The Determinants of OBS Activities in Jordan Banking System: Panel Data Analysis

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Abstract

The main objective of this study is to examine the determinants of off-balance sheet (OBS) activities in Jordan Banking system during the period (1999-2010) by using the Panel data analysis. We employ Mansfield (1961) logistic diffusion model and we consider the OBS activities as a real financial innovations follow a time trend diffusion curve. The model is modified to include regulatory and non – regulatory bank specific factors in addition to macroeconomics factors. The results reveal that OBS activities are a real financial innovations and increasing over time. Another major finding is that regulatory tax hypothesis is not in force to determine the OBS activities by Jordan banks. The results also suggest that OBS activities follow the business cycle notion and the usage decision depends on the economics conditions. The OBS activities follow the economy of scale notion since they require higher qualifications and that is more likely available in the large size banks. Another result, the more loans the more OBS activities as a result to the increased risk. While the OBS activities are more likely to be an innovation then they are determined by some other factors like technology and learning.

Keywords: Off-Balance Sheet (OBS), Banking System, Financial Innovations, Business Cycle Notion.

1. Introduction

The last several decades have witnessed an increasing risk, increased competition and deregulation in the banking industry. These factors have resulted in the foundation of off-balance sheet activities (OBS thereafter). These activities generate a new fee income source that is beyond a bank's balance sheet activities. Since the off-balance sheet activities are one of the major fee income generators for banks. Another reason banks engage in these activities is to avoid regulatory costs and taxes since these

activities are not shown on bank's balance sheet under current accounting standards. Banks also engage in these activities as a risk management instrument against increasing credit risk, interest rate risk, and foreign exchange risk. Moreover, OBS activities have both risk-reducing as well as risk-increasing attributes and the net impact of the risk will depend on the ability to manage the risk resulting from engaging in these activities.

Jordan banking system has also engaged in the OBS activities like all other countries. The numbers indicate an extensive OBS usage, for example, during the period 1999 to 2010 the OBS activities in the Jordanian banks have grown by 12% compared to 9.4% growth rate in the total assets. During the same period the ratio of the OBS activities has recorded about 33% to the total assets. By the end of year 2010 the notional value of the OBS activities in the Jordanian banking industry was $32.032 billion and the on balance sheet items was $87.62 billion. (See figures 1&2, and table 1)

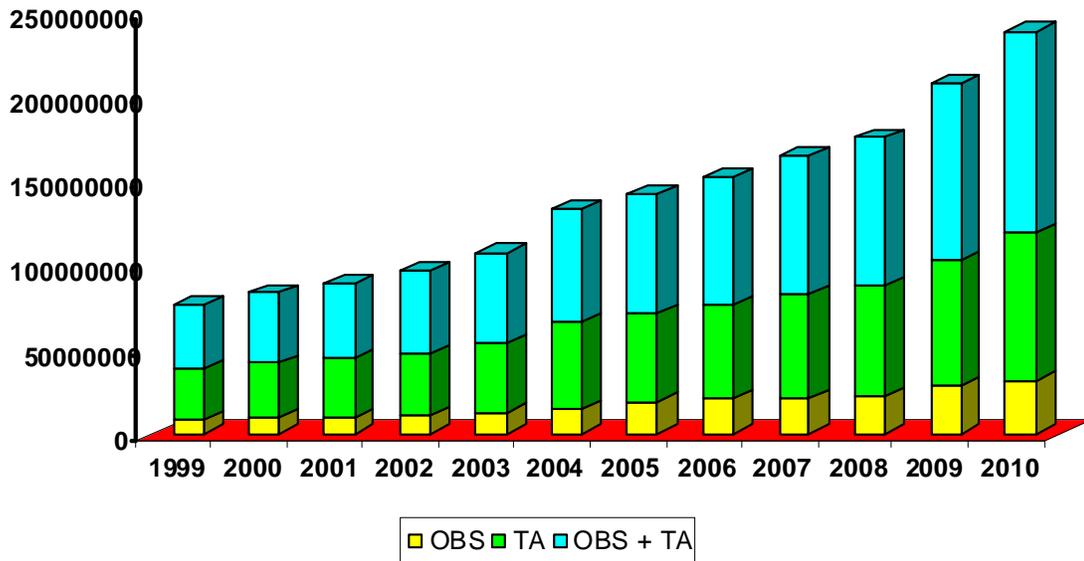**Figure 1:** The Distribution of the Aggregated Off-Balance Sheet and Total Assets
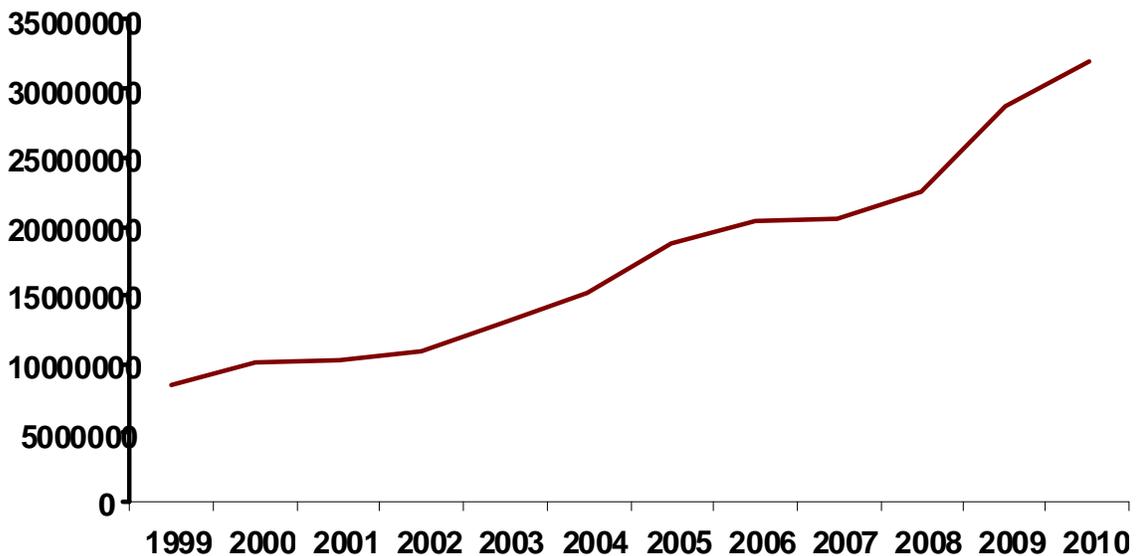

