Arab Journal of Administrative Sciences

2005, Vol. 12, No. 3, 451 - 472

Ghassan M.K. Omet

Khaled A. Al-Zu'bi

The Hashemite University, Jordan

FINANCIAL REFORMS AND INTEREST RATE SPREAD IN JORDANIAN BANKING SYSTEM (1981 - 2002)

Key Words

Jordan; Interest Margin; Financial reform; Loans; Banks.

Abstract

Given the economic importance of interest rate liberalization and the size of the Jordanian banking sector, it is useful to examine the impact of the financial reform (interest rate liberalization) in 1989/90 on the interest rate spread among Jordanian banks. Based on the statistical analyses, the results indicate that the 1989/90 interest rate liberalization did not have any significant impact on the interest margin among Jordanian banks. Moreover, the results indicate that the main determinants of the interest margin are total loans to total assets and loan loss provisions to total loans. In more specific terms, Jordanian banks do not shift the risks associated with loans (and their provisions) to their customers in the form of wider interest rate margins.

Introduction

The link between financial development and economic growth has generated many theoretical and empirical research papers. Following the classical works of Schumpeter (1934) and Robinson (1952) on the role of financial development in economic growth and the early research by Gurley and Shaw (1955), Goldsmith (1969), McKinnon (1973), and Shaw (1973), many models emphasized the economic role of well-functioning financial intermediaries (banks) and markets (stock markets). Indeed, it is expected of financial systems to ameliorate information and transaction costs and thereby foster a more efficient allocation of scarce economic resources (Benciven-

Submitted April 2004, accepted April 2005.

ga and Smith, 1991; King and Levine, 1993a; Bencivenga *et al*., 1995).

The works of King and Levine (1993a and 1993b) are considered to be among the early papers that examined the importance of banks in economic growth. Based on a measure of bank development (total liquid liabilities of financial intermediaries divided by Gross Domestic Product) and other control variables, King and Levine showed that bank development explains economic growth in a sample of about 80 countries. This conclusion is also supported by the findings of Levine (1998, 1999) and Levine *et al*. (2000). Finally, using time-series data, Watchel and Rousseau (1995) and Rousseau (1998) confirm the positive impact of financial intermediaries' development on economic growth.

As a major part of many financial systems, banks are expected to play a positive role in economic development through the sector's importance in mobilizing savings and channeling them to the most efficient investment projects. This argument is based on the fact that without banks, individuals would be hesitant to lend (invest) their savings. First, it is difficult and costly for individuals to acquire and process information about borrowers. Second, it is not possible for individuals to monitor the performance of borrowers once they have received the funds. Finally, the fact that most investments are long-term, individuals would be reluctant to commit their funds for long periods unless the financial system provides them with the service of liquidity (ability to buy and sell investment securities instantaneously without significant loss). The presence of banks can serve both borrowers and savers. First, banks specialize in the assessment and monitoring of borrowers. In other words, by solving the informational problems between savers and borrowers, banks can positively affect savings and capital accumulation. Second, by pooling savings and investing them in short-term and long-term investments, banks can transform the maturity of society's savings and thus facilitate the financing of long-term investment projects.

In addition to the above, because banks have an important role in the transmission of monetary policy and are an integral part of the payments system, the economic and social costs of any bank's failure are thought to be much greater than those of other types of businesses. Indeed, prolonged and expensive government bailouts of many financial intermediaries have proliferated around the world. For example, Caprio and Klingebiel (1999) recorded 112 episodes of systemic banking crisis in 93 countries

since the late 1970s. Moreover, the resolution of these crises typically involve the reliance on public money. During the 1980s and 1990s, Goodhart (1995) found that two out of three failed banks in 24 developed countries were bailed out. In a sample of 40 different bailout episodes, Honohan and Klingebiel (2000) found that, on average, countries spend about 13 percent of their Gross Domestic Product (GDP) cleaning up their banking systems. Similarly, it is estimated that Spain, Sweden and Finland shave spent 16.8 percent, 6.4 percent and 8 percent of their respective GDP on bailouts. Finally, it is reported (Honohan, 1997) that the cost of the banking crises in Indonesia (1997) and Thailand (1997-98) was about 55 percent and 42 percent of their respective GDP in terms fiscal contributions. The Jordanian economy was not an exception. By the time of its crash (1989), Petra was the third largest bank in Jordan and the ''poverty stricken Jordanian government was forced to pay $200m to depositors who would otherwise have lost their savings, and to avert a possible collapse of the country's entire banking system'' (Leigh and Whitaker, 2002, The Guardian). Indeed, the size of the banking sector in Jordan is relatively large. For example, the ratio of total banking assets to GDP has increased from about 90 percent in 1980 to 118 percent in 1985, to 153 percent in 1995 and to around 229 percent in 2002.

