

Determinants of Off-Balance Sheet Usage: Emerging Markets Evidence from Bank Level Data

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This paper tests for the factors determining the diffusion of off-balance sheet businesses within the context of emerging markets. The pooled balanced panel data model has been applied on a large sample of banks over the period 1997-2015. For the six GCC countries considered, though the estimates conclude differences among the regressors, however, the targeted determining factors contribute significantly in influencing OBS businesses in several terms. As capital market perspective, the findings indicate the requisite to develop the derivatives market in the GCC region, while prudential authorities have to provide more spotlight on banks asset/liability management practices where banks need to re-assess their OBS positions as part of their overall portfolio management strategies. This paper contributes to the literature by empirically testing for the OBS determining factors within an emerging market settings, likewise extending the empirical literature by considering not only banks-specific factors but also general macroeconomic conditions and regulatory variables attributes.

Keywords: Off-balance sheet, regulatory pressure, macroeconomic conditions, GCC.

JEL Classification: C33, F65, G21

Field of Research: Research paper

1. Introduction

Financial innovations, explicitly the substantial expansion in range and scope of the Off-Balance Sheet (OBS) businesses, have experienced dramatic changes over the last decades and are viewed as critical for the banking industry. Per se, banks shifted their traditional intermediary credit functions to more marketable credit instruments, yielding wide variety of the fee-based contracts that are embodied as natural response to clients' demand for credit guarantees and interest rate insurance.

So far, the significant expansion of the OBS banking businesses outside banks' budgets has been attributed to numerous advantageous factors. These include hedging risk exposure, global trade relations, generating fee income and avoiding regulatory restrictions in the form of reserve constraints and deposit insurance premiums. On the contrary, the expansion in the OBS businesses creates contingent claims on banks' financial positions as they magnify' the fortuitous for greater leverage. This results in higher levels of risks, hence, leading to more feasible failure cases. Having said this, it is obvious that the OBS businesses have both risk increasing and risk-reducing attributes. Since increased OBS earnings can potentially reimburse the increased OBS risk exposure and actually reduce the probability of banks insolvency; dual role of OBS business as profit and risk maximizer for banks is a logical conclusion as reported by Lukic (2015).

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As per the literature, there is evidence that OBS businesses are expected to grow over time. However, results regarding OBS determining factors are ambiguous. Pavel and Philis (1987) concluded that diversification, binding capital and reserve requirements have a significant influence on OBS usage, loan sales in particular. This suggests that banks with binding capital constraints are more likely to engage in OBS business, swaps and loan securitization, compared to banks with excess capital. Benveniste and Berger (1987) alongside with Koppenhaver (1989) identified that binding capital requirements are not significant influential factors in issuing an OBS item. Koppenhaver (1989) revealed that bank size, reserves and loan losses are some of the main determinants of banks' OBS usage i.e., loan commitments, standby letter of credit and commercial letters of credit. Jagtiani *et al.*, (1995) resolved that changes in capital regulations have had no influence on issuing a particular OBS item and the expansion of most OBS items are not attributed to bank features such as banks' size, capital ratio and creditworthiness factors.

Sinha (2005) reported that OBS businesses are determined by operating profits and non-performing asset ratios where a positive (negative) relationship is revealed. Nachane and Ghosh (2007) found that, not only regulatory factors, but also market forces are at work in the diffusion pattern of OBS businesses. They showed that non-performing assets and bank size are of a prime concern for foreign as well as public sector banks. Ahmad and Hassan (2010) showed that banks participate in more OBS businesses to reduce risk resulting from granting loans, while political and economic events negatively affect banks' OBS businesses. Cooper (2011) analyzed the OBS behavior by testing for the impact that monitoring intensity has on banks' OBS usage. He tested whether weak governance structure reduces the extent of banks' usage of an OBS activity, concluding that weak governance reduces risk-taking due to strict supervisor monitoring. Also he tested whether supervisory ratings have a role in the association between governance structure and OBS activity, concluding a difference in the extent of OBS usage between banks that federal regulators deem to be subpar with banks having strong rating. This implies that monitoring intensity increases when ratings decline, causing banks' managers to be more risk-averse in terms of their behavior towards issuing an OBS item. As per the GCC banking sectors, Eliau (2012) revealed that bank specific variables have important roles in influencing off balance sheet businesses, whereas the regulatory and the macroeconomic variables are less important. Khasawneh *et al.*, (2012) identified that the regulatory, non-regulatory and macroeconomic factors are of the main determinates of OBS usage, while Buckova (2012), Ziadeh-Mikati (2012) and Aktan *et al.*, (2013) disclosed that OBS usage is justified by the growth in factors such as revenue, risk and political impact dynamics i.e., market risk, operational risk, credit risk, leverage and liquidity position.

By using a number of control variables for banks' characteristics, capital regulatory requirements, and GDP, Teixeira (2013) showed that either risk management or liquidity improvements were not the main motivations for issuing an OBS item as per the European banking context. Kasa (2013) used the tax-regulatory hypothesis and market discipline hypothesis to test for the OBS determinants, suggesting that regulations, institutional and technological deficiency may prevent the banking system in Ethiopia from adopting more forms of OBS business. As for the usage of a particular OBS item, studies such as Pozsar *et al.*, (2010), Gorton *et al.*, (2010), Pozar *et al.*, (2010) and Ordenez (2013) focused on the usage of the asset-backed commercial papers (ABCP) as a major OBS item to be used, resolving that regulatory arbitrage was the motive behind driving the growth of the ABCP. Although, Chen (2015) found that the ABCP may become risk free OBS business, proposing that banks provide valid credit guarantees which can be ensured throughout rating agencies. He identified that rolling over the commercial paper would become costless, so

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that frequency rolling over to short term ABCP to fund long term assets (a maturity mismatch) would have no impact on bank value. As for the Islamic and conventional banks, *Ma'in et al.*, (2015) concluded that differences among the two groups are in terms of their OBS determining factors, namely bank-specific and macroeconomic factors in Malaysia.

In conclusion, even though the literature on OBS usage is extensive, practical evidence, which appears to be forthcoming under the context of emerging banking markets, is limited (see Jagtiani *et al.*, 1995b, Fung and Cheng 2004 and Nachane and Saibal 2007). Countless studies, pertaining to OBS business, are available in the context of and confined towards developed banking markets including USA, European and Asia. It is these markets where the phenomenon is most prevalent. The aim of this paper is to fill this gap by empirically testing for OBS determining factors using bank level data within the context of developing economies, GCC countries being our focus [1].

