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2012

Online at <https://mpra.ub.uni-muenchen.de/119121/>
MPRA Paper No. 119121, posted 28 Nov 2023 15:31 UTC

The Determinants of Bank Net Interest Margin: Evidence from the Lebanese Banking Sector

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Abstract

This study analyses the determinants of commercial bank interest margins in Lebanon using bank-specific, industry specific, monetary policy, and macroeconomic variables for the period 1996-2009. The empirical results indicate that interest rate margins are shaped differently between domestic and foreign banks. For instance, domestic bank size, liquidity, efficiency, and to a lower extent, capitalisation and credit risk, have a negative impact on interest margins. The same impact was captured by concentration, dollarization, and to a lower extent, by economic growth. On the other hand, the growth rate of deposits, lending, inflation, central bank discount rate, national saving, domestic investment, and to a lower degree, the interbank rate, all have a positive impact on net interest margins. For foreign banks, we found that size, liquidity, capitalisation, and credit risk, do not show a significant impact. Another interesting remark is that the host market macroeconomic conditions, industry characteristics, central bank discount rate, and interbank rate, have much weaker impact for foreign bank interest margins.

Keywords: Interest Rate; Net Interest Margin; Foreign Banks; Concentration.

1. Introduction

Interest rate margin is among the most important factors that gauge the efficiency of financial institutions, and wide interest margins are seen to have negative implications for financial intermediation and financial development. There are concerns mainly in the developing economies about the structure and the level and of interest rates (which remain high) and their implications for the efficiency of the banking sector, where high intermediation margins may imply inefficiency of the financial sector and could act as a disincentive to investment and may also slow the economic growth. Thus, interest margins are an important policy factor as it shows how efficiently banks perform their intermediary roles of collecting savings and allocating loans.

Regarding the view to interest rate margin level, Brock and Suarez (2000) among others, argue that high interest margins are in fact unfavourable because they lead to a “disintermediation”. They state that low deposit rates represent unattractive returns for maintaining deposit accounts, which discourage savings. Additionally, high lending rates make the cost of funds increasingly prohibitive to potential borrowers and therefore, restrain investments. Nevertheless, they state that very low margins cannot be considered always positive, mainly in liberalised systems with inadequate regulation, where the mechanisms that ensure the intervention in (or even the closure of) poorly capitalised or unstable banks are absent. In other words, if weak banks are allowed to continue operating, there is a possibility that they adopt a strategy of offering lower lending rates to gain additional market share. Conversely, Saunders and Schumacher (2000) argue that while high net interest margins are usually associated with

inefficiency, they may also contribute in strengthening a country's banking system, when profits earned from high spreads are channelled by banks to their capital bases.

In addition to the above, there is a continuous debate on the key determinants of interest rate margins. The empirical studies suggest that net interest margin determinants are numerous and vary across countries and regions. For instance, some of those studies argue that the main determinants of net interest margins are bank-specific factors, whereas others claim that the industry-specific factors are more important. On the other hand, others believe that the macroeconomic factors are the most important factors that explain the level of interest rate margins particularly in developing countries.

Interest rates in Lebanon are shaped as a result of many factors, notably its open economy, a *de facto* fixed exchange rate system, a continuous government borrowing, a large public debt, and a high degree of dollarization. Besides, global interest rates are an important factor in determining interest rates in Lebanon. A study done by Poddar et al. (2006) found a substantial pass-through of international interest rates to Lebanese Eurobonds and domestic dollar deposit rates, and changes in international interest rates have substantial impact on the government's borrowing costs. The study also shows that interest rates in Lebanon are affected by domestic liquidity and sovereign risk.

This paper will try to detect the determinants of commercial bank net interest margin, with focus on the Lebanese banking sector. This sector provides an interesting case study for analysing how banks set their interest rates (i.e. what factors shape their interest margins) as it has the following characteristics: (1) an over-populated market, with the existence of 50 commercial banks competing in such a small and narrow market, (2) the large size of the banking sector relative to the economy (where total sector assets are about 3.5 times the GDP), and (3) the very high dollarization of loans and deposits. In addition to that, the Lebanese banking sector witnessed a dramatic increase in deposit inflows and a significant decline of interest rates during the past decade. Secondly, beside the bank-specific factors, industry-specific factors, and macroeconomic factors, this paper will test the effect of two additional factors, namely the gross national saving and the domestic total investment, on bank net interest margins. Finally, the study will try to detect whether foreign banks set differently their interest margins than domestic banks. In other words, it will test if the determinants of interest margins have different implications for domestic and foreign banks.

The paper proceeds as follows. Section 2 presents the development of interest rates in Lebanon. In section 3 we shed light on the literature regarding the determinants of bank net interest margins. The empirical methodology of the study is presented in section 4. The data set exploited is presented in section 5. The empirical findings of the study are included in section 6.

2. Interest Rate Development in Lebanon

The Lebanese financial system is characterised by a unique relationship between government debt and banking sector. The large government debt is about 1.6 times Lebanon's GDP, and this debt is largely held by domestic commercial banks, which are largely financed with deposits. For instance, in August 2011, total banking sector claims on public sector reached \$27.82 billion, which represents 20% of its assets and 25% of its deposits.

