

## 4 CONCENTRATION AND COMPETITION IN THE BANKING SYSTEM<sup>1</sup>

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*While the banking sector in Pakistan is widely acknowledged for its rapid progress in recent years, debates still abound about the concentration of business and the associated impact on efficiency and the evolving market structure of the industry, especially since competition is an important dimension of efficiency. This is of particular relevance at a time when the industry has undergone a structural transformation due to consolidation in the last few years, a process which is expected to continue in view of the recent announcement by the central bank which aims to increase the Minimum Capital Requirement to USD 300 million by 2013. Consequently, the emergence of organizations which are “too big to fail” and the significant role of large foreign banks and their subsidiaries raises concerns regarding the degree of market contestability in the industry, an issue which is explored at length in this chapter.*

The traditional theory of Industrial Organization Economics (IOE), also known as the *Structure-Conduct-Performance* (SCP) hypothesis, assumes a one-way causal relationship from the nature of market structure to the price setting behavior of firms, with reference to issues of concentration and competition. The essence of the SCP hypothesis is based on the argument that concentration encourages collusive behavior in market participants by reducing the cost of collusion. It implies that high concentration may impede competition in the sector, while the presence of a large number of relatively equal sized firms (banks) can result in competitive price-setting behavior. A competing hypothesis, known as the *Efficient Structure* (ES) hypothesis states that the high productive efficiency of a bank helps in increasing its market share and realizing abnormal profits.

Another approach views concentration and competition in terms of market contestability. A market is contestable if there are no barriers to entry and exit is costless. The key idea is that a firm may be compelled to be more competitive and efficient by the prospect of new entrants.<sup>2</sup> Theoretical and empirical literature on market contestability suggests that there are several conditions which can yield competitive behavior in concentrated markets, and that collusive behavior can exist and thrive even in the presence of a large number of firms/banks. A number of factors such as restrictions on entry, competition from non-bank financial institutions, and the presence of active capital markets and insurance companies, can play an important role in determining the level of competition in the banking sector. This emerging body of literature suggests that the degree of competition in the banking sector should be determined by the observed price-setting behavior of banks.

It is in this backdrop that this chapter analyzes issues of concentration and competition in the banking industry. It starts with a discussion of the market structure of the banking sector along with traditional measures of concentration. Subsequent sections present and discuss results based on the estimation of the Panzar-Rosse (PR)-H statistic: a measure of market contestability.<sup>3</sup>

### 4.1 Banking Structure and Measures of Concentration

The banking sector in Pakistan is generally characterized by the dominant position of the five large banks. The share of these five banks in the overall assets of the banking system was 84.0 percent at the end of 1990: a year in which broad-based financial sector reforms in Pakistan were