This paper is motivated by the following attributes. First; the GCC banking industry is characterized with more deregulation and risky scheme of lending, causing higher level of market risks confronting most banking decisions. This necessitates integration with most regional (global) counterparts, and simultaneously, calls for more OBS items to be issued. Second, GCC banks are asked to compete through the usage of fee-based sources of income (OBS items), given the reduction in interest income as per their on-balance sheet banking business. Third, the reversed speculative capital inflows have led the GCC banking sector to confront squeezed liquidity conditions, reflecting increasing reliant on external financing and causing asset-liability maturity mismatch. This results in asking for more usage of the OBS items as hedging purpose. Fourth, from a regulatory perspective, prudential regulators, region wide, need to be aware of the OBS determinates since regulating OBS businesses would have a significant impact on the costs and scope of banks overall activities. The above attributes initiated the ideal ground to explore the usage of the OBS businesses and test empirically for the factors determining these businesses within the GCC economies. Moreover, as determinants of OBS businesses, this paper extends the empirical literature by considering not only banking specific factors, but also general macroeconomic conditions and regulatory variables attributes.

As methodology, a pooled balanced panel model is used. The panel data estimation technique allows for identifying and measuring effects that are simply not demonstrable in pure sections or pure time-series data. The empirical evidence of the panel data estimates, suggest that the determining factors contribute significantly in influencing OBS businesses in the six GCC considered. On country basis, given the banks-specific characteristic variables, it seems that adding the regulatory and macroeconomic variables significantly enhance the statistical fit of the regression results.

Rest of the paper is structured as follows. Section 2 presents the methodology specification including model estimation and proxies of variables, together with data collection. Section 3 outlines the empirical findings, while summary and concluding remarks are given in section 4.

2. Methodology Specification and Data Collection

2.1 Model Estimation

Econometrically, following Eliau (2012), we used the standard diffusion model developed by Mansfield (1961) where it is the most commonly used model in diffusion studies [2]. The

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basic proposition is that the proportion of banks not adopting an OBS item at (t), however, their adoption begins at time ($t + 1$) which is a function of the proportion of those adopters at time (t). Hence, the growth in the proportion of banks adopting the innovation over time may be expressed as a logistic function:

$$N_{t+1} - N_t = \beta (D - N_t) N_t/D \quad (1)$$

Where N_t is the total, or cumulative, number of banks adopting an OBS item by time (t) and (D) is the total number of banks in the banking industry. β is the parameter which can measure the rate of the OBS diffusion across banks. Replacing discrete time by continuous time and integrating produces a logistic time curve describing OBS diffusion:

$$N_t/D = [1 + \exp(-\alpha - \beta t)]^{-1} \quad (2)$$

Where N_t/D is the proportion of banks adopting the innovation (issuing an OBS item) at time (t). α and β are the parameters which measure the rate of diffusion[3]. While the expected value of β can be assumed to be a function of innovation (industry) characteristics, then, generating β through OLS estimation is considered as standard practice. This can be achieved by equation (2) in its revised form. Regressing the resulting estimates of β on firms-specific and innovation specific variables is thought to influence the rate of diffusion, Hannan and McDowell (1984). Overall, given a relevant transformation and the panel structure of the data, the basic equation to be estimated can be written as follows:

$$\ln OBS = \ln(P(it) / (1 - P(it))) = \alpha_i + \beta_t + \varepsilon_{it} \dots \dots (3)$$

P_{it} is the proportion of bank (i) issuing an OBS item at time (t) relative to the total asset size of bank (i) at time (t), including total of on-balance sheet items and off-balance sheet items of bank (i) at time (t). The justification of this, following Jagtiani *et al.*, (1995a) and Bondt (1997), is that we consider the scale on which banks issue OBS items. A linear relationship between the number of banks engaged in issuing OBS items as a proportion of all banks and the amount of OBS items in terms of the total balance sheet size (on and off-balance businesses) is proposed.

In light of the aforementioned discussion and depending on the characteristics of the unobservable bank specific variables, α_i , two way error component regression models can be outlined [4]. More precisely, pooled regression data models presuppose the fact that differences across units can be captured in differences in constant term, as for the Fixed Effect Modes (FEM) or alternatively, individual specific constant terms are randomly distributed across cross-sectional units, as for the random effects models (REM) [5]. For our case, since there is no prior condition to suggest correlation between the cross-section specific error components (ε_i) and the regressors, we used the Hausman test to compare the coefficient estimates from the FEM and the REM. We use this in making the decision on which model is more appropriate [6].

To conclude, the model used here is an extension of the earlier basic model presented in equation (3) above, while incorporating additional variables that have an influence on adopting OBS businesses. These variables are bank specific variables (characteristics), in addition to regulatory and macroeconomic explanatory variables. Accordingly, the empirical test is based on the following general pooled regression equation that typified a modified version of equation (3):

$$\ln OBS = \ln(P(it)/(1 - P(it))) = \alpha_i + \beta_t + \varphi_{it} + \Phi_{it} + \varepsilon_{it} \dots \dots \dots (4)$$

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Where: i denotes the number of banks ($i = 1, 2, 3, \dots, 64$) and t denotes the number of years ($t = 1, 2, 3, \dots, 16$). $\ln OBS_{it}$ (as logistic transformation of P_{it}), is the dependent variable and represents the proportion of bank (i) issuing OBS items at time (t) relative to the total asset size of bank (i) at time (t), including total of on- balance sheet items and off-balance sheet items of bank (i) at time (t). The time trend (β_t) accounts for the autonomous diffusion (deterministic trend), where its coefficient indicates the autonomous speed of OBS diffusion. ϕ_{it} is a function defining bank (i) specific variables (creditworthiness variables) at time t . Φ_{it} is a function defining bank (i) nonspecific variables at time t . ϵ_{it} is the residual term that is included to reflect all other influences on bank (i)'s probability to issue OBS items. The bank specific variables include market power, bank size, loan ratio, net loan ratio, net charge-off ratio and profitability, while the bank nonspecific variables include the capital adequacy ratio and the growth in real gross domestic product to proxy regulatory and macroeconomic condition variables, respectively.

Following Bondt (1997), another way to look at the models is not in a logistic diffusion context, but just as logistic regressions explaining OBS items as a fraction of total assets plus OBS items. While the models used in this paper are extracted basically from our formal model equations 3 and 4, incorporating the effects of bank specific variables (creditworthiness variables), regulatory changes and macroeconomic conditions are presented via the below three models. Model (1) below presents the estimation of the banks' specific variables (creditworthiness variables) captured by Φ_{it} . Model (2) incorporates additional regulatory proxy affecting the OBS businesses captured by K_{it} . Model (3) incorporates additional macroeconomic proxy affecting the OBS businesses captured by Y_{it} .

$$\ln OBS_{it} = \alpha_i + \beta_t + \Phi_{it} + \epsilon_{it} \dots \dots \dots (5)$$

$$\ln OBS_{it} = \alpha_i + \beta_t + \Phi_{it} + K_{it} + \epsilon_{it} \dots \dots \dots (6)$$

$$\ln OBS_{it} = \alpha_i + \beta_t + \Phi_{it} + K_{it} + Y_{it} + \epsilon_{it} \dots \dots \dots (7)$$

2.2 Proxies of Variables

As proxies of variables, the dependent variable (OBS) is measured by the natural logarithm of bank (i) OBS items at time t . The time trend variable (TIME) indicates the number of years since the first year of the sample period. Its coefficient reflects the autonomous speed of diffusion (β), which depends on development in financial technology, learning factors and changing preferences regarding the OBS produced items. Larger β indicates more rapid adaptation of an OBS product, Bondt (1997). For market power (MARP), it is expected that the more the market power of a bank, the more the ability to expand businesses toward on-and-off balance sheet businesses. While market power increases the creditworthiness of a bank, it is expected to have a positive impact on the probability of banks to underwrite an OBS item. For measurement purposes, the level of market share (the percentage share of bank (i) deposits to total banks deposits) is used as a relevant statistic to provide a snapshot of the market power at a point in time. Applied to our case, this ratio measures the absolute size of total deposits which is held by the i^{th} bank to total size of the banking market as measured by total deposits. While the market power of bank (i) is assumed to be directly related to the bank share of the deposits market, the MARP coefficient is expected to be positive, indicating that bank with more market power tend to engage in more OBS businesses.