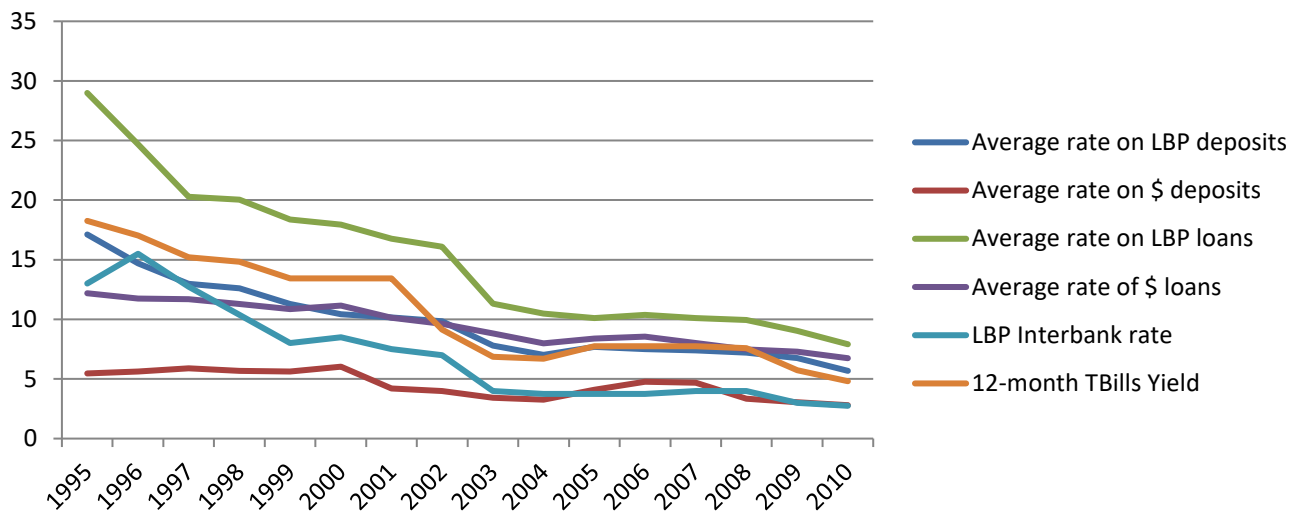
Lebanon is considered as an attractive "haven" for depositors, with \$46 billion flowing into the country between January 2008 to August 2011, at the same time when international liquidity was shrinking.¹ These large liquidity inflows combined with the lower rates offered internationally and the heightened confidence in the Lebanese financial system helped the interest rates in Lebanon to decline. The interest rate differential in favour of the Lebanese Pound has brought the level of dollarization of

¹ We also note that the deposit base increased from \$37.82 billion at the end of 2000 to \$113.52 billion in August 2011.

(resident private sector) loans from 87.01% at the beginning of 2001 to 77.28% at the end of 2010, and the dollarization of (resident private sector) deposits from 62.30% to 58.85% during the same period.²

Another important event participated in lowering interest rates, namely the Paris II conference held in November 2002, where a number of countries and international organisations participated in a \$4.3 billion, 15-year loans at lower rates to support the government's economic reform plan for lowering the cost of public debt. This also led to a significant drop in on treasury bills interest rates, which was followed by a decline in bank LBP and foreign currency deposit and lending rates. Consequently, the central bank and the ministry of finance started to offer lower returns on treasury bills and certificates of deposit and interest rates have been in a gradual decline ever since, where the average interest rate on LBP deposits declined from 10.15% in December 2001 to 5.68% in December 2010, and the average interest rate on LBP loans declined from 16.76% to 7.91% during the same period (Figure 1).

Figure 1: the development of interest rates in Lebanon 1995-2010 (end of period)



We note finally that the decline in interest rates have caused a decline in bank net interest margins that is putting pressure on bank profits. Lebanese banks have responded by seeking growth opportunities abroad and by expanding private sector credit domestically.

3. Literature Review

As noted above, the theoretical and empirical literature on interest rates determination is based on many factors such as macroeconomic variables, dollarization and exchange rate policy, bank capital, efficiency, credit risk, interest rates volatility, and banking sector structure. In this section, we shed light on these factors and how they affect bank interest rate margins.

3.1. Macroeconomic variables

The interest rate on loans depends positively on real GDP and inflation. Better economic conditions increase the number of profitable projects and hence, increase the demand for credit, giving incentives to banks to increase lending rates when borrowers have no substitute for loans (Kashyap et al. 1993). On the other hand, an increase in money market rate caused by an inflation rate forecast that is above

² This consists with the main objective of monetary policy in Lebanon. The central bank of Lebanon conducts its monetary policy by defining two operational targets: (1) the spread between foreign-currency deposit rates and those on international markets, which attracts capital to the country to finance current account deficit and external debt; and (2) the spread between LBP interest rates and dollar interest rates in Lebanon, to promote deposits in Lebanese pound.

the target rate, makes it more attractive to invest in risk-free securities that represent an alternative to retain deposits and subsequently, this decrease of demand on deposits, increases deposit interest rates.

