

**Do Depositors Discipline for Risk and Reward for Cash Prizes?
The Case of the Jordanian Banking Sector**

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Abstract

Given the high costs of banking crises, regulators always seek the means that promote greater levels of prudence in the behaviour of banks. Indeed, this can be done by relying on certain regulatory actions (supervision and regulations) and on market discipline.

This paper examines whether depositors discipline Jordanian banks for poor performance by withdrawing their deposits and or by requiring higher interest rates. In addition, this paper examines whether depositors reward banks that offer random cash prizes and the impact (if any) of the 1989/90 interest rate liberalization on the behaviour of bank deposits and interest expenses.

The empirical results indicate that depositors in Jordan do not punish banks for risky behaviour. Similarly, depositors do not reward banks that offer random cash prizes. Finally, the results indicate that 1989/90 interest rate liberalization had no significant impact on the year-on-year growth rate in bank deposits and had a positive impact on bank interest expenses.

Key Words: Jordanian Banking Sector; Market Discipline; Capital; Risk; Interest Rate Liberalization.

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I. Introduction

Famous economists have provided conflicting arguments about the importance of financial intermediaries (banks) and financial markets (stock markets) in economic development. On the one hand, Joseph Schumpeter (1934) argued that financial intermediaries play a positive role in economic development. Joan Robinson (1952), on the other hand, argued that financial development follows economic development.

Following the arguments by Schumpeter (1934) and Robinson (1952), a large number of theoretical and empirical papers examined the economic role of financial development. Indeed, following the publication of Gurley and Shaw (1955), Goldsmith (1969), McKinnon (1973) and Shaw (1973), more recent theoretical papers modeled the role of financial intermediaries and markets in the allocation of scarce economic resources¹.

Banks perform a variety of functions including the efficient mobilization and allocation of savings. This argument is based on one simple idea. Without the presence of banks, individuals would not lend their savings on an individual basis. This is due to the following reasons. First, it is difficult and costly for individuals to acquire and process information about borrowers. Second, it is not possible for individual lenders to monitor the performance of borrowers once they have received funds. Finally, the fact that most investments are long – term, individuals would be reluctant to invest their funds unless they can liquidate their investments (liquidity risk). Relative to these reasons, banks perform a useful role for both borrowers and savers. Banks specialize in the assessing and monitoring of borrowers. In other words, by solving informational problems between savers and borrowers, banks can positively affect savings and capital accumulation. In addition, by pooling savings and investing them in short – term and long – term investments, banks can transform the maturity of societies' savings and thus facilitate the financing of long – term investment projects.

Over the last three decades, both developed and developing countries have witnessed many banking crises. Caprio and Klingebiel (2003) for example, document 117 systemic banking crises observed in 93 countries since the late 1970s. Similarly, it is reported that 51 non-systemic banking crises in 45 countries occurred during the same time period². The resolution of these crises typically involve the use of public money. Goodhart (1995) reported that two out of three failed banks in 24 developed countries were bailed out during the 1980s and 1990s. In addition, Honohan and Klingebiel (2000) found that, on average, countries spend about 13 percent of the Gross Domestic Product (GDP) cleaning up banking systems.

Relative to the above, 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*). The trigger for the bank’s failure was a decision by the Central Bank (CB) Governor to enforce regulations on liquidity ratios and to tighten up the outflow of foreign exchange from Jordan. The Governor

¹ Some of these papers include King and Levine (1993) and Bencivenga et al. (1995).

² The budgetary costs of such crises are large. They range from 3 percent of GDP to more than 55 percent of GDP (Caprio and Klingebiel (2003)).

ordered banks to deposit 30 percent of their foreign exchange holdings with the CB as part of its efforts to prop up the currency. Petra bank was unable to comply. The CB replaced the Petra's board of directors and investigations began. Two weeks later, August 1989, Chalabi left Jordan. The report by Arthur Anderson found that the bank's assets had been overstated by \$200 million. Moreover, it was found that the bank had huge bad debts (\$80 million), unsupported foreign currency balances at counter – party banks (\$20 million) and that money purportedly due to the bank which could not be found was equal to about \$60 million. As expected, much of the bad loans were to Chalabi's linked companies.

