. There was almost no competition among these banks as most of the newly created commercial banks were specialized by industrial sectors. In the new era, liberal bank licensing policies allowed specialized banks to operate in all segments of business and encouraged new bank entry in the market. By 1991, the number of banks rose to 37, a substantial increase from 15 in 1987. Most of these new banks were either subsidiaries or branches of multinational banks or were affiliated with the large state-owned banks.

The initial impact of new entrants affected the banking sector unevenly. The newly formed subsidiaries of foreign banks focused their activities initially on foreign trade and foreign exchange transactions and rapidly gained a major share of the market. By 1991, these banks accounted for almost 44 percent of market share in the letter of credits issued and 27 percent of the corporate loan sector from around 6 percent market shares in these categories in 1989 [NBH (1992)]. As the newly formed foreign or joint-venture banks increased their position, the large state-owned banks registered a relative decline.

Privatization

In spite of Hungary being a leading transitional country with respect to privatization, the progress in the early stages was primarily in the manufacturing sector. By 1994, the economy witnessed the transformation of this sector with the participation of foreign investors by means of management buyout, direct tender by investors, and, in some cases, through flotation of shares in

the capital market. In the banking sector, the initial progress was slow due to lack of a comprehensive regulatory setup while many existing banks were burdened with excessive nonperforming loans in their portfolio. Moreover, the authority suffered from ambiguity and uncertainty regarding any desirable method of privatizing. Although there was a consensus that the new investors ("strategic investors") must be committed to improving the governance of the bank, its technological modernization and infusion of capital, the form of such participation and the magnitude and involvement of foreign partners was controversial.

There were concerns and debates regarding the dominance of foreign ownership of state-owned institutions. It was the Banking Act of 1991 that allowed foreign banks to have more than 10 percent of equity share in domestic banks. The preference of retaining government control and ownership was evident in the privatization of the National Savings Bank (NSB), the largest and most valued Hungarian public bank. NSB, which had been involved in nationwide retail banking serving consumers and local governments since 1949, did not suffer from large nonperforming loans in their portfolios and thus stayed moderately profitable. The authority was concerned about potential foreign owners dominating the business, and thus restricted foreign involvement by allocating certain blocks of shares to domestically owned institutional funds, retail investors, as well as to the management and employees of the company during the public flotation of shares. Only 20 percent of the equity was offered to foreign institutional investors.

By the mid-1990s there was a more broad based acceptance of majority foreign ownership of banks, but the preference for the government keeping a "golden share" of the venture continued. This government policy discouraged foreign banks from participation in the privatization, especially during the early years [Abel and Bonin (1994)]. In 1996, the government further liberalized the banking laws and encouraged active foreign participation and did not impose share limitation. In its negotiations with foreign banks, the government was flexible and took new approaches on the terms and conditions of bank privatization.

Two key features characterized privatization of large Hungarian banks. First, the large banks were privatized in tranches, i.e., blocks of shares were offered to different foreign investors at different times. For the strategic foreign investor, this reduced the initial cost and risk of investments. In the case of two of the largest banks, for example, the government negotiated with the

European Bank of Reconstruction and Development (EBRD), the international financing institution, to be involved with 20 and 32 percent equity participation in the deals. In the early stages, foreign investors got involved with the 20-40 percent range of equity shares with the government retaining 20-25 percent ownership. The government, however, granted full management control to the foreign partners and gave call options to these investors to subsequently increase their ownership either by acquiring the share of partners like EBRD or of the government.

Second, at least in the case of two large banks, the contract provided for subsequent price adjustments in the purchase price, depending on the future profit of the bank. Regarding the privatization of Budapest Bank with the involvement of General Electric Capital, for example, the terms of the sale provided a few call options for GE Capital to sell back assets to the government in case of nonperformance of assets. And it also allowed for acquisitions of additional shares from the government and other nonprivate partners (EBRD). Interestingly, subsequent to the completion of privatization, the management of Budapest Bank did exercise its option and sold back its unprofitable subsidiary, Polgari Bank, to the government.

Politically, the terms of this type of negotiated liberal privatization were subject to substantial criticism and the government subsequently limited or reversed some of the provisions. Others, on the contrary, argued that while the government may not have received maximum revenue for its assets in some of the foreign-investor-involved privatization, it did lay the foundation of a strong efficient banking sector in Hungary [Schnatterly and Kormendi (1998)]. Irrespective of the involvement of foreign or domestic investors in the privatization deals, it freed banks from the government influence in credit allocation. Privatization was also followed by large lay-offs of personnel, which was politically unpopular but provided significant cost-efficiency to these formerly state-owned banks notoriously overstaffed by any standard.

