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The Determinants of Credit Growth in Lebanon

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Abstract

This study aims at defining the credit growth determinants in Lebanon by exploiting a panel data of 34 commercial banks over the period 2000-2015. The empirical results show that deposit growth, GDP growth, inflation, and money supply, all boost bank credit to the resident private sector. Conversely, credit risk, lending interest rate, T-bill rate, public borrowing, and remittance inflows decrease loan growth. We extend our analysis and detect the impact of one year lag of all exploited variables in order to find out if they have a delayed impact on credit growth, where we find several different results. For instance, lag LLP recorded the opposite effect of LLP; ROA does not affect credit growth, whereas its lag lowers credit growth; the impact of a change in money supply amplifies considerably after one year; and finally, the negative impact of remittances fades away after one year.

Keywords: credit growth; panel fixed effects

1. Introduction

The macroeconomic implications of credit growth have attracted considerable attention from both policy makers and researchers, and a large empirical literature examined the determinants of domestic credit.

Given the particular importance of bank loans for financing both firms and households, developments in these loans have important implications for economic activity. For instance, increased credit availability often spurs economic growth helping savings to be channelled into investment, but a rapid credit growth also raises concerns about prudential risks, as it may decrease loan quality, increase systemic risk, and deteriorate bank soundness (Igan and Pinheiro, 2011). Furthermore, an excessive credit growth often leads to the build-up of systemic risks to financial stability, which may result in a systemic banking crises (Alessi and Detken, 2014).

Consequently, policymakers use credit data as a main source of information about the state of the economy. The trend of bank credit allows predicting future economic conditions, where a rapid growth of credit supply could participate in subsequent financial or economic crises, whereas a significant decline in credit can result in a recession in economic activities.

Understanding loan supply and demand mechanisms requires recognising the determinants of bank credit growth. Therefore, this paper aims at studying the determinants of bank credit growth in Lebanon, by implementing a set of bank-specific variables, macroeconomic variables, and variables reflecting the monetary policy. Using Panel Fixed-Effects method, we found that bank-specific factors have a limited effect on credit growth compared to macroeconomic variables and monetary policy tools. More specifically, factors shaping the growth of bank lending in Lebanon are: deposit growth and its one year lag (positive effect), GDP growth ant its one year lag (positive effect), inflation rate (positive effect), lending rate and its one year lag (negative effect), T-bill yield and its one year lag (negative effect), increase in money supply and its one year lag (positive effect), public debt (negative effect), and finally remittance inflows (negative effect).

The novelty of this paper is that in addition to analysing the impact of exploited variables on credit growth, it detects the impact of their one-year lag, where the empirical results reveal several different results. This in fact proves that the delay effect of some variables may in some cases offset the immediate effect.

The remaining of the paper is as follows. In the following section, we shed light on the relevant literature. Section 3 illustrates the empirical methodology. In Section 4 we present the dataset. The empirical results are presented and interpreted in Section 5. Finally, the conclusions of the research are presented in Section 6.

2. Literature Review

A considerable body of literature has detected the different determinants of bank credit and come up with different results according to the exploited sample and the studied period. For instance, using a sample of European countries, Calza et al. (2001) showed that the long-run domestic credit is related positively to real GDP growth, but affected negatively by short-term and long-term real interest rates. Égert et al. (2006) investigated the determinants of domestic credit to the private sector as a percentage of GDP in 11 emerging European countries. Their results indicate that credit to the public sector, nominal interest rates, inflation rate and the spread between lending and deposit rates are the major determinants of credit growth in the CEE-5, while GDP per capita is the only important factor for the Baltic and South-eastern European countries. Cucinelli (2015) investigated the inter-temporal relationship between bank lending behaviour and credit risk in Italy, with focus on the impact of NPL and loan loss provision. The author found that the credit risk of previous years have a negative impact on bank lending behaviour. Focusing on a large panel of non-transition developing and industrialised countries, Cottarelli et al. (2005) showed that bank lending is positively related to GDP per capita and financial liberalisation but negatively affected by public debt.