Figure 2: OBS over time

Table 1:   Aggregated banking data[4]

Year	Total Assets (TA)	Off-Balance Sheet (OBS)	(OBS/TA)%
1999	29717900	8578100	28.87
2000	31766000	10120200	31.86
2001	34645200	10291500	29.71
2002	37237200	10957400	29.43
2003	40871600	13064600	31.96
2004	51542414	15137896	29.37
2005	52458597	18867318	35.97
2006	55665707	20324223	36.51
2007	62257635	20547787	33.00
2008	65538503	22625267	34.52
2009	75299069	28751574	38.18
2010	87620732	32032757	36.56

So, we believe, the primary objective of this study is to provide answer to the following questions:

1) What are the motivations behind the usage of OBS activities in Jordan banking systems? Is it the regulatory tax hypothesis? Is it a risk reducing tool? Are they bank specific characteristics? Are they macroeconomic factors?
2) Do OBS activities follow the financial innovations diffusion model in Jordan banking system?

Finally, this study well be useful for the financial decisions makers in Jordan banking to avoid regulatory costs and taxes since these activities are not shown on bank's balance sheet under current accounting standards.

Accordingly, this study is divided as follows. The second section presents the theoretical and literature review. The methodology along with data and models in the third section. The empirical results are presented and interpreted in the fourth section. The concluding remarks are given in the last section.

2. Theoretical and Literature Review

Off-balance sheet (OBS) items are contingent assets and liabilities that may affect the future status of a financial institution's balance sheet. Although OBS activities are now an important source of fee income for almost all banks they have the potential to produce positive as well as negative future cash flows. OBS activities include issuing various types of guarantees, commitments, and derivatives.

Letters of Credit LC: banks deal with two types of LC, Commercial Letters of Credit (CLCS) and Standby Letters of Credit (SLCS). The LCs are essentially guarantees to underwrite performance that a depository institution sells to the buyers of guarantees for fees and at the same time the depository institutions add to their contingent future liabilities. Although both CLCS and SLCS have the same type of risk exposure, default risk, they are different in the severity of the risk exposure. In CLCs case the bank's role is to provide a formal guarantee that payment for goods shipped or sold internationally or domestically will be forthcoming regardless of whether the buyer of the good defaults on payment. In SLCs case the bank's role is to provide a formal guarantee of payment to cover contingencies that are potentially more severe and less predictable like bond performance SLCS, which means a higher level of default risk exposure. At the same time LCs also have a risk reducing impact through the diversification effect.

Commitments: a loan commitment agreement is a contractual commitment by a bank to loan to a customer a certain maximum amount at given interest rate terms. The commitment contracts also define the period over which the customer will be able to utilize his contracted loan. It is true that the

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[4] The total assets and off-balance sheet data are the aggregated data for the thirteen banks included in the study.

banks will generate fee income for making these commitments to the borrowers, but it will also generate more credit and liquidity risks.

Derivatives: derivatives contracts may take the following forms, futures, forwards, options, and swaps. Banks can be either a user of derivatives contracts for trading purposes (hedging and other purposes) or dealers (non-trading purposes) that act as counterparties in trades with customers for a fee.

Contingent credit risk is likely to be present when banks expand their positions in futures, forward, option, and swap contracts. This risk relates to the fact that the counterparty to one of these contracts may default on payment obligations, leaving the bank unhedged and having to replace the contract at today's interest rates, prices, or exchange rates, which may be relatively unfavorable. In addition, such defaults are most likely to occur when the counterparty is losing heavily on the contract and the bank is in the money on the contract. This type of default risk is much more serious for forward contracts than for futures contracts. This is because forward contracts are nonstandard contracts entered into bilaterally by negotiating parties, such as two banks, and all cash flows are required to be paid at one time (on contract maturity). Thus, they are essentially over the counter (OTC) arrangements with no external guarantees should one or the other party default on the contract. By contrast, futures contracts are standardized contracts guaranteed by organized exchanges such as the NYSE. Futures contracts, like forward contracts, make commitments to deliver foreign exchange at some future date. If a counterparty were to default on futures contracts, however, the exchange would assume the defaulting party's position and payment obligations.