Against this brief account of the importance of the banking system and the cost of financial intermediaries' bailout, one should not be surprised of the extremely large number of published papers that examine different aspects of banks. While it is not the objective of this paper to review this vast literature, it is probably useful to point out that the literature considers a myriad of banking issues including the operating performance of commercial banks, bank credit channel, interest rate spreads and the efficiency of commercial banks.

This paper examines the issue of interest rate spread in the Jordanian banking sector. In more specific terms, the focus of this paper is to provide answers to the following questions:

1. How do Jordanian banks operate in terms of their interest rate spreads?
2. Has the 1989/90 interest rate liberalization impacted the Jordanian banks' interest rate spread?
3. Are main-stream determinants of interest rate spread applicable to the Jordanian banking sector?

Given the economic importance of banks, the size of the Jordanian banking system and the fact that the effectiveness of any banking system in channeling funds from surplus to def-

icit actors is often gauged by examining the net interest margin, it is hoped that the findings of this paper prove interesting and encourage further research.

Jordanian Banking Sector: Some Background Information

During the last three decades, the Jordanian economy has witnessed the establishment of new economic institutions and numerous economic reforms and restructuring programs. For example, the national economy witnessed the establishment of a capital market (Amman Financial Market) in 1978, the June 1997 abolition of the non-Jordanian ownership ceiling of 50 percent in the shares of listed companies and the more recent (June 2000) introduction of the Automated Exchange Trading System (AETS), the 1989/90 devaluation of the national currency, liberalization of interest rates and elimination of credit rationing, liberalization of the foreign exchange market, and the imposition of fiscal austerity measures, the enactment of the Law of Aqaba as a Special Economic Zone (SEZ) in August 2000, and the establishment of a number of Qualified Industrial Zones (QIZ's). In addition, Jordan's privatization process was launched in 1997 as part of the economic reform plan. The privatization law (No. 25 / 2000) was approved by the Lower House of Parliament in May 2000. This law established the Privatization Council to oversee the process through the Executive Privatization Commission and to decide on the use of privatization proceeds through the Privatization Proceeds Fund.

Further, Jordan has made the decision to liberalize its trade regime, integrate with the world economy and become an integral part of the process of economic globalization. This is based on the fact that Jordan signed the Association Agreement with the European Union (November 1997), has become the 136th member of the World Trade Organization (WTO) in April 2000, and by President Bush signing (September 28, 2001) into law the United States-Jordan Free Trade Area Implementation Act.

Finally, the Jordanian economy, like that of many other developing countries, has witnessed financial liberalization. Indeed, since the 1989 devaluation of the local currency and interest rate liberalization, a series of financial sector reforms have been introduced to improve the structure and efficiency of the banking system. In 1993, for example, the Central Bank of Jordan moved away from direct instruments of monetary control. The issuance of certificates of deposits has become the major instrument of monetary policy. In addition, the year 1996 witnessed the end of central bank's rediscount subsidies and preferential credit facilities and the introduction of a new

investment law that allows equal treatment for domestic and foreign investors and opening financial markets to foreign participation. In the same year, capital account transactions in capital market securities and money market instruments were also liberalized. In 1998, the CBJ introduced an overnight repurchase agreement with commercial banks and opened an overnight deposit facility. The new banking law, approved in 2000, redefined the scope of banking activities and provided for prudential regulation by strengthening the supervisory role of the central bank of the banking system in terms of loan classification and credit limits. Further, the new banking law laid down specific procedures for intervention in case of troubled financial institutions and offered insurance on bank deposits up to Jordanian Dinars 10,000. Finally, the Jordanian Mortgage Refinancing Company was established in 2002 to pave the way for local banks to get involved in home financing.

The above policies make the Jordanian private sector a major player, an instrumental actor, and a direct prime beneficiary of any expected economic benefits. Moreover, it can be argued that one cannot underestimate the importance of Jordanian banking system in the national economy. Indeed, the size of the banking sector in Jordan is relatively large. At the end of 2002, the banking sector in Jordan comprised twenty-eight banks, of which fifteen are commercial, five foreign, two Islamic and six financial corporations. It is interesting to note here that all Jordanian banks are listed on the Jordanian Stock Exchange. In other words, there are no state banks in the economy. In Table (1), we report some of the main items included in the consolidated

Table 1
Consolidated Balance Sheet of Jordanian Banks (1998-2002)
(Percent Unless Indicated)