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For the bank size (BSIZ), the impact of the BSIZ on OBS businesses can go either way (positive or negative). On the one hand, the positive impact of the BSIZ may be justified by many attributes. First, it is expected that large size banks, in term of total assets for example, will have more chance to diversify their banking businesses, employ high skilled and well trained employees, derive the benefits of the economies of scale, and then be more efficient in providing higher quality of banking products. Second, large size banks may have well developed widespread networks with access to large and sophisticated clients who are likely asking for OBS products. Third, large size banks armed with specialized management skills will ask for and move toward more OBS products engagement, hence, meeting the demand for large and institutional clients who will be in favor to large banks to handle their OBS requests. Fourth, large size banks indicate greater market confidence and less failure possibility for both the regulatory parties and clients. These indicators, aside others, will encourage banks to expand their businesses toward the OBS items. On the other way around, it can also be argued that larger banks in terms of total assets would have the probability to be more risk-diversified (less business risk) causing less usage of an OBS product. As relevant proxy, the natural log of total assets is used and the BSIZ coefficient is expected to be positive /negative, reflecting that the larger bank asset base, the more/less potential of issuing OBS items.

The loan ratio (LOAR) is measured by the banks' loan to total assets. As reported by Angbazo (1997), higher loan ratio normally increases interest rate risk, leading to more engagements in OBS businesses for hedging purposes. Another rational to support such expected impact lies in the way used while approving clients' loans, in which banks access their clients' investment information that will facilitate the offer of relevant OBS risk management product, see Nachane and Ghosh (2007). Although the LOAR is directly related to OBS businesses, its coefficient is expected to be positive, indicating that bank with more loan ratio tend to undertake more OBS businesses. The net loan ratio (NLOR), gross loan minus loan loss reserves as a percent of total assets, is considered as a proxy of traditional bank risk and can be regarded as a measure of the maturity gap, maturity mismatch, between a bank assets and liabilities. As net loan ratio widens the maturity gap widens as well, providing a positive incentive to use OBS products, since the increase in risk exposure has to be hedged. In addition, banks with more willingness to make risky loans may be more willing to take more OBS risk (Bondt 1997). The variable coefficient is expected to be positive, indicating that bank with more net loan ratio tend to undertake more OBS businesses.

For the net charge-off ratio (NCHF), the impact is ambiguous. On one hand, considering the net charge-off as proxy of non-performing loans, the impact is expected to be negative. An increase in a bank non-performing loans would decrease its creditworthiness, leading to lower levels of OBS practices. On the other hand, higher levels of a bank charge-offs indicates higher levels of loan portfolio risk, reflecting more possibility to issue or supply OBS products for hedging purposes and, simultaneously, generate substitute income (fee income) to compensate for bad debt loans. Hence, an increase in the level of charge-off would have a positive impact on issuing an OBS product. The charge-offs (net loan write-offs) which are based on the difference between loans actually written-off and recoveries on loans previously classified as uncollectable, to gross loan ratio is used as a proxy of the NCHF variable.

The profitability (PROF) proxy can be positive or negative. On one hand side, profitability can be considered as a measure of the banks' creditworthiness and indicates a clients' trust, causing anticipated positive relationship between profitability and the issue of OBS items.

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Further, high profits increase cash flows and can be retained to absorb future losses, reflecting the chance to improve creditworthiness, concluding that banks with more creditworthiness would attract or would use more of OBS businesses. On the other hand, it may be argued that banks with more creditworthiness positions and with high interest profits generated from granting loans would have less incentive to ask for fee-income sources, reflecting less usage of OBS items. An additional concern is that, banks with low net income would attempt to increase their underwriting in fee-based forms of income to compensate or offset the reduction in interest income generated from traditional credit businesses, and hence, such banks would supply more derivatives (OBS) products. The moral hazard hypothesis suggests that banks with low net interest income (low profitability) would speculate using derivatives, while banks with high net interest income would not hedge.

As banks' non-specific variables, the capital adequacy ratio and the growth in real gross domestic product are included to control for the regulatory and macroeconomic conditions, respectively. For the banks' capital adequacy ratio (CAPC), the impact is ambiguous and can be viewed in two perceptions (Furlong and Keeley 1989, cited by Bondt 1997, Nachane and Ghosh 2007 and Ahmad and Hassan 2010). On one hand, while the capital adequacy ratio (CAR) measures the banks' capital to protect its depositors and insure stability, OBS businesses are expected to be larger for banks with higher CAR ratio, since these banks are more creditworthy, and hence, clients would place more trust towards the performance of such banks. A high CAR, high capital position, with accompanying high credit rating would be an incentive for a bank to be an attractive provider/supplier for OBS products. Alternatively, a high CAR ratio reduces a banks' marginal gain from increasing the risk in the asset portfolio. As bank capital increases, the ability to assume/bear risk increases as well, but the need for OBS products to hedge the risk exposure may decrease. Therefore, a bank with high CAR is expected to take on less OBS risk and issue a lower volume of OBS products. The capital adequacy ratio, primary capital to risky-assets, is used as proxy. The emphasis is on the response of banks to the 8% total risk-based capital standards which signals to the degree of regulatory pressure for adequately capitalized banks, CAR more than 8%. In all, banks in the GCC region have acceptable leverage ratios and are well capitalized with capital adequacy ratios (CAR) above the minimum standard levels of the CARS.