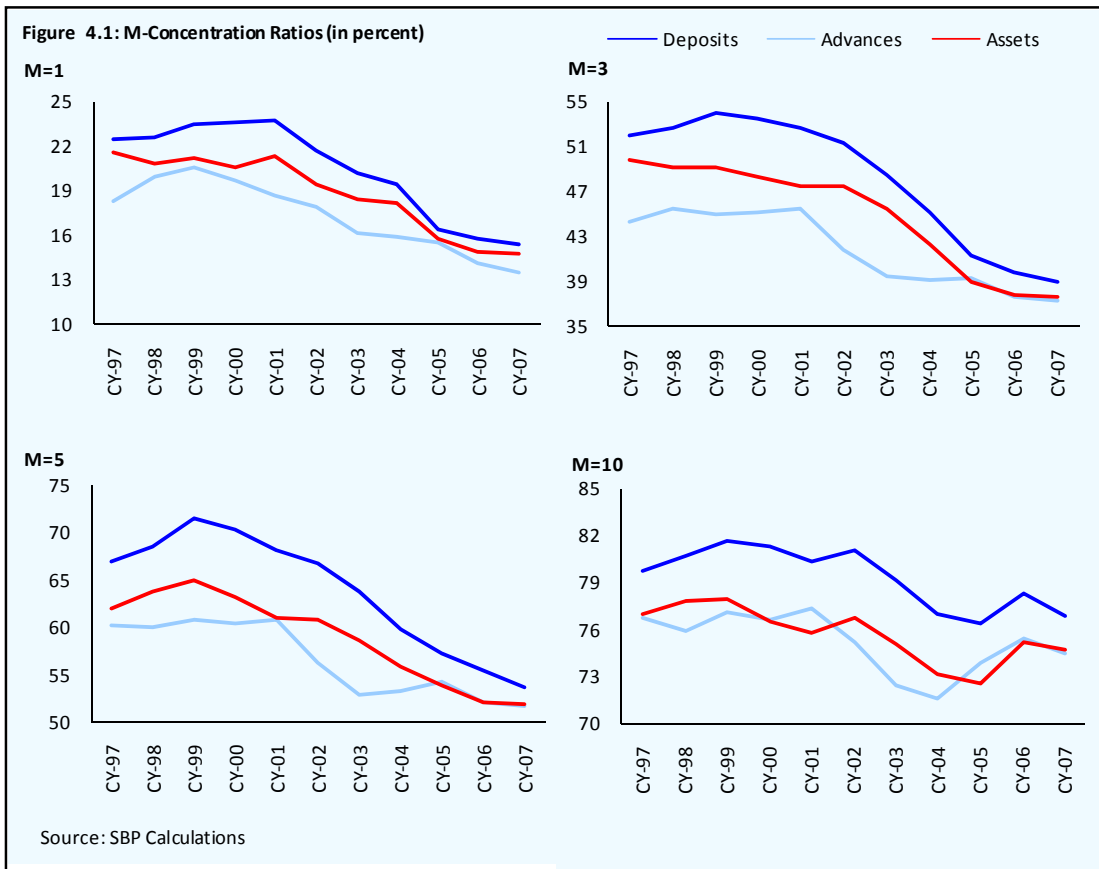
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<sup>1</sup> This chapter is based on a forthcoming Financial Stability paper titled “Concentration and Competition in the Banking Sector of Pakistan: Empirical Evidence” by Mahmood ul Hasan Khan, Financial Stability Department, State Bank of Pakistan. The chapter has benefited from comments from Mr. Jason Allen (Bank of Canada) and Mr. Carl-Johan Lindgren (ex-IMF, ADB Consultant).

<sup>2</sup> As elaborated in Allen & Engert (2007), and Allen & Liu (2007).

<sup>3</sup> This is one of the most widely used techniques for the assessment of competition in the banking system.

initiated, which included liberal licensing of banks in the private sector. Since then, the structure of the banking sector has evolved substantially. While the total number of banks operating in the country increased from 31 in 1990 to 45 in 1995, the number of domestic banks more than doubled over the same period. This rapid increase in the number of banks helped in reducing concentration (according to traditional measures) to some extent, as the asset share of the top five banks in the overall assets of the scheduled banks declined to 68.9 percent by 1995. However, these small sized banks were unable to provide meaningful competition to the big five banks. The financial health of some of these newly established banks also deteriorated over this period. These developments paved the way for an implicit moratorium on the issuance of new commercial banking licenses in 1995. This measure, along with the implementation of risk-based regulatory capital requirements in 1997 and subsequent increases in the minimum paid-up capital requirement (net of losses) set the stage for mergers and acquisition in the financial sector, especially within the banking sector.<sup>4</sup> SBP also facilitated this process of consolidation as the regulator and supervisor of the banking sector. The impact of these changes on the traditional measures of concentration (namely M-Concentration ratio, coefficient of variation and Herfindahl-Hirschman Index) is discussed in the following section.