We note that the effect of macroeconomic factors on deposit rate is different from that of loans. A higher level of permanent income increases the demand for deposits and therefore, reduces the incentive for banks to set higher deposit rates. Moreover, the direction of change in market rates plays a role in defining the responsiveness of bank deposit rates and this depends whether the bank interest rate is below or above a target rate, and depends also on market concentration in bank deposit market. In fact, a bank's decision to change deposit rates in response to exogenous changes in interest rates is similar to the decisions by firms to change prices in response to exogenous changes in costs (Hannan and Berger, 1991). These authors found that price rigidity is significantly greater in markets characterised by higher level of concentration and that deposit rates are significantly more rigid when the change is upward rather than downward. Any bank or market characteristic associated with a flatter supply of deposits will increase the incentive to change price. Two characteristics that may influence the slope of the perceived supply curve are (1) the level of market concentration and (2) the size of the firm's "customer base". To the extent that firms in more concentrated markets exhibit higher price conjectures as a result of greater recognised interdependence, operation in a more concentrated market implies a steeper perceived supply curve and greater price rigidity. Besides, larger customer base results in more customers changing deposit quantities in response to a price change, and a larger customer base is likely to be associated with a flatter perceived supply curve and less price rigidity.

3.2. Bank Interest Rate Channel

A monetary tightening (easing) determines a reduction (increase) in deposits, and an increase (reduction) in money market rates. This has a positive effect on the bank interest rates through the "traditional interest rate channel". However the increase in the cost of financing can have different impact on banks depending on their specific characteristics. This heterogeneity in banks' response (i.e. the impact on lending and deposit rates) to monetary policy change is due to two mechanisms: (1) "bank lending channel" and (2) "bank capital channel".

3.4.1. Bank Lending Channel

According to the bank lending channel, monetary policy has a direct effect on the supply of loans because banks finance loans in part with liabilities that carry reserve requirements. By lowering banks reserves, contractionary monetary policy reduces the extent to which banks can accept deposits (if reserve requirements are binding). This decrease in "reservable liabilities" leads banks to reduce lending.

Nevertheless, Romer and Romer (1990) claim that banks can in fact switch easily to non reservable liabilities and for this reason, they doubted the effect of the lending channel. Conversely, Kashyap and Stein (1995, 2000) provide evidence that this hypothesis does not hold if asymmetric information about the value of the bank's assets exists. Bernanke and Blinder (1988) state two conditions must be fulfilled for a bank lending channel to exist. Firstly, borrowers are not able to fully insulate their real spending from a decline in the availability of bank loans, i.e. bank loans are imperfect substitutes for other sources of finance. In financial systems that are more market-based, a higher degree of asset substitutability makes the bank lending channel less compelling. Secondly, banks are not able to fully insulate their loan supply from a monetary policy-induced change in their reserves, otherwise banks could simply offset the decline in reservable deposits by switching to liabilities that carry no reserve requirements such as certificates of deposits.

3.4.2. Bank Capital Channel

This channel is based on the fact that bank assets typically have longer maturities than liabilities. After an increase in market interest rates, a small fraction of loans can be renegotiated with respect to deposits. Banks incur a cost due to the maturity mismatch that reduces their profit and capital accumulation. If equity is sufficiently low and it is too costly to issue new shares, banks will be obliged to reduce their lending volume and widen their interest rate spread; otherwise they will breach the regulatory capital requirements. This decrease in lending volume will increase lending interest rates and decrease deposit rates (Van den Heuvel, 2002).

3.2. Dollarization and Exchange Rate Policy

Reinhart *et al.* (2003) proposed a measure of dollarization to identify its evolution trends in developing economies, and to ascertain the consequences of dollarization on the effectiveness of monetary and exchange rate policy. They found that a high degree of dollarization does not seem to be an obstacle to monetary control or to disinflation. Reinhart (2000) states that advocates of hard exchange rate pegs suggest that it can reduce the currency risk component in domestic interest rates, thus lowering borrowing costs (for government and private sector) and improving the outlook for financial deepening, investment and growth. However, the risk of government default and the related risk of confiscation of private assets denominated in both domestic and foreign currency are more likely to be the source of high interest rates in emerging markets.

3.3. Bank Specific Factors

3.3.1. Bank Efficiency

The costs of intermediation (screening, monitoring, branching costs...) have a positive effect on interest rate on loans and negative effect on that of deposits. This effect is attributed to the efficiency in operations of banks. Empirically, Jonas and King (2008) found that the loan supply curve of an efficient bank will be less steep compared to an inefficient bank, because marginal cost of issuing a loan is lower for an efficient bank and the production function is steeper than inefficient bank. The authors also argue that after a monetary policy contraction, an efficient bank is better able to react and controls costs by reducing its risk exposure to risky clients when interest rate on loans rises. Alternatively, during a monetary expansion, an efficient bank facing higher reserves can quickly issue loans at similar rates because it has more streamlined loan applications compared to an inefficient bank.

3.3.2. Credit Risk and Interest Rate Volatility

Lending interest rate is affected by the riskiness of the bank's credit portfolio. Banks that invest in riskier projects will have a higher rate of return to compensate the higher percentage of bad loans written-off (Angbazo, 1997). Besides, a decrease in interest rates reduces agency costs, or may cause banks to relax their lending standards, raising credit risk and thus non-performing loans. Additionally, high volatility of money market rate increases lending and deposits rates.

3.3.4. Capitalization

Well-capitalized banks are considered less risky and are better able to raise – uninsured – funds in order to compensate the drop in deposits (Van den Heuvel, 2002). Besides, the effects on lending detected for well-capitalized banks are offset by their higher capacity to insulate clients from the effects on interest rates and therefore, they are less responsive to changes in the monetary policy.

