The Evolution of Bank Competition: Have Conditions Changed in the Jordanian Banking Sector?

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Abstract

The primary aim of this paper is to measure competitiveness in the Jordanian banking sector. In addition, this paper examines the competitive dynamics in this sector. Based on panel data analysis and the time period 2000-2014, the estimation results indicate that Jordanian banks operate under monopolistic conditions and this has not changed during the period of the study. Naturally, the findings of this paper have a number of implications. This is based on the literature which argues that bank competition influences, for example, real economic growth, manufacturing productivity growth, and the lending channel of banks.

Key words   Jordan, bank competition, Panzar-Rosse, H-Statistic, return on assets

1. Introduction

For centuries, economists in particular have tried to examine the issue of why some countries witness strong and stable real per capita economic growth, while others are not so fortunate. As expected, this cumulative effort has led to the publication of many theoretical and empirical papers, and policy-oriented papers. Naturally, this research output has looked at many macro and micro variables including "financial development".

Long-term sustainable real economic growth depends on a myriad of factors like the ability of economies to invest in productive assets and to use them efficiently. Within this aspect, it is also known that financial intermediation (banks, and stock markets) supports this process by mobilizing savings for investments and ensuring that the funds are allocated efficiently. This is why financial development in any country must involve the "establishment and expansion of efficient institutions, instruments and markets that support the investment and growth process".

The subject matter of financial development has for long been a topic of interest to, among others, international organizations as well as policy-makers. For example, the World Bank defines this concept as the improvement in the quality of five financial roles: (a) the production and processing of information regarding promising investments and then allocation of capital; (b) monitoring of borrowers and exertion of good corporate governance principles after the allocation of capital; (c) facilitate trading, diversification, and risk managing; (d) pooling and mobilizing savings; and (e) facilitating goods exchanges, services, and financial instruments. In the same spirit, the World Economic Forum (WEF) identifies the financial development as the policies and factors as well as institutions that guide to efficient financial intermediation and markets, as well as profound and wide access to capital and financial services.

As far as the economic roles of financial systems are concerned, one can argue that they are the same across all countries. However, they differ in how well they carry out their functions. In addition, financial systems differ in terms of the types of financial instruments, markets, and institutions they have. To compare countries in terms of financial development per se, one must be able to measure each country's financial system on, for example, the efficiency of the allocation of resources. Naturally, such an exercise is ideal and impossible to do. This is why researchers have developed a number of indirect measures of financial development. To benchmark financial systems, the World Bank and the World

Economic Forum, for example, publish financial development measures for a large number of countries across the world.

The World Bank launched the online database on financial development in 205 countries in terms of the (1) size of financial institutions and markets, (2) degree to which individuals use financial institutions and markets, (3) efficiency of financial institutions and markets in providing financial services, and (4) stability of financial institutions and markets. In addition, the World Economic Forum measures financial development for a total of 62 countries in terms of three categories: (1) Factors, policies, and institutions, (2) financial intermediation's variety, size, depth, and efficiency, and (3) financial access.

Given the importance of banks, one should expect the literature to consider many aspects of the performance. Indeed, this is the case. For example, the financial economics literature has for long been focusing on the determinants of banks' performance (return on assets and net interest margin), efficiency of banks, bank discipline, determinants of bank credit, determinants of banks' capital, and others.

In addition to these issues, it is interesting to note that recently, the World Bank has made available the global financial inclusion index (Global Findex) database which includes country-level data, and individual-level micro-data. Within this context, it is also interesting to note that in a recently published paper, Dabla-Norris (2015) examine the constraints of financial inclusion and their impact of Gross Domestic Product (GDP) and inequality.

