

# A Framework for Analyzing Competition in the Banking Sector

An Application to the Case of Jordan

*Asli Demirguc-Kunt*

*María Soledad Martínez Pería*

The World Bank  
Development Research Group  
Finance and Private Sector Development Team  
December 2010



## Abstract

This paper proposes a framework to analyze competition in the banking sector using Jordan as an example. In particular, the paper pursues a multi-pronged approach to analyze competition including (i) an examination of the extent to which the market is contestable (that is, has low barriers to bank entry and exit), (b) an evaluation of the behavior of bank spreads, and (iii) an assessment of non-structural and direct measures of bank competition such

as the H-statistic and the Lerner Index. This approach provides a more comprehensive framework to examine competition in the banking sector, compared with the commonly used alternative of looking only at bank concentration figures. In the case of Jordan, the analysis indicates that although concentration has declined, competition in the country is low and has decreased over time.

---

This paper is a product of the Finance and Private Sector Development Team, Development Research Group. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The authors may be contacted at [Ademirguckunt@worldbank.org](mailto:Ademirguckunt@worldbank.org), [@worldbank.org](mailto:@worldbank.org), [Mmartinezperia@worldbank.org](mailto:Mmartinezperia@worldbank.org).

*The Policy Research Working Paper Series disseminates the findings of work in progress to encourage the exchange of ideas about development issues. An objective of the series is to get the findings out quickly, even if the presentations are less than fully polished. The papers carry the names of the authors and should be cited accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.*

# **A Framework for Analyzing Competition in the Banking Sector: An Application to the Case of Jordan**

Asli Demirguc-Kunt and María Soledad Martínez Pería\*

**Keywords:** bank competition, market structure

**JEL:** G21, L11

---

\* Asli Demirguc-Kunt is Chief Economist in the Vice Presidency of Finance and Private Sector Development and a Senior Research Manager in the Finance and Private Sector Development Research Group of the Development Economics Vicepresidency. María Soledad Martínez Pería is a Senior Economist in the aforementioned group. We are grateful to Zsofia Arvai, Mario Guadamillas, Barry Johnston, Susan Marcus, Roberto Rocha, David Scott, and participants in the FSAP Unit Brown Bag Lunch Seminar Series for many useful comments and suggestions. We thank Subika Farazi for excellent research assistance. The views and opinions in this paper are those of the authors and do not reflect those of The World Bank and/or its Executive Directors. Corresponding author: María Soledad Martínez Pería, The World Bank, 1818 H St., N.W., MSN 3-300, Washington, D.C. 20433. [mmartinezperia@worldbank.org](mailto:mmartinezperia@worldbank.org).

## 1. Introduction

The Jordanian banking sector is concentrated. The share of assets held by the three largest banks is close to 70 percent when we take into account the global assets of Jordanian banks.<sup>1</sup> Though concentration levels have come down recently, they still exceed that of many countries in the region (Table 1). However, concentration is not equivalent to competition (see Jackson, 1992 and Cetorelli, 1999), since contestable sectors where barriers to entry and exit are low can remain competitive. As a result an analysis of bank competition in Jordan requires a more comprehensive framework.

This paper proposes a multi-pronged approach to examine the extent of competition in the banking sector. The framework is applied to Jordan but can be used to analyze bank competition in any country.<sup>2</sup> First, the paper examines banking sector contestability by looking into the licensing procedures and practices, the capital requirements, and the regulations affecting bank activities and transparency. As part of evaluating contestability, the paper also examines the experience with bank exit. Second, the paper analyzes the behavior of bank spreads – the difference between lending and deposit rates, a measure of the cost of financial intermediation and a frequently used indicator of efficiency and bank competition. Third, the paper computes the Panzar and Rosse (1987) H-statistic, a non-structural and more direct measure of competition, which captures the elasticity of interest revenues with respect to input prices. As a robustness check, the paper also presents estimates of the degree of market power in the Jordanian banking sector by reporting the Lerner Index, defined as the difference between output prices and marginal costs relative to prices.

The analysis shows that bank competition in Jordan is low and has decreased in recent years. The current concentrated market structure and the lack of contestability in the Jordanian banking sector appear to explain the low level of competition.

---

<sup>1</sup> It is worthwhile to consider concentration based on global assets, because the global activity of some banks can give them a comparative advantage and, hence, increase their market power at home as a result.

<sup>2</sup> In fact, other studies have used this framework to analyze competition in Russia (Anzoategui, Martinez Peria, and Melecky, 2010), in China (Demirguc-Kunt, Martinez Peria, and Merrouche, 2010) and to compare banking sector competition in the Middle East and Northern Africa Region to that in other regions (Anzoategui, Martinez Peria, and Rocha, 2010).

## 2. Assessing Banking Sector Contestability

A market is contestable when barriers to bank entry and exit are low. The threat of bank entry and exit can exert pressure on incumbent banks and keep the sector competitive even if banking sector concentration is high. By facilitating bank entry and operations and by promoting transparency, the regulatory framework practices can have a significant impact on banking sector contestability and competition. Regulations that enable bank entry and operations and foster bank disclosure can bring greater contestability to the banking sector and promote competition. Hence, an analysis of competition in the banking sector requires a close examination of the regulations regarding bank entry and transparency in the banking sector. At the same time, it is important to analyze how regulations are implemented in practice since even if *de jure* barriers to entry and exit appear not to be very restrictive, regulators can limit entry and exit *de facto*.