	1998	1999	2000	2001	2002
Total Assets (JD Billion)	10.460	11.551	12.913	14.154	15.119
Total Assets / Nominal GDP	202	200	216	226	229
M2 / Nominal GDP	107.4	117.0	124.1	124.6	126.5
Credit to Private Sector / GDP	68.4	69.9	70.3	74.4	72.9
Credit to Government / GDP	19.3	20.6	18.4	20.7	21.1
Cash / Total Assets	20.5	19.4	20.7	21.4	20.1
Cash in Foreign Banks / Assets	19.7	18.6	19.9	20.4	23.3
Credit to Private Sector / Assets	39.6	38.0	38.3	36.5	33.2
Credit to Public Sector / Assets	7.3	6.1	7.5	8.0	8.0

Source: Central Bank of Jordan, Monthly Statistical Report Bulletin, June, 2003, p.20.

balance sheet of all Jordanian banks. Based on these figures, we can make a number of observations.

On average, the ratio of Jordanian banks' total assets to nominal GDP is equal to about 215 percent. This ratio is much higher than those reported by Barth *et al*. (2004). For example, the ratios of banking system assets to GDP in Morocco, Philippines, Romania, Thailand, Turkey and Indonesia were equal to 88.74 percent, 90.78 percent, 25.49 percent, 116.85 percent, 67.35 percent and 100.79 percent respectively. It is only countries like Belgium, Germany, Luxemburg, the Netherlands, Singapore, Switzerland, the United Kingdom that have a larger banking system size than that found in Jordan. Similarly, total Jordanian bank loans to the private sector stood at an annual average of 71 percent of GDP during the time period (1998-2002). Again, this ratio is much higher than those reported by Hanson (2003) for a group of 25 large developing and transition countries like Brazil, Turkey, Poland, Venezuela, Malaysia, Thailand, Russia, Morocco, and others. For example, from 1993-2000, it is reported that bank credit to the private sector increased from 32.5 percent of GDP to only 35.1 percent of GDP. The average ratio of cash to total assets (20%) is much higher than that in Japan (1.57 percent) and in the USA (6.6 percent). This reflects the conservative nature of managing Jordanian banks. Similarly, it is interesting to note that Jordanian banks hold a large proportion of their assets in terms of foreign currency deposited in foreign banks. Indeed, the mean ratio of deposited cash in foreign currencies as a proportion of total assets stood at 23.3 percent in 2002.

Interest Rate Spread: A Brief Literature Review

As a component of any financial system, banks are expected to play a major role in economic growth. The banking sector's importance in mobilizing savings and channeling them to the most efficient investment projects leads to higher productivity and more capital accumulation. Moreover, because banks are a source of funds for firms and individuals, have an important role in the transmission of monetary policy and are an integral part of the payments system, the economic and social costs of any bank's failure are much greater than those of other types of businesses.

Due to the above reasons (and others), a number of studies have examined many aspects of depository institutions in major economies like those in the USA, Japan and Britain. While it is not the objective of this paper to review this vast literature, it is

probably useful to point out that the literature considers, among others, four streams: (i) operating performance of commercial banks, (ii) bank credit channel, (iii) interest rate spreads in commercial banks and (iv) efficiency of commercial banks.

A number of studies have examined the profitability and solvency (operating performance) of depository institutions. These studies include Cole (1993), Williams *et al.* (1994), Molyneux *et al.* (1994), Berger (1995), Demirguc-Kunt and Huizinga (1999), Genay (1999), Barth *et al.* (2000), Kwan (2002), Barth *et al.* (2003) and others. Typically, these studies regress cross-country or single-country measures of performance (return on assets or return on equity) on a number of variables including bank specific, sector specific and macroeconomic variables.

In addition to the issue of bank performance, a number of papers have examined the issue of bank credit. Indeed, during the 1990's various studies had sought to test for the existence of the bank lending channel. Using individual bank data, Bondt (1998) was of the early researchers who examined whether there exists important differences in the way in which European banks with varying characteristics (based on different balance sheet items) respond to changes in the stance of monetary policy. Similar studies have also been carried out by, among others, Favero *et al.* (1999) on European banks. Banks in the USA have also been examined by Kayshap and Stein (1995 and 1997) and Kishan and Opiela (2000). Typically, these papers regress bank lending on a number of bank characteristics, sector characteristics and macroeconomic variables. Some of the main variables which are used as possible determinants of bank credit are size of bank, interest rate spread, GDP growth rate, interest rate or a dummy variable for interest rate liberalization, bank capital, number of employees or branches, and loan loss provisions, among others.