The effect triggered by variations in the economic activity is captured by the real gross domestic product growth rate (GROR) which is used to control for the macroeconomic conditions. Under high growth rates of GDP, demand for OBS products will respond positively, given the growth in the business cycles. The variable coefficient is expected to be positive, reflecting that with the higher growth rates of GDP, the probabilities of issuing OBS items will increase. Given the explanatory variables, the formal models equations are rewritten below, while variables expected signs and their economic rational all are presented in Table 1.

$$\ln OBS_{it} = \alpha_i + \beta_1 MARP_{it} \pm \beta_2 BSIZ_{it} + \beta_3 LOAR_{it} + \beta_4 NLOR_{it} \pm \beta_5 NCHF_{it} \pm \beta_6 PROF_{it} + \varepsilon_i$$

..... Model (1)

$$\ln OBS_{it} = \alpha_i + \beta_1 MARP_{it} \pm \beta_2 BSIZ_{it} + \beta_3 LOAR_{it} + \beta_4 NLOR_{it} \pm \beta_5 NCHF_{it} \pm \beta_6 PROF_{it} \pm \beta_7 CAPC_{it} + \varepsilon_i$$

..... Model (2)

$$\ln OBS_{it} = \alpha_i + \beta_1 MARP_{it} \pm \beta_2 BSIZ_{it} + \beta_3 LOAR_{it} + \beta_4 NLOR_{it} \pm \beta_5 NCHF_{it} \pm \beta_6 PROF_{it} \pm \beta_7 CAPC_{it} + \beta_8 GROR_{it} + \varepsilon_i$$

..... Model (3)

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Table 1: Variables expected signs and their economic rationale

Variable	Code	Proxy	Expected Coefficient Sign	Economic rationale
<i>Time trend</i>	<i>TIME</i>	(t)	+	Time \uparrow \Rightarrow OBS technology diffusions \uparrow \Rightarrow OBS \uparrow
<i>Bank-Specific Variables</i>				
Market power	MARP	(Deposits/Total Deposits)	+	MARP \uparrow \Rightarrow Scale economies \uparrow \Rightarrow OBS \uparrow
Bank size	BSIZ	Ln(Total Asset)	\pm	BSIZ \uparrow \Rightarrow Scale economies \uparrow \Rightarrow OBS \uparrow BSIZ \uparrow \Rightarrow Bank Risk \downarrow \Rightarrow OBS \downarrow
Loan ratio	LOAR	(Loans/Total Assets)	+	LOAN \uparrow \Rightarrow Scope Economies and Risk \uparrow \Rightarrow OBS \uparrow
Net loan Ratio	NLOR	(Net Loans/Total Assets)	+	NLOR \uparrow \Rightarrow Scope Economies and Risk \uparrow \Rightarrow OBS \uparrow
Net charge Offs	NCHO	net loan write-offs/ gross loan)	\pm	NCHO \uparrow \Rightarrow Scope Economies and Risk \uparrow \Rightarrow OBS \uparrow
Profitability	PROF	(Net Profit/Total Assets)	\pm	PROFIT \uparrow \Rightarrow Creditworthiness \uparrow \Rightarrow OBS \uparrow PROFIT \uparrow \Rightarrow Creditworthiness \uparrow \Rightarrow OBS \downarrow
<i>Bank-non-specific Variables:</i>				
<i>Regulatory and Macro-economic Variables</i>				
Capital Ratio	CAPC	(primary capital/risky-assets)	\pm	CARH \uparrow \Rightarrow Creditworthiness \downarrow \Rightarrow OBS \downarrow CARL \uparrow \Rightarrow Creditworthiness \uparrow \Rightarrow OBS \uparrow
Real GDP growth	GROR	<i>g</i>	+	GDP \uparrow \Rightarrow Economic Activity \uparrow \Rightarrow OBS \uparrow

2.3 Data Collection

Considerable efforts were devoted to construct the targeted level panel database from Bank Scope and the IMF data sources. The growth in real GDP variable is obtained from the online database of International Financial Statistics (IFS). To prepare the sample, we constructed a balanced data set for all banks in each country for the years 1997-2015. The sample size varies between 90 observations for 6 banks in Kuwait and 285 observations for 19 banks in United Arab Emirates (UAE). To avoid outliers, the filtering process eliminated short lived banks, foreign banks and central banks. For the study period, the sample is chosen over a period that encompasses 19 annual financial years, 1997 to 2015, inclusive. The period represents an era of significant challenge to the GCC banking industry, in which bank management attempted to improve and measure their performance while facing several changeable market and economic conditions. As far as diversity is concerned, all countries are oil producing countries, and hence it can be concluded that similarity exists in terms of level of technology, financial structure and legal environment.

3. Empirical Findings

For the GCC banking industry, most banks are relatively new participants in many OBS items, reflecting the limited usage of the OBS businesses [7]. The results of the fixed effects specification provide qualitatively the same estimates as the random effects specification where the differences between the FEM and the REM coefficients are statistically insignificant, for all regressors. The empirical estimation results of the total long-balanced

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panel model are presented in Table 2 and Table 3. The fit of the estimated equations (R^2) of model 1, model 2 and model 3 are high, in which it explains almost more than 90% of the variance of the dependent variable. The adjusted (R^2) is slightly lower, but it still exceeds 90% for the three models.

As shown by model 3 results, in aggregate indication, the autonomous speed of diffusion is significantly different than zero. The trend variable, while the speed of diffusion is relatively slow for all countries under consideration, it has a significant and positive sign for Qatar and Oman, while it has a significant and negative sign for UAE, Bahrain, Saudi Arabia and Kuwait. Given the period of study, the negative sign indicates that the usage of OBS businesses is decreasing overtime, suggesting lower adoption of OBS items and indicating that OBS businesses in the GCC region may be considered as risk increasing businesses rather than risk decreasing activities. This conclusion may be attributed to deficiency in the technological infrastructure and/or lower engagement in the speculation and hedging businesses within the market workplace. In terms of magnitude of diffusion, the highest is reported for Qatar and Oman, suggesting rapid diffusion of OBS businesses in these countries, while the lowest is reported for Bahrain and Saudi Arabia, indicating lower speed of diffusion of OBS businesses.

The MARP has positive and significant impact for Oman and the UAE, indicating that a bank with more market power would be categorized as more creditworthiness bank, causing more probability to underwrite an OBS item. However, for Bahrain and Saudi Arabia the market power proxy has negative and significant impact, while it indicates negative and insignificant impact for Qatar and Kuwait. The negative impact indicates less offering of OBS businesses, concluding that the banking sector in these countries still relies on the traditional banking businesses as the main sources and uses of funds. For those banks, the lesser offerings of OBS businesses as alternative sources of returns can be attributed to factors like reasonable levels of profitability generated from the on-balance sheet activities and low volatile conditions of both interest rate and foreign exchange rate markets. The bank size is significantly related to OBS businesses. It has positive and significant impact for all countries, except Oman, reflecting that there are economies of scale resulting from OBS businesses in the GCC region. This alludes to relative contribution of OBS businesses within the overall balance sheet products. The findings conclude also, for the GCC region, the on-balance sheet banking businesses (tradition banking businesses) seem relatively less secure to most banks in the region and there is more drive to engage in the OBS businesses with or without high risk to hedge. For Oman, the BSIZ proxy is negative and insignificant. The negative impact support the argument that larger banks in terms of total assets would have the probability to be more risk-diversified, reflecting lower business risk, causing less usage of an OBS product.

The loan ratio proxy has a positive and significant impact on the OBS businesses in all GCC banking industries, except Oman, indicating that loans and OBS businesses are not substitutes. This reflects economies of scope between loans and OBS businesses. The result implies that banks would issue more OBS products in order to minimize the resulting risk generated from loans. For Oman, the loan ratio proxy is negative and significant, indicating lower loan ratio, reflecting lower interest rate risk, and, hence, causing less OBS items to be used for hedging purposes. The net loan ratio has the opposite expected sign. It has a negative and significant influence on OBS businesses for all countries, except Oman. This indicates making more secure loans, leading to a narrower maturity mismatch between assets and liabilities, causing less risk exposure to be hedged, leading to the need of issuing less OBS products. For Oman, the reverse is clear. The positive impact indicates

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making more risky loans, wider maturity mismatch, causing more risk exposure to be hedged, leading to more OBS products to be issued.