#### 4.1.1 M-Concentration ratio

The M-Concentration ratio depicts the market share of *M* big participants. **Figure 4.1** shows that the market shares of the biggest one, three and five banks have declined significantly over the last few years, in particular since CY00. As shown in the figure, this decrease in concentration is visible in all the three major variables of the banking sector. Specifically, the asset share of the top five banks has declined from 63.2 percent in CY00 to 52.0 percent by end CY07. This

<sup>4</sup> "Consolidation of the Financial Sector", Financial Stability Review 2006, State Bank of Pakistan.

decrease of more than 10 percentage points in the share of assets is reflective of the changing market structure of the banking sector, which is even more evident from the asset share of the top ten banks. Increase in market share of the top ten banks in recent years (CY05-CY07) along with decreasing market share of the top five banks clearly suggests that the second tier top five banks are gaining ground in the banking sector. The primary reason for this shift in composition is the ongoing wave of mergers and acquisitions.

#### 4.1.2 Coefficient of variation

While the M-concentration ratio provides useful information about the skewed nature of distribution, it does not disclose any information about the dispersion in the market. This shortcoming is generally overcome by the coefficient of variation. Information in **Table 4.1** shows that the coefficients of variation for deposits, advances and assets of the banking sector, have declined in recent years, implying that the dispersion around the mean has decreased over time.<sup>5</sup> Both the decrease in the M-concentration ratio and the coefficient of variation jointly suggest that the market structure of the banking sector is improving over time.

**Table 4.1: Coefficient of Variation**

	CY96	CY97	CY98	CY99	CY00	CY01	CY02	CY03	CY04	CY05	CY06	CY07
Deposits	2.21	2.09	2.11	2.15	2.10	2.05	1.90	1.79	1.63	1.52	1.49	1.45
Advances	1.92	1.80	1.82	1.83	1.77	1.80	1.57	1.47	1.40	1.44	1.40	1.38
Assets	2.03	1.97	1.96	1.95	1.87	1.83	1.72	1.65	1.51	1.42	1.40	1.39

Source: SBP Calculations

**Table 4.2: Herfindahl-Hirschman Index (HHI)**

	CY96	CY97	CY98	CY99	CY00	CY01	CY02	CY03	CY04	CY05	CY06	CY07
Deposits	1255	1149	1190	1259	1238	1185	1130	1032	946	833	810	785
Advances	1004	906	941	967	942	965	852	777	764	772	746	732
Assets	1098	1045	1055	1069	1023	993	973	912	850	762	745	741

Source: SBP Calculations

#### 4.1.3 Herfindahl-Hirschman Index (HHI)

While both the M-concentration ratios and the coefficients of variation provide useful information about the market structure, these measures do not take into account the number of banks operating in the banking sector. As is well known, the number of market participants in the industry has a direct bearing on issues of concentration and competition. Another widely used measure of market concentration which overcomes this problem is the Herfindahl-Hirschman Index (HHI). The HHI takes into account both the relative size and number of banks in the industry. The HHI assumes the value of 10,000 if there is a single bank in the banking sector (a situation of monopoly), while its value approaches zero when the banking system consists of a large number of banks of relatively equal size. **Table 4.2** shows that the values of HHI for all the major indicators of the banking sector decrease over the period of analysis. In absolute terms, the calculated values of HHI are less than 1000: a level below which the market structure is considered to be competitive.<sup>6</sup> It may be further noted that the observed improvement in HHI values is entirely on account of changes in the relative size of banks, as the number of banks has either declined or stayed unchanged over the period of analysis (**Table 4.3**).

<sup>5</sup> It is generally assumed that a large number of institutions of a relatively similar size have better chances of competing amongst themselves.

<sup>6</sup> The U.S. Department of Justice has specified three thresholds levels for HHI to determine the market structure in an industry. These are: (1) less than 1,000 which suggests a competitive marketplace; (2) a value of 1,000 to 1,800 indicates a moderately concentrated marketplace; and (3) a result of 1,800 or greater suggests a highly concentrated marketplace.