Table 2 compares Jordan to a sample of selected countries along these dimensions. In Jordan, the Central Bank grants commercial banking licenses. Only one license is required for a bank to begin its operations. This license covers all permitted banking activities. The capital required to begin banking operations is approximately 56 million U.S. dollars for domestic banks and half of that amount for foreign banks. With the exception of Egypt, where banks require 86 million U.S. dollars as initial capital, the amounts required in Jordan are much higher than those in neighboring countries as shown in Table 2. Furthermore, the initial capital requirements in Jordan far exceed those in other countries with similar or higher levels of financial development, where they average 5 to 10 million U.S. dollars.

To obtain a banking license, banks in Jordan need to present information on or submit the following: (1) draft by-laws, (2) the intended organization chart, (3) financial projections for the first three years, (4) financial information on the main potential shareholders, (5) background/experience of future directors, (6) background/experience of future managers, (7) sources of funds to be disbursed in the capitalization of the new bank, and (8) market differentiation of the new bank. Most comparator countries have the same eight requirements, with the exception of Israel where only three requirements have to be met (3, 5, and 6, as defined above).

Though in general regulations concerning entry in Jordan are similar to those in other countries, in practice, entry conditions seem more stringent in Jordan. Over the last five years the Central Bank reports receiving 23 inquiries from interested parties, but approved only 3 banking licenses. Rejection rates were lower in all other comparator countries. Furthermore, since 1996 no domestic bank has entered the system.

Banking regulations in Jordan concerning the breadth of bank activities are fairly unrestrictive and do not seem to limit bank operations. The degree to which banking regulations restrict banks' ability to engage in securities, insurance, and real estate activities and to own non-financial firms can affect the capacity of banks to diversify their operations and to capitalize on synergies that may arise from complimentary activities. In Jordan, banks can engage in the business of underwriting, brokering and dealing in securities, but regulations place restrictions on their ability to conduct insurance activities (i.e., underwriting) and to own shares in non-financial firms. At the same time, banks are prohibited from engaging in real estate investment, development, and management. They are, however, still permitted to make mortgage loans. The restrictions placed on banking activities in Jordan are more stringent than those in Egypt, are similar to those of Lebanon, but are looser than those of Israel and Morocco.

Jordan does not seem very different from the comparator countries on regulations concerning bank transparency; however, in practice, transparency could be enhanced by promoting greater disclosure of bank operations and prices. In general, Jordan has in place adequate regulations concerning bank audits and bank disclosure of information. External audits are compulsory and, in principle, have to be disclosed to the public. Auditors are required to report to supervisors any information discovered in an audit that could jeopardize the health of a bank. Banks are required to produce consolidated statements and disclose off-balance sheet accounts. While the regulations in Jordan seem to adequately promote transparency, efforts by the Central Bank to disclose information to the public could be improved. Currently, only consolidated statements for the entire banking system as well as average interest rates (as opposed to spreads by bank by product) can be found on the Central Bank's website.<sup>3</sup> In fairness,

---

<sup>3</sup> According to article No 45/c of the Central Bank of Jordan law, the Central Bank is prohibited from publishing any individual bank-level data.

Jordan is not the exception in this regard. Among the neighboring countries listed in Table 2, only Israel publishes bank level information in its central bank website.

In terms of bank exit practices, Jordan does not have a track record of closing many troubled banks, hence the lack of threat of exit can limit competition. Though Jordan has established a Prompt Correct Action framework), the banking authorities have been largely reluctant to close banks. Banks have either been merged with public assistance or have been allowed to continue to operate (see Table 3).

Overall, while bank entry regulations in Jordan are similar to those observed in other countries, banking sector contestability seems to be limited because the system is characterized by low entry and exit in practice.

### **3. Analyzing Bank Spreads**

The banking literature has often used bank spreads (the difference between contractual lending and deposit rates) and ex-post interest margins (measured as interest income minus expenses relative to bank assets) as indicators of banking efficiency and competition.<sup>4</sup> Higher spreads and margins are often interpreted to signal greater inefficiencies and lack of competition in the banking sector.

Ex-ante average interest rate spreads in Jordan have declined in the last decade (from 4.8 percent to 3.2 percent), but they exceed those for neighboring countries such as Israel and Lebanon (see Figure 2). Furthermore, distinguishing between the spreads on the prime rate charged to the best bank borrowers (large corporations) and the average rates on all lending instruments indicates that the spreads charged to non-prime borrowers can be higher than those reported in Figure 2 (see Table 4). While the spread on prime borrowers is 2.6 percent, the spread on all loan and advances is 4.2 percent, the spread on overdraft facilities is 3.3 percent and the one on discounted bills and bonds is 3.9 percent. Though no information is available from the Central bank of Jordan on the spreads on corporate vis-à-vis SME and retail lending, anecdotal evidence suggests that spreads on SMEs and retail clients range between 3 and 4 percent. The average spreads tend to be closer to the prime rate because close to 50 percent of all loans in Jordan are directed to corporations and, on average, 33 percent of bank loans (as of

---

<sup>4</sup> See Demirguc-Kunt and Huizinga (1999), Demirguc-Kunt, Laeven and Levine (2004), and Gelos (2006).

December 2007) are concentrated among their top ten borrowers. Consistent with what ex-ante spreads reveal, net interest margins in Jordan also exceed those of the majority of neighboring countries (see Table 5).