The net charge-off ratio has a significant and positive sign for Qatar and Saudi Arabia. The positive impact indicates that banks are using OBS products to manage loan portfolio risks, mainly risks that are normally resulted from bad debt and, simultaneously, generate substitute income (fee income) to compensate for bad debt loans. By considering the net charge-off as proxy of non-performing loans, the negative sign for the other countries indicates that an increase in a bank non-performing loans would decrease its creditworthiness, leading to lower levels of OBS practices, particularly those practices used for investment and speculation purposes. The results for Qatar, Oman, Bahrain and Kuwait show a significant positive impact of the profitability proxy, while a negative impact is shown for UAE and Saudi Arabia. The positive impact indicates that profitability as a factor of creditworthiness is conducive to OBS businesses. The results for UAE and Saudi Arabia indicate that higher OBS usage is not derived from profitability considerations. It seems that banks in both countries have high net interest income reflecting their deep emphasis on granting loans as traditional banking businesses and less prominence is provided towards fee-based forms as source of income.

On a country by country basis, it seems that adding the regulatory and macroeconomic variables significantly enhances the statistical fit of the regression outcomes. For the regulatory factor, the coefficient of CAPC is positive but insignificant for Qatar and Saudi Arabia, while it is negative and significant for Oman, UAE, Bahrain and Kuwait. The positive impact indicates that banks with high capital ratio are less likely to engage in OBS businesses in order to avoid regulatory constraints, supporting the capital avoidance hypothesis which asserts that banks with low capital are more likely to engage in OBS businesses. This confirms that low regulatory pressure has positive impact on the use of OBS products, indicating that low regulatory pressure increases the creditworthiness of banks and increases the clients' incentives to engage in the OBS products offered by such banks under consideration. In other words, low capital regulation, as implied by high CAR, signifies relevant capital position (high credit rating). This enhances creditworthiness position of a bank, causing higher engagement in OBS businesses. Alternately, low capital regulation (low regulatory pressure) also reduces the marginal propensity to increase the risk of a banks' asset portfolio, see Koppenhaver and Stover (1991) for the former and Furlong and Keeley (1989) for the later. In other means, banks with high capital ratios (implying low regulatory pressure) can be expected to have lower OBS risk, and hence, engage in lower OBS businesses, concluding that imposing more tight restriction on banks' capital will cause less engagement in the OBS usage. This supports the argument that an OBS business is being risk increasing factor.

For the macroeconomic factors, the growth proxy has a significant and positive sign for all countries, except Qatar. For each country, the positive impact of the real GDP growth on the OBS usage reveals that the OBS businesses follow the overall economic growth and business cycles, concluding that higher economic growth would create more OBS usage. This reflects the double role of the OBS businesses as income generating and risk management techniques, meaning, an upturn in the economic activities would increase business risks and there is an incentive to supply more volume of OBS businesses.

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Table 2: Estimation Results: panel Least Squares Estimation Model, banks (aggregate)

$$\ln OBS_{it} = \alpha_i + \beta_1 MARP_{it} \pm \beta_2 BSIZ_{it} + \beta_3 LOAR_{it} + \beta_4 NLOR_{it} \pm \beta_5 NCHF_{it} \pm \beta_6 PROF_{it} + \varepsilon_i \dots\dots\dots \text{Model (1)}$$

$$\ln OBS_{it} = \alpha_i + \beta_1 MARP_{it} \pm \beta_2 BSIZ_{it} + \beta_3 LOAR_{it} + \beta_4 NLOR_{it} \pm \beta_5 NCHF_{it} \pm \beta_6 PROF_{it} \pm \beta_7 CAPC_{it} + \varepsilon_i \dots\dots\dots \text{Model (2)}$$

$$\ln OBS_{it} = \alpha_i + \beta_1 MARP_{it} \pm \beta_2 BSIZ_{it} + \beta_3 LOAR_{it} + \beta_4 NLOR_{it} \pm \beta_5 NCHF_{it} \pm \beta_6 PROF_{it} \pm \beta_7 CAPC_{it} + \beta_8 GROR_{it} + \varepsilon_i \dots\dots\dots \text{Model (3)}$$

Variable	(Qatar)			(Oman)			(UAE)		
	Model (1)	Model (2)	Model (3)	Model (1)	Model (2)	Model (3)	Model (1)	Model (2)	Model (3)
α	-5.738*** (-7.064)	-6.355*** (-4.273)	-7.249*** (-4.843)	6.871*** -9.074	7.466*** -8.58	6.147*** -6.156	-0.699*** (-2.707)	-0.869*** -3.062	0.381 -1.300
Trend	0.052*** 4.212	0.063*** 5.382	0.048*** 3.802	0.015** 2.037	0.009 1.482	370E.05*** 19.019	-0.013 -7.429	-0.011 -7.797	-0.017*** -11.837
MARP	-73.908* (-1.653)	-97.452 (-1.492)	-31.479 (-0.455)	839.856*** -7.523	843.295*** -7.582	776.838*** -6.954	37.383** -1.769	118.677*** -5.786	99.378*** -4.929
BSIZ	1.502*** -12.718	1.570*** -8.636	1.631*** -9.098	-0.323*** (-2.670)	-0.341*** (-2.815)	-0.184 (-1.378)	1.068*** -19.423	0.845*** -15.668	0.920*** -16.939
LOAR	7.335*** -6.912	7.775*** -5.608	9.265*** -6.251	-1.371*** (-9.139)	-1.338*** (-8.851)	-1.008*** (-5.100)	1.155*** -18.745	1.075*** -19.706	1.099*** -20.849
NLOR	-4.776*** (-5.054)	-4.986*** (-4.799)	-5.977*** (-5.479)	1.644*** -8.869	1.336*** -4.588	1.171*** -4.019	-1.556*** (-9.231)	-1.585*** (-10.772)	-1.542*** (-10.870)
NCHF	8.150*** -4.1	7.975*** -3.037	9.691*** -4.623	-1.791** (-1.699)	-0.563 (-0.408)	-1.288 (-0.936)	-10.888*** (-7.953)	-4.247*** (-3.029)	-8.254*** (-5.165)
PROF	16.227*** -10.787	15.153*** 5.744	16.125*** -6.187	5.312*** -4.761	5.217*** -4.687	3.516*** -2.746	-0.142 (-0.126)	3.862*** -3.578	-0.200 (-0.148)
CAPC		0.014 -0.496	0.043 -1.454		-0.041 (-1.369)	-0.057*** (-5.148)		-0.064*** -0.007	-0.028*** (-2.793)
GROR			-1.197*** (-2.470)			0.898*** -2.509			0.709*** -4.673
R ²	0.969	0.969	0.971	0.919	0.919	0.925	0.985	0.989	0.99
Adjusted R ²	0.968	0.965	0.967	0.914	0.915	0.914	0.984	0.988	0.989
F-Statistic	596.584	238.153	233.483	212.327	183.894	84.929	3215.47	3630.324	3435.927
P-Value	0	0	0	0	0	0	0	0	0
Count	120	120	120	120	120	120	285	285	285

Explanatory notes dependent variable is lnOBS; t-statistics are reported in parentheses***, ** and * indicate significance at the 1, 5, and 10 percent level, respectively.