Elekdag and Han (2012) analysed the main drivers of credit growth in 10 emerging Asia countries over the period 1989:Q1–2010:Q4. They showed that greater exchange rate flexibility promote financial stability, which reduces the role of external factors affecting domestic credit dynamics. Magud et al. (2012) analysed the impact of exchange rate flexibility on credit markets in 25 emerging markets in Asia, Europe, and Latin America. They revealed that bank credit grows more rapidly in economies with less flexible exchange rate regimes. Guo and Stepanyan (2011) examined the changes in bank credit across 38 emerging market economies. They found that domestic deposit growth, non-resident liability, stronger economic growth and high inflation increase demand for credit and leads to higher credit growth. Moreover, they found that loose monetary conditions (domestic or global) result in more credit, and a healthy banking sector tends to extend more credit than an unhealthy one. Gozgor (2014) examined the determinants of domestic credit expansion across 24 emerging market economies over the period 2000-2011. They used a dynamic panel data estimation technique to investigate the short-run and long-run effects of internal demand and external supply factors, external balance, trade openness and global uncertainty on domestic credit. The author found that loose monetary policy in the domestic market, differences between domestic and global lending rates, and real trade openness positively contribute to domestic credit levels. Chen and Wu (2014) examined bank credit growth in the emerging markets before, during, and after the 2008-09 financial crisis. The authors found that expansionary monetary policy led to higher credit growth, and banks in Latin America and Asia that relied more on retail funding had higher credit growth. Moreover, they found that better-capitalised banks, banks with more liquid assets, and banks in countries with stronger banking regulation had higher credit growth during the crisis.

Oluitan (2013) examined the factors that propel credit growth by studying a panel data of 33 African countries over the period 1970-2006. The author showed that real export is inversely related to real private sector credit, while real capital inflow and real imports is positively related to real private sector credit. Tan (2012) analysed the determinants of private sector credit growth in the Philippines, and found that a consumption-driven growth, a rise in the Fed rate, a distressed asset ratio, and net interest margins all slow down private credit. Imrana and Nishatb (2013) empirically identified the factors that explain bank credit to the private sector in Pakistan using annual data from 1971 to 2010. The authors found that foreign liabilities, domestic deposits, economic growth, exchange rate, and monetary conditions are significantly associated with bank credit particularly in the long run, whereas inflation and money market rate does not affect the private credit. Furthermore, their results infer that the financial health and liquidity of the banks play a significant and vital role in the determination of loan. Thaker et al. (2013) detected the impact of macroeconomic variables on bank credit in Malaysia between 1991 and 2011. Overall, the author found that the macroeconomic developments contribute positively towards bank credit.

Pham (2015) investigates the determinants of bank credit in 146 countries at different levels of economic development over the period 1990-2013, and found also that the health of domestic banking system plays a relevant role in boosting bank lending.

The impact of regulation on bank credit was also tested by many studies. For instance, Curry et al. (2006) quantified the short-term and long-term impact of bank supervision (proxied by CAMEL ratings) on commercial and industrial loans, consumer loans, and real estate loans. They divided their time series into two distinct sub-periods: 1985-1993 (which covers the credit crunch period), and 1994-2004 (which covers the sustained recovery period). For the first period, the authors found that business lending was the most sensitive to changes in CAMEL ratings, whereas the other loan categories show lower sensitivity. For the second period, they find

little evidence that changes in CAMEL ratings had any systematic effect on loan growth for any of the loan categories. Kupiec et al. (2015) estimated the sensitivities of banks' quarterly loan growth rates (over the period 1994-2011) to variation in bank supervision, proxied by CAMELS ratings. The authors found that an increase in intensity of bank supervision following a poor examination rating has a very significant impact on a bank's loan growth. In contrast, they found that variations in bank capital and liquidity positions have only minor impacts on loan growth. Berrospide and Edge (2010) examined how bank capital influences the extension of bank credit in the U.S. and found a modest effects of capital-to-asset ratios on bank lending. The authors argue that these results contradict the constant-leverage view, which has been quite influential in shaping forecasters' and policymakers' views regarding the effect of bank capital changes on loan growth.

Many studies have also analysed the impact of monetary policy on bank lending. For instance, Farinha and Robalo-Marques (2001) found a banking lending channel in the transmission of monetary policy in the Portuguese economy. They also showed that this channel is more important for less capitalized banks. Conversely, they did not find that bank Size and liquidity are relevant characteristics that determine the importance of the lending channel. Hernando and Martinez-Page (2001) found no differences in the response of loan growth to monetary policy changes for Spanish banks in terms of size or different degrees of capitalisation. However, the authors found some evidence that less liquid banks may display a stronger response than banks with a higher degree of liquidity. Finally, Sun et al. (2010) find that the required reserve ratios and the official lending interest rate are negatively related with bank lending in China.

3. Methodology

As cited above, the empirical literature show that bank lending is determined by several internal and external variables. The internal variables, or as known by bank-specific factors, are bank size, capitalisation level, profitability, and riskiness, among others. The external variables are factors reflecting economic environment and developments, in addition to the policies executed by monetary authorities. Regarding macroeconomic variables we can cite GDP growth, inflation rate, public debt, and financial inflows. On the other hand, variables that represent monetary policy include money supply and interest rates. Therefore, we propose the following equation that links bank credit to a set of internal and external variables:

$$CREDG_{i,t} = \beta_0 + \beta_1 DEPG_{i,t} + \beta_2 CAP_{i,t} + \beta_3 LLP_{i,t} + \beta_4 ROA_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 GDP_t + \beta_7 INF_t + \beta_8 DEBT_t + \beta_9 LInt_t +$$

$$\beta_{10} TbillY_t + \beta_{11} M3G_t + \beta_{12} REMITG_t + \varepsilon \quad (1)$$

Where:

CREDG is the annual percentage growth rate of credit provided by each bank to the resident private sector.