Given the economic importance of financial intermediaries and their role in the transmission of monetary policy and the fact that the social costs of any bank failure is much greater than that of other businesses, banking research has examined a myriad of issues concerning their performance. While it is not the objective of this research to review this vast literature, we can point out the following research issues. A number of studies examined the profitability and solvency (operating performance) of depository institutions. Some of these studies include Cole (1993), Berger (1995), Demirguc – Kunt and Huizinga (1999), Genay (1999), Barth et al. (2000), Kwan (2002) and others. Typically, these studies regress bank performance on a number of variables including bank – specific, sector – specific and macroeconomic variables. Similarly, other studies examined the determinants of bank interest margin using country – level and bank – level data. These studies include Fry (1995), Angabazo (1997), Randall (1998), Demirguc – Kunt and Huizinga (1999), Gelbard and Leite (1999), Berger et al. (2000), Barajas et al. (2000), Brock and Rojas – Suarez (2000), Abreu and Mendes (2001), Sturn and Williams (2002) and others. Again, these studies regress bank interest margins (spread) on a set of regressors including variables that account for bank characteristics, macroeconomic conditions, bank taxation and some underlying legal and institutional indicators. In banking research, there has also been a growing number of papers that examine the performance of banks using Data Envelopment Analysis (DEA) and Malquist Indices. These include Leightner (1999), Okuda (2000), Darrat et al. (2002) and Sturn and Williams (2002). Finally, a number of papers examined the issue of bank credit. Using individual bank data, Bondt (1998) was one of the early researchers who examined whether there exists important differences in the way in which European banks with varying characteristics (based on various 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 been examined by Kashyap and Stein (1995 and 1997) and Kishan and Opiela (2000). Typically, these studies regressed bank lending on a number of bank characteristics, sector characteristics, and some macroeconomic variables. Some of the main variables which are used in the analysis of bank credit include bank size, interest rate spread, GDP growth rate, interest rate level, bank capital, number of employees or bank branches, loan loss provisions and others.

To avoid banking crises or the occurrence of banking crises, regulators always seek the determination of means that promote greater levels of prudence in the behaviour of banks. Indeed, this can be done by relying on certain regulatory actions (supervision and regulations) and on market discipline. The regulatory action of monetary authorities relies on the identification and “correction” of problems that might lead to financial failures. Market discipline, on the other hand, relies on private

sector agents (equity holders and debt holders) in the production of information that is useful for bank supervisors in recognizing potential banking problems and in implementing remedial measures. Moreover, it is interesting to note that Pillar 3 of the Basel Accord relies on enhancing bank disclosures to strengthen market discipline. “There is a third pillar to this approach, one that I believe is critical: market discipline. The real pre-safety-net discipline was from the market, and we need to adopt policies that promote private counterparty supervision as the first line of defense for a safe and sound banking system” (Greenspan, 2001).

The issue of market discipline has generated a lot of research interest. This research examined various issues including the contemporaneous relationship between bank risk levels and subordinated debt yields or deposit rates, the premise that as the perceived risk of a bank increases, holders of its liabilities react by withdrawing or withholding their deposits, the issue of market discipline in terms of stock prices impounding bank information, and the relationship between bank risk and capital.

Against this background, it is useful to note that in addition to the Petra bank crash in 1989 and its economic consequences, the size of the Jordanian banking sector 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. This ratio (229 percent) 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, United Kingdom that have a larger banking system size than that found in Jordan.

The primary purpose of this paper is to examine whether depositors discipline Jordanian banks and the impact (if any) of the 1989/90 interest rate liberalization on the growth rate of bank deposits and on their interest expenses.

