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Abstract

Commercial banks undertake business of risk in an environment of asymmetric
information. This is why, the industrial economists who are interested in theory of
incomplete information and principal-agent framework have found the banking industry a
promising field of research. There are number of studies on the behavior of commercial
banks in various countries under structure-conduct-performance paradigm of industrial
economics. However, there is hardly one in the context of Pakistan. This study attempted
to analyze the structure and performance of commercial banks in Pakistan under the
framework of industrial organization.

Structure and Performance of Commercial Banks in Pakistan

Commercial banks have become a field of rising interest of industrial economists who endeavor in an important branch of industrial economics viz., theory of incomplete information and principal-agent framework. Asymmetry of information in the principal-agent problem provides reasons for banks to play a special role to minimize the agency costs between borrowers and lenders (Diamond, 1984). Although capital market also establishes relationships among borrowers and lenders but commercial banks have comparative advantage due to their superior capability to provide debt with inside information, as explained by Fama (1985).

Although there are number of studies on market structure, conduct and performance in the banking sector conducted since 1960s for a number of countries (for a survey see Swank 1996, Berger 1995, & Gilbert 1984), there is hardly such a study in the context of Pakistan. However, there exist some studies with limited scope like Qureshi, et al (1998) on cost structure of five commercial banks and one specialized bank[1], Malik, et al (1989 & 1991), Qureshi et al (1984) and Qureshi & Shah (1992) on the rural finance and Siddique & Siddiqui (1998) on overall profitability of the banking sector in Pakistan. Recently SBP (2002) evaluated commercial banks' performance under traditional framework of financial analysis, but it also excluded an analysis of the market structure and conduct of the banking sector. Thus one is still unable to find a study on the

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[1] NBP, HBL, UBL, ABL, MCB & ADBP

commercial banks of Pakistan *under structure, conduct and performance paradigm of industrial organization.*

This study is a modest attempt to examine structure and performance of commercial banks in Pakistan under the framework of industrial organization. The analysis is not exhaustive in two senses; first we have reviewed only structure and performance of banking firms and left conduct[2] unexamined due to non-availability of information, and second even structure and performance have been evaluated on the basis of limited parameters. However, the study can be considered a first drop of rain of banking firms' analysis under industrial organization framework. The next section gives structure of commercial banks in Pakistan, and section 3 presents a review of their performance. The last section concludes the paper.

2. Structure

We will discuss structure of banks in Pakistan[3], first in terms of number of banks and size of banks (as measured by assets, deposits, etc), then in terms of concentration ratios (Lorenz curve, Gini co-efficient, Herfindahl index and Concentration Ratio).

In 1990, seven domestic banks and seventeen foreign banks were doing business in Pakistan. All the domestic banks were owned by the government[4]. Entry of domestic private sector in the banking business had been banned since the promulgation of Banks

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[2] Conduct of a firm includes its strategies towards rival firms or new entrants, sales promotion activities, research and development, advertising, product differentiation, etc.
[3] Our analysis is based on 36 commercial banks, distribution of which is given in Annex 1.
[4] Six banks were owned by federal government and one by Government of the Punjab.

Nationalization Act 1974. However, as a part of financial liberalization strategy of 1990s, private sector was allowed to open commercial banks in 1991. At that time fifteen banks were opened. During the next ten years the process of entering of new banks and exiting of inefficient banks continued. Moreover, in order to go some step further to make the banking sector competitive, the government also denationalized a couple of commercial banks. In 1999, there were 19 domestic banks and seventeen foreign banks in Pakistan (see Annex for list). Of the domestic banks, four were owned by the federal government, two were privatized, two were owned by the provincial governments and the rest were in the private sector. The government has also minimized its interventions in the business of its own banks in order to ensure that a competitive environment prevails in the industry.

Along with the growth of banks in numbers, their business also shows a reasonable growth during 1990s. Total assets of commercial banks grew at a compound annual growth rate of 15 percent, from Rs 419 billion at the beginning of decade to Rs 1,469 billion by the end of 1999.

Amongst different groups, assets of private banks showed fastest growth during 1990s, followed by foreign banks. A similar trend is witnessed in the advances and deposits of the banks (Table 1).