DEPG is the annual percentage growth rate of customer deposits received by each bank. We exploit this variable to detect the impact of deposit flows on bank lending supply capacity. Since deposits represent a major source of funds for Lebanese banks, we expect to find a positive impact of this variables on credit growth. To test the impact of bank capitalisation on credit growth, we adopt banks' equity-to-asset ratio (*CAP*). A better-capitalised banks are expected to have higher capability to provide more loans, thus we expect to observe a positive association between this variable and the dependent variable. Credit risk could be a factor that explains bank lending behaviour, therefore we include loan-loss-provision as a percentage of total loans (*LLP*). This variable may have a negative or positive association with bank lending. On one hand, a rapid expansion of credit may result in deterioration of bank credit risk, consequently an increase in loan loss provisions. Conversely, an increase in credit risk may push banks to cut lending. Bank profitability could be a motive for banks to expand their loans to the private sector. Thus, we will test the effect of *ROA* on credit growth and we anticipate a positive correlation between bank profitability and credit growth. Larger banks may have higher ability to expand lending. Therefore, we include the natural log of bank assets (*SIZE*) and we expect a positive impact of size on bank lending.

As the development of economic conditions has a direct impact on loan growth, we use the GDP growth rate (*GDPG*) and inflation rate (*INF*). Regarding GDP growth, we expect to observe a positive impact on bank lending growth, where improvement in economic conditions may encourage businesses and households to borrow, and banks to lend. On the other hand, higher inflation may discourage banks to lend (particularly for the long-term), and thus we expect a negative effect of inflation on lending growth. The government budget deficit in Lebanon is mainly financed with borrowing from local banks. Therefore to test for the existence of any crowding out effect, we use the gross public debt as a percentage of nominal GDP (*DEBT*). We anticipate a negative impact of this variable on bank credit to the private sector.

To detect the impact of monetary policy on Lebanese bank credit growth, we exploit the following 3 variables: local currency lending interest rate (*LInt*), the 1-year T-bill yield (*TbillY*), and the annual growth rate of money supply – particularly M3 (*M3G*). An increase in lending interest rate is expected to lower loan demand, and an increase in T-bill yield is expected to lower loan supply. On the other hand, an ease monetary policy – represented by an increase in money supply – is assumed to boost bank lending capability. Thus, we expect to observe a positive impact of growth of money supply on credit growth rates. Finally, since Lebanon is an example of a remittance-dependent economy, and remittance inflows represented 15% of GDP in 2015, we detect the effect of the annual percentage growth rate remittance inflows (*REMITG*) on credit growth. Remittances may represent a substitute for bank loans. Consequently, we expect to observe a negative correlation between these 2 variables.

4. Data

To estimate Equation 1, we use a panel data set formed of 34 commercial banks operating in Lebanon between 2000 and 2015. This number represents more than 70% of the commercial bank population in Lebanon. We note that our selection of banks was constrained to those having at least 10 years of data.

The source of annual bank data is BilanBanques. The macroeconomic variables (GDP growth rate, inflation rate, and public debt) and remittances were extracted from the World Bank database. The interest rates and money supply data were obtained from the central bank of Lebanon database. Table 1 includes some summary statistics of the exploited independent variables and Table 2 presents the correlation matrix of these variables.