#### 4. Computing a Direct Measure of Competition in the Banking Sector

Looking only at spreads can be problematic since spreads can reflect countries' macroperformance, the extent of taxation of financial intermediation, the quality of the contractual and judicial environment, and bank-specific factors such as scale and risk preferences. The recent banking literature analyzes more direct measures of competition based on models of industrial organization that emphasize market contestability. A large number of studies have focused on measuring bank competition via the Panzar and Rosse (1982, 1987) H-statistic, which captures the elasticity of bank interest revenues to input prices.<sup>5</sup> Under perfect competition, an increase in input prices raises both marginal costs and total revenues by the same amount and, hence, the H-statistic will equal 1. Under a monopoly, an increase in input prices results in a rise in marginal costs, a fall in output, and a decline in revenues leading to an H-statistic less than or equal to 0. Panzar and Rosse (1987) show that when H is between 0 and 1 the system operates under monopolistic competition. In general, the H-statistic is interpreted as a measure of the degree of competition in the banking market. The H-statistic is only valid if the market is in long-run equilibrium (if return on bank assets is not related to input prices).

Based on the Panzar and Rosse (1982, 1987) methodology and following the empirical strategy pursued by Claessen and Laeven (2004), the H-statistic is calculated by estimating equation (1):

$$\ln(P_{it}) = \alpha_i + \beta_1 \ln(W_{1,it}) + \beta_2 \ln(W_{2,it}) + \beta_3 \ln(W_{3,it}) + \gamma \ln(Z_{it}) + \delta D + \varepsilon_{it} \quad (1)$$

where  $i$  denotes banks and  $t$  denotes years.  $P$  is the ratio of gross interest revenues to total assets (proxy for the output price of loans),  $W_1$  is the ratio of interest expenses to total deposits and money market funding (proxy for input price of deposits),  $W_2$  is the ratio of personnel expenses to total assets (proxy for input price of labor) and  $W_3$  is the ratio of other operating and

---

<sup>5</sup> For example, Bikker and Haaf (2002), Gelos and Roldos (2002), Claessens and Laeven, (2004), and Levy-Yeyati and Micco (2007).



administrative expenses to total assets (proxy for input price of equipment/fixed capital). Z is a matrix of controls including the ratio of equity to total assets, the ratio of net loans to total assets, and the logarithm of assets (to control for bank size effects). D is a vector of year dummies. Finally,  $\alpha_i$  denote bank-level fixed effects.<sup>1</sup> The H-statistic equals  $\beta_1 + \beta_2 + \beta_3$ .

To verify the condition of long-run equilibrium, the following regression is estimated:

$$\ln(\text{ROA}_{it}) = \alpha_i + \beta_1 \ln(W_{1,it}) + \beta_2 \ln(W_{2,it}) + \beta_3 \ln(W_{3,it}) + \gamma \ln(Z_{it}) + \delta D + \varepsilon_{it} \quad (2)$$

where ROA is the pre-tax return on assets. Because ROA can take on negative values, we compute the dependent variable as  $\ln(1+\text{ROA})$ . We define the equilibrium E-statistic as  $\beta_1 + \beta_2 + \beta_3$  from equation (2). The test of long-run equilibrium involves testing whether  $E=0$ .

We calculate the H-statistic for Jordan over three periods. Using Bankscope data, we estimate the H-statistic for the period 1994-2006 and for the sub-periods, 1994-2001 and 2002-2006. For every period, we report the p-value for the test of long-run equilibrium. If p-values are larger than 0.05, then we can accept the null of long-run equilibrium.

Results on Table 6 indicate that the Jordanian banking sector operates under monopolistic competition. The H-statistic for Jordan over the period 1994-2006 is 0.19 and we are able to reject the null that the H-statistic is 0 or 1. Comparing the H-statistic for the period 1994-2001 with the period 2002-2006, we see that the degree of competition in Jordan appears to have declined over time, since the value of the H-statistic dropped from 0.34 to 0.19. Note that we are able to accept the null of long-run equilibrium, indicating that the H-statistics are valid, irrespective of the sample considered.

The Jordanian banking sector appears to be less competitive than that of most comparator countries.<sup>6</sup> In particular, the H-statistics for Israel, Lebanon, and Morocco exceeds those obtained for Jordan both during the most recent period and over the entire 1994-2006 period (see Table 6). Furthermore, a cross-country analysis, detailed below, including 91 countries (67 of

---

<sup>6</sup> Additional tests, not shown but available upon request, indicate that the confidence intervals for the H statistics for Jordan include lower values of H relative to the other countries. Furthermore, at 5% significance we can reject the null that the H-statistics for Jordan are the same as those for Lebanon and Israel, the countries with the most competitive systems according to their H-statistics.

which are developing), reveals that the H-statistic for Jordan is below the 0.52 average across all countries and the 0.55 average obtained across developing economies.

To identify the factors that explain differences in the H-statistic for Jordan vis-à-vis other countries, we estimate equation (3):

$$H_i = \alpha_i + \beta_1 Z_i + u_i \quad (3)$$

where  $i$  is the country identifier,  $Z$  is a matrix of country characteristics discussed below, and  $u$  is the error term. We estimate equation (3) for 91 countries around the world using Bankscope data for the period 1994-2006 (see Table 7). The idea is to use the parameters from this estimation to determine the factors that explain the degree of competition in Jordan vis-à-vis other countries. In particular, we hope to compare Jordan to: (i) all other countries, (ii) all other developing countries, and (iii) a group of non-oil producing neighboring countries plus the Eastern European countries with similar GDP per capita.