3.3.5. Market Power

Brissimis and Delis (2010) suggest that certain banks have market power in raising uninsured finance, which may or may not be the result of size. This feature naturally is carried over to the asset side of bank balance sheets causing deviations from perfectly competitive behaviour. Nevertheless, Gambacorta (2005) found an insignificant interaction between bank size and monetary policy. This result was consistent with Ehrmann et al. (2003), who found that size is not as a useful indicator for the distributional effect of monetary policy on lending.

3.5. Concentration

Berger and Hannan (1989) state that this factor has two possible impacts on interest rate settings. The first is that more concentrated banking industry will behave oligopolistically (structure performance hypothesis) and competition should result in higher spreads. Conversely, concentration could be the result of more efficient banks taking over less efficient counterparties (efficient-structure hypothesis), and efficiency in operations decreases the need to spread.

4. Methodology

4.1. Model specification

The bank net interest margin (NIM) is assumed to be determined by four types of factors: (1) bank-specific factors, (2) industry-specific factors, (3) monetary policy factors, and (4) macroeconomic factors.

Among the bank-specific factors, we cite bank size, deposit growth, capitalisation level, liquidity, efficiency, lending, and credit risk. Factors related to the structure of the banking sector include concentration, the interbank rate, and the dollarization of loans and deposits. A key monetary policy factor is the central bank discount rate. Finally, regarding the macroeconomic variables there is economic growth, inflation rate, gross national saving, and total investment. The equation relating bank NIM to the set of explanatory variables is therefore:

$$\begin{aligned} NIM_{it} = & \beta_0 + \beta_1 SIZE_{it} + \beta_2 DEP_{it} + \beta_3 CAP_{it} + \beta_4 LIQ_{it} + \beta_5 CI_{it} + \beta_6 LOAN_{it} + \beta_7 LLP_{it} + \beta_8 CONC_t + \\ & \beta_9 GDPG_t + \beta_{10} INF_t + \beta_{11} DISCOUNT_t + \beta_{12} INTERBANK_t + \beta_{13} SAVING_t + \beta_{14} INVESTMENT_t + \\ & \beta_{15} LOANDOLLAR_t + \beta_{16} DEPDOLLAR_t + \varepsilon_t \end{aligned} \quad (1)$$

4.2. Variables Specification³

Firstly, regarding the effect of bank-specific factors on bank NIM, we implement the natural log of assets (SIZE) to detect the effect of bank size on interest rate margins. The impact of growth of deposits (DEP) will also be tested. To detect the relationship between bank capitalisation level and NIM, we exploit the equity-to-asset ratio (CAP). We will also test the impact of bank liquidity (LIQ), efficiency (represented by cost-to-income ratio – CI), and lending (LOAN). Finally in this context, we will detect the impact of bank credit risk (LLP) on interest margins.

Secondly, regarding industry-specific factors, we will exploit the concentration level (CONC), the dollarization of loans (LOANDOLLAR), and deposits (DEPDOLLAR), and the LBP interbank rates (INTERBANK).

Thirdly, to assess the impact of monetary policy, we use the 1-year TBills discount rate adopted by the Central bank (DISCOUNT).

³ For the calculation of these variables, see Appendix A.

Finally, to find out the relationship between the macroeconomic factors and bank NIM, we exploit the real GDP growth (GDPG), the end of period inflation rates (INF), the gross national savings as a percentage of GDP (SAVING), and the domestic total investment as a percentage of GDP (INVESTMENT).

5. Data

5.1. Source of Data

To estimate Equation 1, we use a panel data set for the Lebanese commercial banks between 1996 and 2009, i.e. 14 years. 53 banks operating in Lebanon during the period under study are included in our data set.⁴ This sample includes 32 “domestic banks” and 21 “foreign banks”.⁵ Annual data (balance sheets and P&L accounts) are used. Data for some banks for some years were not available, therefore we are analysing an unbalanced sample.

The source of all bank data is BilanBanques. The data on discount rates, interbank rates, and the dollarization of loans and deposits were taken from the central bank of Lebanon database. Finally, the macroeconomic variables (GDP growth, inflation rate, gross national saving, and total investment) were extracted from the IMF database.

5.2. Descriptive Statistics

Table 1 presents the descriptive statistics for domestic banks and Table 2 presents the descriptive statistics for foreign banks. From Table 1, we notice that the average growth rate of deposits at domestic banks varies significantly from year to another. This growth reported a maximum of 33.98% in 1996 and a minimum of 4.23% in 2005, with an overall average growth rate of 18.66%. The level of capitalisation of domestic banks witnesses a general stability during the period under study, apart from three years (2003, 2004, and 2005) where domestic banks reported an average equity-to-asset ratio below 9%. The liquidity of these banks witnessed a general increase from 61.71% in 1996 to 71.25% in 2009, with a maximum of 72.41% in 2005. Domestic bank NIM recorded an obvious decrease between 1996 (3.95%) and 2009 (1.97%). This was due to the increase competition on one hand, and the decrease in lending rates (following the decrease of sovereign rates) on the other. Domestic bank efficiency fluctuated considerably, where the cost-to-income ratio ranges from a maximum of 83.44% in 2000 and a minimum of 45.15% in 2009 with an overall average of 70.73%. The lending rates at domestic banks decreased during the period under study from 31.46% in 1996 to 24.47% in 2009 with an overall average of 27.42%. This is consistent with the increase in liquidity during that period. Finally, credit risk increased from 1996 to 2003, were LLP increased from 11.83% to 20.03%, then LLP decrease gradually to 13.83% in 2009 reflecting a decrease in credit risk after 2003.