3 Relevant Literature

As mentioned earlier, the literature on the restructuring and development of the financial sector in transition economies is abundant. Some studies deal with the various issues of transformation on a conceptual level, and by now the “typical” and “stylized” problems related to the transformation of the

financial sector are well described [Gorton and Winton (1998)]. In the broader context, the relative merits of bank- versus securities-based systems in transition economies are contrasted [Litwack (1995), Gros and Steinherr (1997)]; issues concerning effective corporate governance and appropriate institutional structures to influence management have been analyzed.[3] Catte and Mastropasqua (1993) reported lack of experience in assessing and monitoring borrowers and investment projects during the early transitional years in the Central and Eastern Europe. McNulty (1999) investigated the extent of financial intermediation in transitional economies in Central and Eastern European region, finding the banking systems of most of the countries of the former Soviet Union lagging behind those of Eastern Europe. Kraft and Tirtiroglu (1998) focused on the bank performance of Croatian banks during the 1994-1995 period reporting higher efficiency by the newly organized private banks relative to older state institutions.[4] Recently, Scholten (2000) reported the quick progress of Central European banking systems relative to the stock markets in respective countries where as Hermes and Lensink (2000) focused on the role of deposit insurance, independent central banks, and capital market in improving the stability of the banking system in transition economies.

The problems related to loan performance were debated and the question of moral hazard and debt conversion assumed a key position in the early 1990s [EBRD (1995), Csaki (1994)]. Subsequently, privatization of state-owned banks with its multiple dimensions took a center stage. Optimal sequencing of dealing with nonperforming loans, bank recapitalization, incentive pattern and privatization were discussed by McKinnon (1991), Perotti (1993) and Bonin and Leven (1996), often with conflicting views and findings about the merits of certain sequencing or the pace of privatization. Thorne (1993) reported that countries that have encouraged the establishment of new private banks, introduced new regulation and supervision, and enhanced bank competition show an improvement in the allocation of credit and greater control of loss making enterprises.

A number of papers emphasizing conceptual issues of financial sector developments and the impact of foreign-owned banks on local market competition are available in the management, finance, and international business literature [Gray and Gray (1981), Grosse, R. and L. Goldberg (1991), DeYoung and Nolle (1996), Meyendorff and Snyder (1997), Hasan and Hunter (1996), Haslem et al. (1992)]. Most of these papers are based on experiences in the

United States. Recently, Dijkstra (1996), Barlett (1996), Jelic and Mallin (1997) and Sabi (1996) investigated the banking practices, performance and privatization experience in Hungary. These studies, however, were limited to descriptive analyses and, in most cases, based on industry-level data and are primarily focused on the financial reform or overall operational performance of different groups.

Comparing financial ratios, Sabi (1996) reported a significantly superior performance by the foreign-owned banks over domestic institutions during the 1992-94 period mainly due to their risk-adverse behavior. However, Sabi's research covered the period prior to the resolution of the nonperforming loans that domestic-owned banks inherited at their formation. Also, most of the large local institutions were still owned by the state and had various levels of government intervention in their management. With the change of these critical variables in subsequent years, relaxation of regulatory restrictions with regard to the increasing involvement of foreign-owned banks, and the lack of rigorous empirical analyses, warrant a comprehensive initiative in understanding the experience, performance, and efficiency of Hungarian banks. This paper attempts to do so. In evaluating performance, we have emphasized more on the dynamics of bank efficiency rather than focusing on traditional measures such as return on assets and return on equity. Given the newly privatized transitional environment; continuous restructuring of nonperforming assets by local banks; and entry of foreign banks in the market, we were more interested in finding how banks have approached to its highest operational capability or relative efficiency. Efficiency estimates reflect extent of efficient use of output and input choices by banks thus reflecting the magnitude of superior management of resources. The paper also focuses on a time period when a predominantly private-owned banking sector was established. This time period helped the privatization initiatives of almost all previously state-owned commercial banks. Additionally, this paper highlights the role of foreign banks in the local transitional banking market.

4 Data

The data comprises financial statements of all banks that reported during the 1993-97 period. As new banks entered the market and a number of mergers and acquisitions took place between foreign and local banks, our sample had

an uneven number of banks each year, totaling 160 bank observations overall. We collected our data from the Hungarian Financial and Stock Exchange Almanac during the sample years and from the publications of the National Bank of Hungary and the Hungarian Ministry of Finance. We were forced to delete some of the institutions due to the lack of consistent and unstained data. The total sample ended up being 154.

The sample period encompasses three fairly distinct economic and sectoral conditions. First the initial years, 1993-94, were characterized by a large concentration of nonperforming loans by the state-owned banks, which became manifest partly due to the newly adopted reporting standards and partly because of the deterioration of economic conditions. Second, the year 1995 marked completion of debt consolidation and recapitalization of banks and the adoption of restrictive monetary policies to stabilize the economy. Third, the 1996-1997 period witnessed completion of privatization of all the major banks, with well-developed bank regulatory and supervisory institutions in place under relative economic stability and positive GDP growth rates.

Table 1 displays descriptive statistics for all the variables used in our efficiency models and regression estimates on sample Hungarian banks. The first column provides combined estimates of key asset, liability, income, expenditure ratios in respect to total assets, and other related variables for the pooled sample. The other columns presented yearly estimates for each sample year. On average, the banks were producing more loans by reducing their liquid assets and increasing their short-term loans. The overall investment was relatively similar across sample years; however, involvement in financial investments did increase a little. Once adjusted for inflation, the average growth of assets did not show any significant changes, although in a few cases there was evidence of declining size. On average, the banks moved away from retail lending - lending to customers - and also depended less on retail deposits over the sample years. Capital backing of the banks has been strong as reflected by the 10-12 percent equity ratio over the years.