Following Claessens and Laeven (2004), we include as regressors variables that capture countries' market structure, contestability, macroeconomic conditions, and general level of development. Furthermore, we also include variables that capture the extent of transparency in the system. In particular, as indicators of market structure, we include the concentration ratio (defined as the share of assets held by the five largest banks), the number of banks per population, the share of assets owned by government banks, and the share of assets owned by foreign banks. To capture market contestability, we include the number of documents or procedures required to obtain a banking license, the fraction of applications for bank licenses denied, and an index of the extent of restrictions on bank activities. We also include the log of the minimum capital required to open a bank and the capital adequacy ratio, since high capital requirements are likely to deter entry. We include an index of bank auditing requirements and an index of bank disclosure requirements as measures of bank transparency. All the variables discussed so far come from the Barth, Caprio, and Levine (2001) database. We control for the impact of macroeconomic conditions by including the inflation rate and the real GDP growth. These variables come from the *World Development Indicators*. As measures of institutional development, we include GDP per capita from the *World Development Indicators* and, alternatively, an index of property rights from the *Heritage Foundation*.

To examine the factors that are most influential in explaining differences in the H-statistics between Jordan and other countries, we multiply the coefficients from Table 7 by the difference between the values for Jordan and the mean for (i) all other countries, (ii) all other developing countries, and (iii) the group of comparator countries (primarily other non-oil producing countries in the Middle East) to determine the factors that explain the difference in H-statistic. The results are found in Table 8.

The current concentrated market structure and the lack of contestability in the Jordanian banking sector appear to explain the low H-statistic. Table 8 reveals that among the variables that we found to have a significant impact on the H-statistic, the level of concentration is the most important in explaining the observed difference in H-statistics between Jordan and other countries. Other variables that are also important are the share of applications denied, the initial minimum capital, the capital asset ratio, and the index of bank auditing.

## 5. Measuring Market Power

An alternative way to examine competition in banking is to compute direct measures of market power, since greater market power implies less competition.<sup>7</sup> A frequently used measure of market power in banking is the Lerner index, defined as the difference between output prices and marginal costs (relative to prices). The advantage of the Lerner Index, vis-à-vis the H-statistic, is that it is not a long-run equilibrium measure of competition. Also, because of this, the Lerner index can be calculated at each point in time.

The Lerner Index is computed using the formula  $(P-MC)/P$ , where P is the price of banking outputs and MC is the marginal costs. Following the approach in Fernandez de Guevara et al. (2005, 2007) and Berger et al. (2008), who proxy banking production by total assets, P is calculated as total bank revenue over assets and MC is calculated by taking the derivative from a translog cost function as specified in equation (4) below:

$$\begin{aligned} \ln(C_{it}) = & a_{0i} + b_0 \ln(Q_{it}) + b_1 0.5 [\ln(Q_{it})]^2 + a_1 \ln(W_{1it}) + a_2 \ln(W_{2it}) + a_3 \ln(W_{3it}) + \\ & b_2 0.5 \ln(Q_{it}) * \ln(W_{1it}) + b_3 0.5 \ln(Q_{it}) * \ln(W_{2it}) + b_4 0.5 \ln(Q_{it}) * \ln(W_{3it}) + \end{aligned}$$

---

<sup>7</sup> See for example Angelini and Cetorelli (2003) for Italy; Fernandez de Guevara, Maudos, and Perez (2005, 2007) for the EU; and Maudos and Solis (2007) for Mexico.

$$\begin{aligned}
& a_4 \ln(W_{1it}) * \ln(W_{2it}) + a_5 \ln(W_{1it}) * \ln(W_{3it}) + \\
& a_6 \ln(W_{2it}) * \ln(W_{3it}) + a_7 0.5 [\ln(W_{1it})]^2 + a_8 0.5 [\ln(W_{2it})]^2 + a_9 0.5 [\ln(W_{3it})]^2 + \\
& d_1 \text{Trend} + d_2 \text{Trend}^2 + d_3 \text{Trend} * \ln(Q_{it}) + d_4 \text{Trend} * \ln(W_{1it}) + d_5 \text{Trend} * \ln(W_{2it}) + \\
& d_6 \text{Trend} * \ln(W_{3it}) + u_{it}
\end{aligned} \tag{4}$$

where  $i$  denotes banks and  $t$  denotes years.  $C$  is total operating plus financial costs,  $Q$  is total assets,  $W_1$  is the ratio of interest expenses to total deposits and money market funding (proxy for input price of deposits),  $W_2$  is the ratio of personnel expenses to total assets (proxy for input price of labor) and  $W_3$  is the ratio of other operating and administrative expenses to total assets (proxy for input price of equipment/fixed capital). We also include a trend to capture the influence of technical change leading to shifts in the cost function over time. As in most papers, the estimation is done under the restrictions of symmetry and degree one homogeneity in the price of inputs. However, our results do not change if we drop these constraints.