Table 1: Descriptive statistics for domestic banks operating in Lebanon 1996-2009 (%)

		DEP	CAP	LIQ	NIM	CI	LOAN	LLP
1996	Mean	33.98	9.04	61.71	3.95	68.71	31.46	11.83
	SD	15.86	5.93	9.31	1.20	20.59	7.95	11.10
1997	Mean	29.01	10.79	61.44	3.43	64.88	31.22	11.97
	SD	19.28	8.04	9.65	0.99	21.17	6.95	9.56
1998	Mean	30.51	10.51	61.50	2.99	67.37	31.21	10.73
	SD	41.01	7.58	10.52	0.94	20.34	7.74	8.25

⁴ Following Awdeh and Hamadi (2011), we will divide our sample into 2 subsamples according to the ownership of banks: the first subsample contains domestic banks, and the second contains foreign banks. We do this to test if the implemented variables will have different impact on banks, taking into consideration their ownership (i.e. domestic vs. foreign).

⁵ We mean by “foreign banks” the subsidiaries of foreign banks.

1999	Mean	22.14	9.76	60.65	2.68	73.38	32.32	11.49
	SD	52.15	7.18	9.55	1.07	23.71	7.83	7.19
2000	Mean	18.86	9.44	62.52	2.40	83.44	31.19	13.22
	SD	25.30	6.62	10.27	0.73	48.84	8.56	8.28
2001	Mean	10.85	9.30	64.55	2.15	81.36	29.11	15.11
	SD	14.71	6.74	10.56	0.76	40.80	8.75	9.07
2002	Mean	15.88	9.29	67.08	2.44	71.95	26.52	16.59
	SD	14.86	6.69	10.06	0.60	17.86	7.97	8.34
2003	Mean	19.99	8.26	70.83	2.32	73.30	23.05	20.03
	SD	14.02	5.66	10.44	0.74	28.81	8.21	13.13
2004	Mean	14.05	7.92	70.93	1.82	70.93	22.61	18.80
	SD	14.45	5.05	10.80	0.56	15.41	9.23	12.15
2005	Mean	4.23	8.93	72.41	1.87	68.95	21.83	18.69
	SD	8.36	5.14	9.17	0.48	17.28	8.39	11.60
2006	Mean	9.79	9.60	72.25	1.94	70.13	22.31	17.88
	SD	8.87	4.09	9.90	0.53	26.01	9.63	12.82
2007	Mean	5.05	12.22	70.11	1.80	76.27	23.77	16.26
	SD	30.78	12.51	9.80	0.52	70.64	10.52	15.48
2008	Mean	12.24	11.35	68.46	2.01	64.52	25.81	15.49
	SD	10.67	11.42	9.34	0.44	18.08	9.79	15.69
2009	Mean	22.18	10.52	71.25	1.97	45.15	24.47	13.83
	SD	18.17	10.66	8.50	1.11	74.74	7.93	14.01
Grand mean		18.66	9.85	66.16	2.54	70.37	27.42	14.89

For foreign banks, the growth rate of deposits witnessed an overall decrease during the period under study with an average of 12.46%. The capitalisation rate of foreign banks ranges between a minimum of 9.04% in 1996 and a maximum of 14.83% in 2009, with an overall average of 11.77%. The liquidity of these banks recorded a minimum of 62.43% in 2001, and a maximum of 71.36% in 2008, with an overall average of 66.58%. The net interest margin recorded a minimum of 2.50% in 2004 and a maximum of 4.77% in 1996, with an overall average of 3.31%. The cost-to-income ratio of foreign banks fluctuated significantly between 1996 and 2009, with a minimum of 59.67% in 2008 and a maximum of 139.42% in 2004, and an overall average of 82.32%. Regarding lending rates, foreign banks decreased their loan-to-asset ratios between 1996 and 2009, with a minimum of 20.83% in 2007 and a maximum of 31.53% in 2001, with an overall average of 27%. Finally, the credit risk of these banks increased significantly, where LLP increased from 17.06% in 1996 to 26.82% in 2009, with an overall average of 22%.

Table 2: Descriptive statistics for foreign banks operating in Lebanon 1996-2009 (%)

		DEP	CAP	LIQ	NIM	CI	LOAN	LLP
1996	Mean	25.87	9.04	62.80	4.77	69.51	30.83	17.06
	SD	23.05	6.09	14.47	2.68	25.93	14.38	19.74
1997	Mean	17.36	12.87	65.48	3.84	68.96	28.48	16.00
	SD	22.40	10.89	14.01	1.24	23.76	13.53	18.14
1998	Mean	9.77	12.60	63.83	3.62	66.41	29.95	15.83
	SD	22.19	10.69	13.82	1.51	18.67	12.72	18.19
1999	Mean	12.46	14.68	63.19	3.57	83.25	30.36	15.78
	SD	23.53	18.54	14.77	1.67	36.14	15.61	17.61
2000	Mean	32.59	12.36	64.17	3.10	128.95	28.83	18.98
	SD	84.18	12.89	15.65	1.39	215.34	16.02	19.00
2001	Mean	14.02	10.28	62.43	2.77	83.59	31.53	17.84
	SD	50.44	7.68	16.51	1.41	52.54	15.13	15.17
2002	Mean	22.86	9.44	67.28	2.67	76.02	26.31	18.37
	SD	87.59	6.83	12.80	1.17	33.36	12.17	12.27