In a comprehensive study, Demirguc-Kunt and Huizinga (1999) investigated the determinants of bank interest margins (spread) using bank-level data for 80 countries. The set of regressors include variables that account for bank characteristics, macroeconomic conditions, bank taxation and underlying legal and institutional indicators. In addition, another branch of the literature is concerned with the determinants of bank interest margins in individual countries. Some of these studies include Angbazo (1997), Berger *et al.* (2000), Abreu and Mendes (2001), Sturm and Williams (2002) and many others. Finally, the determinants of bank interest margin in developing countries have attracted a growing number of research papers. Typically, it is found

that financial systems in developing countries show high and persistent spreads (see, for example, Fry, 1995; Randall, 1998; Barajas *et al*., 2000). The reported high interest rate margins have persisted even though most developing countries have undertaken financial liberalization measures over the last fifteen years or so. Gelbard and Leite (1999), for example, observe that in many sub-Saharan African countries interest rate spreads remained wide. Similarly, Brock and Rojas-Suarez (2000) show that spreads in Latin America failed to converge with international levels.

Several arguments have been advanced to explain the failure of interest spreads in developing countries to converge with those observed in developed economies. These include market power (Barajas *et al*., 1999 and 2000), the absence of bank deposit insurance and high reserve requirements (Saunders and Schumacher, 2000), high non-financial costs (Brock and Rojas-Suarez, 2000), the low significance of capital to asset ratio due to inadequate accounting standards and inappropriate classification of the riskiness on loans (Brock and Rojas-Suarez, 2000), and macroeconomic instability (Claessens *et al*., 2001).

In banking research, there is a large and growing body of literature that examines the efficiency of financial institutions using Data Envelopment Analysis (DEA), stochastic frontier approach and other parametric techniques. Some of these papers include Kraft and Tirtiroglu (1998), Leightner (1999), Okuda (2000), Darrat *et al*. (2002) and Sturm and Wiliams (2002), Isik and Hassan (2003) and Weil (2003).

As far as the Jordanian banking sector is concerned, the only paper that examines the performance of banks is provided by Maghyereh (2004). In this paper, the DEA approach is used for each year during the period 1984-2001 to determine the evolution of the efficiency scores. In addition, a second-stage regression is used to analyze the determinants of efficiency. Based on the empirical results, it is concluded that Jordanian banks did show some signs of improvement in efficiency and that the size of banks is one of the main determinants of bank efficiency.

Relative to the above, it is probably safe to state that "banking systems around the world differ widely in size and cooperation. Across countries, commercial banks have to deal with different macroeconomic environments, different explicit and implicit tax policies, deposit insurance regimes, financial market conditions, and legal and institutional realities" (Demirguc-Kunt and Huizinga,

1999). This is why the empirical results are not expected to be the same across all countries. Similarly, given the fact that our knowledge about Jordanian banks' performance in terms of their interest rate spreads, it is hoped that this paper will contribute to the hitherto existing scanty literature and provide greater understanding of the relative standing of Jordanian banks in terms of their interest rate spreads.

Data and Methodology

This research investigates the impact of the 1989/90 interest rate liberalization on interest rate spreads in the Jordanian banking sector. In addition, the spread of Jordanian banks is compared with other banks that operate in developing and developed economies. Finally, this research examines whether mainstream determinants of interest rate spread are applicable to Jordanian banks.

To investigate the impact of the 1989/90 interest rate liberalization on interest rate spreads in the Jordanian banking sector, all banks are considered for inclusion in the analysis. Due to the availability of all relevant data, the researchers managed to obtain individual bank data (annual) for a total of 10 banks during the time period 1982-2002. Given the fact that the total number of listed banks was equal to 10 and 15 in 1982 and 2002 respectively, our sample can be considered as a good representation of the Jordanian banking sector.

The specification of our empirical spread model takes the following form:

$$IRS_{jt} = f(X_{jt}, Y_t, Z_t, D_t, \varepsilon_t) \quad (1)$$

where for time period t, IRS is the interest rate (annual) margin for bank j, X is a vector of bank-specific variables for bank j, Y is a vector of banking sector variables, Z is a vector of macroeconomic variables, D is a dummy variable that takes the value of zero before the interest rate liberalization and a value of one after liberalization, and å is the error term.

The literature suggests a number of ways of measuring interest rate spread. For example, Brock and Rojas-Suarez (2000) use narrow and wide definitions of interest rate margins depending on including (or excluding) commission income. Again, based on the availability of the relevant data, we managed to calculate two estimates of interest rate spread. These are defined below.