**Table 4.3: Number of Banks**

	CY90	CY95	CY00	CY01	CY02	CY03	CY04	CY05	CY06	CY07
PSCBs	6	6	6	6	5	5	4	4	4	4
DPBs	0	15	14	14	16	18	20	20	24	26
FBs	21	20	20	19	16	14	11	11	7	6
SBs	4	4	4	4	3	3	3	4	4	4
Total	31	45	44	43	40	40	38	39	39	40

Source: SBP

#### 4.1.4 PR-H Statistic

One of the most widely used techniques to study competitive conditions in the banking system is the Panzar and Rosse (1987) framework, commonly known as the PR-H statistic. The framework primarily studies the impact of changes in factor input prices (cost) on the (equilibrium) revenue of the banking system. Specifically, the PR-H statistic is the sum of factor input price elasticities of the reduced form revenue equation of a bank or the banking system. Under perfect competition, the PR-H statistic assumes the value of 1.0, as a change of 1.0 percent in cost will lead to a 1.0 percent change in revenues. On the other hand, the PR-H statistic is zero (or less than zero) under a monopoly. In this case, an increase in input prices will increase marginal cost, reduce output and ultimately decrease revenue. The model also suggests that the value of the PR-H statistic will fall between 0 and 1 in case of monopolistic competition.

To calculate the PR-H statistic, reduced form revenue equations are estimated by using panel data of the banking sector consisting of 26 banks (including domestic and foreign banks operating in the country) over the period from 1997 to 2007. Besides including bank-specific control variables in each regression, the possibility of bank-specific fixed effect is also explored to capture the behavior of banks. Pooled estimation for each regression is also carried out as it helps in comparing the calculated H-statistic with earlier estimates of the H-statistic for the banking sector in various other studies.<sup>7</sup> Theoretically, there is a justification for the presence of bank-specific fixed effects as banks operating in the country face a uniform macroeconomic and supervisory environment. The results are based on best-fitted regression equations.

**Table 4.4: PR-H Statistic of Pakistani Banks**

Dependent Variable	H-Statistics	Prob. H=0	Prob. H=1	Prob. H<0	Prob. H<1	Adj. R Square
Interest Income						
Fixed Effect	0.868	0.000	0.053	0.000	0.995	0.997
Pooled	0.407	0.008	0.000	0.004	0.999	0.963
Total Income						
Fixed Effect	0.899	0.000	0.085	0.000	0.957	0.997
Pooled	0.418	0.007	0.000	0.004	0.999	0.966

Source: Khan(2008)

Values of H-statistic from various specifications of revenue equations along with probability values (p-values) for the null hypotheses are presented in **Table 4.4**. Both interest revenue and total revenue are used as dependent variables. As a first step towards hypothesis testing, the null hypothesis of the H-statistic ( $H_0: H=0$  and  $H_1: H \neq 0$ ) is rejected in both equations at the 1.0 percent level of significance under fixed effect and pooled specifications. In literature, this test is usually considered to be a test of monopoly structure. In the second step, the null of perfect competition ( $H_0: H=1$  and  $H_1: H \neq 1$ ) in case of pooled estimations is rejected at the 1.0 percent

<sup>7</sup> Claessens and Laeven (2004) and Bikker et.al (2007).

level of significance. In the other specification, the null of perfect competition is also rejected in case of the fixed effect estimation procedure. As mentioned earlier, since all banks operating in Pakistan face the same macroeconomic and regulatory environment, the results from the fixed effect estimation are more reliable. It can be concluded that the market structure of the banking sector cannot be characterized as one with perfect competition. For monopolistic competition, two separate tests are conducted at boundary value. In the first part, the null of  $H < 0$  against the alternative hypothesis of  $H \geq 0$  is tested. This test is rejected at the 1.0 percent level of significance. In the second part, the null of  $H < 1$  against the alternative case of  $H \geq 1$  is tested. This null fails to be rejected at the 1.0 percent level of significance. Both these tests jointly suggest that the market structure of the banking industry is best described as monopolistically competitive.

