

Reason for Reserve? Reserve Requirements, Dollarization, and Credit

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Abstract

Monetary policy is often intertwined with regulatory policy in developing countries. This paper considers the impact of currency-sensitive regulatory actions on bank credit. I make use of a reserve requirement change in Lebanon that was considerably greater on foreign currency deposits than on domestic currency deposits to answer this question. This variation is utilized to identify the credit consequences of changes in reserve requirements among different banks. Using a panel of roughly 60 commercial banks, I find that the currency composition of a bank's balance sheet matters. The tightening of the binding reserve requirement led banks to cut lending as they scrambled to adjust their asset portfolios. But the greater the proportion of liras in a bank's initial deposits, the less adversely affected was the bank by the reserve requirement tax. Liquidity buffers, in the form of foreign currency liquid assets also helped to insulate lending. Matching firms to their main banks indicates that small and young firms were the most exposed to the drop in lending. This paper also elicits bank behavior and opinion by way of a unique bank survey.

Keywords: dollarization, bank credit, monetary policy, reserve requirements.

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1 Introduction

In a wide range of countries, such as Lebanon, the local currency is accepted for payment together with a foreign currency, typically the dollar. Commercial banks also receive deposits and extend credit in both local and foreign currencies, and banking regulation can be currency dependent. This paper offers insight into the impact of currency-sensitive banking regulation on bank credit to the private sector, using a panel of over 60 commercial banks operating in Lebanon over 1996 to 2004. The regulation in question concerns bank reserve requirements that differ depending on whether the deposit made is in local (lira) or in foreign currency. Lebanese regulation requires that a larger share of overall lira-denominated deposits than of foreign currency-denominated deposits be held as reserves in vault cash and at the Central Bank. This difference was particularly sizeable prior to June 2001, when there was a zero reserve requirement on foreign-currency deposits in place. In contrast, the reserve requirement was 13% on all lira-denominated deposits. On June 2, 2001, the Central Bank of Lebanon issued circular number 84, which increased the reserve requirement on lira-denominated deposits to 25% on demand deposits but to only 15% on term deposits, which make up the large part of lira deposits (roughly 94%). Concurrently, the requirement on foreign currency deposits increased from zero to 15%. Therefore, the change in reserve requirements was effectively greater on foreign currency than on domestic currency deposits. This variation is utilized to identify the credit consequences of changes in reserve requirements among different banks.

There is enduring financial dollarization worldwide despite falling inflation. The ratio of foreign currency deposits to total deposits has gone up across a diverse group of world regions (with the exception of industrial countries). For example, the share of dollar deposits in South America increased from 46% to 56% and in Lebanon from 53% to 69% over the period 1996 to 2001 (see Gulde et al, 2004 and De Nicolo et al, 2005). Table 1 lists the average ratio over 1995 to 2001 for the set of 101 countries in De Nicolo et al (2005) where Lebanon ranked 15th over that period. The degree of deposit dollarization in Lebanon has since stabilized at roughly 68% over the 2001-2008 period¹. A second stylized fact is that the large part of borrowing in these countries is also intermediated in dollars (see for example, Eichengreen and Hausmann, 2005).

Table 1 also indicates that countries differ in their treatment of reserve requirements on local and foreign currency deposits. The results of this research are therefore particularly relevant to

¹Greater political uncertainty in recent years has led to a few spikes in dollarization. For example, the foreign currency deposit share jumped to 77% in March 2005 after the assassination of former Prime Minister Rafik Hariri in February.

countries with financial dollarization and different currency reserve requirements. I interpreted a country's reserve requirement policy using a database of over 150 countries compiled at the World Bank by Barth et al (2001, updated 2003) and missing information was filled in using various issues of the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) through 2004². Of the sample of countries, I find that 28 countries had different currency reserve requirements. Of these, ten have a higher requirement on local currency deposits (these include Lebanon, Egypt, and Slovenia) and eighteen have a higher one on foreign currency deposit (these include Chile and Turkey).