A: Interest Rate Spread (1) = [Interest Income / Loans] - [Interest Paid / Deposits]

B: Interest Rate Spread (2) = [(Interest Income + Commission Income) / Loans] -

[(Interest Paid + commission Paid) / Deposits]

As far as our dependent variable (interest rate spread) is concerned, it is hypothesized to be a function of bank variables, banking sector variables, and macroeconomic variables. In other words, the following explanatory variables are used in the analysis:

- OR = overhead ratio measured by dividing operating cost by total assets.
- BS = bank size measured by the natural logarithm of total assets.
- LLP = loan loss provisions divided by total loans.
- CAP = equity capital divided by total assets.
- LOAN = total loans divided by total assets.
- MS = market share of each bank in the deposit market.
- INF = inflation rate.
- GDP = real GDP growth rate.

First, we include the annualized ratio of operating cost (including the wage bill) to total assets (OR) and expect a positive relationship with the three measures of spread. This is based on the argument that more efficient banks are expected to operate under tighter spread conditions. Second, the size of banks measured by the logarithm of total assets (BS) is included to account for size-related economies and diseconomies of scale. We expect bank size to have a negative impact on interest rate spread. Third, the annualized ratio of loan loss provisions to total loans (LLP) is included as an indicator of the quality of bank assets. We expect a positive relationship between this measure and spreads, which reflects the fact that banks might attempt to let their customers pay for the cost of non-performing loans. Having said that, it must also be pointed out that because bank managers have latitude in using their judgment to estimate loan loss provisions, they can exercise discretion over the timing of recognition of loan losses. Moreover, it can be argued that an increase in LLP can indicate that "management perceives the earning power of the bank to be sufficiently strong that it can withstand a 'hit to earnings' in the form of additional loan loss provisions" (Beaver *et al.*, 1989). In other words, an increase in LLP conveys good news about the strength of a bank's earnings and hence its net interest margin might be lower than that of other banks. Fourth, it is expected that banks with higher equity - to asset ratios (CAP) tend to need external funding less than banks with low equity-to-asset ratios. Moreover, well-capitalized banks tend to have lower costs of bankruptcy and hence their funding costs

tend to be lower. These arguments imply that more capitalized banks are expected to have lower spreads. Fifth, bank loans are the primary source of banks' income. Other things being equal, the higher the annualized ratio of total loans divided by total assets (LOAN), the lower the net interest margin is expected to be. This is based on the argument that banks which transform a higher proportion of their deposits into loans can afford to charge their customers with lower net interest margins. However, a higher proportion of total loans to total assets might also mean higher risk levels and wider interest rate spreads. Sixth, we include the market share of each bank in the total bank deposit market (MS) as an indicator of the potential exercise of monopoly power. It is expected that high deposit concentration ratios might lead to a widening in the interest rate spreads. Finally, we include in our analysis two macroeconomic variables: inflation rate and real GDP growth rate. These variables are included in the model to capture the effect of macroeconomic environment on interest rate spreads.

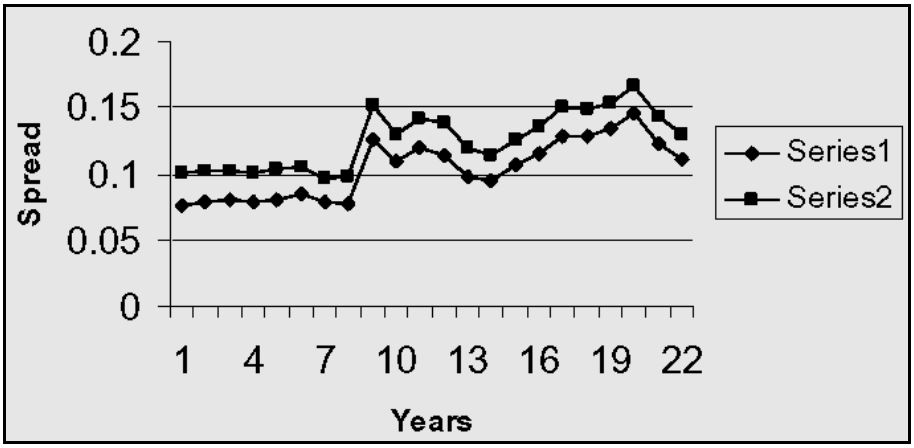
To estimate the above panel regression model, we use three alternative methods: pooled ordinary least squares, the fixed effects model, and the random effects model. Based on the results of the Hausman test, we report the suitable results of our model. It must be noted that the advantage of using panel data (combining inter-individual differences with intra-individual dynamics) over cross-sectional or time series data lies in the fact that it usually gives a large number of observations, which increases the degrees of freedom and, hence, improve the efficiency of the econometric estimates. Furthermore, the most important advantage of using the panel data approach is that it accounts for the unobserved heterogeneity among the cross-sectional firms over time in the form of unobserved firm-specific effects. Moreover, as the sample includes multi-year observations, we utilize the correction techniques for unknown heteroskedasticity of White (1980).