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Table (3): Table (2): Estimation Results: panel Least Squares Estimation Model, banks (aggregate)

$$InOBS_{it} = \alpha_i + \beta_1MARP_{it} \pm \beta_2BSIZ_{it} + \beta_3LOAR_{it} + \beta_4NLOR_{it} \pm \beta_5NCHF_{it} \pm \beta_6PROF_{it} + \varepsilon_i \dots\dots\dots \text{Model (1)}$$

$$InOBS_{it} = \alpha_i + \beta_1MARP_{it} \pm \beta_2BSIZ_{it} + \beta_3LOAR_{it} + \beta_4NLOR_{it} \pm \beta_5NCHF_{it} \pm \beta_6PROF_{it} \pm \beta_7CAPC_{it} + \varepsilon_i \dots\dots\dots \text{Model (2)}$$

$$InOBS_{it} = \alpha_i + \beta_1MARP_{it} \pm \beta_2BSIZ_{it} + \beta_3LOAR_{it} + \beta_4NLOR_{it} \pm \beta_5NCHF_{it} \pm \beta_6PROF_{it} \pm \beta_7CAPC_{it} + \beta_8GROR_{it} + \varepsilon_i \dots\dots\dots \text{Model (3)}$$

Variable	(Bahrain)			(Saudi Arabia)			(Kuwait)		
	Model (1)	Model (2)	Model (3)	Model (1)	Model (2)	Model (3)	Model (1)	Model (2)	Model (3)
α	2.075	-13.726***	-11.29***	-8.854***	-8.479***	-12.499***	2.075	-13.726***	-11.294***
	-1.162	(-7.285)	(-5.742)	(-4.466)	(-3.842)	(-4.849)	-0.744	(-4.650)	(-3.651)
Trend	-0.065***	-0.055***	-0.061***	-0.054***	0.00028***	-0.079***	-0.065***	-0.055***	-0.061***
	-12.421	-13.559	-14.625	-9.901	21.122	-12.093	-7.942	-8.639	-9.285
MARP	261.604***	-198.175***	-111.493***	-159.873***	-154.373***	-209.787***	261.604***	-198.175**	-111.493
	-5.289	(-3.706)	(-1.923)	(-4.572)	(-4.086)	(-5.033)	-3.389	(-2.365)	(-1.224)
BSIZ	0.559***	2.961***	2.609***	2.127***	2.079***	2.691***	0.56	2.961***	2.609***
	-1.008	-10.174	-8.661	-7.124	-6.433	-7.041	-1.278	-6.493	-5.507
LOAR	-1.401	14.501***	12.060***	9.773***	9.778***	10.523***	1.042	14.501***	12.060***
	(-0.722)	-8.574	-6.723	-8.452	-8.426	-9.081	(-0.463)	-5.473	-4.274
NLOR	0.539	-16.498***	-14.067***	-8.999***	-9.010***	-10.345***	0.539	-16.498***	-14.067***
	-0.329	(-8.766)	(-7.161)	(-8.031)	(-8.010)	(-3.675)	-0.211	(-5.595)	(-4.552)
NCHF	-4.109***	0.496	-0.928	0.955***	0.990***	1.152***	-4.109***	0.496	-0.928
	(-5.776)	-0.751	(-1.212)	-5.446	-4.998	-5.732	(-3.701)	-0.479	(-0.771)
PROF	6.311***	17.373***	12.052***	-3.629***	-3.231***	-3.704***	6.311***	17.373***	12.052***
	-6.438	-14.705	-6.226	(-4.324)	(-2.451)	(-2.846)	-4.125	-9.386	-3.956
CAPC		-0.014***	-0.009***		-0.009***	0.004		-0.014***	-0.009***
		(-12.012)	(-4.541)		(-0.393)	-0.174		(-7.667)	(-2.887)
GROR			0.689***			0.923***			0.689***
			-3.416			-2.813			-2.172
R ²	0.942	0.967	0.969	0.919	0.919	0.925	0.942	0.967	0.969
Adjusted R ²	0.94	0.966	0.968	0.915	0.965	0.92	0.934	0.962	0.964
F-Statistic	553.545	854.627	791.842	244.389	208.133	193.855	116.013	190.035	184.248
P-Value	0	0	0	0	0	0	0	0	0
Count	120	120	120	135	135	135	90	90	90

Explanatory notes dependent variable is InOBS; t-statistics are reported in parentheses***, ** and * indicate significance at the 1, 5, and 10 percent level, respectively.

4. Summary and Concluding Remarks

Previous empirical studies pertaining to OBS business have documented evidence where the phenomenon is most prevalent, particularly in the context of developed banking markets including USA, Europe and Asia. While limited evidence appears to have been forthcoming under the context of emerging banking markets, this paper contributes to the related literature and tests for the determinants of banks OBS businesses within the GCC context. The determinants include not only bank-specific variables but also regulation and macroeconomic conditions, reflecting the importance of regulating OBS businesses and the influence that may be made on the costs and scope of banks, and hence, the monetary policy broadcast within the GCC region.

In the GCC region, estimates conclude differences among the regressors in determining the OBS businesses. The speed of diffusion is relatively slow and the autonomous speed of diffusion is significantly different than zero. The trend variable indicates decreasing OBS usage over time, suggesting lower adoption of OBS items. For the bank-specific variables, the market power positive impact designates the banks' creditworthiness influence in underwriting an OBS product, whereas the negative sign reflects more reliance on the on-balance sheet products for some countries. The bank size variable signposts the economies of scale influence, while the loan ratio factor result indicates that loans and OBS offering are not substitutes to each other, supporting economics of scope between the two variables. The net loan ratio variable result indicates that less risk exposure would be hedged by issuing an OBS item, given the narrower maturity mismatch between assets and liabilities. The net charge-off ratio reveals that the usage of OBS products would generate substitute fee income to compensate for bad debt loans, while in other cases such variable would cause less investment and speculation usage of the OBS items. The profitability results suggests that higher OBS usage is not derived from profitability considerations, reflecting banks' focus on the on-balance sheet businesses and their less prominence towards fee-based forms as source of income.

On a country to country basis, it seems that adding the two regulatory and macroeconomic variables significantly enhance the statistical fit of the regression results. The coefficient of the capital adequacy ratio indicates that banks with high capital ratio are less likely to engage in OBS businesses in order to avoid regulatory constraints. The growth factor suggests that the OBS businesses follow the overall economic growth and business cycles, supporting the dual role of the OBS businesses as income generating source and risk management technique.