It is therefore important to understand the economic implications of currency-sensitive banking regulation, such as different currency reserve requirements, on the availability and distribution of loanable funds and credit to the productive sectors of the economy. It is to this end that the paper contributes. In fact, while borrowing in foreign currencies has dominated the existing theoretical and empirical dollarization literature, much less attention has been paid to deposit dollarization, as observed by Broda and Levy-Yeyati (2006). The advantage of using data from Lebanon comes from the following facts: 1) the Lebanese Central Bank radically changed the law governing commercial bank reserves in 2001 and in doing so affords a natural experiment; 2) banks in Lebanon are the most important source of external credit for firms; and 3) a large part of this credit is in dollars (about 84% in recent years based on statistics published by the Banque du Liban, the Central Bank). Evidence on the importance of bank intermediation in Lebanon is provided by a comparative study of the Middle East and North Africa (MENA) region by Grais and Kantur (2003) that shows that Lebanon has the highest share of banking assets to GDP (272%) and the lowest stock market capitalization (10%) in the region. Moreover, domestic banks dominate the banking system, accounting for 80% of system assets over the sample and their share has only gone up over time. This is an additional advantage to this study because foreign banks are expected to escape domestic regulatory constraints more easily. These facts combined make the Lebanese case suitable to study the transmission of a change in the reserve requirement policy on banks' behavior, utilizing the variation among banks.

This paper is also part of a broader research area aimed at understanding monetary policy in developing countries. Monetary policy is often intertwined with regulatory policy in countries such China, India and Brazil. For example, the People's Bank of China has raised reserve requirements 16 times since January 2007 to drain excess liquidity in the banking system. More recently and because of the global downturn, it has instead lowered reserve requirements, as has Brazil as a way to boost domestic credit³. In contrast, in countries like the United States, "reserve requirements

²Table A3, which lists these requirements in detail, is available upon request.

³See for example, *The Economist*, 'hot and bothered', June 26, 2008, 'a monetary malaise', October 9, 2008, and 'not just straw men', June 18, 2009.

are rapidly losing relevance”, as noted by Bennett and Peristiani (2002), who find that reserve requirements are no longer binding⁴. Several factors have contributed to this. First, central banks in a number of industrial countries have moved to targeting short-term interest rates and away from direct control over reserves. The Federal Reserve also reduced reserve requirements in the early 1990s as a way to mitigate distortions that the reserve requirement ‘tax’ imposes on depository institutions and their customers but not on other financial institutions. Finally, depository institutions have effectively lowered their reserve requirements by regularly sweeping their transaction deposits to non-transaction deposits that have been subject to a zero reserve requirement since 1991 (also see O’Brien, 2007, and Sellon and Weiner, 1996). As Sellon and Weiner point out, this means that banks’ demand for central bank balances is no longer set by transaction deposits but depends on banks’ need to hold settlement balances for clearing and payment purposes. This has tightened the link between the payments system and monetary policy⁵.

Historically, however, reserve requirement policy featured as an important part of the Federal Reserve’s credit actions and served to restrain bank lending. Romer and Romer (1993) argued that several episodes of direct regulatory actions taken by the Federal Reserve in the postwar period had greater effects than a standard ‘credit channel’ interpretation of monetary policy (see the next Section for a more detailed discussion and literature review). Indeed, the most blatant use of reserve requirements was when the Federal Reserve doubled reserve requirements in 1936-37 leading to a severe downturn in 1937-38 because of the resulting monetary contraction (see the classic study by Friedman and Schwartz, 1963). This occurred because when the Federal Reserve locked up reserves, banks moved to restore their desired liquidity cushion by reducing lending. As a result, the measure did more than simply “prevent an uncontrollable expansion of credit in the future”, which was the main concern articulated by the Federal Reserve in 1937⁶. In contrast, current proposals for an ‘exit strategy’ have been made contingent on economic recovery and involve less brute-force instruments than locking up reserves (in addition to a natural wind-down of liquidity facilities, proposed measures include paying interest on bank reserves, which would allow the Central Bank to target a path for short-term interest rates)⁷.

⁴Note that this is even before the most recent exceptional period since 2008 when the Federal Reserve and other central banks have made available special liquidity facilities that have led to a buildup in excess reserves. For example, Keister and McAndrews (2009) point out that required reserves were only about \$40 bn prior to the crisis. Excess reserves have increased from \$1.5 bn to more than \$900 bn by 2009.

⁵One concern raised in these papers is that this could lead to an increase in volatility of the federal funds rate. Nautz and Schmidt (2009) find that the decrease in reserve requirements led to a rise in volatility but that it was offset by improved communication and transparency by the Federal Reserve about the target since 1994. Sellon and Weiner also note that banks increased their reliance on clearing balances and have better managed their balances because of falls in computing costs.

⁶Cited in Goodfriend and Hargraves (1987) as Board of Governors of the Federal Reserve System, Annual Report, 1937, page 2.