Table 1. Variables summary statistics – selected years and the entire period

	DEPG	CAP	LLP	ROA	GDPG	INF	LInt	TbillY	M3G	DEBT	REMITG
						2000					
Mean	19.81	9.51	13.13	0.66							
Median	14.07	7.65	11.4	0.79							
SD	24.19	6.75	7.12	0.91							
CV	1.22	0.71	0.54	1.38							
Max	111.35	39.01	29.62	2.83							
Min	-2.9	2.92	1.9	-2.57							
Values					-0.93	-1.61	17.94	13.43	9.56	146.11	12.83
						2007					
Mean	3.64	12.67	18.94	0.86							
Median	9.91	8.06	13.41	0.89							
SD	27.75	12.86	14.78	0.99							
CV	7.63	1.01	0.78	1.15							
Max	48.25	67.46	65.8	5.05							
Min	-98.65	4.33	0.89	-2.1							
Values					12.75	5.96	10.1	7.75	12.4	171.02	10.9
						2015					
Mean	9.16	11.07	8.7	1.14							
Median	5.88	8.33	5.55	0.87							
SD	17.19	13.83	7.62	1.78							
CV	1.88	1.25	0.88	1.56							
Max	91.35	84.01	31.5	10.53							
Min	-8.44	1.48	1.12	-0.46							
Values					1.79	-3.4	7.45	5.35	5.05	138.41	4.03
						2000-2015					
Mean	12.85	10.47	14.62	0.85	7.08	2.78	10.42	7.32	9.36	153.87	10.72
Median	10.57	8.12	12.03	0.85	5.78	2.67	10.03	6.78	7.99	153.51	7.51
SD	18.77	10.27	12.04	1.03	5.92	3.42	3.41	2.62	3.97	17.84	21.69
CV	1.46	0.98	0.82	1.22	0.84	1.23	0.33	0.36	0.42	0.12	2.02
Max	148.37	84.89	83.72	10.53	21.88	10.08	17.94	13.43	19.54	185.19	86.41
Min	-98.65	0.31	0.51	-10.96	-0.93	-3.4	7.07	4.81	4.4	130.8	-11.93

Table 2. Variables correlation matrix

	DEPG	CAP	LLP	ROA	SIZE	GDPG	INF	LInt	TbillY	M3G	DEBT	REMITG
DEPG	1											
CAP	-0.12	1										
LLP	-0.17	0.39	1									
ROA	0.07	0.03	0.08	1								
SIZE	-0.04	0.22	-0.18	0.03	1							
GDPG	-0.02	-0.43	-0.41	0.01	0.07	1						
INF	0.06	0.07	0.00	0.53	0.10	0.09	1					
LInt	0.05	-0.05	0.14	-0.25	-0.11	-0.31	-0.31	1				
TbillY	0.00	-0.04	0.12	-0.26	-0.11	-0.29	-0.36	0.94	1			
M3G	0.18	0.03	0.11	0.31	0.03	-0.06	0.74	0.06	-0.01	1		
DEBT	-0.06	-0.03	0.37	0.16	-0.12	-0.26	-0.13	0.38	0.37	0.12	1	
REMITG	0.09	-0.05	0.13	-0.03	-0.06	-0.12	-0.03	0.22	0.12	0.37	0.29	1

Besides, Figure 1 shows the Lebanese banking sector aggregate credit to the resident private sector, and Figure 2 shows the growth rates of both the nominal GDP and the aggregate credit to the resident private sector.