The rest of the paper is organized as follows. In section II, we provide a brief review of the market discipline literature. Section III provides some background information about the Jordanian banking sector. In sections IV and V, the data and methodology and empirical results are discussed respectively. Finally, section VI provides a summary and conclusions.

II. Market Discipline: A Brief Literature Review

In all countries, banks are supervised and regulated in order to control their liquidity and insolvency risk. Indeed, bank regulation is justified by the desire to maintain a safe and sound financial system (Hall and Miles, 1991)³. Moreover, Fama (1980) and Baltensperger and Demine (1991) argued that bank regulation is warranted due to a number of unique services that banks provide. First, the risk sharing services that banks provide transform short term deposits into long-term loans (credit risk and interest rate risk) and hence bank runs can result in forced sales of illiquid assets at

³ For some, it is less clear why the market mechanism should not work for banks as it does for other corporates (Marquand, 1987; Goodhart, 1998; Benston and Kaufman, 1996).

great losses. Second, banks promote a more efficient mechanism for the allocation of funds by resolving the asymmetric information problem that exist between borrowers and lenders. Indeed, this issue (asymmetric information) might result in two basic problems: moral hazard and adverse selection.

The moral hazard problem is a peculiarly banking problem because individual banks get involved in a much larger number of contracts than other individual corporates. Similarly, banks are expected to facilitate lending by reducing the cost of screening and monitoring borrowers. In other words, any failure in the banking sector can result in a huge loss of information about borrowers and this is expected to lead to rising credit terms and hence falling levels of investments. Due to the above two arguments (risk sharing and information asymmetry) most of the banking literature looks at the banking sector as a special case that warrants “regulation”.

The principle factors of banking crisis are many and various. They include inefficient process of risk analysis, insufficient monitoring and information transfer, weak incentives structure and inadequate corporate governance (Llwellyn, 2002). Moreover, to avoid banking crises or following the occurrence of banking crises, regulators always seek the determination of means that promote greater levels of prudence in the behaviour of banks. Indeed, this can be done by relying on certain regulatory actions (supervision and regulations) and on market discipline.

The regulatory action of monetary authorities relies on the identification and “correction” of problems that might lead to financial failures. In principle, supervisors complement any mandatory bank reporting with periodic on-site bank examinations to arrive at information useful in the determination of the probability of banks’ failure⁴. Market discipline, on the other hand, relies on private sector agents (equity holders and debt holders) in the production of information that is useful for bank supervisors in recognizing potential banking problems and in implementing remedial measures. In other words, as banks undertake greater risk levels, private sector agents take actions on the basis of these costs (Berger, 1991). For example, depositors may “penalize” riskier banks by requiring higher interest rates or by withdrawing their deposits. “Market discipline is a regulatory mechanism that delegates the monitoring and disciplining task not only to the national and international regulator but also to the market participants whose wealth is affected by the banks’ conduct. Consequently the continuous ‘curse’ of disciplining measures by these market participants creates strong incentives for management to run their banks in a safe and sound way” (De Ceuster and Masschelein, 2003).

Relative to the above - mentioned sources of promoting greater levels of bank prudence (regulatory actions and market discipline), it is useful to note that Pillar 3 of the Basel Accord relies on enhancing bank disclosure to strengthen market discipline. Indeed, the New Basel Accord shifts the burden of bank supervision away from supervisors to markets. “There is a third pillar to this approach, one that I believe is critical: market discipline. The real pre-safety-net discipline was from the market, and we need to adopt policies that promote private counterparty supervision as the first line of defense for a safe and sound banking system” (Greenspan, 2001). Similarly, in

⁴ Financial regulation takes many forms including the lender of the last resort, deposit insurance, interest rate constraints and restrictions on entry and branching, and capital adequacy requirements.

his speech before the Conference on Reforming Bank Capital Standards, Meyer (1999) stated that market discipline is an “attractive tool for encouraging safety and soundness in a rapidly evolving environment. Market discipline is inherently flexible and adaptive with respect to innovations, since market participants have incentives to change the ways that they evaluate risks as innovations are adopted”.