The literature also examines bank competition and its evolution. Indeed, this issue is important for a number of reasons. For example, while some argue that competition matters for bank efficiency and quality of financial services (Claessens, 2009), others argue that competition might change the risk-taking behavior of banks and hence cause banking instability (Berger et al., 2009). For these reasons, and others, some researchers have also been attempting to explain the reasons behind the intensity of competition. In other words, this recent literature attempts to understand the determinants of competition. These papers include those published by Demirguc-Kunt *et al.* (2004), Claessens and Laeven (2004), Fernandez de Guevara and Maudos (2007), Jeon *et al*. (2011), Delis (2012), and Mirzaei and Moore (2014).

In this paper, we examine the competitive conditions that prevail in the Jordanian banking sector. In addition, the fact that the relevant data covers the period 2000-2014, this paper also examines the evolution of competition. In other words, the paper looks at whether or not the degree of competition has changed during this period.

2. Literature review

2.1. Bank Competition

Following any serious examination of the relevant literature, one can realize that different researchers have used different methodologies in measuring bank competitiveness. However, three methods stand out and these are developed by Panzar and Rosse (1982), Bresnahan (1982), and Hall (1988). The foundation of the Panzar-Rosse approach rests on basic microeconomics in that it measures the relationship between firms' costs and their revenue. In other words, if any change in costs is reflected in total revenue, this sector is said to be perfectively competitiveness because these firms earn normal profits in the first place. To apply the Panzar-Rosse principle, the empirical literature regresses total revenue of banks (or total interest revenue) on the price of labour (personnel expenses), price of funds (total interest expenses), and the price of capital (other operating expenses). Naturally, a number of control variables are usually included in the model. In other words, and typically, this line of research estimates the following model:

$$\ln TIREV_{it} = \alpha_i + \beta_{1t}\ln PE_{it} + \beta_{2t}\ln IE_{it} + \beta_{3t}\ln OE_{it} + \delta_{1t}\ln CAP_{it} + \delta_{2t}\ln SIZE it + \delta_{3t}\ln RISK_{it} + \varepsilon_{it} \qquad (1)$$

The dependent variable (TIREV) stands for the ratio of total interest revenue to total assets. The independent variables are the ratio of personnel expenses to total assets (PE), interest expenses to total deposits (IE), and the ratio of other operating expenses to total assets (OE). The remaining independent variables are the ratio of equity capital to total assets (CAP), bank size (SIZE) which is measures by total assets, and the ratio of total credit to total assets (RISK). Naturally, all variables are taken in their natural logarithm form.

Based on the estimated results of the above reduced-form expression, the degree of competitiveness is measured by what is called the H-statistic which is equal to the sum of the three cost coefficients ($\beta_1 + \beta_2 + \beta_3$). If the sum of these three coefficients is close to +1, the industry is said to operate under competitive conditions (table 1). Within this context, it is important to note that the model implicitly assumes that the industry (banking sector) operates in its long-run equilibrium. In other words, re-estimating the above model with return on assets as the dependent variable, the sum of the three coefficients ($\beta_1 + \beta_2 + \beta_3$) which is called the E-statistic must be close to zero (table 1).

Table 1. Theoretical Interpretation of the H-Statistic and E-Statistic

Equilibrium Test:	
E = 0	Equilibrium
E > 0	Disequilibrium
Competitiveness Test:	
H ≤ 0	Monopoly
0 < H < 1	Monopolistic Competition
H = 1	Perfect Competition

Source: Adapted from Molyneux *et al.* (1994)

The Panzar-Rosse methodology has been used by numerous researchers. Some of the papers which examined competition in the American, Canadian, European and Japanese banking systems include Shaffer (1982), Nathan and Neave (1989), Lloyd-Williams *et al.* (1991), Molyneux *et al.* (1996), De Bandt abd Davis (2000), Hempell (2002), Coccorese (2004), Casu and Girardone (2006), Matthews *et al.* (2007), and many others. Most of these studies reported monopolistic competition conditions. In addition, the CEE, Indian, Chinese, and Latin American banks are examined by Yildrim and Philippatos (2007), Prasad and Ghosh (2005), Yuan (2006), and Gelos and Ghosh (2005) respectively.