⁷That said, a number of economists are critical and fear that excess reserves will be converted into loans, fuelling monetary growth and inflation, echoing the concerns in 1937 (see for example, Feldstein, *Financial Times*, April 19,

The rest of this paper is organized as follows. In Section 2, I describe the context of the reserve requirement change in Lebanon. I also articulate the hypothesis and briefly preview the findings. Section 2 also provides more context within the existing literature, both that relating to reserve requirements and that to dollarization. Section 3 sets out the method used in this study and describes the data. Section 4 goes over the results in detail. These are divided into aggregate evidence, individual bank evidence, bank-firm ties, and bank survey findings. Finally, section 5 concludes.

2 Context

2.1 Context in Lebanon

As mentioned in the introduction, the Central Bank announced an increase in reserve requirements in mid-2001, and the increase was considerably greater on foreign-currency deposits than on lira deposits. The regulatory change in the reserve requirement was most likely introduced to tighten monetary policy in the face of capital outflows, declining foreign assets at the Central Bank and exchange rate pressure⁸. Table 2 describes the summary statistics for the aggregate economy, and a number of features are consistent with this story. Data on macroeconomic variables (including the interbank rate, monetary aggregates, growth and inflation) are from the Banque du Liban, the International Monetary Fund Public Information Notices (PINs), *Bilanbanques*, and JPMorgan Chase (from Datastream) for the eurobond EMBIG stripped spread on Lebanon's foreign currency debt. The exchange rate peg to the dollar survived the pressure, but Central Bank foreign assets began to decline in 2000 and dropped more in 2001 reaching 0.34 as a fraction of total Central Bank assets compared with 0.66 in 1999. Although the ratio of foreign assets to currency in circulation is high relative to other countries, it also declined from 7.6 in 1999 to a low of 4.3 in 2001⁹. At the same time, the interbank rate rose in 2001 to an average of 9.7% compared with 7.6% in 2000, country risk went up, and the growth of monetary aggregates contracted. The higher reserve requirement increased bank reserves in 2001-02 to roughly 0.6 from 0.4 as a fraction of Central Bank assets. Then and in response to the positive signal produced by the agreement of the 'Paris II' donor conference in 2003, there was a big capital inflow and increase in net foreign assets at the Central Bank in 2003

2009, and Meltzer, *Fortune*, August 17, 2009).

⁸This was also the most commonly cited reason given by respondents to the bank survey (see Table 8 and Section 4.3). The change in regulation may have also come to pass out of prudential concerns about insufficient liquidity in the banking system, especially dollar liquidity (see Gulde et al, 2004, on the prudential exercise of foreign currency reserve requirements).

⁹See Schnabl and Schobert (2009) for a cross-country comparison. They mention that countries like Lebanon rank relatively high based on the ratio of foreign assets to currency (reaching over 10 by 2008) because domestic transactions are often settled in foreign currencies. In contrast, this ratio is close to zero in the US and a number of other industrial countries.

(also see Schnabl and Schobert, 2009 and Poddar et al, 2006). This was also reflected in an increase in excess reserves in 2003 (see Section 4 for more on identifying the different fluctuations in reserves and their consequences). The interbank rate fell, as did country risk.

Therefore, the tightening of reserve requirements in 2001-02 fits as part of a tightening of monetary policy and a response to capital outflows. It was not used at the time as a measure to help sterilize capital *inflows*, which is the common use of reserve requirements by countries, like China, aiming to maintain exchange rate stability. For example, Reinhart and Reinhart (1999) argue and provide evidence that in many emerging economies experiencing capital inflows, central banks intervene to buy foreign exchange as a way to avoid exchange rate appreciation. But central banks also have a second objective to maintain price stability, which they achieve both by OMO sales of treasuries and by raising reserve requirements in order to keep money supply constant¹⁰. In contrast, the 2001-02 Lebanese episode shares more similarity with reserve requirement changes in Brazil over the 1994-2001 period studied by Takeda et al (2005). They note that increases in reserve requirements in Brazil over this period was associated with periods of turbulence in the financial markets. And they find that small bank lending was less affected because more exemptions were applied to small banks than to big banks.

The hypothesis Whatever the main cause, regulatory reserve changes can have unintended consequences such as a pull back in lending as banks scramble to adjust their asset portfolios because of binding reserve requirements. Reserve requirements can be seen as a tax, and much of the existing empirical literature focusing on the US has sought to determine whether bank depositors, borrowers, or shareholders bear the reserve requirement tax (see the review in the next section). The insight of this paper is that currency-sensitive reserve requirements impose different taxes *among* banks in a partially dollarized economy.