The issue of market discipline is important because of its potential social benefits. First, by penalizing banks for excessive risk-taking, market discipline can reduce the moral hazard incentives which government guarantees create for banks to undertake excessive risk. Second, market discipline can improve the efficiency of banks. Finally, the social cost of supervising banks is expected to be reduced when market participants share some of the responsibility (with central banks) in monitoring the performance of banks. Moreover, market discipline has generated a lot of research interest. This research can be classified under four main groups.

The first group of papers examine the contemporaneous relationship between bank risk levels and subordinated debt yields or deposit rates. Papers by Morgan and Stiroh (2001), Sironi (2002), Evanoff and Wall (2002), Jagtiani et al. (2002), and Krishnan et al. (2003) report that the issuance and secondary – market risk premiums on traded subordinated notes and debentures are correlated with accounting – based measures of bank risk, bank asset portfolio composition, credit – agency ratings, and the probability of bank failures.

The second group of research papers attempt to detect evidence of market discipline by examining the availability of funds. In other words, this research is based on the premise that as the perceived risk of a bank increases, holders of its liabilities react by withdrawing or withholding their investments (deposits). Similarly, such banks are expected to face higher borrowing costs. Goldberg and Hudgins (1996), Park and Peristiani (1998), Billet et al. (1998), Jagtiani et al. (2001), Hall et al. (2002) and others document some consistent evidence which shows that as the financial condition (risk) of financial intermediaries (banks and thrifts) worsens, their reliance on insured deposits increases. Similarly, McDill and Maechler (2003) report some evidence on market discipline. That is, the volume of uninsured deposits falls at banks with increasing risk levels even though these banks respond by offering higher rates on their liabilities (deposits).

The third group of papers examine the issue of market discipline in terms of stock prices impounding bank information. For example, the impact of changes in loan loss reserves, the announcement of supervisory actions and the announcement of changes in Moody’s rating on stock prices have been examined by Docking et al. (1997), Jordan et al. (2000), and Billet et al. (1998) respectively. These studies document negative abnormal stock returns following the announcement of these announcements.

Finally, a number of papers examined the relationship between bank risk and capital. These papers are based on the argument that banks can keep their risk constant by balancing any change in their risk levels by changes in capital. For example, Swindle (1995) reports that changes in the regulatory capital ratio are a function of CAMEL ratings. Similarly, Shrieves and Dahl (1992) and Calomiris and Wilson find that increases in bank risk are reflected in bank capital increases. Finally, Flannery and

Rangan (2003) document that increases in bank risk levels are often accompanied by capital increases.

Against this background, it is interesting to note that the deposit insurance system and the pace and certainty with which deposits are paid off in the event of bank failure are considered to be important prerequisites for any effective market – based (depositor) discipline (Tsuru, 2003). It is argued that full protection of deposits reduces the incentive for depositors to monitor the risk level of banks⁵. In other words, to strengthen the disciplinary role of depositors, any deposit insurance scheme should provide coverage for a minimum safety net for small depositors who cannot shoulder the costs of selecting and monitoring banks' risk (changing) levels. The second institutional factor (pace and certainty with which deposits are paid off in case of bank failure) is thought to be an equally important factor in the effectiveness of bank discipline because if repayments are greatly delayed, depositors are expected to shift their funds to safer banks. In other words, in situations where the costs that accompany deposit repayments are low, we expect deposit discipline to be less effective.

III. The Jordanian Banking Sector: Some Background Information

Like all central banks, the Central Bank of Jordan (CBJ) regulates the banking sector in Jordan. This sector is made up of commercial banks, investment banks, investment banks, specialized credit institutions and financial corporations.

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. In Table (1), we report some of the main items included in the consolidated balance sheet of all Jordanian banks. Based on these figures, we can make a number of observations.