**Table 4.5: Comparison of H-Statistics of Pakistani banks**

Studies	H-Statistics	SE (H)	Conclusion
Claessens and Laeven (2004)	0.480		Monopolistic Competition
Bikker et.al. (2007)*			
Specification 1**	0.470	0.261	Reject Monopoly & PC
Specification 2	0.724	0.068	Reject Monopoly & PC
Specification 3	0.734	0.064	Reject Monopoly & PC
Specification 4**	0.457	0.261	Reject Monopoly & PC
Specification 5	0.710	0.074	Reject Monopoly & PC
Specification 6	0.719	0.070	Reject Monopoly & PC
Khan (2008)			
Specification 1	0.407	0.153	Monopolistic Competition
Specification 2	0.418	0.089	Monopolistic Competition

\* Bikker et al use six different specifications of the underlying revenue equation to explain the problem misspecification

\*\* denotes preferred estimates of H-statistics

Note: PC- Perfect Competition; SE- Standard Error

The results from pooled estimation are also used to compare the H-statistic from different studies, which shows that the qualitative conclusion of monopolistic competition remains unchanged (**Table 4.5**), however the value of the H-statistic differs because of various factors. Some of these factors relate to the adoption of different methodologies, especially in the specification of the dependent variable, estimation options like pooled, fixed effect etc., choice of estimation period, and inclusion of control variables. These factors play an important role in undermining a direct comparison of the H-statistic.

A cross country comparison will also be helpful in understanding the position of the domestic financial sector viz a viz its neighboring countries. For this purpose, results from Claessens and Laeven (2004) and Bikker et.al (2007) are used.<sup>8</sup> The results from these studies, based on pooled estimation, suggest that the H-Statistic for all regional countries indicate the presence of monopolistic competition in the banking sectors of the respective countries (**Table 4.6**). It may

**Table 4.6: International Comparison of H-Statistics**

Countries	Claessens & Laeven	Bikker et.al.*
<i>Regional Countries</i>		
Bangladesh	0.69(0.13)	0.966(0.064)
India	0.53(0.04)	0.736(0.022)
<b>Pakistan</b>	<b>0.48(0.13)</b>	<b>0.724(0.068)</b>
Philippines	0.66(0.05)	0.715(0.055)
Turkey	0.46 (0.21)	0.651(0.094)
<i>Developed Countries</i>		
UK	0.74(0.04)	0.776(0.035)
USA	0.41(0.01)	0.583(0.008)
Canada	0.67(0.07)	0.792(0.040)
Switzerland	0.67(0.03)	0.555(0.034)

\* Failed to reject any hypotheses (including perfect competition) in case of Singapore, Turkey, Korea and Iceland.

Note: The values of H-Statistics for Pakistan based on pooled estimation from this study are 0.407 and 0.418.

<sup>8</sup> Both studies have estimated the PR- H Statistic for various countries as a part of their broad objectives. Specifically, Claessens and Laeven (2004) estimate PR-H statistics for 50 countries to understand the determinants of competition, while Bikker et.al (2007) estimate the PR-H statistics for 101 countries to show how misspecification of the revenue equation can yield misleading results about market structure.

be noted that the utility of this cross country comparison must be discounted by the usual problems, including variation in model specification, differences in sample sizes, and use of estimation procedures.

#### **4.1.5 Robustness of Results**

The validity of the PR-H statistic rests on certain assumptions. A key assumption which can significantly alter the findings of the PR-H model is that the banking sector is in a state of long run equilibrium. This implies that there is no entry or exit from the industry, as the market has attained its equilibrium. Contrary to this, the banking sector of Pakistan has undergone considerable consolidation over the period of analysis, especially in recent years. This situation warrants further investigation.

A notable point here is the construction of panel data consisting of 26 banks (and not *all* banks) from the year 1997 to 2007. Specialized banks were excluded from the data, as their behavior is significantly different from those of commercial banks. Similarly, newly established small banks were also excluded as they still don't have an established presence. These adjustments leave us with 26 banks operating over the period of analysis. A key point to note is that these 26 banks hold over 90 percent of commercial banks' assets over the given period, which shows that there is no significant loss of information from restricting the number of banks to 26. While these adjustments are expected to help reduce the problem of entry or exit of new banks in line with the required assumptions for the PR-H analysis, an indirect effect of the presence of these banks on the behavior of the rest of the banks included for analysis does exist.