The underlying hypothesis is that any increase in reserve requirements that is binding is expected to initially lead to a decrease in the remaining terms on the asset side of banks' balance sheet, such as credit to the private sector, holdings of government treasury bills and foreign assets. But because the increase in reserves is greater on foreign currency deposits and because banks tend to match the currency structure of their assets to their liabilities, this would imply that they will decrease their credit in foreign currency more than their credit in lira. And because banks prefer to lend in foreign currency because of exchange rate risk, they will not perfectly offset the decrease in foreign currency

¹⁰Schnabl and Schobert (2009) make a similar point, and they also discuss why central banks may prefer to apply reserve requirements and not rely exclusively on "market-oriented sterilization" such as open market operations or remunerating (at market rate) required reserves. This is because open market operations are costly because of the higher domestic market rate than the return on foreign assets. Therefore, central banks can reduce sterilization costs by increasing reserve requirements (although this comes at the cost of increasing the implicit tax on financial intermediation).

loans with increased lira lending. I provide support for the view that Lebanese banks tend to match the currency composition of their assets to their liabilities and for the view that banks prefer to lend in foreign currency. This means that there could be a bank-driven fall in total lending, which is expected to be more pronounced among the more dollarized banks. Therefore, this paper tests the following two hypotheses: first, whether banks were overall more inclined to lend in dollars prior to June 2001 and second, whether those banks that held a larger share of foreign-currency deposits prior to 2001 contracted credit more in response to the change in requirements.

I find that the currency composition of the balance sheet matters. Lending growth was overall negative in 2001–02 due to the tightening in the reserve requirement but the greater the proportion of liras in a bank’s initial deposits, the less adversely affected was the bank. This effect is economically significant: a bank in the lower 25th percentile in its share of lira deposits experienced a 10% to 15% greater decline in commercial & customer lending compared with a bank at the 75th percentile. This effect was strongest among domestic banks, while majority foreign-owned banks were not as constrained by the policy change. Liquidity buffers, in the form of foreign currency liquid assets also helped to cushion against adverse effects on bank lending. There is also support for a shift in overall lending from foreign currency to lira denomination at the time the regulatory change was announced, while reserves (and in particular foreign currency reserves) increased at the time the change took effect, as expected. The results are robust to controlling for other bank characteristics and macroeconomic conditions, and therefore hypotheses such as demand for credit are unconvincing alternative explanations. Matched data on firms to their main banks helps to identify which sectors and types of firms were most exposed to the distortionary credit consequences of the reserve requirement change.

2.2 Context in the Literature: Reserve Requirements

As indicated in the introduction, reserve requirement policy is well and active in developing countries, in contrast to the US and other industrial countries that have largely abandoned it. The large part of the literature has focused on the US and the consensus finding is that reserve requirements have served as a distortionary tax on the depository financial system and intermediary activity. While the initial rationale for reserve requirements in the US was to make sure banks had adequate liquidity to prevent bank runs, over time requirements increasingly served to ensure a predictable demand for reserves and liquidity. This helped to reduce excessive fluctuations in the market for reserves at a time when monetary policy was concerned with direct control over reserves. But the cost of holding non-interest bearing reserves meant foregone interest and imposed a tax burden on depository institutions, borne by borrowers, depositors and bank shareholders. Therefore, central

banks also used reserve requirements to influence the financial health of depository institutions and to take direct credit actions. One strand of the literature has looked at the reaction of interest rates and equity returns to changes in reserve requirements to identify how the tax burden was distributed. Another strand of the literature has focused instead on the impact on bank credit and firm investment. My paper is related to both these strands because I use micro bank data to understand the credit consequences of reserve requirement changes.

If bank deposits offer special transaction and liquidity services, then the cost of higher reserve requirements can be passed on to bank depositors in the form of lower deposit rates. This is the view expressed by Black (1975). Fama (1985) challenged this view noting that banks were also required to hold reserves on CDs, but CDs are easily substitutable with other money market instruments like commercial paper. Therefore Fama conjectured that the reserve tax is borne instead by bank-dependent borrowers. That is, bank loans – being inside loans and not outside debt – must be special¹¹. James (1987) is known for showing the positive certification effect from new bank loan agreements, but he also provides evidence on the uniqueness of bank loans supporting Fama. He finds that an increase in reserve requirements had no effect on the spread between the yield on CDs and other market yields, meaning that CD depositors did not bear the reserve requirement tax. Subsequent studies examined bank abnormal equity returns around periods of reserve requirement changes. For example, Slovin et al (1990) and others found that announcements of increases in requirements lowered bank stock returns and had an opposite effect on nonbank financial firms that gained at the expense of the banking system. This means that the reserve requirement tax is at least partly covered by bank shareholders. As Slovin et al point out, this is consistent with the hypothesis that by raising the cost of bank loans, lending is reduced and banking activities are scaled back. This leads to a lower franchise value that is reflected in a fall in shareholder wealth at the time of the announcement. My paper’s focus on the variation among banks also has parallels to Cosimano and McDonald (1998) who find that banks with more CD financing benefited more from the reduction in the reserve requirement on CDs in 1990, in that they reacted with a greater positive abnormal equity return.