2003	Mean	1.86	9.53	67.65	2.60	90.32	25.95	25.29
	SD	8.88	7.46	15.68	1.02	55.19	14.73	17.27
2004	Mean	7.67	11.14	70.03	2.50	139.42	24.05	30.96
	SD	9.17	9.28	16.67	1.08	233.65	15.70	25.37
2005	Mean	-3.75	12.68	70.16	2.80	79.62	23.93	30.84
	SD	20.18	11.37	14.36	1.17	31.32	14.34	24.26
2006	Mean	5.24	12.17	70.51	3.07	88.67	21.39	30.96
	SD	14.84	10.19	12.20	1.33	80.36	13.63	22.94
2007	Mean	3.39	13.37	70.41	2.93	66.33	20.83	27.55
	SD	13.75	10.17	12.75	1.19	26.69	14.25	23.05
2008	Mean	15.57	13.31	71.36	3.36	59.67	23.52	27.46
	SD	15.35	9.77	14.29	1.59	18.84	13.78	25.43
2009	Mean	2.38	14.83	71.02	2.78	61.80	23.81	26.82
	SD	18.32	12.46	15.05	1.09	16.64	14.28	25.59
Grand mean		12.46	11.77	66.58	3.31	82.32	27.00	22.00

6. Empirical Results

6.1. The Determinants of Domestic Bank NIM

Table 3 presents the regression estimates for the determinants of domestic bank NIM. We present several models to avoid multicollinearity among some variables and to test the impact of several combinations of regressors. The presented models show to have high explanatory power, since their adjusted R-Squared ranges between a minimum of 67.55% and a maximum of 75.44%. Besides, the models are overall significant, shown by their F-stat. and Prob(F-stat.)

Turning to the individual variables we note the following. The size of domestic banks is negatively correlated with NIM and significant at the 1% level in all presented models. Larger domestic banks have significantly lower interest margins than smaller ones, which suggest that the former pay higher interest on deposits and/or charge lower interest rates to loans. Therefore, it seems that larger domestic banks rely less on interest income than their smaller counterparties, since they have the capability to provide more fee-based services and products. Besides, large banks may offer higher rates to deposits to benefit from cross-selling and economies of scale.

Deposit growth is positively and significantly related to NIM, which suggests that banks with more demand for deposits pay lower rates to depositors. This may suggest that some banks rely on their reputation to attract deposits, despite the fact that they offer lower rates.

CAP is negatively correlated with NIM, in all presented model, and significant (at 1% level) in one of them. An interpretation for this is that better capitalised banks, offer higher rates to depositors to obtain more funds and channel them as loans, since their high capitalisation allows them to engage more in lending activities. This could be accompanied with lower lending rates in order to have a wider base of borrowers and benefit from economies of scale.

Liquidity affects negatively bank NIM, and is significant in two out of the three presented models. Thus, domestic banks may increase their interest rates to attract deposits, which boosts their liquidity, but at the same time lowers their interest margins. This could also be linked to the effect of monetary policy, where an increase in reserve requirements puts pressures on domestic bank interest margins, and vice versa. Cost-to-income ratio is also negatively and significantly associated with NIM, in all presented models. This suggests that more efficient banks tend to charge lower rates to loans and/or offer higher rates to deposits. Thus, they benefit from their efficiency to be competitive.

LOAN affects positively and significantly (at 1%) bank interest margins. An interpretation for this is that banks that have high demand for loans, have pricing power that allows them to charge higher rates to loans. Another possible explanation is that those banks have access to large amounts of cheap deposits (i.e. they pay lower rates to deposits), which allows them to expand their lending. Credit risk is negatively correlated with bank interest margins and this is shown by the negative sign captured

by LLP in all model (but significant at 10% in only one the presented models). Thus, banks with high credit risk tend to offer higher rates, to encourage depositors to bank with them.

The empirical results show that concentration in the Lebanese banking sector does not lower competition, but in fact increases it significantly (and therefore lowers bank margins). This is shown by the negative and significant correlation between CONC and NIM. Thus, the increase in concentration increases competition, which has an effect of lowering lending rates, and/or increasing deposit rates.

The economic growth affects domestic bank interest margins negatively, and this is shown by the negative sign captured by GDPG (significant at 10% in only one model). Thus, in good economic conditions, domestic banks tend to increase deposit rates to attract more deposits in order to boost their lending capacity. At the same time they may charge lower rates to loans, since during good economic conditions credit risks are generally lower. Conversely to GDPG, INF is positively correlated to bank NIM. The impact of this variable is significant at 1% in all presented models, which shows the very strong impact of inflation on bank interest margins. Thus, when inflation increases, lending interest rate increases.

Central bank discount rate also boosts banks margins. This is shown by the significant association between DISCOUNT and NIM. Thus, whenever the central bank increases (decreases) its discount rate, domestic banks react by increasing (decreasing) their lending rates. The interbank rate has also a strong impact on domestic bank rates, where an increase in this rate pushes banks to increase their lending rates.

Gross national saving has significant effect of increasing bank interest margins, since an increase in national savings increases the demand for deposits and thus, lowers deposit rate, which boosts bank NIM. The total investment also augments bank NIM, since INVESTMENT and NIM are positively and significantly correlated (in three out of the four presented models). Since the Lebanese financial market is very small and inactive, the banking sector is – by large – the main source of funding for investors. Therefore, the domestic investment is mainly financed with bank loans, and any increase in the demand for loans increases lending rates.