In addition to the above adjustments, formal tests of equilibrium suggested in literature are also used. Theoretically, there should be no relationship between the return on assets (profits) and input prices if the market is in equilibrium. To check this, a formal test of equilibrium as suggested in literature is used, i.e. testing the relationship between the return on bank assets and factor input prices. The results fail to reject the null of equilibrium ( $E=0$ ) in all three options of panel estimation namely fixed, random, and pooled. This lends credence to the earlier conclusion that the market structure of the banking sector is characterized by monopolistic competition.

#### **4.2 Conclusion**

A value of less than 1000 for HHI for all three major indicators of the banking sector, improvement in other concentration ratios and a PR-H statistic which lies between 0 and 1, altogether suggest that the structure of the banking sector can at best be described as monopolistically competitive. This also seems to be in line with ground realities as banks compete aggressively to increase the size of their loan book, in addition to venturing into relatively new areas like SMEs, consumer and agricultural finance due to stiff competition in the corporate sector which has a limited client base.

On the issue of market contestability, the above findings and practical examples seen over the period of analysis, also support the conclusion that the banking sector in Pakistan, despite the presence of the implicit moratorium on bank licenses, is reasonably contestable.

However, the conclusion that the banking sector is monopolistically competitive needs to be qualified on the basis of the nature of the existing branch network, with the large five banks enjoying an extended outreach and the other banks still in the process of expanding their network. This issue is discussed in **Box 4.1**.

Suffice to say that while traditional measures of concentration show a decline, these results need to be qualified on the basis of the outreach of the big five banks in rural vs. urban areas. These banks have a virtual monopoly in the rural areas due to their large branch network and economies of scale acquired over the years. Although other banks have started to operate in rural areas, primarily in compliance with regulatory requirements, it will take some time for them to reach the level of operating efficiencies, and similar dynamics of competition, that the big banks enjoy.

**Box 4.1 : Skewed Dynamics of Competition - Micro Level Analysis**

Visible improvements in various measures of concentration and the conclusion derived from the PR-H statistic that the banking sector is monopolistically competitive in the context of market contestability, reflects the increasing degree of competition in the banking sector. Despite these positive developments, the low rates of return to depositors (negative in real terms), high banking spreads, and the weak pass-through of monetary policy measures to the deposit rate, all point to the presence of relatively weak competitive forces at play in the industry in case of deposit mobilization. Given the market structure of the banking sector with the historical dominance of the big 5 banks, the related economies of scale and extended distribution enjoyed by them, an intuitive assessment regarding the status of competition would be that while there is a fair degree of banking competition in urban areas, there is a strong monopoly of the big 5 banks in small cities due to their large branch networks. To assess whether this is indeed the case, city-wise (and division-wise) branch level data on the number of bank branches, and the amount of loans and deposits mobilized by these branches is used.

In the absence of defined categorization of banking sector data on rural versus urban basis, city-wise and division-wise branch level information is used to analyze the activities of the banks in big and small cities. Specifically, the biggest 20 cities or 9 divisions from all over the country are used as a proxy for big cities, while the rest of the cities or divisions are merged to represent small cities.<sup>1</sup>

Information on bank-wise and division-wise number of branches indicates that the share of the largest division in the total number of branches has increased from 11.3 percent in CY00 to 15.1 percent by end CY07. Similarly, the share of top 10 divisions in the total number of branches has also recorded an increase of 4.7 percentage points to reach 76.8 percent in CY07. By including bank-wise details in this analysis, it can be inferred that the share of the big five banks<sup>2</sup> in the largest division has remained almost unchanged over the given period. This implies that the entire increase in the biggest division in the share of the total number of branches is attributed to the opening of new branches by banks other than the big five, including domestic private banks and foreign banks. In so far as the top ten divisions are concerned, the increase in the share of all the other banks is more pronounced compared to the share of the big five banks. Importantly, approximately 25 percent branches of all other banks are concentrated in just one largest division compared to the banking sector average of around 15 percent. It may also be noted that the branch network of these banks have witnessed strong growth in recent years (Table 1).

