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The efficiency cost of market power in banking: a test of the "quiet life" and related hypotheses in the Jordan's banking industry

Abstract

This paper analyzes the relationship between market power accrued by concentration – proxied by Herfindahl-Hirshman index (HERF) – and efficiency in the Jordanian banking industry. Employing data on Jordanian banking industry over 2001-2005, we find the efficiency cost of concentration as well as the social loss from mispricing measured by the welfare triangle to be statistically and quantitatively insignificant in Jordan's banking industry, allowing the rejection of the so-called quiet life hypothesis (Berger and Hannan, 1998). These results should not discourage the economic policy measures aimed at removing the barriers or obstacles that protect national markets from outside competition.

Keywords: the Jordan's banking industry, cost efficiency, the distribution free approach, the relative market power, the efficient structure hypothesis, X-efficiency, scale-efficiency, the quiet life hypothesis.
JEL Classification: D40, G21.

Introduction

Public policy concerns about concentration in markets focus on the social loss associated with the exercise of market power. The higher prices in concentrated markets misallocate resources – this social cost has been measured by the welfare triangle which represents the difference between the loss in consumer surplus and the gain in producer surplus. The possibility of greater loss associated with the market power has also been addressed by Berger and Hannan (1998) who find that reduced competitiveness in more concentrated U.S. banking market results in lower operating efficiency. This is because the market power exercised by firms in concentrated markets allows them to avoid minimizing costs without necessarily exiting the industry.

On the other hand, the economic theory commends the gains obtained in perfectly competitive markets over those in which market power exists, as the existence of market power implies a net loss of social welfare (Maudos and Guevara, 2007). In the case of the banking sector, the analysis of market power is especially important because it translates into a higher cost of financial intermediation, a lower volume of savings and investment, and therefore lowers economic growth.

To avoid the unfavorable consequences of market concentration, the economic authorities have paid attention to the importance of reducing the levels of market power in banking markets to enhance their competitiveness. Thus, since the mid-1990s in particular, the Jordan's financial authorities have adopted measures tending to the liberalization of banking market including the freedom to branch expansion throughout the country, the liberalization of interest rates, the opening of the sector to foreign competition.

Berger and Hannan (1998) address the relevance of increased concentration and market power to the policy analyses in banking industry especially in the recent years as the banking industry is consolidating rapidly, a trend that is expected to continue under recent deregulations undertaken in all over the world. If the "quiet life" and efficiency-reducing effects of concentration, described later, are substantial, they might be considered by regulatory authorities in the merger approval process, along with concern about the welfare loss due to mispricing.

This concern appears because the reduction in competitive pressure in concentrated markets, as suggested by Hicks, may result in lessened efforts by managers to maximize operating efficiency. As for the "quiet life" hypothesis, it is a form of monopolistic or market power that arises from concentration that permits the manager to set prices above marginal cost and thus relaxing the effort to maximize operating efficiency. In the absence of other disciplining mechanisms, manager may allow unit costs to rise to consume part of this profit and still allow owners to earn economic rents without the full effort of cost minimization.

In the academic research, there has also been great interest in the measurement of the degree of competition in banking markets (Maudos and Guevara, 2007). Thus, there have appeared a substantial number of studies that use different indicators of competition (Lerner index, Panzar and Rosse´s test, Bresnanhan´s mark-up test, conjectural variation parameter) with empirical applications whose purpose is to analyze competitive rivalry in banking markets.

In this study on the Jordanian banking industry, we find evidence that the Jordan banks do not exhibit poorer cost efficiency during the years that exhibit

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relatively higher levels of concentration compared to those years characterized by relatively lower levels of concentration (i.e., the change in concentrations levels over the study period has no noticeable impact on efficiency scores). Our results suggest the efficiency cost of concentration and the social loss from mispricing measured by the welfare triangle to be insignificant in Jordan's banking industry over the period of 2001-2005. This result should not discourage the economic policy measures aimed at removing the barriers or obstacles that protect national markets from outside competition.