Table 1: Assets, Deposits and Advances* of Commercial Banks (million rupees)

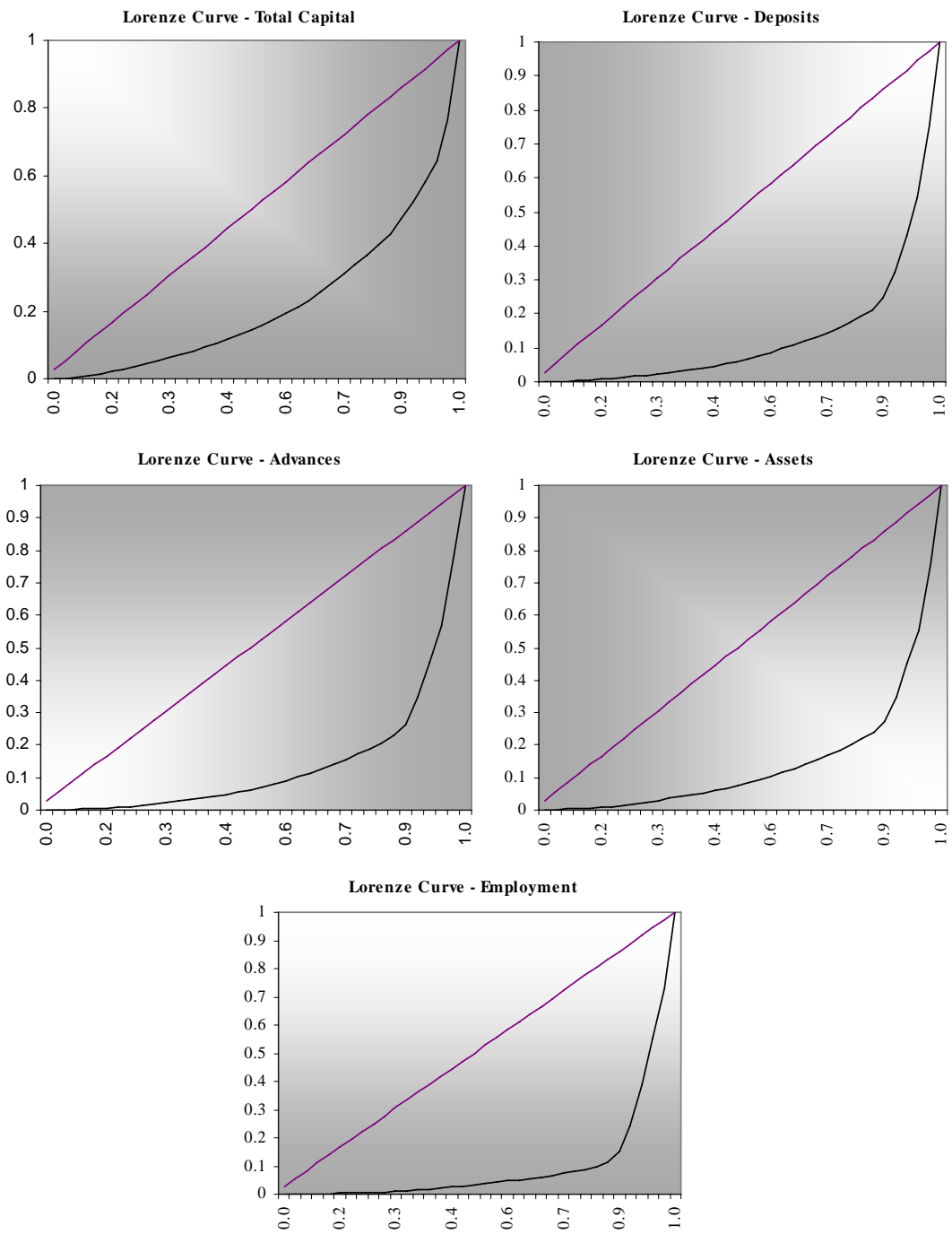|	1990	1995	1999	Annual Compound Growth Rate (%)
Assets				
State Owned Banks**	389.6	769.9	1,071.2	11.9
Private Banks	2.7	96.2	200.2	61.6
Foreign Banks	26.9	126.7	197.1	24.8
Total	419.1	992.9	1,468.5	14.9
Deposits				
State Owned Banks	327.3	658.6	899.5	11.9
Private Banks	2.4	68.4	146.8	57.7
Foreign Banks	20.2	101.6	142.8	24.3
Total	349.9	828.6	1,189.2	14.6
Advances				
State Owned Banks	303.8	589.5	735.0	10.3
Private Banks	1.5	63.5	141.0	65.6
Foreign Banks	19.8	90.8	120.8	22.2
Total	325.1	743.8	996.8	13.3