Empirical Results

The mean values of the two measures of interest rate spread during the time period 1981-2002 are shown in Graph 1. Based on this Graph, we can see that both measures of spread reflect some increase following the 1989/90 interest rate liberalization.

In Tables 2 and 3 we present some descriptive statistics for all the variables that enter into the statistical analyses. Several characteristics of these results merit some comments. First, the mean overhead ratio, which includes the wages bill, is extremely low. This observation reflects the low-

Graph 1
Behaviour of Interest Rate Spread



Note: The mean annual spreads (for all banks in the sample) are based on the following measures. Spread (1) = Series 1 = [Interest Income / Loans] - [Interest Paid / Deposits]; Spread (2) = Series 2 = [(Interest Income + Commission Income) / Loans] - [(Interest Paid + commission Paid) / Deposits]. Years 1-22 stand for the period 1981-2002

income levels in the Jordanian economy. Second, it is interesting to note that the maximum value of market share of each bank in the deposit market is equal to 46.15 percent. This reflects the fact that one bank only (Arab Bank Limited) accounts for a large proportion of the Jordanian banking sector. Third, while the mean proportion of bank loans to total

Table 2
Spread Measures: Some Descriptive Statistics

The mean annual spreads are based on the following measures: **Spread (1)** = [Interest Income / Loans] - [Interest Paid / Deposits]; **Spread (2)** = [(Interest Income + Commission Income) / Loans] - [(Interest Paid + commission Paid) / Deposits].

1981-2002	Spread (1)	Spread (2)
Mean	0.1040	0.1253
Median	0.1002	0.1232
Maximum	0.2413	0.2611
Minimum	0.0326	0.0340
Std. Deviation	0.0421	0.0445
Skewness	0.6353	0.5696
Kurtosis	2.9273	3.0968
Jarque-Bera	15.3234	12.3649
Probability	(0.0005)	(0.0021)

Table 3
Some Descriptive Statistics (Other Variables)

OR is the overhead ratio measured by dividing operating cost by total assets. **BS** stands for bank size and is measured by the natural logarithm of total assets. **LLP** is loan loss provisions divided by total loans, **CAP** is equity capital divided by total assets, **LOAN** is total loans divided by total assets, **MS** is market share of each bank in the deposit market, **INF** is inflation rate, and **GDP** is the real GDP growth rate.

	Mean	Median	Maximum	Minimum	Std.Dev.	Skewness	Kurtosis
OR	0.0097	0.0075	0.0307	0.0007	0.0065	1.0362	3.5517
BS	8.3848	8.3502	9.6041	6.9569	0.5049	-0.0086	3.1496
LLP	0.0091	0.0056	0.1463	0.0000	0.0152	5.2997	42.1417
CAP	0.0587	0.0439	0.2986	0.0121	0.0482	2.1078	8.0303
LOAN	0.4311	0.4196	0.6814	0.1916	0.1148	0.1304	2.0309
MS	0.0969	0.0611	0.4615	0.0038	0.1120	2.0037	5.9726
INF	4.6965	3.5000	25.7000	-0.2000	5.6674	2.2474	8.4559
GDP	0.6048	0.5940	14.6350	-16.4580	6.0002	-0.3541	5.0179

assets is equal to 43.11 percent, it has the largest standard deviation among all variables. In other words, the loans to total assets ratio reflect some significant differences between all banks. Finally, it is useful to note that the inflation rate and real GDP growth reflect some great variations, which reflects the unstable macroeconomic conditions the Jordanian economy passed through during the period (1981-2002).

The estimation results of the determinants of spread (1) and spread (2) are presented in Tables 4 and 5 respectively. If we examine these Tables, we can make the following observations.

First, while the coefficients of the overhead ratio (OR) are positive, they are consistently not significant. In other words, total operating costs (including the wage bill) do not affect interest rate spreads. This is expected given the fact that this expense is not really high. For example, the mean ratio of total operating cost divided by total assets was less than 1 percentage point (Table 3). Moreover, the standard deviation of this ratio is extremely low (about 3 percent). In other words, all banks have consistently low operating costs and this item does not affect their interest spreads.