The rest of the paper is structured as follows. Section 1 reviews the relationship between market power and efficiency. Section 2 describes the study models. Sections 3 & 4 present the efficiency measures and determinants of efficiency. The empirical estimations are contained in section 5. Section 6 evaluates the impact of concentration on efficiency levels and welfare triangle. Finally, the last section contains the conclusions.

1. The relationship between market power and efficiency

This section reviews the theoretical and empirical background of the relationship between market power and efficiency. The literature on this issue is related to the hypotheses that explain the relationship between market structure and performance.

In this context, there are three main hypotheses explaining the relationship between market structure and performance. The first one is the collusion hypothesis, also called the structure-conduct-performance (SCP) hypothesis (Bain, 1956). This hypothesis postulates that greater profits are the result of collusion between the firms of the industry.

The second one is the efficient structure hypothesis (Demsetz, 1973) which proposes an alternative explanation for the positive correlation between concentration and profitability, affirming that the most efficient banks obtain both greater profitability and market shares and, as a consequence, the market becomes more concentrated. More recently, Berger (1995) divided this hypothesis into the X-efficiency and scale efficiency hypotheses.

The third one is the relative market power hypothesis. Shepherd (1982 and 1986) establishes that the variance in performance is explained by efficiency as well as by the residual influence of the market share (i.e., the higher market share of the individual bank enables gaining higher market power), because market share captures the influence of factors unrelated to efficiency, such as market power and/or product differentiation. Under this hypothesis, individual market share is the proxy variable for assessing market power.

The quiet life hypothesis can be considered a special case of the market power hypothesis. The positive relationship between market power and inefficiency is known as the "quiet life" effect (see for details, Maudos and Guevara (2007) page 3).

A few studies have analyzed the relationship between market power and efficiency in banking. The only study, as far as we know, that tests this hypothesis on U.S. banking market is that of Berger and Hannan (1998). The authors find a statistically significant negative relationship between the levels of concentration and efficiency. Results are consistent with the quiet life hypotheses and indicate that the efficiency costs estimated are much higher than the social cost occasioned by non-competitive pricing.

In the European markets, Maudos and Guevara (2007) test this hypothesis and find a positive relationship between the levels of concentration and efficiency. Thus, their results lead to the rejection of the quiet life hypothesis in banking.

Market structure can influence cost efficiency for various reasons (Berger et al., 1998; Maudos and Guevara, 2007). First, high levels of concentration allow firms to charge prices in excess of competitive levels, thus managers may take part of the benefits in the form of a "quiet life". Second, market power may allow managers to pursue objectives other than firm profits such as the growth of the firm, of the staff, or the reduction of labor conflict by means of higher wages, at the expense of efficiency (i.e., they benefit for their own on the account of maximizing the owners wealth). Third, manager may expend resources to obtain and maintain market power. Such expenditures would reduce cost efficiency. Fourth, the higher price provided by market power may allow inefficient managers to persist without any wilful shirking of work effect, pursuit of other goals, or efforts to defend or obtain market power.

As far as we know, there is no study that analyzes the relationship between market power and efficiency in the emerging markets, specially the Jordanian banking sector. In this context, the present study has three main aims (similar to those of Berger and Hannan (1998) and Maudos et al. (2007)): a) to quantify the level of market power in the Jordanian banking sector; b) to analyze the relationship between X-inefficiency in costs and the market power; and c) to estimate the loss of welfare associated with market power. We will analyze the two ways in which market power generates costs: the loss of net social welfare associated with the setting of prices above marginal costs, and the loss of efficiency associated with the "quiet life" hypothesis.

2. Empirical model

In this section, we present the results regarding the relationship between market power and efficiency in the Jordanian banking sector. To test whether the efficiency is affected by concentration levels in Jordan's banking industry, and to evaluate the strength of this relationship, we estimate efficiency as:

$$EFF_i = f(CONC, X_i) + \varepsilon_I, \quad (1)$$

where EFF_i is a measure of firm i's efficiency, $CONC$ is a measure of concentration in the market, X_i represents a vector of other characteristics (these include the degree of financial leverage, the non-deposit borrowings over total assets, the bank size and a time trend) that are likely to influence efficiency, and ε_i is a mean-zero error term. A significant negative relationship between EFF_i and $CONC$, controlling for other factors, would be consistent with the quiet life and related hypotheses. Definitions of all the variables specified in equation (1) are shown in Table 1.