Options contracts can also be traded over the counter or bought/sold on organized exchanges. If the options are standardized options traded on exchanges, such as bond options, they are virtually default risk free. If they are specialized options purchased OTC, such as interest rate caps, some elements of default risk exist.

In swaps contracts, two parties contract to exchange interest rate payments or foreign exchange payments. If the interest rate or foreign exchange rates move a good deal, one of the two parties will face considerable future loss exposure, creating incentives to default. Similarly, swaps are OTC instruments normally susceptible to default risk. In general, default risk on OTC contracts increases with the time to maturity on the contracts and the fluctuation of underlying prices, interest rates, or exchange rates.

Derivative contracts also have a favorable impact on total bank's risk when they are used to hedge against the future uncertainty of interest rates and exchange rates. Several studies have reported a favorable impact of swaps on a bank's total market risk. Moreover, derivative contracts will have another favorable impact on a bank's risk when they are treated as diversification in the bank's asset portfolio[1].

We have an extensive literature body about the OBS activities, which are competing in three dimensions according to the hypothesis considered to explain the OBS activities phenomenon. These hypotheses are:

i. The regulatory tax hypothesis: this hypothesis shapes a positive relation between bank's OBS activities and the regulatory taxes on on-balance sheet assets and liabilities. The regulatory taxes usually forced by imposing constraint on bank's reserve, deposit insurance premia, and capital. These constraints will encourage banks to substitute off-balance sheet activities for on-balance sheet activities.

ii. The moral hazard hypothesis states that banks with high breakdown probabilities have greater moral hazard incentives and therefore more incentive to engage in OBS activities. It proposes that both under priced, fixed rate deposit insurance and capital requirements provide incentives to increase financial leverage through the issuance of OBS activities that are not subject to regulations. This hypothesis argues that capital-constrained banks are projected to engage in more OBS items than less constrained banks. Moreover, banks

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[1] Definitions of OBS items are taken from, Anthony Saunders and Marcia Millon Cornett, "Financial Market and Institutions, a Modern Perspective", Second Edition, Mc Graw Hill, Irwin, 2004.

that are about to be unsuccessful will prefer to have an OBS items that are out of accounting rules consideration which allow them to book these activities' income immediately whereas income from the on – balance sheet items cannot be booked until the interest is earned.

iii. <u>The market discipline hypothesis</u> argues that because OBS activities are an uninsured dependent future claims which are related to other claims on the banks, banks with safer positions will engage in more OBS activities which will reduce banks risk. Banks customers will value these claims more when banks are safer, therefore those banks which are already OBS items issuer will have the incentives to decrease their risk position and issue additional OBS items.

Having the three hypotheses defined we will explore some of the empirical research during the last period. Pavel and Phillis (1987) discussed the regulatory tax hypothesis in examining the determinants of commercial loan sales activities. Their conclusion is that diversification, capital, binding capital constraint, and reserve requirements all have an important impact on loan sales engaged by the commercial banks. Their study find that there is a negative relation between banks loan sale and banks capital ratio, and there is a positive relation between banks charge – off and their issuance of loan sale. They also argued that OBS activities permit banks to invest in and diversify across a wider range of assets than their traditional activities. Avery and Berger (1988) arguing in the context of the Moral Hazard Hypothesis that the SLC has a positive impact on the risk level of banks.

Benveniste and Berger (1986,1987) they supported the market discipline hypothesis that banks SLC issuance decrease as they approach failure, moreover the maintained the regulatory hypothesis by stating that there is a positive relation between SLC and leverage. Pavel (1988) declared that there is no relation between Loan sales and bank risk. Koppenhaver (1989) studied the determinants of the OBS activities employing Logit models. They found that bank size, amount of reserve, and loan losses are important factors for banks to engage in OBS activities. While capital constraint factors are insignificant for banks' OBS activities decision, they extended the previous studies by considering more OBS (loan commitments, SLC and CLC). Berger and Udell (1990), Avery and Berger (1990) found that bank risk and Loan Commitments are negatively related. Avery and Berger (1991) separated banks into small and large banks in terms of their assets size, their results support the market discipline dominance for large banks while it is not for the small banks. By considering more risk measures they suggested that SLC have a positive impact to small banks' risk, and a negative impact to large banks' risk. Berger (1991) examined the actual banks performance instead of stock market prices to counter for the equity effect of disciplining banks' risk – taking. The result revealed that higher capital ratios for both small and large banks are related with higher future earnings, lower probability of bankruptcy, and better bank performance.

Koppenhaver and Stover (1991) criticized the existing empirical research and they claim that these studies encounters a simultaneous equation bias. They employed granger causality test, they found that SLCs have a positive impact on bank leverage, while there leverage has a negative impact on the SLCs. Hassan (1992) studied the riskiness of the CLCs in the stockholdes and bondholders point of view, the result suggest that stockholders consider CLCs as bank' risk reducer while debtholders are indifferent about CLCs activities. This suggests that more constrained capital requirements are not appropriate for some of the OBS activities for large commercial banks. Hassan, Karels and Peterson (1994) used a contingent valuation model to test the market discipline hypothesis of the OBS activities for bank subordinated debt. Their result support the market discipline hypothesis for most OBS activities, and debtholders and equityholders regard the OBS activities as bank risk reducers.