The total cost showed a substantial decline over the years. Most of the decline came from lowering noninterest operating expenses. New consolidation efforts, layoffs of excess employees, and closing down of some branch activities helped in lowering the noninterest expenses. The return on assets increased from a negative ratio of -0.24 in 1993 to a high 0.56 in 1995 and then declined substantially by 1997 to 0.26. A similar trend is also observed in the other performance proxy ratio - return on equity. The availability of

bank services as reflected in the number of hours per week banks are open for business activities has increased substantially from an average of 29.8 hours to 36.7 hours. In respect to foreign bank involvement in the local banking market, the percentage share increased from 51.4% in 1993 to 74.3% in 1997. In fact, by the end of 1997, every financial institution in Hungary had at least some capital involvement of foreign banks in their business activities.

5 Estimating Inefficiency

We used the econometric frontier approach (EFA) to estimate profit and cost inefficiency.[5] In EFA models, a frontier is estimated using a statistical procedure that decomposes the error term into two parts. One part of the error term captures random disturbances and is assumed to follow a symmetric normal distribution around the frontier that captures a phenomenon beyond the control of management (e.g., local or regional economic conditions, luck, labor strikes, or machines performance). The other part of the error term is assumed to capture inefficiency that is assumed to follow a positive half-normal distribution below (above) the profit (cost) frontier and represent individual firm profit (cost) deviations or errors due to factors under management control (technical and allocative inefficiency). This represents poor managerial performance (e.g., incompetent asset-liability management, expense preference behavior, agency problems, etc.).[6]

Along with our key focus on profit inefficiency,[7] we also estimate cost inefficiency and eventually investigate the relative importance of cost inefficiency in determining profit (revenue) inefficiency. We use a Fourier-flexible, alternative, or nonstandard profit (cost) function to estimate separate annual frontiers for banks during each sample year.[8] [9] This functional form combines a standard translog functional form with the nonparametric Fourier functional form. The translog form is a local approximation that performs well for banks close to the sample means, but can perform poorly for particularly small or large banks. In the Fourier-flexible form, trigonometric transformations of the translog variables are added so that the function globally approximates the underlying profit or cost function over the entire range of data. Mitchell and Onvural (1992); McAllister and McManus (1993); Berger, Leusner, and Mingo (1997); Berger, Cummins, and Weiss (1997); and Berger

and DeYoung (1997) all found that the Fourier-flexible form dominates the translog. This type of functional form is appropriate for analyzing the Hungarian banking industry consists of institutions with a wide range of asset sizes.

We estimate the following Fourier-flexible profit (cost) function:[10]

$$\begin{aligned}\ln P \ (\ln C) = {} & \alpha_0 + \sum_{j=1}^{3} \beta_j \ln Y_j + \frac{1}{2}\sum_{j=1}^{3}\sum_{k=1}^{3} \beta_{jk} \ln Y_j \ln Y_k + \sum_{m}^{2} \gamma_m \ln W_m \\ & + \frac{1}{2}\sum_{m=1}^{2}\sum_{n=1}^{2} \gamma_{mn} \ln W_m \ln W_n + \sum_{j=1}^{3}\sum_{m=1}^{2} \rho_{jm} \ln Y_j \ln W_m \\ & + \sum_{j=1}^{5} \left[\delta_j \cos Z_j + \theta_j \sin Z_j\right] + \sum_{j=1}^{5}\sum_{k=1}^{5} \left[\delta_{jk} \cos\left(Z_j + Z_k\right) + \theta_{jk} \sin\left(Z_j + Z_k\right)\right] \\ & + \sum_{j=1}^{5}\sum_{k=j}^{5}\sum_{l=k}^{5} \left[\delta_{jkl} \cos\left(Z_j + Z_k + Z_l\right) + \theta_{jkl} \sin\left(Z_j + Z_k + Z_l\right)\right] + \eta\end{aligned}$$

where the subscript that identifies individual banks has been dropped for simplicity. P is the after-tax profit (C is cost); Y is a vector of outputs including total loans, total investments, and total borrowed funds; and W is a vector of inputs, the price of borrowed funds, and price of labor. The price of borrowed funds equals total interest expense divided by total borrowed funds. The price of labor equals noninterest expenses divided by the number of full-time equivalent workers. Given that our data did not have firm-specific consistent information on the salaries and benefits, we substitute it with the best available alternative - total noninterest expenditure.[11] The Z's are functions that rescale the $\ln Y_j$ and the $\ln W_m$ terms so that they fall on specific intervals.[12] The error term h is a composite expression: $\eta = \ln U + \ln V$, where lnU captures profit (cost) inefficiency and is distributed as a truncated normal variable, and lnV captures random error and is distributed as a normal variable.[13]

6 Results

Descriptive statistics for estimated inefficiency are shown in Table 2. The first two columns display cost-inefficiency followed by profit inefficiency in the following two columns. Overall, the pooled average estimate indicates a cost inefficiency of 21.62 and profit inefficiency of 29.08. Hence, an aver-

age bank could improve its cost and profit categories by 21.6 and 29.1 percent respectively, thus matching its performances with the best-practiced bank. Hungarian-owned banks, i.e., institutions with no foreign involvement, reported higher inefficiency (24.84 and 29.93) than their foreign counterparts in both cost and profit (20.96 and 25.24) categories.