A concern here is the possibility of 'reverse causation', in which efficiency (*EFF*) may affect concentration (*CONC*), and thereby bias the estimated effect of *CONC* on *EFF*. Such causation occurs under the efficient-structure paradigm of Demsetz (1973). According to this hypothesis, efficient firms increase their market shares, which may in turn increase market concentration. This hypothesis suggests a positive causal relationship running from EFF_i to *CONC* and implies a bias in ordinary least-squares (*OLS*) estimates of equation (1). We address this issue through the use of a 2-stage least squares (2*SLS*) procedure.

Table 1. Variables definitions and sample means for banks in the sample

Symbol	Definition	Mean	Max.	Min.	Std. dev.
EFF	Efficiency measure, defined as the ratio of predicted costs of an efficient bank to that of bank i	0.671	1.000	0.430	0.154
HERF	Herfindahl index of local market concentration	0.514	0.589	0.395	0.074
F-Leverage	The total assets/the owner's equity; a measure of financial leverage in the market	9.961	22.429	-7.120	5.148
Nondeposit borrowing/TA	The non-deposit borrowing as a % total asset	0.255	0.679	0.037	0.136
Size 1	Dummy variable indicating bank assets of less than $200 million	0.125	1.000	0.000	0.333
Size 2	Dummy variable indicating bank assets of between $200 million and $500 million	0.375	1.000	0.000	0.487
Size 3	Dummy variable indicating bank assets of between $5 billion and $10 billion	0.238	1.000	0.000	0.428
Size 4	Dummy variable indicating bank assets of greater than $10 billion	0.063	1.000	0.000	0.244
T	Time trend (year 2001=1, 2002=2,...2005=5).	3.000	5.000	1.000	1.423

Note: The excluded dummy categories are banks whose asset sizes are less than $200 million (SIZE1).

3. Efficiency measures

We measure X-efficiency by the closeness of the bank costs to the minimum costs for the bank's output that could be achieved on the efficient frontier. To estimate efficiency, it is assumed that the cost function has a composite error term that includes both inefficiencies and random error. We use a distribution-free approach which assumes that the cost differences owing to inefficiency are relatively stable, while those owing to random error are ephemeral and should average out. For the distribution-free method, a cost function applying to each of the 5 years period extending from 2001 to 2005 is specified as:

$$\ln OC_{it} = \ln C_t(Y_{it}, w_{it}) + \ln x_i + \ln v_{it}, \quad (2)$$

where ln indicates natural logarithms, t denotes time, C is operating costs, $C(Y,w)$ is a cost function with output quantity vector Y and input price vector w. Lnx is an efficiency factor, and ln$v$ is a random error. We use a translog specification with two output quantities (loans and other earnings assets) and two input prices (customers' deposit and non-deposit borrowings).

To calculate efficiency, we average the residuals from equation (2) for each bank over the sample period. This average residual, $\ln \hat{x}_i$ for each bank, is an estimate of $\ln x_i$, given that the random errors $\ln v_{it}$ will tend to cancel each other out. We transform $\ln \hat{x}_i$ into a normalized measure of efficiency,

$$EFF_i = \exp(\ln \hat{x}_{min} - \ln \hat{x}_i) = \hat{x}_{min} / \hat{x}_i, \quad (3)$$

where min indicates the minimum for all i. This is an estimate of the ratio of costs for the most efficient bank in the sample to bank i's costs for bank i's combination of outputs and input prices, that is $C_{min}(Y_i, w_i)/ C(Y_i, w_i)$.

Table 2 below shows the cost efficiency estimates of the Jordanian banking industry over the period of 2001-2005.

Table 2. Cost efficiency estimates of the Jordan's banks over the 2001-2005

Year	2001	2002	2003	2004	2005	Average
Cost efficiency estimates	0.65	0.67	0.70	0.67	0.66	0.67

Source: The authors' own estimation.