Complementing the micro work on bank profitability and tax distribution, the second strand of the literature takes a macro approach by looking at the effect on bank intermediation and real activity. The classic example is the 1936-37 doubling of member bank reserve requirements. Friedman and Schwartz (1963) pinpointed this as being the main cause of the 1937-38 recession. As mentioned in the introduction, the supposedly ‘excess’ reserves were not excess in an economic sense. Banks moved to restore their liquidity cushion by reducing lending. Cargill and Mayer (2006) offer a direct

¹¹The comparative advantage of banks as insiders is the message of this classic paper by Fama that has survived the years and is often cited. In contrast, the CD reserve tax justification has largely been forgotten.

test of the Friedman and Schwartz hypothesis and their findings strongly support the hypothesis that banks wanted to hold large precautionary liquidity balances. They exploit the variation between member banks and nonmember banks. Nonmember banks were not subject to the change in the reserve requirement. They find that member banks cut lending relative to nonmember banks so as to increase their cash ratios. This leads them to conclude that lower credit demand was not the reason that member banks were holding excess reserves. Because if banks lacked lending opportunities, then the lending response of member banks to the increase in reserve requirements should not have been different from nonmember banks also facing similarly weak credit demand.

Also supporting the aggregate supply effects stemming from changes in reserve requirements is a study by Loungani and Rush (1995). Focusing on the postwar US aggregate data, they find that reserve requirement changes led to significantly lower commercial and industrial lending, aggregate investment and output, controlling for other measures of monetary policy (interest rates and money aggregates) and real stock returns. Romer and Romer (1993) also survey the US postwar monetary policy transmission mechanism and find strong support for the thesis that direct credit actions, such as reserve requirements, had a greater impact on constraining bank lending than the typical ‘credit channel’ interpretation of monetary policy. That is, it was not that monetary policy open market operations, which altered the supply of reserves, greatly affected the opportunity cost of funds available to banks. For example, they find that in almost all of the recessions (1966 credit crunch, 1968-69, 1974, 1978-80), the Federal Reserve raised reserve requirements. In contrast, later episodes of tight monetary policy were not accompanied by direct credit actions. This leads them to conclude that the Federal Reserve became less prone to directly intervene. They also find support for the conventional interest rate channel effect on output.

2.3 Context in the Literature: Dollarization

There is also an extensive literature on dollarization, which I will very briefly summarize. Baliño et al (1999) and Gulde et al (2004) discuss the benefits of a dollarized banking system in remonetizing an economy where confidence in the local currency has been undermined. On the other hand, it can lead to loss of seignorage, and difficulty for the monetary authorities in choosing the appropriate policy targets. They also argue that it can lead to increased fragility of the banking sector with less options for the central bank to act as a lender of last resort. They therefore propose that commercial banks and central banks hold larger international reserves and arrange external lines of credit. They also make a prudential case for imposing higher reserve requirements on foreign currency deposits as a way of managing higher systemic liquidity risk not internalized by domestic banks and depositors. This is because dollar deposits are only partially covered by liquid dollar

assets and, unlike domestic currency deposits, no price adjustment is possible by printing currency. Overall, prudential measures to manage banks' exposures to currency risk in dollarized economies is limited. The exposure of banks to currency risk may be under-estimated because they transfer the currency risk to their unhedged borrowers when they extend dollar loans but banks retain the resulting credit risk. This is why countries like Chile, prohibit lending in foreign currency to the non-tradable sector and have increased the attractiveness of intermediation in the domestic currency.

There is a literature on the direct effect of monetary policy and depreciations on firms' competitiveness and balance sheet channels (see for example, Chang and Velasco, 2001, Aguiar, 2005, and Bleakley and Cowan, 2008). In contrast, there has been little research on the effect of and possible distortions arising from bank regulation that can be currency-sensitive. This paper fills this gap. I am aware of only one recent theoretical paper on a related topic, currency-blind deposit insurance. Broda and Levy-Yeyati (2006) argue that there will be excessive dollarization within banking systems in countries like Argentina because of explicit deposit insurance policy that is currency-blind. In their model, the equal treatment of dollar and local currency deposits in the event of default means that dollar claims experience a valuation gain when the exchange rate is devalued because the share of deposits repaid is the same.