We investigate the performance of the foreign institutions based on the extent of foreign involvement in banks operating in Hungary into four categories (quartiles). The results indicate that the higher the foreign involvement in bank ownership the lower is the inefficiency. Banks with at least 75 percent foreign involvement were the most efficient group, with a cost- inefficiency score of 20.06 and a profit-inefficiency score of 23.14. These banks, as well as banks with 50 to 75 percent owned by foreign institutions, displayed significantly lower inefficiency than the domestic bank scores, at least at the 5 percent significance level.

Interestingly, the inefficiency scores of these two groups were quite similar indicating that some of the foreign banks that have some local involvement performed as well as the banks with total foreign ownership. Banks with less than 50% foreign ownership fared substantially lower relative to the groups with over 50% foreign ownership. The group with banks up to 25 percent foreign involvement was relatively less efficient among the foreign-based groups, with inefficiency scores of 23.80 and 28.79 in the cost and profit categories, respectively. Interestingly, these scores were still lower than the inefficiency scores of the Hungarian-owned domestic bank group.

Observing the inefficiency trend over the sample years, we notice a significant improvement in both categories. In the profit category, the average profit-inefficiency score was 32.54 in 1993; this score declined significantly over the years, with the lowest score of 25.01 reported in 1997. The same trend was observed in the cost category, where the inefficiency score declined from a high of 28.62 in 1993 to 16.83 in 1997. The overall evidence reveals that different regulatory initiatives, privatization of state-owned banks, and an increase in foreign ownership in the banking market were associated with improved profitability and profit efficiency. It is also plausible that the overall improvement of the country's stability and its economic condition relative to the initial transition years contributed to the trend of improvements in the banking sector.

Correlates of Profit Inefficiency Scores

Once we have attained the profit-inefficiency scores, we employ a series of Ordinary Least Squared (OLS) regressions to find possible correlation between such inefficiency and other relevant organization-specific and related variables reflecting portfolio positions and management practices. Among other issues, we are interested in seeing whether the influence of foreign-owned banks or foreign-involved joint venture initiatives are significantly correlated with the profit- inefficiency scores.

$$\begin{aligned} Pineff_i = {} & a_0 + b_1 LQASSET_i + b_2 STLOAN_i + b_3 FINVEST_i + b_4 RLOAN_i \\ & + b_5 RDEPOSIT_i + b_6 EQUITY_i + b_7 CINEFF_i + b_8 LASSET_i \\ & + b_9 YRBUS_i + b_{10} HOURS_i + b_{11} FSHARE_i + b_{12} ACQDUM_i \\ & + \sum b_{13\text{-}17} FSHAREDUM_i + \sum b_{18\text{-}22} YEARDUM_i + e_i \end{aligned}$$

$Pineff_i$	=	Profit-inefficiency score, our dependent variable.
LQASSET	=	Liquid asset (cash and securities) to total assets.
STLOAN	=	Short-term loan to total assets.
FINVEST	=	Financial investment to total assets.
R LOAN	=	Retail loans (loans given to customers) to total assets.
RDEPOSIT	=	Retail deposit (deposits given to customers) to total assets.
EQUITY	=	Equity to total assets.
CINEFF	=	Cost inefficiency score.
LASSET	=	Logarithm of assets.
YRBUS	=	Logarithm of number of years in business.
HOURS	=	Logarithm of number of hours bank service available.
FSHARE	=	Percentage of asset owned by foreign banks.
ACQDUM	=	Acquisition dummy variable. If the bank has acquired or merged with another bank during the post-1991 period then ACQDUM = 1 or ACQDUM = 0.
SFSHAREDUM	=	Four foreign share dummy variables under different categories of foreign bank involvement [.01-25%, 25.01-50%, 50.01-75%, and 75.01-100%].

		For example, if the bank has .01 to 25% foreign involvement in bank's asset then $fshare._{01\text{-}25\%}$ = 1otherwise $fshare._{01\text{-}25\%}$ = 0 and so on.
SYEARDUM	=	Year dummy variables for all sample years, for example, if year is 1993 then $yeardum_{1993}$ = 1 otherwise $yeardum_{1993}$ = 0.
e_i	=	error term.

All the independent variables are proxy for some sort of management practice, business experience, foreign involvement, and the current portfolio commitments of individual banks. We estimate three sets of OLS regressions: (a) a profit efficiency test that uses profit inefficiency as a dependent variable without cost inefficiency considered as a independent variable; (b) a revenue efficiency test that uses profit inefficiency as a dependent variable with cost inefficiency included in the regression; and (c) a cost efficiency test that employs cost inefficiency as the dependent variable.