Second, the coefficient of bank size (measured by the logarithm of total assets) is consistently positive albeit small in magnitude. For example, in our first estimate of the spread (Table 4), this coefficient is equal to 0.0355 and 0.0376 in model 1 and model 2 respectively. In other words, larger

Table 4
Regression Estimations (Spread 1)
Fixed-Effect

The model: $IRS_{jt} = f(X_{jt}, Z_t, D_t, å_t)$ where for time period t, **IRS** is the interest rate (annual) margin for bank j [Interest Income / Loans] - [Interest Paid / Deposits], **X** is a vector of bank - specific variables for bank j, **Z** is a vector of macroeconomic variables, **D** is a dummy variable that takes the value of zero before the interest rate liberalization and a value of one after liberalization, and å is the error term. **OR** is overhead ratio measured by dividing operating cost by total assets; **BS** is bank size measured by the natural logarithm of total assets; **LLP** is loan loss provisions divided by total loans; **CAP** is equity capital divided by total assets; **LOAN** is total loans divided by total assets; **MS** is share of bank deposits to total bank deposits; **INF** is the inflation rate; and **GDP** is the real GDP growth rate. Numbers in parentheses appearing below the coefficient are White (1980) heteroskedasticity-constant t-statistics. ***, **, and * indicate coefficients are significant at the 10%, 5%, and 1% levels respectively.

	Model 1	**Model 2**
OR	0.1695	0.1019
	(0.5087)	(0.3013)
BS	0.0355	0.0376
	(2.9392*)	(3.3879*)
LLP	-0.5143	-0.4885
	(-2.1410**)	(-2.2670**)
CAP	0.1925	0.2012
	(1.6226)	(1.6309)
LOAN	-0.2683	-0.2637
	(-10.5694*)	(-10.3526*)
MS	-0.0313	-0.0453
	(-0.3495)	(-0.5166)
D	-0.0066	-0.0061
	(-0.7779)	(-0.8228)
INF		0.0005
		(1.4246)
GDP		0.0003
		(0.8908)
F-Statistic	134.2101*	101.3020*
Adj. R^2	0.8029	0.8035

Table 5
Regression Estimations (Spread 2)
Fixed-Effect

The model: $IRS_{jt} = f(X_{jt}, Z_t, D_t, å_t)$ where for time period t, **IRS** is the interest rate (annual) margin for bank j [(Interest Income + Commission Income) / Loans] - [(Interest Paid + commission Paid) / Deposits], **X** is a vector of bank - specific variables for bank j, **Z** is a vector of macroeconomic variables, **D** is a dummy variable that takes the value of zero before the interest rate liberalization and a value of one after liberalization, and å is the error term. **OR** is overhead ratio measured by dividing operating cost by total assets; **BS** is bank size measured by the natural logarithm of total assets; **LLP** is loan loss provisions divided by total loans; **CAP** is equity capital divided by total assets; **LOAN** is total loans divided by total assets; **MS** is share of bank deposits to total bank deposits; **INF** is the inflation rate; and **GDP** is the real GDP growth rate. Numbers in parentheses appearing below the coefficient are White (1980) heteroskedasticity-constant t-statistics. ***, **, and * indicate coefficients are significant at the 10%, 5%, and 1% levels respectively.

	Model 1	Model 2
OR	0.1976	0.0958
	(0.5740)	(0.2772)
BS	0.0259	0.0290
	(1.9175**)	(2.3980**)
LLP	-0.4980	-04591
	(-1.8464***)	(-1.9440***)
CAP	0.2388	0.2518
	(1.6967***)	(1.7368***)
LOANS	-0.2974	-0.3232
	(-10.9129*)	(-16.6219*)
MS	-0.0458	-0.0669
	(-0.5372)	(-0.8025)
D	-0.0049	-0.0043
	(-0.5288)	(-0.5307)
INF	-	0.001
		(2.3618**)
GDP	-	0.0004
		(1.2913***)
F-Statistic	132.1675*	101.6266*
Adj. R^2	0.8004	0.8040

banks tend to have wider interest margins and this might suggest diseconomies of scale.

Third, the coefficient of loan loss provisions as a proportion of total loans (LLP) is consistently negative, large in magnitude and significant. In other words, Jordanian banks do not seem to shift the risks associated with loan loss provisions to their customers. While this result might be surprising, it can also indicate, as discussed above, that an increase in LLP conveys a good news signal about the strength of a bank. In other words, banks with higher LLP can afford to have narrower spreads because of their healthier financial prospects.

Fourth, the coefficient of equity capital to total assets is positive and significant in one of the spread measures (spread 2). This implies that while well-capitalized banks tend to have lower costs of bankruptcy and hence their funding costs tend to be lower, their interest spreads are larger. This observation is probably due to the exercise of monopoly power by the large banks. Indeed, it is the larger banks which tend to be better capitalized.

Fifth, the ratio of total loans to total assets is the most significant determinant factor of interest rate spread. In other words, the significant negative coefficients indicate that, other things being equal, the higher the annualized ratio of total loans divided by total assets (LOAN) is, the lower the net interest margin is expected to be. This is an indication that banks which transform a higher proportion of their deposits into loans can afford to charge their customers with lower net interest margins.