Table 2 above shows the efficiency cost of the Jordan's banking industry is about 67 percent. This suggests that the output of the average bank could be produced with about 67% of the resources actually used, or that about one-third of all costs are wasted. This level of efficiency is relatively lower than the levels found in the other markets.

The next step aims to determine the magnitude of inefficiency that attributes to market power in setting prices due to levels of concentration in the Jordanian banking industry over the period of 2001-2005.

4. Determinants of efficiency

To test the validity of the quiet life hypothesis for the Jordanian banks, we estimate an equation (equation 1) where the dependent variable is cost efficiency and the independent variables are the Herfindahl-Hirshman index (HERF) and other variables that potentially influence bank efficiency.

We measure concentration by the Herfindahl index (HERF) as proxy variable for market power. The HERF is measured by the sum of squared market shares of all banks in the market with the proportion of the bank's deposits in its market serving as the weights (i.e., by squaring each bank's share of deposits in a market and then summing these squared shares).

We employ several control variables in X in the equation to control for the governance structure of the firm and to control for other factors related to bank characteristics that may be associated with managerial decisions and may influence bank efficiency levels. Specifically, the explanatory variables of cost efficiency are the following:

The first control variable is the degree of financial leverage (the total assets/the owners' equity). A positive relationship is expected between the degree of financial leverage and efficiency since the debt has a relatively lower cost of funding compared to equity and the higher levels of financial leverage is usually associated with restrictive covenants on the managements which alleviate the agency problem between management and owners. The positive relationship is rooted in the binding nature of debt; as the debt financing raises pressure on managers to perform, because it reduces the moral hazard behavior by reducing "free cash-flow" at the disposal of managers (Jansen, 1986; Weill, 2008).

The total non-deposit borrowing to total assets is employed as a control variable. Higher non-deposit borrowing is usually associated with more strict restrictive covenants on management on its borrowing and thus the management tends to adhere to the main goal of the firm; value maximization which considers amount, timing and riskiness of cash flows or other profitability measures.

In addition, as Table 1 shows, three bank size dummies are included. The size of each bank, measured by total assets (TA), is included to test if larger banks are able to get better management than smaller ones. The size control for scale economies that enable the larger banks to reduce the cost per unit of output. Finally, a time trend is added to the model to account for the technical change that might occur over our study period.

5. Estimation results

Our study sample consists of the 16 local banks operating in Jordan over the period of 2001-2005; this comprises 80 observations of consolidated banking firms during the study period. This sample includes commercial banks, investment banks, and other types of institutions.

Table 3 presents regression results explaining efficiency (EFF) as a function of concentration (HERF), as in equation (1). The dependent variable is expressed in log form since cost efficiency (our dependent variable) is a variable bounded between zero and one, thus it is necessary to use a non-linear specification of the functional form rather than a linear regression model.

Table 3. Relationship between the LOG of bank efficiency and market concentration and other variables

	Continuous function		Step function
	OLS (1)	2SLS (2)	OLS (3)
Constant	-0.010 (-0.401)	-0.140 (-2.158)	-0.198 (-3.778)
Ln (HERF)	0.156 (0.651)	0.054 (0.682)	
HERF_yr2			0.036 (0.484)
HERF_yr3			0.076 (1.139)
HERF_yr4			0.042 (0.692)
HERF_yr5			0.041 (0.671)
Ln(F-Leverage)	0.010 (0.434)	0.009 (0.393)	0.010 (0.441)
Ln(Nondep-borr/TA)	0.040* (1.800)	0.039* (1.759)	0.040* (1.775)

Table 3 (cont.). Relationship between the LOG of bank efficiency and market concentration and other variables

	Continuous function		Step function
	OLS (1)	2SLS (2)	OLS (1)
SIZE2	0.038 (1.417)	0.040 (1.486)	0.039 (1.422)
SIZE3	0.039 (1.260)	0.040 (1.301)	0.039 (1.254)
SIZE4	0.118** (2.434)	0.119** (2.474)	0.118** (2.413)
T	-0.010 (-0.401)		
Adjusted R^2	0.061	0.072	0.041
No of observations	80	80	80

Notes: *t*-statistics are in parentheses; * indicates significance at the 1% level; ** significance at the 5% level.