The dollarization of loans lowers bank interest margins since dollar lending rates are lower than LBP lending rates.

Table 3: The determinants of domestic bank NIM (Method: Fixed Effects)

	1	2	3	4	5	6	7
C	12.78*** (2.46)	6.95*** (1.08)	11.05*** (2.51)	7.17*** (1.92)	3.81*** (0.46)	4.63*** (1.25)	3.94*** (0.35)
SIZE	-0.28*** (0.08)	-0.25*** (0.07)	-0.51*** (0.07)			-0.26*** (0.08)	
DEP	0.003** (0.001)	0.003** (0.001)		0.002* (0.001)			
CAP	-0.01 (0.06)	-0.004 (0.005)	-0.03*** (0.01)		-0.01 (0.01)		
LIQ	-0.01** (0.01)		-0.01*** (0.01)			-0.0002 (0.01)	
CI	-0.003*** (0.001)	-0.002*** (0.001)		-0.002** (0.001)			
LOAN		0.02*** (0.01)			0.02*** (0.005)		
LLP	-0.0001 (0.005)	-0.002 (0.005)	-0.01 (0.01)			-0.01* (0.01)	
CONC	-0.03** (0.01)	-0.03** (0.01)		-0.03*** (0.01)			-0.07*** (0.01)
GDPG	-0.03* (0.02)		-0.01 (0.01)			-0.02 (0.01)	

INF		0.06*** (0.01)			0.05*** (0.01)		
DISCOUNT	0.05* (0.03)			0.09*** (0.03)		0.08*** (0.02)	
INTERBANK		0.01 (0.004)	0.01*** (0.005)		0.01 (0.004)		0.003 (0.005)
SAVING	0.02*** (0.005)	0.01** (0.01)	0.02*** (0.004)				0.02*** (0.01)
INVESTMENT	0.03** (0.01)	0.002 (0.01)		0.04*** (0.01)			0.05*** (0.01)
LOANDOLLAR	-0.07** (0.03)		-0.02 (0.02)	-0.07*** (0.03)			
DEPDOLLAR		-0.02* (0.01)			-0.05*** (0.01)		
Adjusted R^2	0.7397	0.7544	0.6888	0.7171	0.6969	0.6755	0.7025
Observations	415	415	417	415	417	417	417
F-statistic	27.75	29.91	24.02	28.61	26.85	24.40	28.29
Prob(F-stat.)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hausman test							
χ^2 statistic	104.96	123.59	137.07	100.15	117.38	106.52	119.08
Prob(χ^2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes:

Standard error in parentheses.

*** Significantly different from zero at the 1% level.

** Significantly different from zero at the 5% level.

* Significantly different from zero at the 10% level.

Surprisingly, the dollarization of deposits also lowers bank NIM. DEPDOLLAR has a negative and significant impact on NIM in the two presented models. An interpretation for that is that because banks pay lower rates to dollar deposits (i.e. lower funding rates) they are able to offer loans at lower rates (i.e. lower cost to borrowers). Therefore, banks with more dollar deposits provide lower lending rates, which lower their NIM.

6.2. The Determinants of Foreign Bank NIM

Table 4 presents the regression estimates for the determinants of foreign bank NIM. We present several models to avoid multicollinearity among some repressors and to test the impact of several combinations of regressors. The models have high explanatory power, shown by their adjusted R-squared that ranges between a minimum of 63.20% and a maximum of 65.33%. On the other hand, the models are overall significant, shown by their F-stat. and Prob(F-stat.).

Turning to the individual variables, we observe the following conclusions. The size of foreign banks is negatively associated with NIM. However, this relationship is significant (at 5%) in only one model, unlike domestic banks where this relationship is significant in all models. Thus, larger foreign banks have slightly lower NIM than their smaller counterparties, which means that the former do not benefit from cross-selling and economic of scale similarly to large domestic banks.

Deposit growth is slightly (positively) correlated with bank interest margins, which means that foreign banks with higher demand for deposit do not necessary offer lower deposit rates. The capitalisation of foreign banks does not significantly impact their NIM. Unlike domestic banks, foreign banks do not rely on their higher solvency to offer lower rates (as they are considered less risky).

Liquidity also does not affect NIM and foreign banks do not use interest rates as a tool to attract deposits to boost their liquidity.

Similarly to domestic banks, more efficient foreign banks charge lower rates to loan and/or offer higher rates to deposits. Unlike domestic banks, foreign bank lending rates do not affect their interest margin, and this is shown by the insignificant correlation between LOAN and NIM. Similarly, foreign banks do not offer higher rates for deposits to compensate for higher credit risk. They may base solely on their reputation, as being a subsidiary of a larger international institution.

The concentration in the Lebanese banking sector affects foreign banks in a much lower degree than domestic ones. This is shown by the significant impact captured by CONC in only one of the four presented models. Thus, the increase in concentration that reflects increase in competition does not affect significantly foreign banks, since a large proportion of their activities are in fact located outside the host market. The economic conditions of the host market (represented by GDPG and INF) also have much lower impact on foreign banks. Therefore, foreign banks do not adjust their lending and deposit rates according to the change in the host market economic growth and inflation.

The same conclusion is for the central bank discount rate and the host market interbank rate. This may suggest that foreign banks do not rely on the host market central bank or interbank market to raise funds and thus, their (loans and deposits) rates are not adjusted according to the host market central bank discount rate and interbank rate.