* Including investments;
** Including MCB & ABL

The distribution of assets, deposits, advances, etc., of commercial banks has been worked out on the basis of Lorenz curve, Herfindahl Index and Concentration Ratio.

Lorenz Curve

Lorenz Curve (LC) is a construct used in the calculation of measures of inequality. Using any variable (e.g. in case of banking sector, assets, deposits, advances, etc.) the LC plots cumulative percentage value of the variable held by the firm against cumulative percentage of the number of firms (banks in our case). We have drawn LC for five important variables of banking industry in Pakistan, these are; equity, assets, deposits, advances and number of employees (see Fig 1).

Fig 1: Lorenz Curve of Total Capital, Deposits, Advances, Assets and Employment in Commercial Banks

Lorenze Curve - Total Capital

Lorenze Curve - Deposits

Lorenze Curve - Advances

Lorenze Curve - Assets

Lorenze Curve - Employment

As Fig 1 shows, distributions of all the variables are highly unequal among the banks. The Lorenz Curves lie considerably below the 45° line. It shows the banking sector in Pakistan is not competitive. Almost every key variable is concentrated in a few banks which shows concentration of market power[5]. *Even after financial reforms and liberal licensing policy, the industry is still far from the competitive structure.* As a matter of fact the four nationalized banks along with MCB and ABL still constitute more than three fourth of the industry.

The Lorenz Curves show the structure of the industry in 1999. In order to see the dynamics of inequality, we also have calculated Gini coefficient which is summary measure of inequality derived from Lorenz Curve. It is the ratio of area between LC and 45° line to total area below 45° line. It has been calculated by the following formula;

$$G = 1 + \frac{1}{n} - \left(\frac{2}{n^2 \bar{y}} \right) \sum_{i=1}^{n} i \cdot y_i \qquad\qquad (1)$$

where y_i is the value of the variable of bank i such that $y_i < y_{i-1}$, $\bar{y}$ is average of y_i, and n is the number of banks. The maximum value of Gini coefficient is one which shows complete inequality, and minimum value is zero which shows absolute equality. Table 2 gives Gini coefficient for the years 1996 to 1999[6]. It clearly shows that although a number of commercial banks from private sector entered in to the industry, the banking business is still concentrated in a few large banks. There is marginal reduction of

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[5] In a competitive market no firm has market power; every firm is price taker and no firm can influence prices; no firm is market leader and there are no followers in the market.
[6] Data for private banks prior to 1996 was not available.

concentration in terms of, for example, advances, assets and employment, but these are still highly skewed.

Table 2: Gini Coefficient

	1996	1997	1998	1999
Equity	0.52	0.55	0.60	0.56
Deposits	0.75	0.73	0.72	0.74
Advances & Investment	0.74	0.71	0.71	0.72
Total Assets	0.73	0.71	0.71	0.71
Number of Employees	0.83	0.81	0.81	0.80

Herfindahl Index

It is also a measure of industrial concentration. To obtain the index, individual market share (in fraction) of each bank in terms of equity, assets, deposits, advances, and employment is squared. The sum of squared shares gives the Herfindahl Index, as given below;

$$H \;=\; \sum_{1}^{n} \alpha_i^{2} \tag{2}$$

where $\alpha_i = n\dfrac{yi}{y}$, i.e. share of bank *i*.

The Herfindahl index has an advantage over the Gini coefficient that it takes into account both the number of banks and their size differences. The value of *H* will be 1 when there is single firm in the industry, and tends to 1 when the number of firms decreases and/or inequality in shares increases. Table 3 shows Herfindahl index and co-efficient of variation for different variables relating to banking firms.