Results are shown in Table 3. Estimates display the pooled estimates of the combined sample banks and incorporate bivariate year variables "YEARDUM" for all sample years except for the year 1993. In these estimates, the 1993 binary variable is reflected in the intercept. The first three regressions focus, among other issues, on the relationship between the level of foreign bank's ownership share and bank's inefficiency scores. The last three estimates replace the foreign bank ownership share variable with specific extents of foreign bank involvement incorporating sample bank groups with different levels of foreign ownership involvement. All six estimates provided relatively high model statistics.[14]

Concentration in liquid assets decreased cost inefficiency but it did not necessarily lowered profit and revenue inefficiency as portrayed by a positive correlation between liquid assets and profit (revenue) inefficiency. On the contrary, asset concentration in financial investment increased cost inefficiency but helped to lower profit and revenue inefficiency. The result also shows that dependence on retail lending to customers helped to lower revenue and profit inefficiency. These suggests that Hungarian banks incurred higher cost in shifting into new nontraditional financial investment activities but maintaining a diverse asset portfolio consists of retail lending and investment in financial instruments helped them to achieve more efficiency in the

revenue (profit) side. Equity ratio showed consistent positive correlation with inefficiency. This suggests that risk averse bank with relatively lower earning assets outstanding was less likely to be associated with increased efficiency.

Asset variable, a proxy for firm size, showed inverse relationship with the dependent variable in all estimates. It reflects that bigger institutions were relatively more efficient. As discussed earlier, relaxation of asset restrictions in the banking system encouraged many specialized institutions to grow and also to venture in different areas of the banking business, and were likely to have achieved some economies of scale and scope from growth and joint production, respectively, resulting in lower profit-inefficiency. DeYoung and Nolle (1996) explained such relationship, in the U.S. context, due to the ability of large banks to attract and retain better managers.

The length of the banking experience i.e., the number of years in business variable, did not yield any significant relationship; however, the coefficient of the logarithm of number of hours of bank service available reveals that institutions with more banking hours for customer services are likely to have lower inefficiency. The acquisition dummy variable - which reflects only those institutions that have acquired or merged with another banking institution - revealed a negative and significant parameter. It suggests that banks involved in acquisition in the new banking environment benefited from such experience and are associated with lower inefficiency. Finally, consistent with previous results, the extent of the foreign involvement variable showed that such involvement helped reduce inefficiency.

Additional estimates in regressions 2 and 3, portrayed in columns 2 and 3, reveal similar results except that the marginally significant association between retail loans and profit inefficiency and availability of banking hours and inefficiency no longer existed, although the magnitude of the relationships were the same. Among the additional information, the second regression (revenue inefficiency estimate) showed that the banks performed better during 1995 and 1996. The evidence also reveals that cost inefficiency significantly correlates with revenue inefficiency. The third regression (cost inefficiency estimate) also showed that banks with higher foreign involvement were more associated with lower inefficiency.

As mentioned earlier, the last three estimates replace the foreign bank ownership share variable with specific extents of foreign bank involvement incorporating sample bank groups with different levels of foreign ownership

involvement. These estimates (last three columns) reveal a slightly better model statistics compared to the first three estimates. The independent variables that are common with the first three regressions show the same magnitude and in a few cases, stronger statistical significance in their association with respective inefficiency dependent variables.

Among the disaggregated foreign share variables, a significant inverse association between profit inefficiency and foreign involvement was observed by the group that had over 75 percent of its capital owned by foreign banks. Given almost 80 percent of the banks in this category were 100 percent foreign-owned, this simply confirms significant higher efficiency associated with foreign banking institutions in Hungary. The group that had an average foreign involvement between 50.01% – 75% percent provided similar magnitude but even stronger statistically significant impact on dependent variables in all three estimates. This suggests that foreign banks taking substantial local involvement (25%-50%) without giving up the overall lead ownership were strongly correlated with performance. The groups with minority foreign ownership (25.01%-50% and .01%-25%) however did not reveal any correlation with improved efficiency. In fact, they revealed a positive association with inefficiency. However except for one case, their correlation with inefficiency scores were not statistically significant at any acceptable level for both groups in all other estimates. The lack of significant improvement in efficiency by these two groups especially the less than 25% foreign involvement may not be totally associated with their foreign ownership percentage. It simply could be the fact that institutions in these groups recently went through a significant reorganization, privatization, and joint partnership process and that the new management was yet to make adjustments to the new association and lacked immediately effective and efficient portfolio management. Such explanations seemed plausible as a comparison of mean statistics (not reported in the text) of this group with the group with the highest foreign involvement reveals that the banks in the former group were significantly smaller in asset size and held significantly lower financial investment. Incidentally, both size and financial investment variables were significantly and inversely associated with lower inefficiency in most of our regression estimates.

It can be summarized from evidence that foreign-owned banks in Hungary outperformed their domestic counterparts and their active involvement with local banks in many cases improved the efficiency of those banks as

well as the others institutions in the Hungarian banking sector. However, one should be cautious to make such generalized statements as some banks despite their new partnership with foreign banks (low level of foreign involvement) are yet to achieve a total recovery from costly transition and reorganization.