INSERT TABLE 1 ABOUT HERE

The size of the Jordanian banking sector is relatively large. On average, the ratio of their 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, 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. Second, the

⁵ Based on data from 67 countries (1980-1997) Demirguc-Kunt and Detragiache (2002) showed that a banking crisis is more likely to occur in countries that have explicit deposit insurance systems and provide depositors with greater protections.

average ratio of cash to total assets (20%) is much higher than 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. Finally, total demand and time deposits constitute a high proportion of GDP. In 2002, this ratio was equal to 110.69 percent. As mentioned in the introduction, this ratio is much higher than those reported for Central and Easter Europe and Baltic states. Moreover, it is interesting to note that the private sector time deposits constitute a large proportion of the total time deposits. In 2002, for example, total private sector time deposits as a proportion of GDP was equal to 73.0 percent. This compares with total private sector deposits to GDP of 93.5 percent. In addition, it is useful to note that private sector deposits constitute a large proportion of total bank deposits. In other words, public enterprises and central government deposits are low.

IV. The Data and Methodology

This paper examines the issue of market discipline in the Jordanian banking system. In more specific terms, the focus of this paper is to provide answers to the following questions:

- 1- Do depositors discipline Jordanian banks?
- 2- Do depositors reward banks that offer random cash prizes to depositors?
- 3- Has the 1989/90 interest rate liberalization had any impact on the growth rate of bank deposits and on their interest expenses?
- 4- Are main-stream determinants of bank deposit growth and interest expense applicable to the Jordanian banking sector?

To investigate the issue of market discipline in the Jordanian banking sector, all banks (15) 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 13 banks during the time period 1982 – 2003.

As our earlier discussion implies, depositors can exercise market discipline on banks by withdrawing their deposits (quantity variable) from riskier banks and or by requiring higher interest rates (price level). This research adopts both the quantity and price approaches. The specification of our empirical model takes the following form:

$$DEP_{it} = f(BANK_{it-1}, POLICY_{it}, MACRO_{it}) \quad (1)$$

$$INT_{it} = f(BANK_{it-1}, POLICY_{it}, MACRO_{it}) \quad (2)$$

where for time period t , DEP is year-on-year growth rate in deposits for bank i , and INT is the interest paid on deposits to total deposits. $BANK$ stands for a vector of bank-specific variables. This vector is included with a lag, to account for the fact that the balance sheet information is available to the public with a certain delay. $POLICY$ stands for the 1989/90 interest rate liberalization while $MACRO$ is a vector of macroeconomic variables. It must be noted here that as the year-on-year growth rate

in deposits of those banks (3 in total) that offer cash prizes to depositors did not reflect any significant difference from those banks that do not offer such prizes, this variable is not included in the above model.

The vector $BANK_{it-1}$ contains several bank-specific fundamental which are intended to measure banks' risk exposure. These variables are derived from the CAMEL rating system of banks and include the followings:

CAP = capital adequacy (capital to total assets).

AQ = asset quality (loan-loss provisions to total loans; and total loans to total assets).

MAN = management (operating expenses (including wages) to total assets).

EAR = earnings (return on assets).

LIQ = liquidity (cash and deposits at banks to total assets).

To control for the size of banks. The natural logarithm of bank assets (SIZE) is also included in the model. In order to control for the behaviour of the overall banking sector, we include a policy variable (POLICY) to account for the 1989/90 interest rate liberalization. Accordingly, we assign a dummy variable which takes the value of 0 before 1990 and 1 during 1991-2003. 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 deposits growth and bank interest expense.

To estimate the above balanced panel regression model, we use three alternative methods: pooled ordinary least squares, the fixed effects model, and the random effects model. Based on the Hausman test, we present and discuss the suitable model for our estimations. As the sample includes multi-year observations, we also utilize the correction techniques for unknown heteroskedasticity of White (1980).