The Lerner Index for Jordan indicates rising market power among banks in the system over most of the period 1994-2006 (see Figure 3). According to data from Bankscope, the Lerner index has risen steadily from 0.14 to 0.41 (or 41%) between 1994 and 2006. This decline in competition is consistent with what we find using the H-statistic. Relative to measures reported for other countries such as Mexico and the European Union (EU) (see Maudos and Solis, 2007 for Mexico and Fernandez de Guevara et al., 2005 and 2007 for the EU), the current numbers for Jordan seem to indicate greater evidence of market power, and hence a lower degree of competition.<sup>8</sup>

## 6. Conclusions

The banking sector in Jordan is concentrated. However, the link between concentration and competition is not always clear. Hence, an analysis of competition in the banking sector requires a broader framework. This paper proposes a framework for analyzing competition which

---

<sup>8</sup> Maudos and Solis find that the Lerner Index for Mexico varied between 0.05 and 0.15 between 1993 and 2005. Fernandez de Guevara, Maudos and Perez (2007) find estimates of the Lerner Index for the EU between 0.13 and 0.15, depending of the year considered between 1993 and 2000.

includes looking at banking sector contestability, banking sector spreads as well as analyzing non-structural measures of competition.

Aside from being concentrated, the Jordanian banking sector exhibits other characteristics that suggest that the levels of competition and contestability can be improved. Capital requirements are high and entry has in practice been restricted by the Central Bank. The system also lacks a fully-developed and tested exit framework that encourages competition. Relatively high spreads, low interest revenue elasticities to input prices, and high values of the Lerner Index of market power are also indicative of low levels of competition in Jordan.

Though this paper focused on the case of Jordan, the framework presented can be used to assess bank competition systematically in operational work and can provide an analytical base to provide more informed guidance on policies related to bank competition and contestability in other countries as well.

## References

- Anzoategui, D., Martinez Peria, M.S., and Rocha, R. (2010). "Bank Competition in the Middle East and Northern Africa Region." World Bank Policy Research Working Paper 5363.
- Anzoategui, D., Melecky, M., and Martinez Peria, M.S. (2010). "Banking Sector Competition in Russia." Forthcoming. World Bank Policy Research Working Paper Series.
- Barth, J., Caprio, G., and Levine, R., (2001). "The Regulation and Supervision of Banks around the World: A New Database." *In Integrating Emerging Market Countries into the Global Financial System, Brookings-Wharton Papers on Financial Services*, edited by Litan, R. and Herring, R., pp. 183-241. Washington, DC: Brookings Institutions Press.
- Beck, T., Levine, R., and Demirguc-Kunt, A. (2006). "Bank Concentration, Competition, and Crises: First Results." *Journal of Banking and Finance*, 1581-1603.
- Berger, A., Klapper, L., Turk-Ariss, R., (2008). "Bank Competition and Financial Stability." World Bank Policy Research Working Paper 4696.
- Bikker, J. and Haaf, K., (2002). "Competition, Concentration and their Relationship: An Empirical Analysis of the Banking Industry." *Journal of Banking and Finance* 26, 2191-2214.
- Cetorelli, N., (1999). Competitive analysis in banking: Appraisal of the methodologies. *Economic Perspectives*, 2-15.
- Claessens, S. and Laeven, L., (2004). "What Drives Bank Competition? Some International Evidence?" *Journal of Money, Credit, and Banking* 36, 562-583.
- Demirguc-Kunt, A., and Huizinga, H. (1999). "Determinants of Commercial Bank Interest Margins and Profitability: Some International Evidence." *World Bank Economic Review* 13, 379-408.
- Demirguc-Kunt, A., Laeven, L., and Levine, R. (2004). "Regulations, Market Structure, Institutions and the Cost of Financial Intermediation." *Journal of Money, Credit, and Banking* 36, 593-622.
- Demirguc-Kunt, A. Martinez Peria, M.S. and Merrouche, O. (2010). "Competition in the Chinese Banking Sector." Background paper for Financial Sector Assessment Program, World Bank mimeo.
- Fernandez de Guevara, J., Maudos, J, and Perez, F., (2005). "Market Power in European Banking Sectors." *Journal of Financial Services Research* 27, 109-137.
- Fernandez de Guevara, J., Maudos, J, and Perez, F., (2007). "Integration and Competition in the European Financial Markets," *Journal of International Money and Finance* 26, 26-45.
- Gelos, G., (2006). "Banking Spreads in Latin America," IMF Working Paper No. 06/44.

Gelos, G. and Roldós, J., (2002). "Consolidation and Market Structure in Emerging Market Systems," IMF Working Paper No. 02/186.

Jackson, W., (1992). "The Price-Concentration Relationship in Banking: A Comment." *Review of Economics and Statistics* 74, 373-376.

Levy-Yeyati, E. and Micco, A., (2007). "Concentration and Foreign Penetration in Latin American Banking Sectors: Impact on Competition and Risk." *Journal of Banking & Finance* 31, 1633-1647

Maudos, J. and Solis, L. (2007). "Deregulation, Liberalization, and Consolidations of the Mexican Banking System: Effects of Competition." Mimeo.

Panzar, J. and Rosse, J., (1982). "Structure, Conduct, and Comparative Statistics." Bell Laboratories Economics Discussion Paper.

Panzar, J. and Rosse, J., (1987). "Testing for 'Monopoly' Equilibrium," *The Journal of Industrial Economics*, 35(4), 443-456.