Berger and Udell (1995), Jagtiani (1995) and Jagtiani, Saunders, and Udell (1995) introduced the monitoring technology hypothesis. Jagtiani, Saunders, and Udell (1995) modeled each OBS activity as an innovation whose adoption follows a diffusion pattern specific to these activities. They found no impact of the changes in capital requirements in the speed of diffusion across the OBS activities.

Mansfield (1961) shown that the adoption pattern of real innovations often follow a logistic time curve, and these innovations will grow over time until it reach a 100% occupancy. Many of the financial activities have been considered as an innovation and were studied using Mansfield model. Since the OBS activities are one of the major banking activities during the previous period then we shell follow Jagtiani et al (1995) by considering the OBS activities as financial real innovations and test the determinants of these innovations following Mansfield model.

However, this study differ from Jagtinai et al in the following aspects; we shell employ the regulatory pressure concept, Jacques and Nigro (1997), to measure for the capital regulations, rather than considering dummy variables to present the important changes in capital requirements during the period of study (a detailed discussion of the regulatory factor will follow). Second, their study considered the commercial banks industry in U.S, a developed country; here we are considering the banking industry in Jordan, an emerging economy. Third, in addition to the capital requirement factor and bank specific features we shell add the macroeconomics conditions as a determinant of OBS activities. Moreover, a bank – level panel data is constructed and panel estimation techniques are used. One of the main benefits of panel data is that it enables us to identify and measure effect that are simply not determined in pure cross – section or pure time – series data.

3. Methodology
3.1. Data Source

The data set is sourced from the BankScope CD-ROM and online Bankcope data base. The data set includes all banks in Jordanian banking system except:

   (i)   those banks with short lifetime,
   (ii) Islamic banks which have different activities in nature,
   (iii) Central bank of Jordan.

I collected a yearly frequency data from 1999 - 2010. The final set includes thirteen Jordanian banks (refer to table 2), which build out 156 observations. The OBS items are calculated as the ratio of the notional amount of each item to the total assets then taking the logistic transformation as indicated in model specification previously. The total assets is defined as the summation of the on – balance sheet total assets and the OBS total assets, this is to counter for the scale on which bank introduce OBS items. The macroeconomics variables; the real GDP and the international trade volume are collected from the IFS online data base.

Table 2:   List of Jordanian Banks Included in the Study

	Bank Name
1	Arab Bank Corporation (ABC)
2	Arab Bank Group
3	Arab Bank PLC
4	Bank of Jordan
5	Cairo Amman Bank
6	Capital Bank of Jordan
7	Union Bank for Savings & Investment
8	Jordan Commercial Bank
9	Arab Jordan Investment Bank
10	Jordan Kuwait bank
11	Jordan Ahli Bank PLC
12	The Housing Bank for Trade & Finance
13	Jordan Investment & Finance Bank

3.2. Models

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3.2.1. The Logistic Diffusion Model

Mansfield (1961) introduced a deterministic model to answer two questions: Why firms were so slow to install some innovations and so quick to install others? What factors seem to govern the rate of imitation? His model assumes that the number of firms adopting an innovation between time t and time t+1 depends on several factors. First, the number of firms that have previously adopted the innovation. The increases in the proportion of firms already using an innovation would increase $\lambda_{ij}(t)$. As more information and experience accumulate, it becomes less risky to begin using it. Moreover, competitive pressures mount and "bandwagon" effects occur. Second, the profitability of installing the innovation would also be expected to have an important influence on $\lambda_{ij}(t)$. the more profitable this investment is relative to others that are available, the greater is the chance that a firm's estimate of the profitability will be high enough to compensate for whatever risks are involved and that it will seem worthwhile to install the new technique rather than to wait. Third, for equally profitable innovations, $\lambda_{ij}(t)$ should tend to be smaller for those requiring relatively large investments. One would expect this on the grounds that firms tend to be more cautious before committing themselves to such projects and that they often have more difficulty in financing them. Finally, for equally profitable innovations requiring the same investment, $\lambda_{ij}(t)$ is likely to vary among industries (depending on the risk aversion attitude in each industry). Below is the formal derivation of Mansfield (1961) model.

Let n_{ij} be the total number of firms which adopted the jth innovation in the ith industry, $m_{ij}(t)$ be the number of these firms having introduced the innovation at time t, π_{ij} be the profitability of installing this innovation relative to that of alternative investments, and S_{ij} be the investment required to install this innovation as a per cent of the average total assets of these firms. $\lambda_{ij}(t)$ is the proportion of "hold-outs" (firms not using this innovation) at time t that introduced it by time t+1, i.e.,

$$\lambda_{ij}(t) = \frac{m_{ij}(t+1) - m_{ij}(t)}{n_{ij}(t) - m_{ij}(t)}. \tag{1}$$

and,

$$\lambda_{ij}(t) = f(\frac{m_{ij}(t)}{n_{ij}}, \pi_{ij}, S_{ij}, ...) \tag{2}$$

From the discussion above.