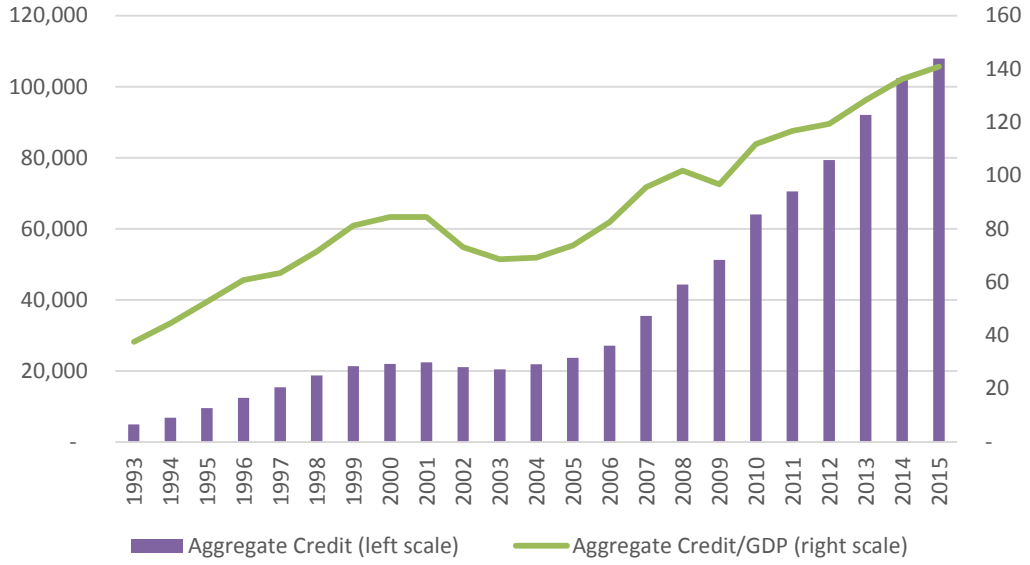

Figure 1. Aggregate credit to customers, billion LBP and percent of GDP

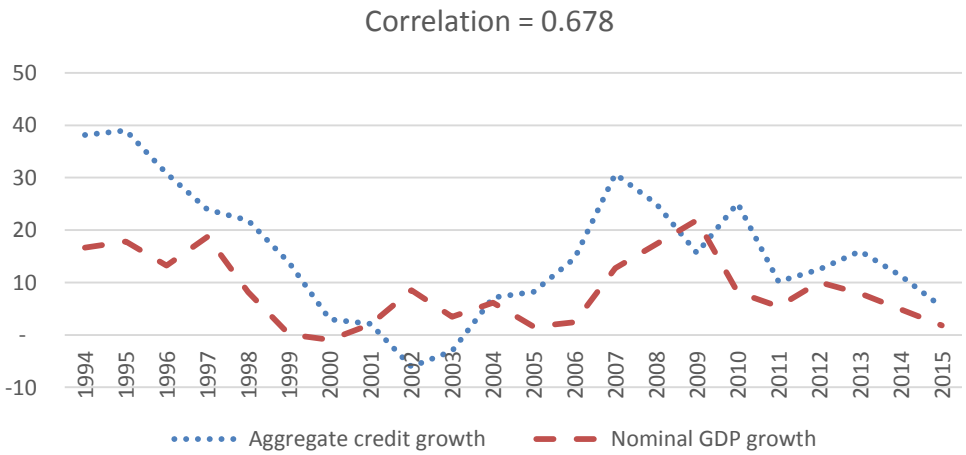

Figure 2. GDP and Aggregate credit growth rates (%)

5. Empirical Results

5.1 The Impact of Exploited Variables on Bank Credit Growth

To detect the impact of exploited variables on Lebanese bank credit growth, we run several regression estimates in order to: (1) avoid including highly correlated independent variables in one estimate, and (2) test the impact of different combinations of independent variables. The estimation outputs are included in Table 3.

We note that the data set under study is a panel data. The first possible regression method in this case is the Ordinary Least Squares method (OLS). However, because the cross-sections (i.e. the banks) included in our sample are widely dispersed in terms of efficiency, size, technological infrastructure etc., the OLS method is not suitable, because it cannot tackle these differences. The Fixed Effects method solves this issue and allows taking into consideration the firm-specific effects in the regression estimates, as it includes individual intercepts for each cross-section. The Fixed Effects method controls for all time-invariant differences between the cross-sections, and the estimated coefficients of the Fixed Effects models are not biased because of the omitted time-invariant characteristics. Furthermore, one more possible method is the Random Effects, which allows for two types of unobserved effects affecting the dependent variable: (1) an idiosyncratic (firm-specific) time-constant effect, which is assumed random; and (2) an idiosyncratic time-varying random error. Unlike the Fixed Effects model, the Random Effects models assumes that the variations across entities are random and uncorrelated with the independent variables. Therefore, the Random Effects model has the advantage of the possibility of including time-invariant variables, whereas in the Fixed Effects model these variables are absorbed in the intercept. Additionally, the Random Effect model assumes that the cross-sections included are drawn from a larger population and have a common mean value for the intercept, and the individual differences in the intercept values of each cross-section are reflected in the error term. In order to select between the Fixed Effects or the Random Effects methods, we perform the Hausman test, which has a null hypothesis of Random Effects. The Hausman test Chi-squares statistics reported in the last raw of Table 3 suggest rejecting the null hypothesis of Random Effects, and consequently the Fixed Effects models are appropriate.

Now, turning to the effects of individual independent variables, we observe the following results. Firstly, deposit growth has a positive and significant impact (at the 1% level) on credit growth in all presented models, and this result consists with those of Guo and Stepanyan (2011) and Imrana and Nishatb (2013). This shows that Lebanese banks rely heavily on deposit flows to expend their lending. This also shows the existence of a direct link between deposits and loans, and the available amount of funds will encourage the private sector to borrow. Overall, this result supports the loanable funds theory, which states that bank credit depends on pre-existent savings.

Bank capitalisation levels do not show to have any significant impact on credit growth, which is shown by the lack of a significant effect of *CAP* on *CREDG*. This result is not consistent with the hypothesis that well-capitalised banks are able to accommodate more credit, and is similar to the findings of Berrospide and Edge (2010). Therefore, this result may suggest that an increase in regulatory capital does not reduce the supply of loans, and there is no trade-off between bank solvency and loan supply in Lebanon.

Credit risk has a negative impact on bank lending, which is shown by the negative and significant association between *LLP* and *CREDG*. This result suggests that an increase in the riskiness of loan portfolio, pushes Lebanese banks to cut their lending immediately, which lowers loan supply.

ROA does not have any significant impact on banks' credit growth and we do not find evidence of an interaction between bank profitability and credit supply. Nevertheless, the negative sign recorded in all models is somehow interesting, and calls for further exploration.