**Table 1. Concentration Levels in Jordan and in Peer Economies, 2006-2007**

<b>Country</b>	<b>Share of assets held by top three banks</b>	<b>Herfindahl index (based on assets)</b>
Jordan	70%	3330
Egypt	53%	1335
Israel	75%	2139
Lebanon	44%	938
Morocco	65%	1915
Tunisia	42%	958

*Source:* Bankscope. Because Bankscope's coverage is incomplete and smaller banks might be excluded, the numbers reported are likely to overestimate the extent of concentration in the countries listed.



**Table 2. Regulations Affecting Entry into Banking and Bank Transparency and Disclosure in Jordan and Peer Economies**

	Jordan	Egypt	Israel	Lebanon	Morocco
<b>Entry into banking</b>					
What body/agency grants commercial banking licenses?	Central Bank	Central Bank	Central Bank	Central Bank	Central Bank
Is there more than one body/agency that grants licenses to banks?	No	No	No	No	No
Is more than one license required (e.g., one for each banking activity, such as commercial banking, securities operations, insurance, etc.)?	No	No	No	No	No
Are foreign entities prohibited from entering through	Acquisition	No	No	No	No
	Subsidiary	No	No	No	No
	Branch	No	No	No	No
	Joint Venture	No	No	Yes	No
What is the minimum capital entry requirement? (in US\$ and/or domestic currency, state which)	For a domestic bank	US\$ 56 mill.	US\$ 87 mill.	US\$ 22 mill.	US\$ 7 mill.
	For a subsidiary of a foreign bank	US\$ 28 mill.	US\$ 87 mill.	US\$ 22 mill.	US\$ 7 mill.
	For a branch of a foreign bank	US\$ 28mill.	US\$ 9 mill.	US\$ 22 mill.	US\$ 7 mill.
What is the minimum capital to asset ratio requirement?	12%	10%	9%	12%	8%
Is it legally required that applicants submit information on the source of funds to be used as capital?	Yes	Yes	Yes	Yes	Yes
Are the sources of funds to be used as capital verified by the regulatory/supervisory authorities?	Yes	Yes	Yes	Yes	Yes
Which of the following are legally required to be submitted before issuance of the banking license?	Draft bylaws?	Yes	Yes	No	Yes
	Intended organization chart?	Yes	Yes	No	Yes
	Financial projections for first three years?	Yes	Yes	Yes	Yes
	Financial information on main potential shareholders?	Yes	Yes	No	Yes
	Background/experience of future directors?	Yes	Yes	Yes	Yes
	Background/experience of future managers?	Yes	Yes	Yes	Yes
	Sources of funds to be disbursed in the capitalization of new bank?	Yes	Yes	No	Yes
	Market differentiation intended for the new bank?	Yes	Yes	No	Yes
In the past five years, how many applications for commercial banking licenses have been received from domestic entities?	23	2	0	5	1
How many of those applications have been denied?	20	13	3	0	1
Proportion of applications denied	0.87	0.3	0.2	0	0.5

**Table 2. Regulations Affecting Entry into Banking and Bank Transparency and Disclosure in Jordan and Peer Economies (cont.)**

	Jordan	Egypt	Israel	Lebanon	Morocco
<b>Activity restrictions:</b>					
1- Unrestricted, 2- Permitted, 3- Restricted, 4- Prohibited					
Securities The ability to engage in the business of securities underwriting, brokering, dealing and all aspects of the mutual fund industry.	1	2	2	1	2
Insurance The ability of banks to engage in insurances underwriting and selling.	3	2	3	4	3
Real estate The ability of banks to engage in real estate investment, development, and management.	4	3	4	4	4
Own non-financial firms The ability of banks to own and control nonfinancial firms	3	3	3	2	3
Index of activity restrictions (4 to 16, where higher numbers represent greater restrictions)	11	10	12	11	12
Is an external audit a compulsory obligation for banks?	Yes	Yes	Yes	Yes	Yes
Are auditing practices for banks in accordance with international auditing standards?	Yes	Yes	Yes	Yes	Yes
Is it required by the regulators that bank audits be publicly disclosed?	Yes	Yes	Yes	Yes	Yes
Are specific requirements for the extent or nature of the audit spelled out?	Yes	Yes	Yes	Yes	Yes
Are auditors licensed or certified?	Yes	Yes	Yes	Yes	Yes
Do supervisors get a copy of the auditor's report?	Yes	Yes	Yes	Yes	Yes
Does the supervisory agency have the right to meet with external auditors to discuss their report without the approval of the bank?	Yes	Yes	Yes	Yes	Yes
Are auditors required by law to communicate directly to the supervisory agency any presumed involvement of bank directors or senior managers in illicit activities, fraud, or insider abuse?	Yes	Yes	Yes	Yes	Yes
Are external auditors legally required to report to the supervisory agency any other information discovered in an audit that could jeopardize the health of a bank?	Yes	Yes	Yes	Yes	Yes
Can supervisors take legal action against external auditors for negligence?	No	Yes	No	Yes	No
Has legal action been taken against an auditor in the last 5 years?	No	No	No	No	No
Are financial institutions required to produce consolidated accounts covering all bank and any non-bank financial subsidiaries (including affiliates of common holding companies)?	Yes	Yes	Yes	Yes	Yes
Are off-balance sheet items disclosed to supervisors?	Yes	Yes	Yes	Yes	Yes
Are off-balance sheet items disclosed to the public?	Yes	Yes	Yes	Yes	Yes
Are bank directors legally liable if information disclosed is erroneous or misleading?	Yes	Yes	Yes	Yes	Yes