**Table 1: Share in Number of Branches**

	Banks		
	Big 5	All Others	Total
<b>The Largest Division</b>			
CY00	10.2	17.2	11.3
CY05	10.4	22.2	13.6
CY07	10.6	24.6	15.1
<b>Ten biggest Division</b>			
CY00	71.9	73.0	72.1
CY05	70.8	79.0	73.0
CY07	74.1	82.4	76.8
<b>Number of Bank Branches</b>			
CY00	6,192	1,271	7,463
CY05	5,501	2,051	7,552
CY07	5,654	2,655	8,309

Source: Statistics Department, SBP

<sup>1</sup>While there may be a number of ways to develop proxies for rural and urban areas, the top cities or divisions are taken into account in each year with respect to the variable of interest.

<sup>2</sup>All banks in Pakistan are divided into two groups for the purpose of this assessment. Big five banks, which have an extended branch network are considered as one group, while all other banks are part of the other group.

In terms of core business activities of the banking sector, 48.4 percent of total deposits are mobilized from the two biggest cities and the share of these cities in overall advances is 64.2 percent (**Table 2**). Similarly, a substantially high share of the top ten cities in the overall deposits and advances of the banking sector reflects concentration of banking activities in the big cities. The information also shows that loan concentration is much higher than deposit concentration. City level information also reveals that the ranking of the cities varies with respect to deposits and loans, which is an indication of the very basic function of channeling surplus funds from deposit rich cities towards industrial cities, where the demand for advances is higher. Information in **Tables 1** and **2** provide strong indication of increasing banking competition in the top ten cities. However, there seems to be not only little competition in small cities, but even the provision of basic banking facilities has considerable room to grow. SBP, being cognizant of this fact, has revised its Branch Licensing Policy in 2007 to facilitate provision of banking services to unbanked areas.<sup>3</sup>

Besides providing guidelines for new places of banking business (opening of sub-branches, sale and services centers, opening of booths etc.), the policy requires that at least 20 percent of additional planned bank branches should be opened in Rural/Underserved Areas.<sup>4</sup> Furthermore, SBP has also introduced a minimum profit rate of 5.0 percent on savings/PLS savings deposits. This will provide ensured returns to small depositors even in the absence of any competition for deposit mobilization, which is clearly missing in rural areas.

The discussion so far has focused solely on the demand side of competition dynamics. **Table 3**, on the other hand, provides information which explains constraints

on the supply side i.e. the banks' point of view. Banks primarily focus on business activities for the opening of new branches. **Table 3** shows that the loan portfolio of a branch in rural areas is ten times smaller than the loan portfolio of a branch in one of the top five cities. Similarly, deposits mobilized by a branch in one of the top 5 cities are more than 5 times the deposits mobilized by a branch in rural areas. All this suggests little incentive for banks to extend their branch network to rural areas.

<sup>3</sup>BPRD Circular No 15 of 2007 dated October 12, 2007.

<sup>4</sup>Rural/Underserved Areas means villages, small towns, and Tehsil headquarter without any bank branch.

**Table 2: Core Banking Business in Major Cities**

	CY00	CY05	CY06	CY07
<b>Share in Overall Deposits</b>				
Top 2 cities	43.6	46.0	46.8	48.4
Top 5 Cities	58.7	68.3	67.8	69.0
Top Ten Cities	67.2	74.7	74.4	75.2
<b>Share in Overall Advances</b>				
Top 2 cities	63.7	60.3	59.0	64.2
Top 5 Cities	74.5	75.6	73.1	78.7
Top Ten Cities	80.9	82.2	79.9	84.7

Source: Statistics Department, SBP

**Table 3: Average Business of a Branch**

million Rupees				
	CY00	CY05	CY06	CY07
<b>Deposits Mobilization</b>				
Top 5 Cities	343.4	866.8	864.2	950.1
Top Ten Cities	303.1	748.3	757.2	832.2
All Others	75.1	139.6	155.4	176.2
<b>Average Advances</b>				
Top 5 Cities	316.6	710.3	732.4	801.4
Top Ten Cities	264.9	610.1	639.7	693.4
All others	31.7	72.6	95.7	80.1

Source: Statistics Department, SBP



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