Assume that the number of firms having introduced an innovation can vary continuously rather than only one integer value, and assume that $\lambda_{ij}(t)$ can be approximated adequately within the relevant

range by Taylor's expansion that drops third and higher order terms. Assuming that the coefficient of $(\dfrac{m_{ij}(t)}{n_{ij}})$ in this expansion is zero, we have

$$\lambda_{ij}(t) = a_{i1} + a_{i2}\frac{m_{ij}(t)}{n_{ij}} + a_{i3}\pi_{ij} + a_{i4}S_{ij} + a_{i5}\pi_{ij}\frac{m_{ij}(t)}{n_{ij}} + a_{i6}S_{ij}\frac{m_{ij}(t)}{n_{ij}}$$
$$+ a_{i7}\pi_{ij}S_{ij} + a_{i8}\pi_{ij}^2 + a_{i9}S_{ij}^2 + \ldots\ldots,$$
(3)

Thus,

$$m_{ij}(t+1) - m_{ij}(t) = \left(n_{ij} - m_{ij}(t)\right)\left(a_{i1} + a_{i2}\frac{m_{ij}(t)}{n_{ij}} + \cdots + a_{i9}S_{ij}^2 + \ldots\right)$$
(4)

Assuming that time is measured in fairly small units, we can use as an approximation the corresponding differential equation

$$\frac{dm_{ij}(t)}{dt} = \left(n_{ij} - m_{ij}(t)\right)\left(\theta_{ij} + \beta_{ij}\frac{m_{ij}(t)}{n_{ij}}\right)$$
(5)

The solution of which,

$$m_{ij}(t) = \frac{n_{ij}\left[e^{\alpha_{ij}+(\theta_{ij}+\beta_{ij})t} - \left(\theta_{ij}\big/\beta_{ij}\right)\right]}{1 + e^{\alpha_{ij}+(\theta_{ij}+\beta_{ij})t}}$$
(6)

Where α_{ij} is a constant of integration, θ_{ij} is the sum of all terms in (3) not containing $\dfrac{m_{ij}(t)}{n_{ij}}$,

and β_{ij} is the coefficient of $\dfrac{m_{ij}(t)}{n_{ij}}$

$$\beta_{ij} = a_{i2} + a_{i5}\pi_{ij} + a_{i6}S_{ij} + \cdots,$$
(7)

Add another assumption, as we go backward in time, the number of firms having introduced the innovation must tend to zero, i.e.,

$$\lim_{t\to-\infty} m_{ij}(t) = 0$$
(8)

It follows, $P_t = m_{tj}(t)\big/ n_{ij} = \left[1 + e^{(-\alpha_{ij}-\beta_{ij}t)}\right]^{-1}$
(9)

Thus, the growth over time in the number of firms having introduced an innovation should conform to a logistic function. The logistic time curve, equation (9), predicts that the proportion of the population which has already adopted the innovation will increase at an accelerating rate until 50 percent adoption achieved, this is attained at t = -(α/β). Thereafter, the adoption will increase at a decelerating rate and 100 percent adoption is approached asymptotically.

If equation 9 is correct, it can be shown that the rate of imitation is governed by only one parameter β_{ij}. Assuming that the unspecified terms in (7) is uncorrelated with π_{ij} and S_{ij} and that it can be treated as a random error term, then it follows from 9

$$\ln\left[P_{it}\big/(1 - P_{it})\right] = \alpha + \beta t$$
(10)

where P_{it} is the ratio of items (in nominal terms) to the nominal value of total assets (defined as on-balance sheet assets + Derivative items) of bank i at time t. this definition follows Jagtiani et al. (1995) which enables us to counter for the scale on which bank introduce OBS items.

3.2.2. The Empirical Model

Starting from equation (3), we shell add two factor vectors; first to encounter the bank specific characteristics and the other one to capture the macroeconomics conditions. The choice of these factors is based on both the received theoretical literature and from the policy discussions. Accordingly, eq. (4) is the modified econometric model from eq. (3).

$$LGTOBS_{it} = \ln\left[\frac{P_{it}}{(1-P_{it})}\right] = \alpha_i + \beta t + \gamma X_{it} + \delta Y_t + \varepsilon_{it} \tag{4}$$

where i = 1,2,3,….,N denotes the number of banks and t = 1,2,3,…T denotes the number of time periods. The dependent variable, $LGTOBS_{it}$ is the logistic transformation of P_{it}, where P_{it} is the ratio of OBS items (in nominal terms) to the nominal value of total assets (defined as on – balance sheet assets + OBS items) of bank i at time t. this definition follows Jagtiani et al (1995) which enable us to counter for the scale on which bank introduce OBS items. The explanatory variables are the time trend (t) which accounts for the autonomous diffusion, X_{it} is a vector of bank – specific characteristics, Y_{it} is a vector of general macroeconomics conditions, and The intercept α is a bank – specific constant. Please refer to table (3) for a summary of the variables and their proxies, predicted signs, and the rational of the relation).

Table 3:   Empirical Model Variables: This table presents the variables of the empirical model of banks off-balance sheet activities, their proxies and predicted coefficients sign, and the economic rational. The dependent variables are OBS items calculated as $LGTOBS_{it} = \ln\left[\frac{P_{it}}{(1-P_{it})}\right]$, where P_{it} is OBS item calculated as the ratio of that item to the sum of on balance sheet and the off-balance sheet assets.