In addition to the above-mentioned papers, more recent papers measured competitiveness in other developing countries. For example, Mlambo and Ncube (2011) examined the evolution of competition in the South African banking sector during the period 1999-2008. Similarly, Duncan and Langrin (2002), Simpasa (2013), Ye *et al.* (2013), Acikalin and Sikinc (2015) examined competitiveness in the banking sectors of Jamaica, Zimbabwe, China, and Turkey respectively.

As far as the Middle East and North Africa (MENA) region is concerned, it is useful to note that bank competition is measured by Anzoategui *et al.* (2010). In table 2, we report the H-statistic values for the examined sectors based on the time period 2000-2008.

Table 2. H-Statistics for Arab Countries (2002-2008)

Country	H-statistics	Country	H-statistic
Algeria	0.512	Morocco	0.503
Bahrain	0.452	Oman	0.678
Egypt	0.625	Qatar	0.496
Jordan	0.480	Saudi Arabia	0.605
Kuwait	**0.299**	Tunisia	0.376
Lebanon	0.627	United Arab Emirates	**0.723**

Adapted from Anzoategui *et al.* (2010)

On average, the results indicate that the Kuwaiti banking sector is the least competitive and the UAE sector is the most competitive. In addition, it is equally useful to note that bank competition in four Arab countries (Jordan, Lebanon, Morocco and Tunisia) and Israel is examined by Demirguc-Kunt and Peria (2010). Some of the main results are reported in table 3. Based on these results, it is stated that "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"
(Demirguc-Kunt and Peria, 2010).

Table 3. H-Statistics for Jordan and Other Economies

Country	2002-2006	1994-2006
Jordan	0.190	0.190
Israel	0.480	0.810
Lebanon	0.460	0.690
Morocco	0.390	0.260
Tunisia	0.350	0.140

Adapted from Demirguc-Kunt and Peria (2010)

3. Methodology of research. Empirical results

In Jordan, there are thirteen national banks and three Islamic banks. As far as the foreign banks with local branches are concerned, they account for less than 10 percent of the Jordanian sector in terms of total assets, total credit facilities, and total deposits. To measure competitiveness and examine its evolution during the period 2000-2014, all Jordanian banks (13) enter the statistical analysis.

We estimate the following two models for each of the three non-overlapping sub-periods (2000-2004, 2005-2009, and 2010-2014) and for the whole time period (2000-2014).

$$\ln TIREV_{i,t} = \alpha_0 + \beta_1 \ln PE_{i,t} + \beta_2 \ln IE_{i,t} + \beta_3 \ln OE_{i,t} + \delta_4 \ln CAP_{i,t} + \delta_5 \ln SIZE_{i,t} + \delta_6 \ln RISK_{i,t} + \varepsilon_{it} \qquad (2)$$

$$\ln TOI_{i,t} = \alpha_0 + \beta_1 \ln PE_{i,t} + \beta_2 \ln IE_{i,t} + \beta_3 \ln OE_{i,t} + \delta_4 \ln CAP_{i,t} + \delta_5 \ln SIZE_{i,t} + \delta_6 \ln RISK_{i,t} + \varepsilon_{it} \qquad (3)$$

Where the subscripts i and t refer to banks (i = 1, …, N) and time (t = 1, …, T) respectively. The dependent variables are the ratio of bank interest revenue to total assets (TIREV) and bank net operating income to total assets (TOI). The independent variables are personnel expenses (wages) to total assets (PE), interest expenses to total deposits (IE), other operating expenses to total assets (OE), equity capital to total assets (CAP), total assets (SIZE), and credit to total assets (RISK). Finally, ln is the natural logarithm operator.

Based on the above two expressions (2 and 3), the H-statistic is given by $H = \beta_1 + \beta_2 + \beta_3$. The sum of these three coefficients reflects how bank interest revenue (TIREV) reacts to changes in the three input prices or costs.