Bank size has a limited impact on lending growth potentials, since *SIZE* captures a significant impact (at the 5% level) in one model only. Therefore, bank size is not a major determinant of lending growth, and larger banks do not rely on size to boost credit supply.

Economic developments – represented by GDP growth – do boost credit growth, and therefore, economic growth plays a significant role in shaping bank lending, which is in line with Calza et al. (2001) and Cottarelli et al. (2005). This is in fact expected, as an increase in GDP growth reflects an improvement of economic activities, which encourages businesses to borrow in order to expand their investment capability. This result is consistent with the theory of a pro-cyclical relationship between economic growth and bank lending, where high economic growth tends to imply a high level of bank credit supply. Therefore, during periods of economic boom, banks in Lebanon tend to relax their selection criteria and lend to both efficient and less efficient projects. Conversely, during periods of tough economic conditions, banks become more selective and cut credit due to the increase in default risk.

Inflation rate shows a strong and positive impact (at the 1% level) on lending expansion, which is in line with both Égert et al. (2006) and Guo and Stepanyan (2011). This could be due to the fact that higher inflation rate lowers real interest rate, and consequently the cost of borrowing, which boosts the demand for credit. Another possible explanation is that an increase in inflation (and prices) forces households to borrow more in order to meet their consumption needs (i.e. an increase in demand for loans). This result contradicts the theory that high inflation limits the amount of external financing available to borrowers, where during high inflation periods banks become less willing to engage in long-run financial projects and tend to maintain more liquid portfolios.

Public debt does show some crowding out effect on bank lending to the private sector as *DEBT* captured negative sign in all presented models and significant at the 5% level in 2 models. This is consistent with Égert et al. (2006) and Cottarelli et al. (2005). Therefore, an increase in government borrowing (resulting from budget deficit), lowers available (loanable) funds to the private sector. This is due to the fact that Lebanese banks are a major investor in Lebanese government securities.

Table 3. Estimations of the impact of variables on bank credit growth (method: Fixed Effects)

	1	2	3	4	5	6	7	8	9	10
C	18.65***	2.69	20.26***	35.50***	-1.21	19.82***	-38.18	32.19***	30.76***	15.21***
	(3.93)	(43.64)	(9.74)	(9.52)	(43.29)	(4.35)	(33.05)	(8.37)	(10.21)	(3.48)
DEPG	0.43***	0.45***			0.47***		0.46***	0.43***		0.46***
	(0.05)	(0.05)			(0.05)		(0.05)	(0.05)		(0.05)
CAP	-0.002			-0.17		-0.13			-0.05	-0.11
	(0.15)			(0.16)		(0.15)			(0.17)	(0.14)
LLP	-0.27*	-0.18	-0.29*			-0.30**			-0.30*	
	(0.14)	(0.15)	(0.17)			(0.14)			(0.18)	
ROA	-1.10	-1.23		-1.32				-1.21	-1.52	
	(1.29)	(1.25)		(1.37)				(1.23)	(1.40)	
SIZE		0.96			1.21		3.59**			
		(2.67)			(2.45)		(1.82)			
GDPG		0.29*	0.37**			0.03				
		(0.15)	(0.17)			(0.30)				
INF	0.75***			0.83***			0.87***	0.84***		0.65**
	(0.27)			(0.31)			(0.26)	(0.27)		(0.26)
LInt	-0.83***	-0.78*				-0.67**			-0.79***	
	(0.28)	(0.43)				(0.33)			(0.30)	
TbillY			-0.73*	-0.67*	-1.01**			-0.79**		-1.02***
			(0.41)	(0.41)	(0.48)			(0.38)		(0.34)
M3G				0.45*		0.69			0.49**	
				(0.27)		(0.46)			(0.24)	
DEBT			-8.9E-05	-0.13**	-0.005		-0.05	-0.13**	-0.05	
			(0.07)	(0.06)	(0.06)		(0.06)	(0.05)	(0.07)	
REMITG			-0.10**		-0.15***	-0.14***	-0.13***			-0.16***
			(0.04)		(0.04)	(0.05)	(0.04)			(0.04)
Adj.- R^2	0.310	0.304	0.207	0.219	0.315	0.209	0.324	0.309	0.197	0.324
Obs.	508	508	508	508	508	508	508	508	508	508
F-statistic	6.69	6.54	4.41	4.48	6.99	4.35	7.25	6.81	4.11	7.24
Prob(F-stat.)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DW	1.90	1.90	1.86	1.91	1.92	1.86	1.93	1.93	1.86	1.95
					Hausman test					
χ^2 statistic	40.7***	40.3***	61.7***	65.1***	38.5***	61.5***	46.5***	43.3***	63.2***	37.5***

Notes. Standard error in parentheses. ***, **, * denotes significant at the1%, 5% level and 10% level respectively

Lending rate shows to have the expected sign and impact, where an increase in the cost of borrowing lowers the demand for credit and consequently, lowers credit growth. This result is similar to that of Calza et al. (2001). Similarly, T-bill yield has a negative and significant impact on bank lending, which could have several interpretations. On one hand, an increase in T-bill yield encourages banks to invest more in government

securities, which lowers their credit supply. On the other hand, an increase in government security yield increases the opportunity cost of provided loans, which pushes banks to increase their lending rate. This in turn lowers the demand for credit, as explained above.