3 Method

I estimate annual panel regressions on the roughly 60 banks operating in Lebanon over the period 1996 to 2004. This level of variation is warranted because analyzing total bank credit in the Lebanese banking system cannot convincingly answer the research question at hand. For example, there may be a decline in credit because of a decline in Lebanese companies' demand for loans and not because of a fall in bank lending supply in that period (see Kashyap and Stein, 2000, for a clear exposition). The advantage of the panel nature of the data is that it exploits both the cross-sectional variation across banks and the time variation across years.

I test whether there was a significant change to bank credit to the Lebanese private sector around the time the reserve requirement regulation was changed in 2001 by estimating the following regression. This method employs a differences-in-differences approach in that it compares the lending of banks before and after the reserve requirement change as a function of the bank's currency deposit composition and its liquidity buffer, controlling for other characteristics:

$$\begin{aligned} \Delta \ln(\text{Loans})_{it} = & \alpha + \delta I_{01-02,t} + \beta_1 LD_{it-1} + \beta_2 (I_{01-02,t} \times LD_{it-1}) + \\ & \gamma_1 FCLA_{it-1} + \gamma_2 (I_{01-02,t} \times FCLA_{it-1}) + \theta X_{it-1} + \lambda Y_{t-1} + u_i + \varepsilon_{it} , \end{aligned} \quad (1)$$

where the dependent variable is the growth of a bank's commercial & customer lending, the dummy I_{01-02} takes on a value of 1 in 2001–02 and 0 otherwise¹², LD is the bank's share of deposits in liras in the previous year, and $FCLA$ is the share of its assets that are foreign currency liquid assets, X and Y capture various controls and their interaction terms, both bank-specific X_i (such as a bank's profitability and size), and macroeconomic Y (such as the Lebanese interbank rate and real GDP growth), and u_i is the unobserved bank fixed effect. First lags of the explanatory variables, such as the bank's lira deposit share and liquidity, are used to avoid biasing the results with a possible contemporaneous adjustment by banks (robustness checks were also done using the second lag). This regression provides a simple test of the hypothesis – namely, whether banks with a larger share of foreign-currency deposits were more constrained in their lending in the 2001-02 period than in other years. That is, loan growth is expected to have been overall negative in the 2001–02 period due to the tightening in the reserve requirement ($\delta < 0$) but the greater the proportion of liras in a bank's deposits, the less adversely affected was the bank (expect $\beta_2 > 0$). Similar reasoning suggests that banks with a higher buffer of liquid foreign currency assets (or net liquid assets, more generally) are able to draw upon these to cushion any negative effect on their lending (expect $\gamma_2 > 0$). Regression results of equation (1) will be discussed in Section 4.1.2.

3.1 Bank Data

Annual data on individual bank-level balance sheet and income statement figures for the decade from 1996 to 2004 were collected from various issues of the annual publication entitled *Bilanbanques*, produced since the early 1980s by Mr. Freddie Baz of Banque Audi (one of the top three banks)¹³. These were not available in electronic format, and the relevant series were meticulously entered by hand by several research assistants. We also collected information on bank mergers and other bank characteristics such as foreign ownership (based on majority shareholder information) and date of establishment from *Bilanbanques* as well as from direct correspondence with the Banque du Liban.

¹²The regulation was effective from October 2001, and therefore is expected to be binding through 2002. The results are, however, robust to specifying the dummy for only 2001 (see Table 6).

¹³The 1996-2004 period is an appropriate sample for the analysis, characterized by relative macroeconomic stability. The earlier period followed the end of the civil war in 1991 and was characterized by high depreciation and inflation. Moreover, *Bilanbanques* had a change in format and expanded the set of variables from 1996 (reported beginning with the 1998 edition). The period after 2005 was also characterized by an increase in instability due to several political assassinations and a war in the summer of 2006.

There were a number of bank exits and name changes over the sample period that were accounted for in the empirical analysis by creating a unique bank code. Another issue was the treatment of mergers and acquisition (M&A), of which there were 14 relevant mergers over the sample period. The acquirer’s balance sheet variables will spike upwards on completion of the purchase. To ensure this doesn’t affect the results of the regressions, we pre-merged banks involved in M&A activity, so that their structure throughout the sample reflects the groups’ composition at the end of the sample (namely end-December 2004)¹⁴.