Columns (1) and (3) present the results of the OLS regressions that assume a continuous log-linear functional form between EFF and HERF, while column (2) presents 2SLS estimations to account for the possibility that a firm's efficiency influences the concentration. In these, number of subscribed shares is employed as the instrument as this variable is expected not to be correlated with efficiency scores but employed as instrument for market concentration.

In the first two regressions that employ ln(HERF) as an explanatory variable, the coefficients of ln(HERF) are positive, but statistically and quantitatively insignificant, implying that operating during the years of relatively higher concentration does affect negatively the banks performance, all else equal.

The coefficient ranges from 0.05 to 0.16 (for the continuous function models shown in the first two columns of Table 3). If these coefficients were statistically significant, it may suggest that an increase in concentration from that of the least concentrated year (year 2001 with HERF = 0.395, shown in Table 1) to that of the most concentrated year (year 2004 with HERF = 0.589) would be expected to cause efficiency to increase by between about 12% and 39%.

As for the controls variables included in the models shown in Table 3, we can notice that only the variable of non-deposit borrowing/total asset is positive and statistically significant allowing for the possibility that agency problems are partially responsible for current levels of efficiency in Jordanian banking industry. This is because, as indicated earlier, the banks with the higher leverage should be most inclined to improve performance (Jensen and Meckling, 1976; Weill, 2008).

In addition, Table 3 shows that the dummy variable (size-4) is positive and statistically significant. It is worthwhile to mention that size-4 applies only to the Arab Bank which holds an asset size of more than JD 10 billion in year 2005 and this bank has a market share of more than 50 percent of the Jordan's banking industry deposits over our study period. This means that the Jordan's banking industry is highly concentrated mainly due to the share of this bank in particular.

It is possible that the continuous monotonic functional forms (columns 1 and 2 of Table 3) discussed thus far do not adequately describe the true relationship between efficiency and market concentration. For example, a rise in concentration could be associated with an increase in market power and a resulting reduction in managerial effort only for some limited range of concentration, with little or no effects outside this range. To address this possibility, column (3) of Table 3 presents the results of step-function regressions in which ln(HERF) is replaced by a series of dummy variables indicating various levels of concentration over time (as the concentration in the market is not constant over time). In this step-function regression, the coefficients of all four concentration dummy variables are positive but also insignificant, suggesting that banks operated in more concentrated years do not have relatively lower efficiency compared to their performance when they operate in the years characterized by relatively lower levels of concentration.

Thus, the regression results provide robust support for the positive but insignificant relationship between market concentration and bank efficiency, this result is inconsistent with the "quiet life" and related hypotheses.

Based on above result, we can note that whether the regressions are in log or linear form, whether the specification is continuous or step-function, whether or not a 2SLS correction is made for possible reverse causation from efficiency to market structure, whether or not the concentration measure is interacted with variables describing the governance structure, the data suggest that the performance of Jordan banks during the years of relatively higher concentrated years does not exhibit lower cost efficiency levels. These results permit us to reject the quiet life hypothesis in the Jordanian banking system.

There may be several reasons explaining the positive effect of market power on efficiency (Maudos et al., 2007). Firstly, banks with monopolistic power due to their location have lower costs of monitoring and transacting with firms. Secondly, banks that possess market power due to geographical or technological specialization may have cost advantages

in screening certain groups of borrowers. Thirdly, market power allows banks to enjoy greater profits, which may create incentives to behave prudently (enhancing bank stability). And fourthly, the banks that enjoy greater market power are under less pressure to increase the quality of banking services, thus decreasing operating cost and increasing their cost efficiency.

Our results are consistent with those of Maudos and Guevara (2007) on European banking but inconsistent with those of Berger and Hannan (1998) on U.S. banking market.

In spite of the insignificant impact of concentration on efficiency scores, it might be interesting and for completeness to calculate the magnitude of inefficiency attributed to various levels of concentration. Thus, the next section describes the impact of concentration on measured efficiency scores for the banks under study.