Table 3: Herfindahl Index & Co-efficient of Variation

	1996	1997	1998	1999
Herfindahl Index				
Equity	0.11	0.10	0.10	0.09
Deposits	0.14	0.13	0.13	0.14
Advances & Investment	0.14	0.12	0.12	0.13
Total Assets	0.14	0.13	0.13	0.13
No. Of Employees	0.18	0.17	0.16	0.16
Co-efficient of Variance				
Equity	0.040	0.069	0.073	0.064
Deposits	0.117	0.107	0.109	0.115
Advances & Investment	0.115	0.100	0.099	0.104
Total Assets	0.112	0.107	0.105	0.106
No. Of Employees	0.161	0.142	0.139	0.139

The table shows that Herfindahl index has slightly declined over the years. This may be

due to increase in number of banks during this period. However, as size inequality was

still very high (as evident from Gini co-efficient) the gain from increase in *number* of

banks was not very significant. The table also gives the co-efficient of variation which

has been increased for capital (equity). It implies there are more variations in terms of

paid up capital of new entrants in the industry.

Concentration Ratio

Concentration Ratio is another useful measure of the dimension of the market structure. It

gives the percentage of total industry size accounted for by the few largest firms in the

industry. We have calculated 4-bank CR, 8-bank CR, and 20-bank CR. Table 4 shows

that 40 to 50 percent equity was concentrated in the largest 4 banks. These four banks

were not only capturing two thirds of the banking business in terms of deposits, assets,

and advances, but also were providing employment to 80 percent of the labor force in the industry. The other 32 banks were providing employment to only 20 percent of bankers.

Table 4: Concentration Ratio

	1996	1997	1998	1999
Total Capital				
4-bank CR	43.0	46.5	54.2	47.6
8-bank CR	59.3	61.3	68.6	63.3
20-bank CR	87.0	88.0	89.3	88.4
Deposits				
4-bank CR	69.3	66.2	66.2	67.6
8-bank CR	83.5	81.3	81.4	82.5
20-bank CR	95.8	95.1	95.0	95.4
Advances & Investment				
4-bank CR	69.1	64.0	64.2	65.4
8-bank CR	83.1	79.8	80.0	81.2
20-bank CR	95.6	94.7	94.6	95.2
Total Assets				
4-bank CR	67.7	64.8	65.2	65.5
8-bank CR	81.5	79.7	79.9	80.0
20-bank CR	94.9	94.4	94.2	94.0
No. Of Employees				
4-bank CR	81.4	77.2	76.1	75.7
8-bank CR	94.1	92.2	91.8	91.3
20-bank CR	98.4	97.9	97.7	97.4

All the indicators of concentration, i.e. Gini coefficient, Herfindahl index and Concentration Ratio, show that distribution of banking business is highly skewed in Pakistan. It implies the absence of competitive environment in its true sense in the industry. This result is contrary to the claim of the State Bank of Pakistan that the banking sector in Pakistan has become competitive in recent years (SBP, 2002, ch 7).

3. Performance

Like previous section, we have analyzed the performance of banks in Pakistan in two respects; *first* a ratio analysis showing trend in profitability of three groups of banks, viz., state-owned, private, and foreign banks, and *second* an estimate of profit function showing effects of different parameters on the profit. The first part of ratio analysis is adopted from SBP (2002).

Ratio Analysis

There are number of indicators used to evaluate the performance of the banking industry; the best and widely used indicators are Return on Assets (ROA), Return on Equity (ROE) and Net Interest Margin. Performance of a bank in terms of earnings and profitability reflects its ability to support present and future operations. More specifically, this determines the capacity to absorb losses by building an adequate capital base, finance its expansion and pay adequate dividends to its shareholders.

Table 5 gives some indicators of performance of different groups of banks in Pakistan. It shows that the profitability of state-owned banks deteriorated, especially after mid 1990s. This was the upshot of falling share of earning assets, mounting burden of non-performing loans (NPLs) coupled with increased provisioning requirements and, to some extent, cut in rates on government securities. On the expenditure side, the rising share of borrowing in total liabilities (partly due to slow growth in deposits), caused expenses to rise faster than income and, hence, reduced the profitability.