Descriptive statistics on the *Bilanbanques* data are shown in Table A1 for domestic banks and Table A2 for foreign banks¹⁵. Several stylized trends can be observed in these tables. First, the share of total banking system assets held by domestic commercial banks increased from 74% in 1996 to 85% by 2004. Therefore, domestic banks are dominant in the Lebanese banking system, and their role has grown over time. There has been a general decline in loans over the period from about 30% of total assets to 20% among domestic banks, and a decline in securities (mostly government bonds) from about 39% to 30%. This decline has been reflected in an increase in cash and central bank assets in 2001 and an even more marked rise in 2003¹⁶. Possible reasons behind the 2003 increase in reserves and associated robustness tests will be discussed in the next section. The main source of funding is deposit funding (over 70% for both types of banks), of which about 60% is in foreign currency for the average domestic bank and 75% for the average foreign bank. Banks tend to match the overall currency composition of their assets and liabilities (the lira share is roughly 45% for domestic banks and 30% for foreign banks). Profitability, measured by accounting return on assets, averaged about 1% over the sample, but it has declined over the period and non-performing loans have also increased for both domestic and foreign banks¹⁷. This finding is comparable with the results of Peters et al (2004) who also found that the profitability of Lebanese banks was mostly greater than one percent over the 1993-2000 sample but they were not as profitable as banks from five other countries in the Middle East. Finally, the banking system’s overall interest margin has decreased over the period from about 4.5% to 2.3%, which reflects the shift away from lending and into safe assets. But the drop in bank lending accompanying this shift cannot be attributed to a

¹⁴Details of the mergers are available upon request.

¹⁵Note that most of the data in *Bilanbanques* was reported in USD millions, and disaggregates for some series such as deposits were also available by domestic and foreign currency, both reported in USD millions (the exchange rate was mostly fixed during the sample period and the exchange rate used in *Bilanbanques* is reported with other macro summary statistics in Table 2). There are some discrepancies in the summary statistics displayed in that the sum of the Lebanese lira (LL) and foreign currency items (FC) for some of the balance sheet items does not quite add up to the total. The reason for this is that the total is based on a typically larger set of banks that reported the total but fewer banks reported the decomposition of, say their interbank assets into LL and FC, respectively.

¹⁶In addition to bank reserves, securities, interbank assets, and total loans, ‘other assets’ accounted for the residual component of assets, which was roughly stable at 10% of assets for domestic banks (and 20% for foreign banks). This other asset category consists of fixed assets, regularization, revaluation, goodwill, investments in related parties, bank acceptances, head office, and other assets.

¹⁷Indeed, the true figures for non-performing loans are probably higher because banks under-report these items.

decrease in the net interest margin on loans & advances. The difference between the interest rate received on loans & advances and that paid on deposits has remained roughly constant over the period at about 3% for domestic banks and 5% for foreign banks¹⁸.

4 Results

4.1 The response of bank credit to different currency reserve requirements

4.1.1 Aggregate evidence

Before turning to the panel regression results, it is informative to look at the aggregate time-series stylized evidence based on the consolidated bank balance sheets from *Bilanbanques* as well as consolidated commercial bank data reported by the Banque du Liban beginning in December 1997. The advantage of the latter source for this aggregate exercise is that it is reported on a monthly frequency as opposed to the annual reporting frequency in *Bilanbanques*, but *Bilanbanques* offers more disaggregates such as reserves by domestic and foreign currency. It is also worth applying the same analysis on both data sets to confirm that the data banks report to *Bilanbanques* is generally consistent with the information they report to the Central Bank, which is presumably more reliable. That the figures are consistent means that using the individual bank data, which are only publicly reported in *Bilanbanques*, is valid for the disaggregated analysis in the next section.

Figure 1 supports the hypothesis that banks were overall more inclined to lend in dollars prior to 2001. The hypothesis is that any increase in reserve requirements is expected to initially lead to a decrease in the remaining terms on the asset side of the banks' balance sheet, such as credit to the private sector, holdings of government treasury bills, foreign assets, etc. But because the increase in reserves is greater on foreign currency deposits and because banks tend to match the currency structure of their assets to their liabilities (for example, about 35% of total bank assets and liabilities were in Lebanese lira over the sample period), this would imply that they will decrease their credit in foreign currency more than their credit in lira. Figure 1a shows that the share of total bank credit in liras was about 10.8% in 1996–2000 and increased sharply in 2001–02 reaching 14.6% by 2002 (this was later followed by somewhat of a decline in the share but that is reasonable to the extent that banks are able to adjust their portfolio over time). Repeating this exercise with consolidated commercial bank data from the Banque du Liban is shown in Figure 1b, which is