As mentioned previously, it is important to note that the estimation of models (2) and (3) to calculate the H-statistics implicitly assumes that the banking sector operates in its long-run equilibrium. This is why, to check for this presence (long-run equilibrium), one must estimate the below model (4).

$$\ln ROA_{i,t} = \alpha_0 + \beta_1 \ln PE_{i,t} + \beta_2 \ln IE_{i,t} + \beta_3 \ln OE_{i,t} + \delta_4 \ln CAP_{i,t} + \delta_5 \ln SIZE_{i,t} + \delta_6 \ln RISK_{i,t} + \varepsilon_{it} \qquad (4)$$

Where ROA is the pre-tax return on assets and the independent variables are as defined above. Naturally, the researchers add +1 to the return on assets in order not to lose the observations with accounting losses.

Again, and as mentioned previously, if the banking sector operates under its long-run equilibrium condition, the E-statistic which is equal to $(\beta_1 + \beta_2 + \beta_3)$ must be close to zero. This result implies that the input costs or prices do not affect the performance of banks.

As customary in similar research effort, we report in Tables 4 and 5 some descriptive statistics about both the dependent variables and explanatory variables. As far as the dependent variables are concerned, one can realize that our sample of banks do differ in terms of the magnitudes of interest income and operating income. For example, while the overall mean value of interest revenue to total assets is equal to 5.4 percent, its maximum and minimum values are equal to 8.3 percent and 2.9 percent respectively (Table 4). In addition, the individual stocks differ in terms of their net interest revenue to total assets and its standard deviation. For example, the mean ratio of interest revenue to total assets of stock number 2 is

equal to 5.9 percent with a standard deviation of 1.3 percent. The mean interest revenue to total assets ratio of stock number 5, on the other hand, is equal to 4.4 percent and a standard deviation of 0.9 percent.

Table 4. Net Interest Margin and Other Variables: Some Basic Information

Variable	Mean	Median	Maximum	Minimum	Std. Dev.
TIREV	0.054	0.054	0.083	0.029	0.010
TOI	0.042	0.042	0.077	0.008	0.011
ROA	0.017	0.018	0.061	-0.041	0.012
PE	0.011	0.010	0.029	0.003	0.004
IE	0.035	0.033	0.079	0.011	0.014
OE	0.015	0.015	0.059	0.001	0.007
CAP	0.078	0.062	0.341	0.006	0.052
SIZE	20.837	20.692	23.975	17.793	1.220
RISK	0.437	0.434	0.685	0.192	0.092

Table 5. Dependent Variables: Individual Stocks

Stock	Interest Revenue to Total Assets		Net Operating Income to Total Assets	
	Mean	Standard Deviation	Mean	Standard Deviation
1	0.058	0.009	0.048	0.005
2	0.059	0.013	0.044	0.011
3	0.052	0.009	0.041	0.007
4	0.055	0.010	0.039	0.016
5	0.044	0.009	0.033	0.003
6	0.055	0.010	0.052	0.008
7	0.056	0.009	0.043	0.011
8	0.057	0.009	0.048	0.007
9	0.051	0.007	0.033	0.012
10	0.048	0.011	0.035	0.005
11	0.057	0.008	0.053	0.005
12	0.058	0.009	0.040	0.010
13	0.050	0.009	0.036	0.016

The estimates of models 2-4 for the three sub-periods (2000-2004, 2005-2009, and 2010-2014) and for the whole time period (2000-2014) are reported in Tables 6-9. Clearly, the results indicate that the Jordanian banking system operates under monopolistic competition conditions. Indeed, in the case of interest revenue to total assets, the E-statistic values are equal to 0.417 (2000-2004), 0.691 (2005-2009), 0.591 (2010-2014), and 0.562 (2000-2014). Similarly, in the case of net operating income to total assets, the E-statistic values are equal to 0.636 (2000-2004), 0.0483 (2005-2009), 0.491 (2010-2014), and 0.449 (2000-2014). Relative to these results, the values of the E-statistics are close to zero.