Variable	Proxy	Predicted coefficient sign	Rational
Size	Total Asset(TA): log(TA)	Positive	Size ↑⇒ Scale economies↑⇒OBS↑
		Negative	Size ↑⇒ Bank Risk↓⇒OBS↓
Loans	Total Loans (TL): log(TL)	Positive	LOAN↑⇒Scope Economies and Risk↑ ⇒OBS↑
Profitability	Net Income (NI): log(NI)	Positive	PROFIT↑ ⇒Creditworthiness↑⇒OBS↑
Non-Performing Loans	Loan – Loss Provision (LOSS): log(LOSS)	Negative	NNPA↑⇒Creditworthiness↓⇒ OBS↓
Low Regulatory Pressure (CARL)	Capital Adequacy Ratio (CAR): $CARL = \begin{cases} 1/CAR_{actual} - 1/0.08, ifCAR_{actual} < 8\% \\ 0, ifCAR_{actual} > 8\% \end{cases}$	Positive	CARL↑⇒ Creditworthiness↑⇒OBS↑
		Negative	CARL↑⇒Risk-taking capacity↑⇒OBS↓
High Regulatory Pressure (CARH)	Capital Adequacy Ratio (CAR): $CARH = \begin{cases} 1/0.08 - 1/CAR_{actual}, ifCAR_{actual} > 8\% \\ 0, ifCAR_{actual} < 8\% \end{cases}$	Negative	CARH↑⇒ Creditworthiness↓⇒OBS↓
International Trade	INTER: log(INTER). INTER = Exports of goods and services + Imports of goods and services	Positive	INTER↑⇒ International transactions↑⇒OBS↑ INTER↑⇒International Risk↑⇒OBS↑
Real GDP	RGDP: Log(RGDP)	Positive	GDP↑⇒Economic Activity↑⇒OBS↑
		Negative	GDP↑⇒Business Risk↓⇒OBS↓

The bank – specific characteristics are classified into regulatory and non – regulatory variables. The non – regulatory factors are bank size, loan ratio, profitability, and the non – performing loans. The anticipated effect of bank size has two – side effect and the net effect of these two determine the

net impact of firm size on the OBS activities. On the one hand, bank has to be of a certain size in order to get involved in the OBS activities, and get the benefits of the economy of scale. Moreover, large banks may be the only banks that may have the high qualified risk management and specialized staff. Another issue, sophisticated clients who are more likely to engage in OBS activities may not consider the small size banks as an option for them as they believe that large banks are too big to fail. On the other hand, as the bank size gets bigger then probably the bank is more risk - diversified and there will be fewer incentives to engage in OBS activities.

The loan ratio (the ratio of loans to total assets), the impact of the loan ratio on the usage of the OBS activities seems to be positive. Angbazo (1997) shows that a higher loan ratio will increase the interest rate risk which will create an incentive for banks to hedge using the OBS activities. Another reason for this positive relation is in the process of approving loans; banks get access to their customers' investment information which will facilitate the offer of relevant OBS risk management tools.

A positive relation is expected between profitability and OBS activities. Profitability considered as a measure for the creditworthiness viewed by customers. Profitability will increase the customer valuation for that bank which in turns will give more incentives to work with profitable banks rather than a non – profitable (less – profitable) ones.

The loan loss provision is a proxy for the non – performing loans that banks assign for the bad debt loans. The predicted impact of the non – performing loans is negative, so as the amount of the non – performing loans increase the bank's creditworthiness decrease and that will decrease the amount of the OBS activities. One may argue that as the loan loss provision amount increase that means the default risk for that bank is high and then a risk management instrument might be needed to hedge against this risk and generate another income source to compensate for the bad loans loss, therefore an increase in the loan loss provision amount might have a positive impact on the OBS activities.

The regulatory factors; following Jacques and Nigro (1997) we shell consider the capital adequacy ratio (CAR) to proxy for the capital requirements regulations. CAR is a measure of bank's capital, it is used to protect depositors and promote the stability and efficiency of financial systems around the world[2]. There are two possible effects of the CAR on the diffusion pattern of the OBS items. On the one hand, as the bank has higher CAR its creditworthiness will increase which in turns will increase the incentives of the bank's customers to work with this banks' OBS risk managements items. On the other hand, higher CAR reduces banks' marginal gain from increasing the risk in the asset portfolio (Furlong and Keeley, 1989). As bank capital increases, the ability to assume risks increases, but the need for OBS products to hedge risk exposure may decrease. Then we shell bring the response of the banks to the 8% well capitalized total risk – based capital (RBC) standards on capital ratio. We shell classify the banks into two groups CARL, CARH as a signal to the degree of regulatory pressure brought about by the risk-based capital standards on capital ratio, because banks with total CAR above and below the 8 percent regulatory minimum may react differently. Specifically, the low regulatory pressure variable (CARL) equals the difference between the inverse of the bank's actual CAR and the inverse of the regulatory stipulated CAR of 8 percent, i.e., CARL equals (1/CRAR-1/8) for all banks with a total risk-based capital ratio less than 8 per cent, and zero otherwise[3]. The high regulatory pressure variable (CARH) equals the difference between the inverse of the regulatory stipulated CAR of 8 percent and bank's actual CAR, i.e., CARH equals (1/8 – 1/ CAR) for all banks with a total risk-based capital ratio greater than 8 per cent, and zero otherwise. High regulatory pressure with respect to capital implies low creditworthiness and can be expected to translate into

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[2] CAR can be expressed as $CAR = \dfrac{TierICapital + TierIICapital}{RiskWeightedAssets}$, it is also called the capital to risk weighted assets ratio (CRAR).