6. The impact of concentration on efficiency levels and the welfare triangle

The aggregate loss burdened by the Jordanian banking industry due to operation on various levels of concentration is estimated by applying our estimated efficiency concentration relationship. The efficiency cost and welfare triangle loss are computed by relying on the step-function ordinary least squares as this model distinguishes among various levels of efficiency associated with various levels of concentration over the period under study.

6.1. Efficiency cost due to operating on various levels of concentration. We apply the coefficients from the first two continuous regression models (columns 1 and 2 of Table 3) and the step-function regression model (column 3 in Table 3) to cost data to calculate three different estimates of the efficiency cost of concentration. Because the results of the step-function do not suggest a significant difference in measured efficiency between banks when operating at various levels of concentration (note, the concentration levels measured by Herfindahl index ranged from 0.395 for year 2001 to 0.589 for year 2004). In addition, given the coefficient of dummy variable of concentration for year 2003 is the highest (HERF-3 = 0.076), we calculate the efficiency cost of concentration assuming that the efficiency cost for this year is zero.

For the models with ln(HERF) as the key variable (columns 1, 2 in Table 3), the elasticity of costs with respect to HERF, $\partial \ln(C_i)/\partial \ln(HERF_i)$, is a constant β, where β is the coefficient of $\ln(HERF_i)$ from the regression. This follows from the fact that costs are not necessarily proportional to the efficiency measure EFF. The efficiency cost of concentration for bank i – the difference between current costs and what costs would be if HERF = 0.527 (as this year has the lowest level of efficiency cost due to concentration) – is given by

$$EFFCOST_i = C_i - (0{,}527 / HERF_i)^{\beta} \text{ x } C_i. \quad (4)$$

For the step function model (column 3 in Table 3) we measure the expected cost savings from reducing concentration into the unconcentrated range of HERF = 0.527. This may be shown as

$$EFFCOST_i = C_i - exp\ (\gamma_j) \text{ x } C_i, \quad (5)$$

where γ_j is the dummy variable coefficient in the step function for the jth concentrated year of *HERF*. The summation of $EFFCOST_i$ is either equation (4) or equation (5) over Jordan banks for which *HERF* = 0,527 yields an estimate of the efficiency cost of operating at various levels of concentration (our reported results in Table 4 are based on efficiency cost estimated by the step functional model given no significant differences between the results of the three models and because this model includes dummy variables to account for the impact of concentration on each of the years under study).

Table 4. Efficiency cost due to market power in Jordan's banking industry (2001-2005)

Estimation method/ continuous function 2 SLS	Number of banks	Total operating costs (JD)	Total efficiency cost	Efficiency cost/total operating cost
2001	80	502,900,000	41,394,200	8.23%
2002	80	509,300,000	18,604,600	3.65%
2003	80	548,700,000	7,496,100	1.37%
2005	80	634,600,000	679,200	0.12%

As Table 4 shows, the total efficiency cost of bank concentration, measured in JD, ranges between less than JD 1 million per annum in year 2005 to about JD 42 million in 2001.

To assess the economic significance of these numbers, the efficiency cost is also shown in terms of total operating costs of banks. The results indicate that less than 2.67% of costs, on average over the period of 2001-2005, could be saved by eliminating the effects of market power.

Given our average inefficiency levels for the banks under study is about 33 percent over the study period from year 2001 to year 2005, we can say the impact or role of concentration on this level of efficiency is not substantial. Thus, there are other factors need to be investigated to enhance the efficiency of the Jordanian banking industry.

6.2. Welfare triangle. We estimate the social loss from the misallocation of resources attributable to market power. This is measured by the area of the welfare triangle bounded by the demand curve and lines representing the quantity when market power is exercised and the price when it is not. This loss may be measured as

$$\text{Welfare triangle loss} = \left(\frac{1}{2}\right) PQ \cdot \varepsilon \cdot \tau^2, \qquad (6)$$

where P and Q represent the price and quantities of products for which market power is exercised; ε is the absolute value of the relevant elasticity of demand (or supply in the case of deposits); and τ is the proportional change in price from the exercise of market power $\Delta P/P$.