The growth of money supply shows the expected impact and an increase in *M3* boosts bank supply of loans. This is revealed by the positive and significant impact of *M3G* on *CREDG*, and this is similar to the findings of Farinha and Robalo Marques (2001), Gozgor (2014), and Chen and Wu (2014). This means that monetary policy in Lebanon has a direct impact on bank lending, supporting the theory known as "bank credit channel" of monetary policy where an increase in liquidity allows banks to expand their supply of loans.

Finally regarding remittances and as noted above, Lebanon is an example of an economy that depends considerably on remittance inflows that reached about $7.5 billion in 2015. Moreover, remittances represent a major source of income for a large base of Lebanese households. The empirical results in Table 3 shows that remittances are indeed a substitute for borrowing from banks, and an increase in remittance inflows lowers household demand for loans.

5.2 The Impact of Lagged Variables on Credit Growth

In fact, some of the variables exploited in this study may have a delayed impact on bank credit supply or demand and consequently, on the growth rate of loans. The literature suggests that previous economic conditions, previous credit risk, previous interest rates, previous money supply, in addition to some previous bank-specific variables may all have direct impact on current bank lending decisions. Therefore, we estimate the impact of the one year lag of all variables. The empirical results of these tests are included in Table 4. Again, the Hausman test Chi-squares statistics reported in the last raw of Table 4 suggest rejecting the null hypothesis of Random Effects, and consequently the Fixed Effects models is appropriate.

The lagged growth rate of deposits shows exactly the same impact as the growth rate of deposits, which suggests that banks rely on both current and previous year's deposit inflows to supply credit. This shows the persistency of the impact of deposit growth on credit growth at least in the following year. Lag *CAP* shows a weak effect on *CREDG*, similar to *CAP*. Thus, higher capital requirements do not restrict bank credit supply in Lebanon, neither with a delayed effect.

Surprisingly, Lag *LLP* captures a positive and significant impact (at the 1% level) on credit growth in 2 models. This result contradicts that of Cucinelli (2015) and may reveal that an increase in credit risk during a year forces banks to cut lending immediately and build provision buffers. Afterwards, these buffers may allow banks to re-lunch credit in the following year, which boosts the growth rate of loans.

Again, another surprising result, is the negative and significant impact (at the 1% level) of Lag *ROA* on *CREDG* in all presented models. The previous estimates show that *ROA* does not have any significant impact on credit growth, whereas its one-year lag has a significant negative association with credit growth. This could suggest that higher profitability during a year leads banks to lower their loan supply during the following year, maybe to avoid high increases in profits and to conserve stable and sustainable levels of profitability. Lag *SIZE* conserves the moderate effect recorded by *SIZE*, and consequently larger size does not allow banks to considerably expand lending.

Lag *GDPG* recorded a similar effect to *GDPG*, and an improvement in economic conditions boosts credit growth during the same year and in the following year at least. Conversely, previous year's inflation does not have a significant impact on current bank lending as lag *INF* captures a significant impact (at the 10% level) in one signal model. Government debt conserves its negative impact on bank lending, with one year lag. This suggests that investing in government securities lower banks' credit supply to the private sector, with the effect extending to the following year at least.

Lending interest rate and T-bill yield show to have a persistent negative impact on the demand for money and credit growth, which is shown by the negative and significant impact of lag *Lint* and lag *TbillY*. A very interesting finding is that the change in money supply shows to have a stronger impact on bank credit growth during the following year. This is due to the fact that lag *M3G* has a significant impact (at the 1% level) in all presented models, whereas *M3G* captures a lower levels of significance. Therefore, from policy-making point of view, an increase (decrease) in money supply during one year, will boost (lower) banks' ability to extend lending during the same year, with the effect amplified during the following year.

Finally, lag *REMITG* captures a weak impact on *CREDG*, which shows that remittance substitute borrowing from banks during the same year of inflow only.