In addition, banking sector has remained a heavily taxed industry in Pakistan and high tax deduction also contributed towards low after-tax profit. More distressing thing for state-owned banks has been the problem of advance taxes. Since banks had to pay 30 percent withholding tax on T -bills and 10 percent on FIBs, a significant increase in the volume of their transactions during 1990s created a serious advance tax burden for banks. It is important to note that advance tax is a common practice in many countries, however the fact that CBR is currently assessing the actual tax liabilities of mid 1990s for these banks, shows the intensity of this problem.

The profitability of private banks was not impressive during 1990s. Their profitability increased initially as, they started their business but they were unable to sustain it in subsequent years. The initial period of good performance can be attributed to clients' attraction to these banks in an expectation of high quality banking services. But later as they suffer inconvenience they may have refrained from the new banks. It is worth noting that most of new banks were set up in few major cities of the country. They didn't have a branch network across the country which may have rendered them unattractive.

As regard foreign banks, despite showing better asset quality, adequate capital base and sound management, they failed to retain their profitability during 1990s. Despite indicating comparatively better position than competitors in the banking industry, the first three indicators showed declining earning capacity and thereby constraining profitability for this group, especially after 1997. Given the fact that they were mainly dealing in

Table 5: Performance of Commercial Banks in Pakistan (percent ratios)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
State-owned Banks										
Net Profit to Asset Ratio	0.4	0.5	0.5	0.7	0.2	0.2	-0.3	-2.3	0.5	-0.7
Net Profit to Equity Ratio	10.5	13.4	15.3	19.2	7.5	5.9	-14.8	-244	11.5	-19.8
Net Interest Margin	3.2	3.2	3.3	3.7	3.4	3.9	1.9	3.2	3.5	3.8
Total Income to Assets	9.6	9.1	8.9	10	9.6	10.2	9.6	10.7	10.6	10
Private Banks										
Net Profit to Asset Ratio			0.7	1.9	1.5	1.4	1.5	1	0.6	0.6
Net Profit to Equity Ratio			6.3	20	17.2	14.4	16.6	13.3	8	8.4
Net Interest Margin			2.3	5.2	4.7	4	3.4	3.9	3.5	2.6
Total Income to Assets			4.3	10.3	10.5	11.7	12.3	12.7	13.1	11.5
Foreign Bank										
Net Profit to Asset Ratio	0.8	1.9	2.6	1.2	0.8	0.4	1	1.3	0.4	0.7
Net Profit to Equity Ratio	10	27.1	30.8	13.5	8.7	4.9	12.8	15.9	4.8	7
Net Interest Margin	3.5	4.8	5.2	5.1	4.2	2.5	3.2	4.4	3.5	4
Total Income to Assets	11.9	11.1	12.1	12.1	12.6	12.5	12.5	14.6	15.2	13.9

Source: FSA, SBP (2002), Tables 3.6, 3.12 & 3.18

foreign currency accounts, their freezing in May 1998 severely affected the earning capacity of foreign banks.

Profit Function

We have also estimated a profit function of commercial banks. We have used pre-tax profit for this purpose as a dependent variable[7]. The specification of the function is given as follows;

$$\pi_{it} = \beta_0 + \beta_1 \, K_{it} + \beta_2 \, D_{it} + \beta_3 \, L_{it} + \beta_4 \, E_{it} + \beta_5 \, F_{it} + \beta_6 \, (F \times K)_{it} + \beta_7 \, (F \times E)_{it} + \varepsilon_{it} \qquad (1)$$

where

i = 1, 2, 3, …. ,36 are number of banks

t = 1990, 1991, …. , 1999 are years

π = profit / assets ratio

K = capital / liabilities ratio

D = deposits / liabilities ratio

L = loans / assets ratio

E = employment per branch

F = dummy variable which is 1 for foreign bank, 0 otherwise

ε = error term with usual assumptions of *iid*

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[7] As discussed earlier, the industry was highly taxed, and tax is an external factor, so it is difficult to explain post-tax profit by internal parameters of the industry.

Before giving the results, it is constructive to give some rational of variables included as explanatory variables.