Based on the available international evidence, we expect capital adequacy, liquidity and earnings to have a positive impact on bank deposits and a negative impact on interest expenses. Asset quality is expected to have a negative impact on both bank deposits and interest expenses. Management is expected to have a negative impact on deposits and a positive impact on the interest rate variable. Larger banks are expected to be less risky because of their size or more diversified customer base. We expect this variable to have a positive impact on the deposit growth rate and a negative impact on bank interest expenses.

The POLICY variable is included in the model to see the impact (if any) of the 1989/90 interest rate liberalization on deposit growth and interest expenses. It is expected that this factor will have a positive impact on the bank's deposit growth and interest expense given the fact that the 1989/90 interest rate liberalization meant the end of financial repression that characterized much of the 1970s and 1980s. The two macroeconomic variables (inflation rate and real GDP growth) measure the relative strength of the economy and are expected to positively affect the quantity variable (deposit growth) and negatively affect the price variable (interest expense).

V. The Empirical Results

In Tables 2 and 3 we present some descriptive statistics for the dependent variables and all other variables that enter our analysis respectively. Based on the reported values, we can make the following comments.

INSERT TABLE 2 ABOUT HERE

INSERT TABLE 3 ABOUT HERE

First, the year-on-year growth rate in deposits reflect some large differences. While the mean annual ratio is equal to 10.06 percent, the standard deviation is equal to 11.9 percent and this reflected in the minimum and maximum values of this measure. Second, with the exception of the inflation rate and real GDP growth rate, the log of total assets reflects the largest standard deviation. This observation signifies the fact that Jordanian banks vary in terms of their total assets greatly. Third, while our sample of banks hold about 45 percent of their assets in the form of cash and bank deposits, some banks hold even higher proportions. This can be seen from the maximum value of this measure (65.9 percent). The performance of the national economy in terms of the inflation rate and real GDP growth rate reflect some great variations and this reflects the relatively unstable macroeconomic performance of the region as a whole.

The estimation results of our models are presented in Tables 4 and 5. Table 4 reports the estimation results of the year-on-year growth rate in deposits and Table 5 reports the results where the dependent variable is the interest expense of banks.

INSERT TABLE 4 ABOUT HERE

INSERT TABLE 5 ABOUT HERE

If we examine the results, we can point out the following observations. First, as expected, capital adequacy (CAP) positively (negatively) affects the year-on-year growth rate in deposits (bank interest expenses). This is obviously due to the argument that a sound capital base is expected to strengthen depositor confidence. Second, the quality of bank assets (AQ) does not impact the growth rate in deposits and negatively affects bank interest expenses. This negative impact on the interest expense is rather surprising. However, the value of this coefficient (-0.033 and -0.035). Third, bank operating expenses (MAN) is consistently not significant. This might be due to the fact that their mean value of this ratio is very low and has an equally low standard deviation (see Table 3). Fourth, the performance of banks (EAR) plays no importance in explaining the year-on-year growth rate in deposits and bank interest expenses. Again, this is probably due to the fact that this variable (EAR) is extremely low (see Table 3). Fifth, bank liquidity (LIQ) is also not significant. This result implies that depositors do not take into account this risk source into consideration when deciding where to deposit their funds or in pricing the cost of the deposits. Sixth, bank size (SIZE) is the most significant explanatory variable. Indeed, the results indicate that the coefficient of this variable is not only large in magnitude

but also significant at the 1 percent level. As expected, larger banks have higher growth rates in their deposits and lower interest expenses. Seventh, the 1989/90 interest rate liberalization had no significant impact on the year-on-year growth rate in deposits. This is surprising given the fact this liberalization meant the end of financial repression. However, as expected, this variable (interest rate liberalization) had a positive (albeit small) impact on bank interest expenses. Finally, while the real GDP growth rate had a positive impact on deposits growth and a negative impact on bank interest expenses, the value of its coefficient is extremely small.