Table 4. Estimations of the impact of lagged variables on bank credit growth (method: Fixed Effects)

	1	2	3	4	5	6	7	8	9	10
C	28.13***	-12.52	25.75***	33.14***	-17.81	12.30***	-56.63	38.71***	40.91***	19.39***
	(4.36)	(46.27)	(9.30)	(8.51)	(47.01)	(4.56)	(34.63)	(8.12)	(9.29)	(4.14)
Lag DEPG	0.21***	0.21***			0.14***		0.14***	0.18***		0.13**
	(0.04)	(0.04)			(0.05)		(0.05)	(0.04)		(0.05)
Lag CAP	-0.03			-0.08		-0.30*			-0.13	-0.11
	(0.15)			(0.15)		(0.15)			(-0.83)	(0.15)
Lag LLP	0.08	0.13	0.51***			0.39***			0.15	
	(0.13)	(0.15)	(0.15)			(0.13)			(0.16)	
Lag ROA	-6.92***	-7.15***		-7.57***				-7.40***	-7.12***	
	(1.17)	(1.15)		(1.11)				(1.10)	(1.17)	
Lag SIZE		2.17			2.30		4.49**			
		(2.85)			(2.71)		(2.03)			
Lag GDPG		0.50***	0.41**			0.26				
		(0.17)	(0.17)			(0.30)				
Lag INF	0.26			0.22			0.49	0.56*		0.32
	(0.32)			(0.34)			(0.33)	(0.33)		(0.33)
Lag LInt	-1.16***	-0.65				-1.16***			-1.17***	
	(0.29)	(0.41)				(0.32)			(0.24)	
Lag TbillY			-0.77**	-1.00***	-0.88*			-1.10**		-1.03**
			(0.37)	(0.38)	(0.50)			(0.37)		(0.38)
Lag M3G				1.16***		1.27***			1.02***	
				(0.26)		(0.46)			(0.23)	
Lag DEBT			-0.12*	-0.09*	0.01		0.006	-0.09*	-0.12**	
			(0.06)	(0.05)	(0.05)		(0.06)	(0.05)	(0.06)	
Lag REMITG			-0.01		-0.01	-0.08*	-0.007			-0.02
			(0.04)		(0.04)	(0.05)	(0.04)			(0.04)
Adj.-R^2	0.259	0.274	0.209	0.255	0.192	0.222	0.191	0.259	0.256	0.194
Obs.	508	508	508	508	508	508	508	508	508	508
F-statistic	5.54	5.90	4.43	5.35	4.10	4.63	4.07	5.67	5.49	4.12
Prob(F-stat.)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DW	1.88	1.93	1.98	1.86	1.86	1.98	1.86	1.92	1.80	1.88
					Hausman test					
χ^2 statistic	63.4***	63.8***	74.8***	16.3***	61.6***	67.7***	67.3***	64.4***	21.9***	58.6***

Notes. Standard error in parentheses. ***, **, * denotes significant at the1%, 5% level and 10% level respectively.

6. Conclusion and Policy Implications

Previous experience has shown that excessive domestic credit growth could lead to asset bubbles and inflation. On the other hand, depressed lending rates may lead to recession in economic activities. Therefore, policy-makers should be able to predict future trends in bank credit supply and demand to avoid inflationary pressures or deep decline in investment and consumption. Consequently, it is crucial to recognise the determinants of credit growth and understand credit demand and supply mechanisms.

This study analysed the determinants of credit growth in Lebanon with focus on several bank-specific, macroeconomic, and monetary policy variables. Using a sample of 34 commercial banks between 2000 and 2015, we found that deposit growth, GDP growth, inflation, and growth of money supply, all boost credit growth. Conversely, loan-loss-provisions, lending rates, T-bill yield, public debt, and remittance inflows, all lower credit growth.

We extended our analysis and tested the effect of one-year lag of all exploited variables on credit growth and found some different results. Specifically, lag deposit growth, lag loan-loss-provisions, lag GDP growth, lag money supply growth, all have positive impact on credit growth. On the other hand, lag ROA, lag lending rate, lag T-bill yield, and lag public debt, all lower credit growth.

These results may have several policy implications and may allow predicting the future trends of credit growth in Lebanon. Among these implications we note the following:

1. Capital requirements do not result in a credit crunch in Lebanon. Therefore, increasing capital requirements should not represent a concern regarding their impact of credit availability.
2. The negative impact of an increase in credit risk is for a short-term only. Afterwards, this increase in credit risk may even result in boosting credit growth in the following year.
3. The impact of changing money supply on credit growth will be amplified during the following year at least. This suggests that this monetary policy tool has a long-term impact on bank lending in Lebanon.
4. When studying the macroeconomic impact of remittances, they should be also considered as substitute for bank credit. Thus, when the economic cycle is in its lower phase where banks tend to cut lending, these financial inflows can play a vital role in providing liquidity for households at least.

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