**Table 3. Bank exit practices in Jordan and peer economies**

	<b>Jordan</b>	<b>Egypt</b>	<b>Israel</b>	<b>Lebanon</b>	<b>Morocco</b>
How many banks have been closed or merged in the last 5 years?	No closures, 2 mergers	6	1	2	3
As part of failure resolution, how many banks were nationalized or recapitalized with official funds in the last 5 years?	1	Not Available	1	Not Available	2
During the last five years, how many banks have been resolved in the following way?					
Closure and liquidation:	0	Not Available	1	2	1
Intervention (or taking control) and open bank assistance (liquidity support):	2	Not Available	1	3	0
Transfer of assets and liabilities (incl. purchase and assumption) or merger and acquisition:	2	Not Available	Not Available	8	2
How many months did each of these resolution techniques take on average, from the moment of intervention by the responsible authority to the moment of resolution?	4 years	6	Not Available	12	10

**Table 4. Spreads charged on different lending instruments and borrowers in Jordan**

	2003	2004	2005	2006	2007
Spread on prime borrowers	3.75	3.51	3.48	2.37	2.59
Spread on overdrafts	6.68	6.3	5.74	4.1	4.27
Spread on loan and advances	6.17	5.1	4.58	3.43	3.3
Spread on discounted bills and bond	7.49	6.49	4.4	3.59	3.89

Source: author calculations based on data from the *Monthly Bulletin* published by the Central Bank of Jordan. Spreads are lending rates relative to the rate on time deposits.

**Table 5. Net interest margins in Jordan and peer economies, 2006-2007**

Country	Net interest margins (% of total assets)
Jordan	2.83%
Egypt	1.15%
Israel	2.44%
Lebanon	1.89%
Morocco	1.40%
Tunisia	2.52%

Source: Bankscope

**Table 6: H-statistics and equilibrium tests for Jordan and peer economies**

Country	Period	H-statistic (std. error)	P-value Null: H=0	P-value null: H=1	P-value for null of long-run equilibrium condition <sup>a</sup>
Jordan	1994-2001	0.34 (0.05)	0.00	0.00	0.08
	2002-2006	0.19 (0.09)	0.03	0.00	0.81
	1994-2006	0.19 (0.04)	0.00	0.00	0.28
Israel	2002-2006	0.48 (0.20)	0.02	0.01	0.55
	1994-2006	0.81 (0.09)	0.00	0.04	0.59
Lebanon	2002-2006	0.46 (0.13)	0.00	0.00	0.25
	1994-2006	0.69 (0.17)	0.00	0.07	0.28
Morocco	2002-2006	0.39 (0.14)	0.04	0.01	0.68
	1994-2006	0.26 (0.24)	0.30	0.01	0.76
Tunisia	2002-2006	0.35 (0.24)	0.16	0.01	0.29
	1994-2006	0.14 (0.15)	0.37	0.00	0.32

Source: Author's calculation based on data from Bankscope. <sup>a</sup> P-values reported are for the null that the long-run equilibrium condition is satisfied.

**Table 7: Cross-country determinants of the H-statistic**

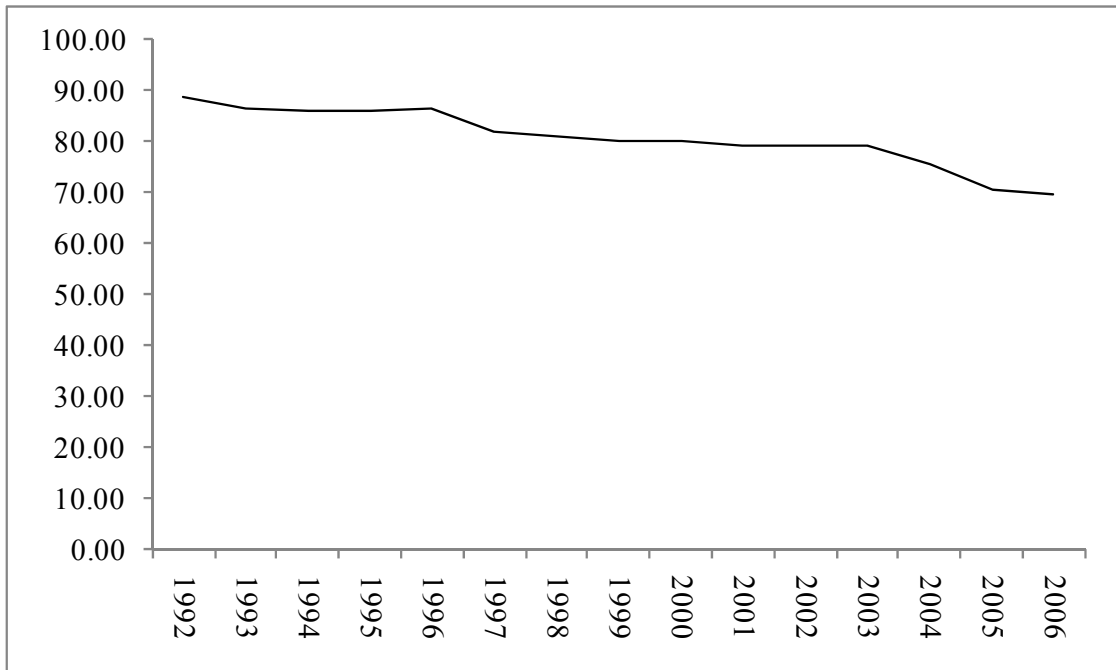
<b>Variables</b>	<b>H-statistic</b>	
Bank concentration	-0.003 [2.05]**	-0.003 [2.06]**
Bank density	0.037 [2.13]**	0.034 [2.21]**
Foreign bank participation	0.001 [1.16]	0.001 [1.18]
Government bank participation	0.001 [0.87]	0.001 [0.78]
Index of restrictions on bank activities	0.022 [1.36]	0.023 [1.47]
Requirements to obtain a bank license	-0.035 [1.79]*	-0.037 [1.76]*
Share of bank licenses denied	-0.064 [0.50]	-0.032 [0.25]
Log of initial required capital	-0.024 [1.04]	-0.027 [1.20]
Capital asset ratio	-0.478 [0.28]	-0.605 [0.37]
Index of bank auditing requirements	-0.033 [1.58]	-0.031 [1.53]
Index of bank disclosure	0.008 [0.16]	-0.004 [0.08]
Inflation	0.00 [0.53]	0.00 [0.39]
Real GDP growth	-0.004 [0.28]	-0.002 [0.14]
GDP per capita	-0.023 [0.90]	
Property rights		-0.001 [0.95]
Constant	2.059 [4.60]***	1.996 [4.51]***
Observations	91	90
R-squared	0.24	0.23