VI. A Summary and Conclusions

It is well-known that banks play a positive role in the development process of any country. This role is achieved through the mobilization of savings and channeling them to the most efficient investment projects. Indeed, 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. In addition, 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, the fact that banks have an important role in the transmission of monetary policy, are an integral part of the payments system, and that the economic and social costs of any bank failure are thought to be much greater than those of other types of businesses, the international banking research has examined many issues. These include, for example, the determinants of bank performance, determinants of interest rate spreads, determinants of bank credit, technical and scale efficiencies of banks, market discipline and others.

As far as market discipline is concerned, this paper highlighted three primary market participants that can play an important role in monitoring and disciplining banks. These are equity holders, subordinated debt holders, and depositors. Moreover, while Pillar 3 of the new Basel Accord relies on enhancing bank disclosure to strengthen market discipline and shifts the burden of bank supervision away from supervisors to markets, the Basle Committee has not chosen any particular market participant to “carry-out” market discipline.

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 around 229 percent in 2002. 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. Indeed it is only countries like Belgium, Germany, Luxemburg, the Netherlands, Singapore, Switzerland, 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 70 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. Finally, total demand and time deposits constitute a high proportion of GDP. In 2002, this ratio was equal to 110.69 percent.

Against this background, it would be interesting to study the Jordanian banking sector in terms of any of the issues that the international literature has investigated. This paper examined market discipline on Jordanian banks by depositors. This issue (market discipline) is important because of its potential social benefits. First, by penalizing banks for excessive risk-taking, market discipline can reduce the moral hazard incentives which government guarantees create for banks to undertake excessive risk. Second, market discipline can improve the efficiency of banks. Finally, the social cost of supervising banks is expected to be reduced when market participants share some of the responsibility (with central banks) in monitoring the performance of banks.

Based on the empirical results, we find that market discipline largely non-existent in the Jordanian banking sector. This conclusion is based on the fact that most of the variables that are derived from the CAMEL rating system of banks are not significant in explaining the year-on-year growth rate in bank deposits or in explaining bank interest expenses. The only consistent and significant factor is bank size. Based on these results, it is recommended that policy makers should not rely on private agents in disciplining Jordanian banks. Moreover it would be interesting to design a survey and examine the determinants of Jordanian depositors' behaviour in terms where they deposit their funds and in terms of the interest rate that they earn. This type of study would indeed complement the results of this paper. Finally, based on such results, some recommendations can be provided to bring about some form of market discipline in the Jordanian banking sector.

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

	1998	1999	2000	2001	2002
Total Assets / Nominal GDP	202	200	216	226	229
M2 / Nominal GDP	107.4	117.0	124.1	124.6	126.5
Total Deposits / GDP	90.3	101.9	108.3	109.7	110.7
Private Sector Time Deposits / GDP	61.9	66.5	70.0	70.9	73.0
Private Sector Total Deposits / GDP	76.2	80.8	85.9	89.2	93.5
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.

Table 2
Some Descriptive Statistics

DEP is year-on-year growth rate in deposits and INT is total interest paid on deposits to total deposits.

	DEP	INT
Mean	0.106	0.049
Median	0.097	0.052
Maximum	0.592	0.081
Minimum	-0.259	0.013
Std. Deviation	0.119	0.014
Skewness	0.776	-0.455
Kurtosis	5.839	2.889
Jarque-Bera	57.172	4.604
P-Value	0.000	0.100

Table 3
Some Descriptive Statistics

CAP is capital adequacy (capital to total assets); AQ is asset quality (total loan to total assets); MAN is management (operating expenses (including wages) to total assets); EAR is earnings (return on assets); LIQ is liquidity (cash and bank deposits to total assets); SIZE is the natural logarithm of total assets; INF is inflation rate; GDP is the real growth rate in GDP.