Sixth, the deposit market share of banks is consistently not significant. This result is in agreement with the relatively low coefficients of bank size. In other words, larger banks that attract a bigger proportion of the deposit market do not pass through any possible economies of scale to their customers in the form of narrower interest rate margins.

Seventh, the most interesting result is the extremely low and insignificant coefficient of the dummy variable. This result implies that the 19989/90 interest rate liberalization had no significant impact on the interest margins of Jordanian banks. This is possibly due to the fact that the total number of banks is small and that the sector is dominated by an even smaller number of banks.

Finally, the introduction of two key macroeconomic indicators (inflation and real GDP growth) has had no significant impact on the empirical estimations. Overall, the coefficients

of these variables are extremely low and their introduction to the basic model made no impact on the other variables. Again, this lack of significance is probably due to the fact that competition among Jordanian banks is limited and, given the low per capita income, the behaviour of borrowers is not affected by the performance of the national economy.

Summary and Conclusions

Given the economic importance of the banking system and the high cost of financial intermediaries' bailout, one should not be surprised of the extremely large number of published papers that examine different aspects of banks. Indeed, the literature considers a myriad of banking issues including the operating performance of commercial banks, bank credit channel, interest rate spreads, and the efficiency of commercial banks, among others.

The size of the banking sector in Jordan is relatively large. For example, the ratio of total banking assets to GDP has increased from about 90 percent in 1980 to 118 percent in 1985, to 153 percent in 1995 and to around 229 percent in 2002. Similarly, total Jordanian bank loans to the private sector stood at an annual average of 70 percent of GDP during the time period (1998-2002).

Against this background and the fact that the 1989/90 interest rate liberalization meant the end of financial repression in Jordan, this paper considered three main questions:

1. How do Jordanian banks operate in terms of their interest rate spreads?
2. Has the 1989 interest rate liberalization in Jordan had any impact on the Jordanian banks' interest rate spread?
3. Are mainstream determinants of interest rate spread applicable to the Jordanian banking sector?

Based on the empirical results, the following observations have been arrived at. First, while interest margins increased by a small margin following the 1989/90 interest rate liberalization, the liberalization process itself did not affect interest rate spreads in a significant manner. Second, the empirical estimations indicate that the most significant determinant factors of interest rate spread are total loans to total assets and loan loss provisions to total loans. In other words, Jordanian banks do not shift the risks associated with loans (and their provisions) to their customers in the form of wider interest rate margins.

The 1989/90 interest rate liberalization meant the end of financial repression which characterized much of the 1980s. This policy, it can be

argued, was the correct policy for a number of reasons. First, interest rates should reflect the prevailing and expected inflation rates. Second, the liberalization of interest rates did dot affect in any significant manner the interest rate spread. In other words, it did not cause as probably expected, an increase in the cost of dealing with banks. Finally, based on the results of this paper, it can be suggested that Jordanian banks must be examined in terms of their lending policies. In more specific terms, the issue of the relationship between loan loss provisions and bad debts must be examined. In other words, do past loan loss provisions predict bad future debts? If the answer is yes, the above conclusions would be reinforced.

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الملخص

الإصلاحات المالية ومدى تباعد أسعار الفائدة في الجهاز المصرفي الأردني (١٩٨١ – ٢٠٠٢)

غسان محمد خير أومت
خالد محمد الزعبي
الجامعة الهاشمية

بناء على الأهمية الاقتصادية لتحرير سعر الفائدة، وحجم قطاع البنوك الأردني فإنه من المفيد أن نختبر أثر هذا التعديل المالي الذي حدث في العام ١٩٨٩/ ٩٠ (تحرير سعر الفائدة) على هامش الفائدة في البنوك الأردنية. وتشير نتائج التحاليل الإحصائية إلى أن تحرير سعر الفائدة لم يؤثر في هامش الفائدة. كما تشير النتائج إلى أن المحددات الرئيسة لهامش الفائدة هي إجمالي القروض إلى الأصول، ومخصصات الديون المشكوك فيها إلى إجمالي القروض. وبعبارة أخرى، فان البنوك الأردنية لا تحمل العملاء تكلفة الإقراض ومخصصاتها من خلال توسيع هوامش سعر الفائدة.

Ghassan M.K. Omet (Ph.D. in Finance, Brunel University,UK, 1991), Associate Professor, Faculty of Economics and Administrative Sciences, The Hashemite University, Jordan, Research Interests: Capital Market Efficiency. Portfolio Management and Company Financing.

Khaled M. Al-Zu'bi (Ph.D. in Finance, Kansas State University, USA, 2001), Assistant Professor, Faculty of Econ. & Admin. Sciences, The Hashemite University, Jordan, Research Interests: Capital Market Efficiency. Portfolio Management and Company Financing.