7 Conclusions

The paper introduces the Hungarian banking sector and its experiences and developments during the transitional process from a centralized economy to a market-oriented system. The paper identifies that among other factors, early reorganization initiatives, flexible approaches to privatization, and liberal policies towards foreign banks' involvement with the domestic institutions paved the way for a stronger banking sector in a short period of time.[15] Using data following the initial changes subsequent to 1992, the paper captures the recent experiences and status of the banking sector finding steady improvement in both the cost and profit inefficiency categories.

Indeed, a liberal privatization policy and easy terms and conditions may have caused some immediate loss of maximum possible benefits; however, the competition and associations from more skilled and experienced foreign banking institutions have resulted in a positive influence on the banking sector. On average, banks today have extended hours of customer services and are involved in cutting costs and developing new lines of businesses. In recent years, the Hungarian banking sector has been one of the most popular and sought-after banking markets by foreign banking institutions in the region; this is well reflected by the involvement of foreign banks.

Banks with foreign involvement were found to be significantly less inefficient than their domestic counter-parts. Among the foreign-involved institutions, a higher share of foreign ownership was associated with lower inefficiency in all estimates. Foreign banking group with substantial local involvement (25%-50%) was found to be strongly correlated with improved efficiency. Also, institutions that took advantage of acquisition of local banks were associated with lower inefficiency. The experience of foreign banks in Hungary has been different from foreign banks studied in other countries; the studies show that foreign banks usually experience excessive costs associated with transferring their own comparative advantages or due to the idi-

osyncratic features of local customers and service delivery systems. In Hungary, on the contrary, the local market conditions presented opportunities for foreign banks to exploit their comparative advantages into lower costs, causing lower inefficiency.[16]

Despite the rapid privatization and much improved banking sector, predominantly through foreign banks, the banking industry in Hungary, similar to that of other countries in the ECE region, remains underdeveloped in terms of the provision of credit to enterprises [EBRD (1999)]. Ultimately, the merits of the evolving Hungarian banking sector will become more evident over time as the rate of financial sector deepening become manifest and comparable to alternative models of banking sector restructuring.

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Table 1 Descriptive Statistics

Panel A						
Key Balance Sheet Items	**Combined**	**1993**	**1994**	**1995**	**1996**	**1997**
Liquid Assets Ratio	21.30 (14.43)	25.66	20.37	20.57	21.74	19.27
Short-term Loans Ratio	46.18 (15.72)	46.65	48.93	48.71	48.43	49.47
Financial Investments Ratio	8.40 (9.67)	7.48	8.19	9.54	9.82	9.06
Retail Loans Ratio	34.77 (14.90)	39.22	36.51	37.25	27.99	27.71
Retail Deposits Ratio	47.06 (19.58)	52.68	46.28	45.99	47.15	46.80
Institutional Deposits Ratio	29.14 (17.92)	24.23	30.60	28.57	29.92	29.08
Equity Ratio	11.21 (6.41)	13.28	11.68	10.62	10.16	10.91
Logarithm of Assets	15.90 (3.35)	13.76	14.95	16.57	17.61	18.26
Panel B						
Key Income Expenditure Items	**Combined**	**1993**	**1994**	**1995**	**1996**	**1997**
Non Interest Costs Ratios	6.10 (7.43)	8.86	8.01	8.27	4.87	4.41
Total Cost Ratio	18.39 (11.69)	19.64	18.92	22.48	15.69	14.83
Return on Assets	0.51 (2.52)	-0.24	0.28	0.56	0.36	0.26
Return on Equity	5.59 (19.38)	5.93	3.59	8.26	3.80	2.76
Panel C						
Output Input Variables & Other Ratios	**Combined**	**1993**	**1994**	**1995**	**1996**	**1997**
Total Loans Ratio	65.19 (17.02)	61.58	62.07	63.69	64.58	69.21
Total Investment Ratio	10.56 (9.91)	10.86	10.16	12.25	12.04	11.90
Total Borrowing Ratio	86.03 (6.60)	84.50	85.22	86.55	87.21	86.98
Price of Fund	11.83 (4.02)	8.78	10.92	13.63	12.89	11.95
Price of Labor	64.25 (24.31)	74.20	59.36	62.14	58.60	60.51
Number of Years in Business	11.81 (13.30)	7.95	8.95	10.41	11.76	13.39
Weekly Banking Hours	33.81 (7.39)	29.89	31.26	33.17	33.80	36.75
Percentage of Foreign Bank Share	63.78 (41.80)	51.43	58.29	61.81	68.64	74.30
Number of Banks	160	34	33	30	29	34

All ratios are in respect to Total Assets. The Price of Fund is equal to total interest paid divided by the total fund borrowed. The Price of Labor is all non-interest expenses divided by the number of employees.