The value of PQ may be observed as the revenues associated with the assets and the expenses associated with liabilities. Banks have been shown to exercise market power on both sides of the balance sheet – charge higher rates on loans (raising revenues) and pay lower rates on deposits (lowering expenses) (Berger and Hannan, 1998). Our data set assumes that all loans and leases and all deposits are competed for on a local loans and may be subject to local market power in pricing. Thus, it includes the revenues from all loans and leases and the interest expenses of all deposits.

A reasonable value of τ – the proportional increase in price owning to the exercise of market power – is suggested by the past empirical studies (Berger and Hannan, 1997). Differences of roughly 5% or slightly higher between the observed rates in the most and least concentrated markets have been found. To allow for an upward bias in the welfare triangle loss, we report estimates setting τ alternately to 0.05 and 0.10. We report estimates under various assumptions that ε is 1, 2, and 3, since this range includes the true elasticities for most of the relevant banking products.

Table 5 presents estimates of the loss as measured using the welfare triangle for the Jordan's banking industry using various assumptions concerning the definition of revenue affected by market power, PQ, price effects of concentration of $\tau = 0.05$, and 0.10, and customer demand and supply elasticities of $\varepsilon = 1$, 2, and 3.

Table 5. Loss measured by welfare triangle in Jordan's banking industry (JD values in millions)

		ε = 1		ε = 2		ε = 3	
Year	Number of banks	Total loss (JD)	Loss / T. operating cost	Total loss (JD)	Loss / T. operating cost	Total loss (JD)	Loss / T. operating cost
τ = 0.05							
2001	80	628,540	0.125%	1,257,079	0.250%	1,885,619	0.375%
2002	80	636,696	0.125%	1,273,393	0.250%	1,910,089	0.375%
2003	80	685,853	0.125%	1,371,706	0.250%	2,057,559	0.375%
2004	80	685,963	0.125%	1,371,927	0.250%	2,057,890	0.375%
2005	80	793,225	0.125%	1,586,449	0.250%	2,379,674	0.375%
τ = 0.10							
2001	80	2,514,159	0.500%	5,028,317	1.000%	7,542,476	1.500%
2002	80	2,546,786	0.500%	5,093,572	1.000%	7,640,358	1.500%
2003	80	2,743,412	0.500%	5,486,824	1.000%	8,230,236	1.500%
2004	80	2,743,853	0.500%	5,487,707	1.000%	8,231,560	1.500%
2005	80	3,172,899	0.500%	6,345,797	1.000%	9,518,696	1.500%

As the table shows, the total loss as percentage of total cost ranges from 0,125% to total 1,50% given various estimates and assumptions. Given these results, the social loss from mispricing in the Jordan's banking industry seems to be also quantitatively and statistically insignificant even under the worst scenarios shown above.

If we compare the levels of social loss derived from market power with the magnitude of X-inefficiency, we can see that, in general, the social welfare losses and the X-efficiency derived from market power are statistically and quantitatively insignificant.

These results should not discourage the economic policy measures adopted and aimed at eliminating barriers and obstacles to banking competition.

Conclusion

This paper evaluates the impact of market power accrued by market concentration on the cost efficiency in the Jordanian banking industry over the 2001-2005 period. The main aim is to determine

whether banks which operated in relatively more concentrated years exhibit lower operating efficiency.

We estimates the two ways by which market power affects social welfare. On the one hand, greater market power implies a loss of social welfare (the so-called welfare triangle). On the other hand, market power may influence the efforts of managers to control costs and, consequently, cost efficiency (quiet life hypothesis).

Using various functional forms and specification techniques on the data of the banks under study, our results advocate the existence of a positive but insignificant relationship between market power and cost efficiency. Thus, the market power did not increase during the year characterized by relatively higher levels of concentration in the Jordan's banking sector over the period of 2001-2005. In addition, the welfare loss (Harberger´s triangle) from the misallocation of resources due market power is found to be only around 1 percent of the total cost over the study period. These results permit the rejection of the quiet life hypothesis. These results between concentration and efficiency might be attributed to lower pressure from competition to increase the quality of banking services, together with lower monitoring and screening costs.

These results should not discourage the economic policy measures aimed at removing the barriers or obstacles that protect national markets from outside competition.

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