[3] Risk – Based Assessment System, Federal Deposit Insurance Corporation, FDIC. They specified three groups in terms of RBC standards, Group 1 - "Well Capitalized." Total Risk-Based Capital Ratio equal to or greater than 10 percent. Group 2 - "Adequately Capitalized." Not Well Capitalized and Total Risk-Based Capital Ratio equal to or greater than 8 percent. Group 3 - "Undercapitalized" Neither Well Capitalized nor Adequately Capitalized.

lower OBS activity. On the other hand, low regulatory pressure, as implied by CRAL, signifies comfortable capital position and (accompanied with a high credit rating) makes a bank an active supplier of OBS products (Koppenhaver and Stover, 1991). Alternately, low regulatory pressure reduces the marginal propensity of the banks to increase the risk in its asset portfolio (Furlong and Keeley, 1989). Therefore, banks with high capital ratios (implying low regulatory pressure) can be expected to take less OBS risk and hence, supply a smaller volume of OBS items.

The macroeconomics vector includes two variables, the real Gross Domestic Product (RGDP) and the notional value of international trade (INTRD). Real GDP captures the effects caused by fluctuations in general economic activity. Two arguments can be made about the impact of the real GDP and the usage of OBS activities, first the demand for OBS products reacts positively to the business cycle due to a transactions motive. Second, business risk decreases in economics boom periods which lead to less demand for risk management techniques (OBS activities). The international trade is expected to have a positive impact on the usage of the OBS activities for two reasons; first, the higher volume of international trade the more guarantees types OBS, like CLCs and SLCs. Second, the higher volume of international trades the higher international risks and the more OBS hedging usage.

4. Empirical Results

Table (4) presents the estimates of the logistic diffusion model that tries to shed light on the determinate variables of the OBS usage in the Jordanian Banking system. The results are as follows:

Table 4[5]:   Empirical Results

The estimation for the OBS determinants model, where the dependent variable is the notional value of the OBS activities that is calculated as $LGTOBS_{it} = \ln\left[P_{it}\big/(1 - P_{it})\right]$, where Pit is the OBS item calculated as the ratio of the notional value of the OBS items to the sum of on balance sheet and the off – balance sheet assets. The explanatory variables are classified into, time, bank specific characteristics, regulatory variables, and macro economic variables.

Time	0.125603 (0.038224)*
Total assets	-0.15984 (.031958)*
Loans ratio	0.292464 (0.132537)**
Net Income	0.030307 (0.021)**
Non-performing Loans	-0.14338 (0.07225)**
CARL	0.0026105 (5.638)
CARH	-0.0022794 (5.43902)
International Trade	0.0320893 (0.172504)**
Real GDP	0.1668 (0.467935)*
R^2	0.450655
Adjusted – R^2	0.346568

Time Diffusion Speed: it is interestingly that the time trend coefficient is statistically significant and positive. This suggests that OBS activities are still expanding over time and considered financial innovation. And their usage has not reached the maximum level relative to other developed economies.

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[5] **Note:** 1) Numbers in parenthesis are the standard errors for each coefficient.
         2) (*), (**) represent significance level of 1% and 5%, respectively.

Non – Regulatory Bank Specific Factors: bank's size, profitability, loan ratio, and non – performing loans are always significant which suggest that OBS activities are influenced by bank specific characteristics. More specifically, bank's size has an interestingly significant negative effect on the OBS activities which can be justified as these items are more related to bank's risk which should decrease with bank's size.

Bank's Loan Ratio; it appears to have a significantly positive impact on the usage of OBS activities, which indicates an informational economies of scope between loans and OBS activities, and banks will participate more in OBS activities to reduce their risk resulted from loans. Bank's Profitability significantly positively affects OBS activities that suggest the OBS contracts are derived from profitability consideration. Non – performing loans has a significantly negative impact on the OBS activities. This implies that banks with larger non – performing loans may have been disadvantaged in adopting the OBS activities due to a lack of credibility.

Regulatory Bank's Specific Factor: Along with the recent evidence, bank regulatory factors have no major impact on the OBS diffusion pattern, and this is supported in this study by having a non – significant relation between bank capital adequacy ratio (CAR) for both group of banks (below and above the minimum risk – based capital standards).

Macroeconomics Factors: it appears that macroeconomics factors have a rule to play in determining the usage of the OBS activities. Real GDP has a significant positive impact on the usage of the OBS contracts, which suggests that OBS activities follow the business cycle of the economy and it move with the size of the economy. So it will increase when the economic growth is high and decrease when the economic is slowing down. International trade plays a major rule in determining the usage of the OBS activities, which implies that more international trade requires more OBS contracts (both guarantees and derivatives) to facilitate the international trade transactions.

5. Concluding Remarks

This study join the set of recent studies by rejecting the regulatory tax hypothesis and regulations has no major impact in determining banks OBS usage. We also conclude that Jordanian banks' OBS activities are increasing overtime and it is considered as a financial innovation in Jordanian banking industry. While banks regulatory factor is not a major determinant to the OBS, bank's non – regulatory factors and macro economics factors are at work to determine the OBS usage.

The results also suggest that the OBS follow the business cycle notion and the usage decision might be considered like the traditional bank activities. OBS are profit driven activities and they increase with banks profit. Banks size affects the OBS positively which is consistent with the market discipline hypothesis and the usage of OBS increase with bank risk. Finally, a lack of credibility presented as the non – performing loans will decrease the usage of the OBS in general.