Table 2 Inefficiency Score

	Cost Inefficiency		Profit Inefficiency	
	Mean	St. Deviation	Mean	St. Deviation
1993	28.62	8.42	32.54	9.26
1994	24.61	6.14	30.62	8.15
1995	21.70	6.75	26.18	8.24
1996	18.45	4.28	24.79	7.34
1997	16.83	4.93	25.01	6.56
Combined 1993-97	*21.62*	7.12	*29.08*	7.71
All Domestic	*24.84*	9.12	*29.93*	6.83
Foreign Banks or Foreign Involvement (FFI)	*20.96**	6.44	*25.24**	5.04
FFI 75.01 -100%	*20.06*	3.91*	*23.14**	4.56
FFI 50.01 – 75%	*20.08*	2.95*	*23.15**	6.75
FFI 25.01 – 50%	*23.05*	6.07	*26.68*	6.05
FFI 0.01 – 25%	*23.80*	4.51	*28.79*	5.59

***** *Significantly different from domestic mean scores at 5 percent significance level.*

Table 3 Correlates of Profit Inefficiency Scores OLS Regressions (t-Statistics in Parenthesis)

Independent Variables	*Profit Inefficiency Regression*	*Revenue Inefficiency Regression*	*Cost Inefficiency Regression*	*Profit Inefficienc Regression*	*Revenue Inefficienc Regression*	*Cost Inefficienc Regression*
	1	*2*	*3*	*1*	*2*	*3*
Intercept	0.028	0.026	0.125	0.023	0.029	0.191
	(1.25)	(1.08)	(1.66)*	(1.19)	(1.34)	(1.78)*
Liquid Asset Ratio	0.023	0.056	-0.035	0.025	0.041	-0.355
	(2.99)***	(3.22)***	(2.20)**	(3.18)***	(3.17)***	(2.66)**
Short-term Loan Ratio	0.152	0.076	0.326	0.105	0.093	0.184
	(1.04)	(0.79)	(0.99)	(1.23)	(0.98)	(1.30)
Financial Investment Ratio	-0.069	-0.065	0.144	-0.054	-0.052	0.079
	(1.90)*	(1.72)*	(1.89)*	(1.99)**	(1.89)*	(2.03)**
Retail Loan Ratio	-0.021	-0.013	-0.117	-0.026	-0.013	-0.091
	(1.71)*	(1.45)	(1.44)	(1.77)*	(1.67)*	(1.08)
Retail Deposit Ratio	-0.026	-0.015	0.104	-0.030	-0.015	0.098
	(1.52)	(1.45)	(1.56)	(1.73)*	(1.62)	(0.77)
Equity Ratio	0.048	0.058	0.058	0.055	0.048	0.066
	(1.84)*	(1.88)*	(1.97)**	(1.90)*	(1.78)*	(1.75)*
Cost Inefficiency	-	0.043	-	-	0.081	-
		(2.65)**			(2.73)**	
Log of Assets	-0.001	-0.006	-0.004	-0.001	-0.006	-0.005
	(2.00)**	(1.81)*	(1.78)*	(2.02)**	(1.83)*	(1.84)*
Log of Years in Business	0.001	0.001	-0.001	.001	.001	-0.001
	(0.33)	(0.40)	(1.72)*	(0.34)	(0.40)	(1.94)*
Log of Hours Service Available	-0.002	-0.001	-0.001	-0.002	-0.001	-0.001
	(1.78)*	(1.57)	(1.40)	(1.81)*	(1.59)	(1.35)
Banks Acquired Local Institutions (Dummy)	-0.047	-0.039	-0.049	-0.048	-0.037	-0.034
	(2.15)**	(1.91)*	(1.90)*	(2.19)**	(1.93)*	(1.89)*
Foreign Ownership Share (FS)	-0.040	-0.045	-0.037	-	-	-
	(1.74)*	(1.90)*	(2.02)*			

Table 3 continues at the next page

Independent Variables	*Profit Inefficiency Regression*	*Revenue Inefficiency Regression*	*Cost Inefficiency Regression*	*Profit Inefficienc Regression*	*Revenue Inefficienc Regression*	*Cost Inefficienc Regression*
	1	*2*	*3*	*1*	*2*	*3*
FS 0 – 25%	-	-	-	0.012	0.018	0.035
				(1.19)	(1.26)	(1.89)*
FS 25.1 – 50%	-	-	-	0.025	0.030	0.080
				(1.31)	(1.44)	(1.49)
FS 50.1 – 75%	-	-	-	-0.024	-0.020	-0.057
				(3.07)***	(2.99)***	(3.11)***
FS 75.1 – 100%	-	-	-	-0.018	-0.019	-0.034
				(2.55)**	(2.61)**	(2.03)**
Year 1994	-0.002	-0.002	0.014	-0.001	-0.002	-0.002
	(1.30)	(1.24)	(1.54)	(0.97)	(1.19)	(1.39)
Year 1995	-0.022	-0.014	0.028	-0.036	-0.023	-0.012
	(2.37)**	(2.09)**	(2.43)**	(2.05)**	(2.34)**	(2.10)**
Year 1996	-0.002	-0.001	0.002	-0.005	-0.001	-0.002
	(1.92)*	(1.71)*	(2.01)**	(1.86)*	(1.73)*	(1.90)*
Year 1997	-0.001	-0.002	-0.015	-0.003	-0.003	-0.002
	(1.39)	(0.93)	(1.25)	(1.61)	(1.00)	(1.45)
Adjusted R-squared	23.15	18.44	28.36	32.09	22.57	30.16
F-Statistics	3.94***	2.99***	5.68***	4.52***	3.06***	5.78***
No of Observation	154					

*Note: ***, **, * means significant at 1, 5, 10 percent significance level respectively.*

Notes

[1] For a description of the '"stylized" symptoms of transition of the financial sector, see Gorton and Winton (1998).