Robust t statistics in brackets. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 8: Explaining differences in the H-statistic between Jordan and other countries**

	<b>Jordan vs. all countries</b>	<b>Jordan vs. developing countries</b>	<b>Jordan vs comparator countries</b>
Actual difference in H	-0.335	-0.359	-0.342
Of which:			
Concentration	-0.046	-0.050	-0.044
Bank density	0.008	0.023	0.035
Foreign bank participation	0.016	0.012	0.023
Government bank ownership	-0.016	-0.019	-0.030
Index of restrictions on bank activities	0.009	0.004	0.006
Requirements to obtain a bank license	-0.008	-0.006	-0.019
Share of applications for bank licenses denied	-0.041	-0.039	-0.041
Log of initial minimum capital	-0.035	-0.036	-0.024
Minimum capital asset ratio	-0.015	-0.014	-0.014
Index of bank auditing	-0.038	-0.047	-0.053
Index of bank disclosure	0.006	0.007	0.007
Inflation	0.000	0.000	0.000
Real GDP growth	-0.005	-0.003	-0.004
GDP per capita	0.015	-0.000	0.009
Unexplained difference	-0.185	-0.192	-0.192

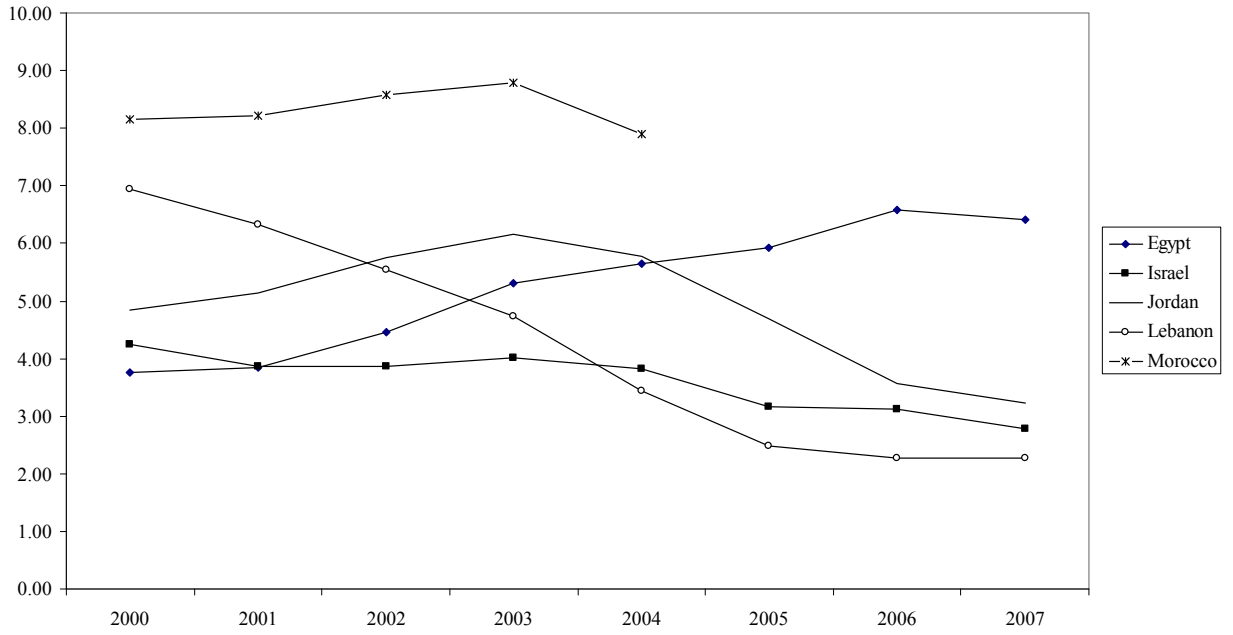
**Figure 1. Concentration levels in the Jordanian banking sector,**  
(Share of assets held by the largest three banks, in percentages)



Source: Bankscope



**Figure 2. Average spreads in Jordan and peer economies**  
(in percentages)



**Figure 3. Lerner index of market power in banking for Jordan, 1994-2006**