A number of factors contribute towards the profitability of commercial banks. Equity capital is the most important one. For a banking firm, capital does not perform exactly the same function as for other non-financial firms. For a bank, capital is the source of strength and consumers' confidence. Higher capital base leads to higher confidence of consumers of the banking services. Since a bank' business involves risk, clients of the bank feel secure if it has high level of capital, and they may increase the use of its services. As banks' services are outcome of the joint actions of client and the bank, more clientele implies more production and sale of services (Neuberger 2002). Thus a high capital base helps a bank increase its quality and quantity of services and has a favorable implication for its profit. In the equation, capital to liabilities ratio has been used as an indicator of capital adequacy ratio[8].

Deposits are other important factor affecting the return of banks. These have two conflicting effects. On the one hand, deposits are the major sources of funds by which the banks run their business, more deposits enable banks to lend more and hence earn more profit, but on the other hand, banks have to pay interest on them. Thus, the net impact of deposits on profit is an empirical question.

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[8] Capital / liabilities had been in vogue as an indicator of capital adequacy before the Basle Committee's recommendation of using capital to risk weighted assets ratio.

Loan to total asset ratio (L) is included as regressor in the profit function in order to captures the effect of one of the core businesses of a bank on its profit, i.e. advances and investment. Interest earned on advances and investment is the major source of revenue for the bank. The level of interest earning depends on the quantity of loans and the rate of interest. In the above function, we have representation for only the quantity of loans; inclusion of both the variables creates problem of multicolinearity because supply of and demand for loans depends on the rate of interest.

Almost every firm needs manpower to run its business; a bank is not an exception. A team of qualified and skilled bankers are imperative for efficient working of the bank. This is why we have also included number of workers employed in the banks' profit function as an indicator of human capital. In order to remove size biasness, we have taken number of employees per branch (E) in the function.

The dummy variable (F) introduced in the model captures the structural differences among foreign and domestic banks. The inclusion of F_t gives the differences in the intercept of the profit function, and interactive terms $(F \times K)_{it}$ and $(F \times E)_{it}$ are used to capture differences in productivity of capital and labor in the two groups of banks[9].

For estimation, we have used a pooled data of 36 banks for ten years. Since data for private sector was available only from 1996, and there are also missing observations for

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[9] We are using a simplistic assumption that productivity differences are transformed into differences in profitability, which implies similar cost structure in the two groups..

some other years, the total number of observations included in the regression are 302.

OLS method is used for estimating the values of parameters.

The estimated equation is given below[10].

$$\hat{\pi}_{it} = 1.36 + 0.22\ K_{it} - 0.06\ D_{it} + 0.04\ L_{it} + 0.002\ E_{it} + 2.41\ F_{it} - 0.29(F \times K)_{it} + 0.01\ (F \times E)_{it}$$

(0.8) (5.0)   (-3.6) (3.6)   (0.4)   (3.0)   (-5.4)   (1.6)

$R^2 = 0.25;$ F statistic $= 13.9;$ DW$=1.89$

Figures in parentheses are t-statistics, which show that except employment all estimated parameters are significant. For a pooled data R^2 at 0.25 is not a low. Durbin Watson indicates the absence of serial correlation in the residuals.

As expected, the results show that equity capital and loans contribute positively to the profitability of the banks. The net impact of deposits is negative on profit. Further, it is interesting to note that;

1. Dummy variable for foreign banks is significant and is very high, it raises the intercept of profit function of foreign banks to 3.77 (1.36+2.41) compared with intercept of 1.36 for domestic banks. It implies that foreign banks have an absolute advantage over domestic banks due to very nature of their origin.

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[10] Since we are using pooled data, the time series problems like non-stationarity do not arise in our case.

2. Parameter of workers for domestic banks is insignificant, implying inefficiencies on the part of these workers. Whereas workers in foreign banks contribute positively towards profit of the banks (parameter value is 0.01, i.e. one employee increases profit as much as 1% of the total assets). Domestic banks have not only non-professional workers but also have over-employed labor force, due to which marginal productivity of labor has been declined significantly. On the other hand foreign banks induct highly professional bankers who contribute positively to the value addition.