References

[1]   Angbazo, L., "Commercial Bank Net Interest Margins, Default Risk, Interest Rate Risk and Off-Balance Sheet Banking", *Journal of Banking and Finance*, 1997, 21, 55-87.
[2]   Avery, Robert, and Elijah Brewer, "Risk – Based Capital and Off – Balance Sheet Activities" Proceeding of a Conference on Bank Structure and Competition, *Federal Reserve Bank of Chicago*, 1988, 261-287.
[3]   Avery, R. B. and A. N. Berger. "Loan Commitments and Bank Risk Exposure", *Journal of Banking and Finance*, February 1991, 15, 173-92.
[4]   Benveniste, L. M. and A. N. Berger. "An Empirical Analysis of Standby Letters of Credit," Proceedings of the Conference on Bank Structure and Competition. *Chicago: Federal Reserve Bank Of Chicago,* 1986, 387-412.

[5]   Benveniste, L. M. and A. N. Berger. "Securitization with Recourse: An Instrument that offers Uninsured Bank Depositors Sequential Claims", *Journal of Banking and Finance*, 11, September 1987, 403-424.

[6]   Berger, A. N. and G. F. Udell. "Collateral, Loan Quality, and Bank Risk", *Journal of Monetary Economics*, 25, January 1990, 21-42.

[7]   Berger, A. N. "Market Discipline in Banking", Proceedings of the Conference on Bank Structure and Competition, *Chicago: Federal Reserve Bank of Chicago*, 1991, 419-427.

[8]   Berger, A.N. and G.F.Udell, "Relationship Lending and Lines of Credit in Small Firm Finance" *Journal of Business*, 1995, 68, 351-382

[9]   Carter D., Simpson W., and Tandon A., "Managerial ownership and compensation and the use of interest – rate derivatives by U.S. Banks", working paper, *FMA conference 2006*, Slat Lake City.

[10]   Davis, S., "The Diffusion of Financial Innovations", Cambridge: Cambridge University Press, 1979.

[11]   Furlong, F.T., and M.C.Keeley, "Capital Regulation and Bank Risk-Taking", *Journal of Banking and Finance*, 1989, 35, 883-891.

[12]   Gorton, Gary, and Anthony M. Santomero, "Market Discipline and the Valuation of Bank Subordinated Debt", *Journal of money, credit and Banking*, February 1990, 22, 118-128.

[13]   Hassan, M. K. "The Market Perception of the Riskiness of Large U.S. Bank Commercial Letters Of Credit", *Journal of Financial Services Research*, 6, September 1992, 207-221.

[14]   Hassan, Gordon, and Peterson, "Off – Balance Sheet Activities and Bank Default – Risk Premia: A Comparison of Risk Management", Journal of Economics and Finance, 1993, Vol 17, No. 3, 69-83.

[15]   Hassan, M. K., G. V. Karels and M. O. Peterson, "Deposit Insurance, Market Discipline and Off- Balance Sheet Banking Risk of Large U.S. Commercial Banks", *Journal Of Banking And Finance*, May 1994, Vol.18, No.3, 575-594.

[16]   Hassan, M. Kabir; Sackley, William H., "Determinants of Thrift Institution Off-Balance Sheet Activities : An Empirical Investigation", *Journal of Financial Management & Analysis*, Jan-Jun2006, Vol. 19 Issue 1, p1-13.

[17]   Jagtiani, J., "Characteristics Of Banks That Are More Active In The Swaps Market", *Journal Of Financial Services Research*, 1995, Volume 9, No. 4.

[18]   Jagtinai,J., A.Saunders And G.Udell, "The Effect of Bank Capital Requirements on Bank Off-Balance Sheet Financial Innovations", *Journal Of Banking And Finance*, 1995, 19, 647-658.

[19]   Jacques, K. And P.Nigro, "Risk-Based Standards, Portfolio Risk and Bank Capital: A Simultaneous Equations Approach", *Journal Of Economics And Business*, 1997, 49, 533-547.

[20]   Koppenhaver, G. O., "The Effects of Regulation of Bank Participation in the Guarantee Market", *Research In Financial Services,* 1989, 165-80.

[21]   Koppenhaver, G. O. and R. D. Stover, "Standby Letters of Credit and Large Bank Capital: An Empirical Analysis", *Journal of Banking and Finance*, 15, 1991, 315-327.

[22]   Mansfield, E, "Technical Change and the Rate of Imitation", *Econometrica*, 1961, 29, 741 – 766.

[23]   Pavel, C. and D.Philis, "Why Commercial Banks Sell Loans: An Empirical Analysis" Economic Perspectives*, Federal Reserve Bank of Chicago*, 1987, May/June, 3-14.

[24]   Pavel, C., "Loan Sales Have Little Effect on Bank Risk", Economic Perspectives, *Federal Reserve Bank of Chicago*, 1988, May/June, 23-31.

[25]   Ronn, Ehud, and A.K. Verma, "Pricing Risk – Adjusted Deposit Insurance: An Option – Based Model", *Jornal of Finance*, September 1986, 41, 871 – 895.

[26]   Zhao F. and Moser J, " Bank Lending and Interest – Rate Derivatives", working paper, *FMA conference 2006*, Slat Lake City.