All in all, the limited usage of the OBS products by GCC banking industry is obvious where it can be defended by the following observations. First, most banks' businesses are directed towards the on-balance sheet products where most banks' assets portfolios are composed of loans, securities investments, and Islamic finance products. This asset structure is supported by the improved asset quality of GCC banks where banks are facing high credit growth rates and the non-performing loans to total loans have been declining since the last decade. However, the deep emphasis of GCC banks towards the on-balance sheet asset structure has significant concentration risk in the context of lending to few targeted clients and/or lending to sectors that are subject to high market price volatility exposure or asset bubbles, real estate and equities sectors for example. Hence, in case of financial crises, GCC banks would face significant losses through mark-to-market valuations of their trading portfolios; see Al-Hassan *et al.*, (2010).

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Second, on the level of capital markets, in spite of having an advanced infrastructure there is deficiency in offering many OBS products. For example, most GCC capital markets have not yet started to provide derivative products, where some derivatives contracts are not needed, given the fixed exchange rate regime and the domestic interest rates that are largely considered as a function of US dollar interest rates, see Gray and Blejer (2006).

In terms of policy implications; first, on the capital market level, there is a need to develop the derivatives market in the GCC region which is still in its basic stages. This is essential given the current invasion of international and regional interested parties who are looking to use OBS items for investment, speculation as well as risk management purposes. Second, given the banks heavy focus on the on balance banking activities, prudential authorities have to provide more spotlight on banks asset/liability management practices where banks need to re-evaluate their OBS positions as part of their overall management strategies. This seems crucial given maturity mismatch between assets and liabilities, and hence, claiming for more usage of OBS products. Third, given the association between banks liquidity positions and the banks' lending rates, decision makers are advised to undertake policy techniques that may isolate the influence of variability in banks' liquidity positions on banks' spread performance. This reflects the possibility of using the OBS derivatives contracts to avoid/eliminate the volatile liquidity positions, hence, offering OBS products would be helpful.

The current work is limited by the following two confines which may have future research significance. First, the constructed OBS panel database is applied on aggregate levels, given the standard classifications of the Bank Scope database where OBS businesses are structured to six items, namely managed securitized assets, other OBS exposure to securitization, guarantees, acceptances and documentary credits, committed credit lines, and other contingent liabilities. Indeed, having sub-category items of the OBS dataset would be useful, namely those OBS items that generate income or expenses without the creation or holding of an underlying asset or liability (market related activities), and those OBS items that involve the bank's commitments and contingent claims, including (1) Financial Guarantees i.e., standby letter of credit, line of credit, revolving loan agreement, securitization of asset with re-course, and note issuance facilities such as Euro-notes, revolving underwriting facilities (RUFs), and standby notes, and (2) Trade Finance i.e., commercial letter of credit, acceptance participation, and investment activities that includes all derivative instruments such as forward commitments, financial futures, interest rate swaps, option (put, call, collars), and currency swaps. Second, given the limited usage of the OBS products by the GCC banking industry, it would be very helpful to test to what extent OBS businesses can be more prominent in controlling GCC banks' return and risk exposure.

Endnotes

1. The Gulf Cooperation Council (GCC) includes Saudi Arabia, Kuwait, Qatar, United Arab Emirates, Oman and Bahrain. These countries share common culture, language, religion, and all are considered as oil producing countries and facing nearly similar deregulation and risks environment.
2. See Hannan and McDowell (1984), Jagtiani *et al* (1995a), Bondt (1997), Nachane and Saibal (2007), Ahmad and Hassan (2010).
3. The S shaped diffusion curve of equation (2) expects that the proportion of banks adopting OBS items will move upwards at an accelerating bound until a proportion of 50% of total banks is attained at time $t = -(\alpha + \beta)$. Hence,

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OBS adoption would move up at a decreasing bound, and 100% OBS diffusion is loomed asymptotically, see Morrison (1998), Bondt (1997) and Nachane and Saibal (2007).

4. Gujarati (2011) and Baltagi (2010) identified the advantages of the panel data over pure cross-sectional or time series data. These advantages include the following factors: First, it takes the heterogeneity explicitly into account by allowing for subject-specific variables. Second, It gives more informative data, more variability, less collinearity among variables, more degrees of freedom and more efficiently. Third, panel data are better suited to study the dynamic of changes. Fourth, it can be better detect and measure effects that cannot be observed in pure cross-sectional or time series data.

5. The FEM, as a method for pooling time-series cross sectional data, considers all individual differences are captured by differences in the intercept parameter. The intercepts α_i are considered as fixed parameters that we could estimate directly using the least squares estimator. The FEM assumes that the errors e_{it} are independent with mean zero and constant variance σ^2 , for all individuals and in all time periods, following that all behavioral differences between individual firms and over time are captured by the intercept. Where the individual intercepts are there to control for the firm specific differences, the resulting econometric model is: $y_{it} = \alpha_i + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \dots + \beta_N X_{Nit} + e_{it}$. For the REM, even it assumes that all individual differences are captured by the intercept parameters, but it considers the individual differences as random rather than fixed. The REM considers α_i as mutually independent random variables that are independent of the equations' error term. Thus, the constant term model α_i is a separate constant term for each bank: $\alpha_i = \alpha_1 d_1 + \alpha_2 d_2 + \dots$, with the d_j 's bank specific dummy variables. In other words, the random individual differences can be included in the econometric model by specifying the intercept parameters α_i to consist of a fixed part that represent the population average and random individual differences from the population average, u_i . So, in the random effects model a, is a firm specific disturbance: $\alpha_i = \alpha + u_i$. The random individual differences u which called random effects are analogous to random error terms that have zero mean, uncorrelated across individuals and have a constant variance so σ^2_u , so $E(u_i) = 0$, $cov(u_i, u_j) = 0$ and $var(u_i) = \sigma^2_{it}$.

6. As for the Hausman test, its underlying null hypotheses is that FEM and REM do not differ substantially, where $H_0: cov(x_i, \varepsilon_i) = 0$ against the alternative hypothesis $H_1: cov(x_i, \varepsilon_i) \neq 0$. Statistically, if it is concluded that ε_i and the regressors are uncorrelated, REM may be recommended, but if they are correlated, then, the FEM would be more appropriate.

7. For Instance, those banks held only 1% of their portfolios in derivatives, further, the contribution of the foreign liabilities is limited and bond financing is small (2% of total liabilities).