	CAP	AQ	MAN	EAR	LIQ	SIZE	INF	GDP
Mean	0.064	0.358	0.007	0.004	0.448	8.609	2.091	2.464
Median	0.049	0.394	0.007	0.006	0.444	8.547	2.400	3.000
Maximum	0.299	0.619	0.0177	0.025	0.659	9.604	6.500	12.991
Minimum	0.012	0.051	0.001	-0.074	0.226	7.467	0.000	-1.742
Std. Dev.	0.052	0.155	0.004	0.013	0.100	0.455	2.167	3.887
Skewness	2.199	-0.439	0.614	-3.889	0.236	0.115	0.532	1.370
Kurtosis	8.427	2.209	3.425	23.017	2.558	2.799	2.144	4.925
Jarque-B.	266	7.627	9.216	2517	2.276	0.509	9.984	61.240
Prob.	0.000	0.022	0.010	0.000	0.320	0.775	0.006	0.000

Table 4
Estimation Results

The model is: $DEP_{it} = f(BANK_{it-1}, POLICY_{it}, MACRO_{it})$ where for time period t , DEP is year-on-year growth rate in deposits. The vector $BANK_{it-1}$ contains several bank-specific fundamental which are intended to measure banks' risk exposure. These variables are: capital adequacy (capital to total assets), asset quality (loan-loss provisions to total loans; and total loans to total assets), management (operating expenses (including wages) to total assets), earnings (return on assets) and liquidity (cash and deposits at banks to total assets). To control for the size of banks. The natural logarithm of bank assets ($SIZE$) is also included in the model. The policy variable ($POLICY$) accounts for the 1989/90 interest rate liberalization. Accordingly, we assign a dummy variable which takes the value of 0 before 1990 and 1 during 1991-2003. 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 deposits growth and bank interest expense.

	Model 1	Model 2
CAP	0.989 (2.269**)	1.082 (2.474**)
AQ	0.134 (0.774)	0.147 (0.858)
MAN	-0.015 (-0.007)	0.176 (0.090)
EAR	0.199 (0.194)	0.169 (0.167)
LIQ	0.014 (0.098)	0.041 (0.303)
SIZE	0.123 (2.109**)	0.175 (2.688*)
DUM	-0.124 (-3.315*)	-0.162 (-3.732*)
INF	-	0.004 (2.108**)
GDP	-	0.005 (2.634*)
F-Statistic	6.952*	6.251*
Adj. R ²	0.165	0.191

Table 5
Estimation Results

The model is: $INT_{it} = f(BANK_{it-1}, POLICY_{it}, MACRO_{it})$ where for time period t , INT is total interest paid on deposits to total deposits. The vector $BANK_{it-1}$ contains several bank-specific fundamental which are intended to measure banks' risk exposure. These variables are: capital adequacy (capital to total assets), asset quality (loan-loss provisions to total loans; and total loans to total assets), management (operating expenses (including wages) to total assets), earnings (return on assets) and liquidity (cash and deposits at banks to total assets). To control for the size of banks. The natural logarithm of bank assets ($SIZE$) is also included in the model. The policy variable ($POLICY$) accounts for the 1989/90 interest rate liberalization. Accordingly, we assign a dummy variable which takes the value of 0 before 1990 and 1 during 1991-2003. 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 deposits growth and bank interest expense.

	Model 1	Model 2
CAP	-0.074 (-1.858***)	-0.0656 (-1.836***)
AQ	-0.033 (-1.742***)	-0.035 (-2.038**)
MAN	0.018 (0.090)	-0.181 (-0.999)
EAR	0.024 (0.339)	-0.025 (-0.346)
LIQ	-0.021 (-1.416)	-0.032 (-2.463**)
SIZE	-0.027 (-4.895*)	-0.037 (-7.073*)
DUM	0.004 (1.212)	0.015 (4.855*)
INF	-	0.001 (1.697)
GDP	-	-0.001 (-7.123*)
F-Statistic	24.085*	28.174*
Adj. R ²	0.356	0.473