Table 4: The determinants of foreign bank NIM (Method: Fixed Effects)

	1	2	3	4	5	6	7
C	4.15 (5.59)	7.71** (3.54)	4.93 (5.10)	0.17 (4.18)	2.12** (0.88)	4.73 (2.92)	2.94*** (0.68)
SIZE	-0.44 (0.27)	-0.41 (0.26)	-0.49** (0.23)			-0.27 (0.23)	
DEP	0.002 (0.002)	0.002 (0.002)		0.002 (0.002)			
CAP	-0.02 (0.02)	-0.02 (0.02)	-0.02 (0.02)		-0.01 (0.01)		
LIQ	-0.005 (0.01)		-0.001 (0.01)			-0.004 (0.01)	
CI	-0.003*** (0.001)	-0.002** (0.001)		-0.002** (0.001)			
LOAN		0.01 (0.01)			0.01 (0.01)		
LLP	0.0005 (0.01)	0.001 (0.005)	-0.002 (0.005)			0.001 (0.01)	
CONC	-0.003 (0.02)	-0.03 (0.03)		-0.004 (0.02)			-0.04*** (0.01)
GDPG	-0.01 (0.03)		-0.03 (0.03)			-0.002 (0.02)	
INF		0.02 (0.03)			0.03* (0.02)		
DISCOUNT	0.03 (0.06)			0.06 (0.06)		0.05 (0.03)	
INTERBANK		0.01 (0.01)	0.01 (0.01)		0.01 (0.01)		0.02* (0.01)
SAVING	0.03** (0.01)	0.03** (0.01)	0.02*** (0.01)				0.03*** (0.01)
INVESTMENT	-0.01 (0.02)	-0.01 (0.02)		-0.001 (0.02)			-0.01 (0.02)
LOANDOLLAR	0.05 (0.07)		0.04 (0.04)	0.01 (0.05)			

DEPDOLLAR		0.01 (0.02)			-0.02 (0.01)		
Adjusted R^2	0.6533	0.6523	0.6460	0.6394	0.6320	0.6347	0.6437
Observations.	237	237	237	237	237	237	237
F-statistic	14.47	14.41	15.85	16.50	16.58	16.77	18.05
Prob(F-stat.)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hausman test							
χ^2 statistic	23.05	22.19	19.65	27.38	19.00	17.88	22.85
Prob(χ^2)	0.0410	0.0023	0.0201	0.0003	0.0042	0.0065	0.0004

Notes:

Standard error in parentheses.

*** Significantly different from zero at the 1% level.

** Significantly different from zero at the 5% level.

* Significantly different from zero at the 10% level.

Similarly to domestic banks, foreign bank NIM is significantly affected by the level of national saving, since a general increase in savings results in an overall increase in the demand for deposit at all banks and consequently, an overall decrease in deposit rates. On the other hand, an increase in domestic investment does not impact foreign bank NIM. This could be due to the fact the foreign banks tend to channel their funds abroad (to their home market) and thus, they do not devote considerable credit to the host market. Thus, a domestic change in the domestic demand for loans does not modify foreign bank lending rates.

Finally, conversely to domestic banks, the dollarization of loans and deposits does not affect foreign banks interest margins, which means that these banks do not adjust their lending and deposit rates according to the level of foreign currency dominated loans and deposits.

7. Conclusion

We have analysed the determinants of bank net interest margin for commercial banks operating in Lebanon between 1996 and 2009. We have implemented four sets of variables reflecting bank-specific factors, industry-specific factors, monetary policy factors, and macroeconomics factors. We have also split our sample according to the ownership of banks (domestic vs. foreign.).

The empirical results of this paper show that interest rate margins are shaped differently between domestic and foreign banks. For domestic banks, we found that bank size, liquidity, efficiency, and to a lower extent, capitalisation and credit risk, have a negative impact on interest margins. The same impact was captured by concentration, dollarization of both loans and deposits, and to a lower extent, by economic growth. Conversely, the growth rate of deposits, lending, inflation, central bank discount rate, national saving, domestic investment, and to a lower degree, the interbank rate, all boost domestic bank net interest margins.

On the other hand, many of the above mentioned variables have different impact for foreign banks. For instance, only efficiency (cost-to-income ratio) maintained its significant negative effect. Whereas foreign bank size, liquidity, capitalisation, and credit risk, do not show a significant impact. We have also noticed that the host market macroeconomic conditions (GDP growth and inflation), industry characteristics (concentration and dollarization), central bank discount rate, interbank rate, and domestic investment, all have much lower impact on foreign banks.

Appendix A: Calculation of Control Variables

Variable	Description
NIM	Interest earned minus interest paid divided by average assets
SIZE	Natural log of assets
DEP	Costumer deposit growth (percentage)
CAP	Equity-to-asset ratio
LIQ	Liquid assets divided by total assets
CI	Cost-to-income ratio
LOAN	Total loans divided by total assets
LLP	Provisions for doubtful loans divided by gross loans
CONC	The assets of top 5 banks divided by total sector assets
GDPG	Real GDP growth (percentage)
INF	End of year inflation rate
DISCOUNT	One year TBills discount rate adopted by the central bank
INTERBANK	Interbank rate
SAVING	Gross national saving as percentage of GDP
INVESTMENT	Total investment as percentage of GDP
LOANDOLLAR	Loans in foreign currencies divided by total loans
DEPDOLLAR	Deposits in foreign currencies divided by total deposits

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