References

- Ahmad, K & Hassan, K 2010, 'The Determinants and Policy Implications of Off-Balance Sheet Activities in MENA Countries Commercial Banks', *Economic Research Forum*, October, pp. 1-31.
- Al-Hassan, A, Khamis, M & Oulidi, N 2010, 'The GCC Banking Sector: Topography and Analysis', *IMF Working Paper*, 10/87, pp. 1-37.
- Angbazo, L 1997, 'Commercial Banks Net Interest Margins, Default Risk, Interest Rate Risk and Off-Balance Sheet Banking', *Journal of banking and Finance*, vol. 21, pp. 55-87.
- Acharya, V, Schnabl, P & Gustavo, G 2013, 'Securitization without Risk Transfer', *Journal of Financial Economics*, vol. 107, no. 3, pp. 515-536.
- Aktan, B, Chan, S, Zikovic, S & Evrim-Mandaci, P 2013, 'Off-Balance Sheet Activities Impact on Commercial Banks Performance: An Emerging Market Perspective', *Ekonomika Istrazivanja Economic Research*, vol. 3, pp.117-132.
- Buckova, V 2012, 'Off-Balance Sheet Activities and the Assessment of Off-Balance Sheet Credit Risk Management in the Banking Sector of the Czech Republic', *Banks and Bank Systems*, vol. 7, no. 3, pp. 18–24.
- Baltagi, B 2010, 'Econometric Analysis of Panel Data', 4th edition, John Wiley & Sons, UK.
- Benveniste, L & Berger, A 1987, 'Securitization with Recourse: An Instrument that Offers Uninsured Depositors Sequential Claims', *Journal of Banking and Finance*, vol. 11, pp. 403-424.

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- Bondt, G 1997, 'Off-Balance Sheet Diffusion: European Evidence from Bank-Level Data', Onderzoeksrapport WO&E nr 528/9743, December, 1-14.
- Chen, J 2015, 'Off-Balance Sheet Financing and Bank Capital Regulation: Lessons from Asset-Banked Commercial Papers', *Job Market Paper*, February 15. Available on line at SSRN: <https://ssrn.com/abstract=2565242>
- Cooper, E 2011, 'Determinants of Off-Balance Sheet Usage in Private Banks', *Studies in Economics and Finance*, vol. 28, no. 4, pp. 248-259.
- Eliau, M 2012, 'Determinants of Off-Balance Sheet Business in the Case of GCC Banking Sectors', *The International Journal of Banking and Finance*, vol. 9, no. 3, pp. 46-68.
- Fung, M. and Cheng, A. (2004), 'Diffusion of Off-Balance Sheet Financial Innovation: Information Complementary and Market Competition', *Pacific-Basin Finance Journal*, vol. 12, pp. 525-540.
- Furlong, F & Keeley, M 1989, 'Capital Regulation and Bank Risk-Taking', *Journal of Banking and Finance*, vol. 35, pp. 883-891.
- Hannan, T & McDowell, J 1984, 'Rival Precedence and the Dynamics of Technology Adoption: An Empirical Analysis', *Journal of Economics and Business*, vol. 49, pp. 533-547.
- Jagtiani, j, Saunders, A & Udell, G 1995a, 'The Effect of Bank Capital Requirement on Bank Off-Balance Financial Innovation', *Journal of Banking and Finance*, vol. 19, pp. 647-658.
- Jagtiani, j, Nathan, A & Sick, G 1995b, 'Scale Economies and Cost Complementarities in Commercial Banks: On and Off-Balance Sheet Activities', *Journal of Banking and Finance*, 19, pp. 1175-1189.
- Gorton, G, Metrick, A, Shleifer, A & Tarullo, D 2010, 'Regulating the Shadow Banking System' [With Comments And Discussion], *Brookings Papers on Economic Activity*, pp. 261-312.
- Gray, S & Blejer, M 2006, 'The Gulf Cooperation Council Region: Financial Market Development, Competitiveness, and Economic Growth', IMF, vol. pp. 41-51.
- Gujarati, D 2011, 'Econometrics by Examples', *Paigraue Macmillan*, 1st edition, UK.
- Kasa, T 2013, 'Determinants of Commercial Banks Off-Balance Sheet Activities: An Empirical Study on Ethiopian Banking Industry', Un Published Master Degree Thesis, Addis Ababa University, College of Business and Economics, Department of Accounting and Finance, November, pp. 1-82.
- Khasawneh, A, Khrawish, H & Feda'a, A 2012, 'The Determinants of OBS Activities in Jordan Banking System: Panel Data Analysis', *European Journal of Economics, Finance and Administrative Sciences*, vol. 47, pp.30-42.
- Koppenhaver, G 1989, 'The Effects of Regulation of Bank Participation in the Guarantee Market', *Research in Financial Services*, vol. 1, pp. 165-180.
- Koppenhaver, G & Stover, R 1991, 'Standby Letter of Credit and Large Bank Capital: An Empirical Analysis', *Journal of Banking and Finance*, vol. 15, no. 3, pp. 15-327.
- Lukic, A 2015, 'Off-Balance Sheet Activities and Their Involvement in Banking Business Operations', *International Journal of Management Research and Business Strategy*, vol. 4, no. 2, pp. 184-189.
- Ma'in, M, Misni, L & Isa, S 2015, 'Off-Balance Sheet Income Activities for Islamic and Conventional Banks', *Journal of Emerging Economies and Islamic Research*, vol. 3, no. 3, pp.1-10.
- Mansfield, E 1961, 'Technical change and the rate of imitation', *Econometrica*, vol. 29, pp. 741-66.
- Morrison, J 1998, 'The Second Curve: Managing the Velocity of Change', *Strategy and Leadership*, vol. 26 no. 1, pp. 7-11.

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- Nachane, D & Ghosh, S 2007, 'Determinants of Off-Balance Sheet Activities: An Empirical Analysis of Public Sector Banks', *Economic and Political Weekly*, Special Issue in Money, Banking and Finance, February, vol. 42, pp. 1-428.
- Nachane, D & Saibal, G 2007, 'An Empirical Analysis of the Off-Balance Sheet Activities of Indian Banks', Munich Personal RePEc Archive (MPRA), Paper No. 17304. Available Online at <http://mpra.ub.uni-muenchen.de/17304>.
- Ordonez, G 2013, 'Sustainable shadow banking', Working Paper 19022, *National Bureau of Economic Research*, May.
- Pavel, C. & Philis, D 1987, 'Why commercial Banks Sell Loans: An Empirical Analysis', *Economic Perspective*, Federal Reserve Bank of Chicago, June, pp. 3-14.
- Pozsar, Z, Adrian, T, Ashcraft, A & Boesky, H 2010, 'Shadow banking', Technical report, Staff Report, Federal Reserve Bank of New York.
- Sinha, R 2005, 'Off Balance Sheet Exposure of Indian Commercial Banks: Some Empirical Results. Indian institute of Capital Markets', the Capital Markets Conference. Available at <http://ssm.comlabstract977813>.
- Teixeira, D 2013, 'Off-Balance Sheet Items in European Banking: A Panel Data Econometric Model on Risk and Liquidity', U. Porto, FEP, *Economia Gestao*, pp. 1-38. Available Online at <https://repositorio-aberto.up.pt/bitstream/10216/69845/2/15614.pdf>.
- Ziadeh-Mikati, N 2012, 'Bank Risk Exposure, Bank Failure and Off Balance Sheet Activities: An Empirical Analysis for U.S. Commercial Banks', Paris December 2012 Finance Meeting, EUROFIDAI-AFFI Paper, Available at SSRN: <http://ssrn.com/abstract=2080>.