[2] Most studies in the related area focused on the restructuring and development of the financial sector in transition economies [Gorton and Winton (1998), Litwack (1995), Gros and Steinherr (1997), Catte and Mastropasqua (1993), McKinnon (1991), and Csaki (1994)]. A few case studies focused on the privatization of individual banks and the changes in the banks' performance and governance subsequent to privatization [Hunter (1993), Abarbanell and Bonin (1997), Meyendorff and Snyder (1997), Abarbanell and Meyendorff (1997)]. Although these studies contributed to a better understanding of the issues and processes involved in financial sector development in transition economies, most are based on conceptual developments on the topics rather than on experiences from empirical perspectives.

[3] For a review of corporate governance and impact of debt and equity investors on management, see EBRD (1993).

[4] In the post deregulatory period – since 1990 -, the Croatian banking industry experienced the entry of over 30 new banks within the first 6 years. Only one of these banks was a foreign banking institution.

[5] The econometric, or "stochastic," frontier approach was introduced by Aigner, Lovell, and Schmidt (1977), and was made tractable by Jondrow, Lovell, Materov, and Schmidt (1982). Bauer (1990) offers an overview of these methods. For an extensive review of the banking literature on efficiency, see Berger, Hunter, and Timme (1993) and Berger and Humphrey (1997).

[6] See Cebenoyan et al. (1992) and Berger et al. (1993).

[7] Berger et al. (1995) provides arguments in favor of using a profit function to examine banking inefficiency.

[8] Our empirical approach closely follows the estimation shown in DeYoung and Hasan (1998). The paper provides a more detailed analysis of the methodology and portrays the benefits of using an annual profit frontier over a single multiyear frontier.

[9] The alternative or nonstandard approach has been applied to banking data by Berger, Humphrey, and Pulley (1996); Humphrey (1994); Pulley and Humphrey (1993); Humphrey and Pulley (1997) and DeYoung and Hasan (1998). In the "standard" approach to estimating a bank revenue function, output markets are assumed to be perfectly competitive, so revenues are specified as a function of output prices and input quantities, with the bank choosing its output quantities based on these prices. In contrast, a "nonstandard" profit function assumes that banks have some market power in output markets, so revenues are specified as a function of input prices and output quantities, with the bank choosing input quantities and output prices. In reality, market power can vary greatly across both geographic and product markets, so it is difficult to know whether individual banks choose output prices, output quantities, or both. We make the assumption that output quantities are exogenous (i.e., banks choose output prices), which allows us to use the nonstandard function. This choice is made for practical reasons — using the nonstandard approach avoids having to use output price data, which is not very reliable, and many times is not even available for banks.

[10] We estimated the profit (cost) equation using maximum likelihood techniques, and imposed the standard symmetry and homogeneity restrictions on the translog portion of the model. Factor share equations were omitted because application of the usual cross-equation restrictions would impose the assumption that the given input proportions were the allocatively efficient ones [see Berger (1993), p. 266].

[11] Noninterest expense includes labor expenses and office expenses. One can assume that money spent on office related expenses is, in some way, an indirect benefit to employees, and therefore, the whole noninterest expense can be a good substitute of employee benefits. Alternatively, we also estimate the functions using one input - the price of borrowed funds. In these additional estimates, we do not follow the homogenity assumption that followed in the two input estimates. Interestingly, our inefficiency estimates based on one input was not significantly different from the two reported input esti-

mates. Moreover, in subsequent regression analyses, we substituted the inefficiency scores with our one input-based inefficiency and it did not change the overall significance of the reported results and conclusions of the paper. Therefore, we did not report additional results; however, they are available upon request.

[12] See Berger, Leusner, and Mingo (1997) for a derivation of, and a justification for, this truncation.

[13] Stevenson (1980) has shown that the assumption of a truncated normal inefficiency distribution is more general and more flexible than the assumption of a half-normal distribution. Berger and DeYoung (1997) show that the truncated normal distribution results in lower estimates of average inefficiency for banks than does the half normal, but that the rank efficiency order of banks remains virtually identical across distributions.

[14] We did not report the yearly estimates because the overall magnitude and significance of the relationship between profit inefficiency and other variables were strikingly similar to the reported combined results. Also, we estimated a pooled sample, adding an economic environment variable for each year represented by the GDP growth taken from International Financial Statistics. The GDP growth variable did not show any significant correlation while other results portrayed a similar relationship. Moreover, we estimated additional regressions adding an asset growth variable as an independent variable. It lowered the sample size to 118. Although in each of the six combined regressions, the variable reported a positive relationship with inefficiency however the coefficients were not statistically significant in five of the estimates. Only, in the sixth estimates reporting correlation with cost inefficiency the growth variable parameter significant only at 7.8%. All of these results are available upon request.

[15] These results are consistent with Thorne (1993) initial perspectives in the Central and Eastern European region.

[16] The comparative advantage of foreign banks however was also related to the fact that foreign banks started from a stronger position relative to the local banks which had a legacy of inherited nonperforming loans.

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