Based on the above results, it can be argued that during the period 2000-2014, the competitive conditions that prevail in the Jordanian banking system has not changed. The system remains monopolistic competition. Finally, and relative to results published by Demirguc-Kunt and Peria (2010) about competitiveness in Jordan, the fact that they reported H-statistics equal to 0.34 (1994-2001) and 0.19 (2002-2006), we can state that the degree of competitiveness, on average, has increased during the period 1994-2014.

Table 6. Bank Competition: Estimation Results (2000-2004)

Variable	Dependent Variables		
	INTREV	INTREVC	ROA
	Coefficient	Coefficient	Coefficient
PE	-0.055	0.586*	0.011**
IE	0.476*	-0.182**	-0.008*
OE	-0.004	0.232*	-0.014*
CAP	0.040	-0.035	-0.005
SIZE	-0.131**	0.173	0.001
RISK	0.241*	0.371	0.014
H-statistic	**0.417**	**0.636**	-----
E-Statistic	-----	-----	**-0.011**
Adjusted R^2	0.839	0.677	0.689
F-statistic	55.196*	8.482*	8.892*
D-W Statistic	1.598	2.154	2.132

Table 7. Bank Competition: Estimation Results (2005-2009)

Variable	Dependent Variables		
	INTREV	INTREVC	ROA
	Coefficient	Coefficient	Coefficient
PE	0.173*	0.149	-0.004
IE	0.454*	0.181*	0.009*
OE	0.064*	0.153*	-0.006*
CAP	-0.035	0.175*	0.010*
SIZE	-0.036	-0.001	0.001
RISK	0.324*	0.269*	0.017*
H-statistic	**0.691**	**0.483**	-----
E-Statistic	-----	-----	**-0.001**
Adjusted R^2	0.854	0.857	0.692
F-statistic	13.426	13.711*	5.763*
D-W Statistic	1.835	1.957	2.001

Table 8. Bank Competition: Estimation Results (2010-2014)

Variable	Dependent Variables		
	INTREV	INTREVC	ROA
	Coefficient	Coefficient	Coefficient
PE	0.161**	0.433*	0.009*
IE	0.404*	-0.060	-0.002
OE	0.026	0.118**	-0.009*
CAP	-0.031**	-0.044	-0.002
SIZE	-0.061	-0.086	-0.004
RISK	0.090*	-0.317*	-0.015*
H-statistic	**0.591**	**0.491**	-----
E-Statistic	-----	-----	**-0.002**
Adjusted R^2	0.901	0.873	0.832
F-statistic	36.290	25.453*	18.630*
D-W Statistic	1.623	1.831	1.933

Table 9. Bank Competition: Estimation Results (2000-2014)

Variable	Dependent Variables		
	INTREV	INTREVC	ROA
	Coefficient	Coefficient	Coefficient
PE	0.064**	0.407*	-0.002**
IE	0.470*	-0.084	-0.006*
OE	0.028***	0.126***	-0.001*
CAP	0.033***	-0.014	0.002
SIZE	0.045*	0.226*	0.019*
RISK	0.242*	0.237	0.001
H-statistic	**0.562**	**0.449**	-----
E-Statistic	-----	-----	**-0.009**
Adjusted R^2	0.806	0.567	0.634
F-statistic	91.925*	13.249*	17.170*
D-W Statistic	1.471	1.852	1.391

4. Conclusions

The banking literature has given the issues of bank performance in general, and bank competition in particular, a lot of research attention. Indeed, this is what one must expect. In the first place, banks provide economies with a number of services which are conducive to real economic growth at both the macro and micro levels. Similarly, the fact that competition matters for bank efficiency and quality of financial services, the measurement and evolution of competitiveness has also attracted much research effort. This paper examines bank competition in Jordan. Based on a total of 13 banks and the time period 2000-2014, the results indicate that during this period, the Jordanian system remains to operate under monopolistic competition conditions.

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