3. It is rather strange result that capital base of foreign banks affects their profit *negatively*. A one percentage point increase in capital / liability ratio reduces profit / asset ratio by 0.07 percentage points (0.22 - 0.29). One explanation to this puzzle may be decreasing return to scale for foreign banks as their operations are not diversified (foreign banks operations are generally limited to foreign trade related business).

4. Conclusion

Commercial banks undertake business of risk in an environment of asymmetric information. This is why, the industrial economists who are interested in theory of incomplete information and principal-agent framework have found the banking industry a promising field of research. There are number of studies on the behavior of commercial banks in various countries under structure-conduct-performance paradigm of industrial

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economics. However, there is hardly one in the context of Pakistan. This study attempted to analyze the structure and performance of commercial banks in Pakistan under the framework of industrial organization

On the basis of key indicators of inequality viz., Lorenz curve, Gini co-efficient, Herfindahl index and Concentration Ratio, we have found that distribution of banking business is highly skewed in Pakistan. All the main variables like equity, assets, deposits, advances, and employment are distributed unequally across the banks. It implies absence of competitive environment in its true sense in the industry. Our results are in contradiction to the claim of the State Bank of Pakistan that banking industry has become competitive.

Analysis of performance show that the profitability of state-owned banks deteriorated, especially after mid 1990s. The profitability of private banks was also not impressive during 1990s. Their profitability increased initially as, they started their business but they were unable to sustain it in subsequent years. The initial period of good performance can be attributed to clients' attraction to these banks in an expectation of high quality banking services. But later, as they suffer inconvenience, they may have refrained themselves from the new banks. As regards foreign banks, despite showing better asset quality, adequate capital base and sound management, they failed to retain their profitability during 1990s.

We have also estimated a profit function on the pooled data of commercial banks. It is found that equity capital and loans affect profit favorably, and deposits affect it negatively. While employees of domestic banks do not contribute towards their profitability, foreign banks' employees add significantly to their profits.

Annex 1: Commercial Banks in 1990 and 1999

	As on June 1990		As on June 1999
	Nationalized Banks		**Nationalized Banks**
1	First Women Bank Limited	1	First Women Bank Limited
2	Habib Bank Limited	2	Habib Bank Limited
3	National Bank Limited	3	National Bank Limited
4	United Bank Limited	4	United Bank Limited
	Privatized Banks		**Privatized Banks**
5	Muslim Commercial Bank Ltd.	5	Muslim Commercial Bank Ltd.
6	Allied Bank Ltd.	6	Allied Bank Ltd.
	Provincial Banks		**Provincial Banks**
7	The Bank Of Punjab	7	The Bank Of Punjab.
		8	The Bank Of Khyber
	Private Banks		**Private Banks**
		1	Askari Commercial Bank
		2	Platinum Commercial Bank
		3	Prudential Commercial Bank
		4	Prime Commercial Bank
		5	Soneri Bank
	NIL	6	Bolan Bank
		7	Bank Al -Habib Limited
		8	Faysal Bank Ltd.
		9	Metropolitan Bank
		10	Bank Alfalah Ltd.
		11	Gulf Commercial
	Foreign Banks		**Foreign Banks**
1	Habib Bank Ag Zurich	1	Habib Bank Ag Zurich
2	Oman International Bank	2	Oman International Bank
3	Societe Generale	3	Societe Generale
4	Emerates Bank	4	Emerates Bank
5	Bank Of Tokyo	5	Bank Of Tokyo
6	Mashreque Bank Psc	6	Mashreque Bank Psc
7	ABN Amro Bank	7	ABN Amro Bank
8	IFIC Bank	8	IFIC Bank
9	Al Barka Islamic Bank Ltd.	9	Al Barka Islamic Bank Ltd.
10	Rupali Bank Ltd.	10	Rupali Bank Ltd.
11	Citi Bank N.A.	11	Citi Bank N.A.
12	Bank Of Cylon	12	Bank Of Cylon
13	Doha Bank	13	Doha Bank
14	American Express Bank	14	American Express Bank
15	Deutsche Bank Ag.	15	Deutsche Bank Ag.
16	Standard Chartred Bank	16	Standard Chartred Bank
17	Cradit Agricole Indosuez	17	Cradit Agricole Indosuez

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