¹⁸Foreign banks have a more favorable spread, reflecting the lower deposit interest rates they pay. This may reflect higher customer confidence but may also be because a relatively greater proportion of their deposits are in foreign currency, which are associated with lower interest expenses.

comparable to Figure 1a, and shows that the share of credit in lira stabilized at a higher 18% over the next two years. Moreover, Figure 1b reveals that the rise in the share of lira credit coincided with the time of the announcement in June 2001 (marked by the vertical line). Figures 1a and 1b are only illustrative evidence but provide preliminary confirmation of the hypothesis. Figure 2 shows year-on-year lending growth (and by currency denomination of the loan) from the monthly Banque du Liban data. The annual data from *Bilanbanques* is very similar and is therefore omitted in the interest of space. The trend is consistent with Figure 1, in that lira lending growth increased around the time of the announcement through the end of 2002 while foreign currency credit decreased and its growth rate turned negative. This was also reflected in a decline in overall credit because foreign currency credit is the dominant form of credit. We also see this concurrent decline of credit (as a share of total bank assets) in Figure 3a that derives from the *Bilanbanques* data. Although this may be on account of a general decline in credit over the previous years, the fact that lira lending growth went up points to a regulatory constraint on bank supply. Nonetheless, this question will be taken up in the next section because individual bank data will be better able to distinguish between the supply of and the demand for credit.

Figure 3a also shows that the adjustment in bank reserves¹⁹ took place in 2001, when the share of bank assets held in the form of cash and reserves at the Central Bank increased from about 10.2% in 2000 to 14.5% in 2001, indicating that the reserve requirement was binding. We also observe a similar rise in Figure 3b when using the monthly Banque du Liban data. The advantage of the Banque du Liban data is its monthly frequency so that the announcement effect and the implementation of the regulatory change can be studied within the same year. As noted above in the discussion of Figure 1b, the share of total bank credit in liras increased immediately beginning in June 2001 when the announcement of the change in the reserve requirement was made. In contrast, the ratio of reserves to total assets only increased in October 2001, which is when the law was applied. These results suggest that banks reacted rationally and adjusted the composition of their asset portfolio when the announcement was made and before the law became effective. Figure 3c also confirms that the 2001 reserve requirement increase had a differential effect, in that reserves in foreign currency increased while those in lira remained largely stable, which is as expected²⁰.

What is striking about Figure 3 is the sharp increase in the ratio of reserves to total assets in 2003, reaching over 30% of assets and remaining quite high in recent years. This is puzzling because it is not on account of any regulatory change in required reserves and therefore consists of a sharp

¹⁹The data in *Bilanbanques* is only available for the sum of cash and Central Bank assets – which I denote as reserves. Therefore, these reserves include not only required reserves but also voluntary holdings of cash and excess reserve balances held at the Central Bank.

²⁰Information on the currency composition of reserves is not available from the Banque du Liban's monthly data on consolidated bank balance sheets, so the *Bilanbanques* data shown in Figure 3 provides additional support for the differential effect of the change in law.

increase in voluntary reserve balances, and in particular those in lira as can be seen in Figure 3c. The effect of this increase and some reasons behind it will be addressed in the next section. This most likely occurred as a result of the positive conclusion to the ‘Paris II’ donor conference in 2003, which led to a big inflow of capital and in net foreign assets at the Banque du Liban in 2003 (see also Schnabl and Schobert, 2009 and Poddar et al, 2006).

4.1.2 Individual bank evidence

Table 3 presents the basic estimation results of equation (1), and accounts for the panel nature of the sample by including bank fixed effects to capture any bank-specific variation in lending not accounted for by the explanatory variables. The standard errors are also clustered by bank. The dependent variable is the annual growth of commercial and other customer loans. These are a subset of total loans reported in *Bilanbanques*, and are a good proxy for total current loans to the private sector because substandard and doubtful loans are excluded. In addition, very short-term loans and advances such as net debtor/creditor accounts and overdraft accounts are excluded. And also excluded are loans and advances to related parties, since these may be difficult to adjust if a bank is tied to other parties. Current commercial and other customer lending comprised roughly 65% of total reported loans, as shown in Table A1. Column (1) of Table 3 shows that current commercial and customer lending (hereafter referred to simply as "lending" for ease of exposition) was significantly affected by the change in regulation. The sample in column (1) is for all commercial banks operating in Lebanon and includes majority foreign-owned banks (63 banks total, of which 23 are foreign). Lending growth was negative in the 2001–02 period (a drop of 15% and significant at the 10% level), but those banks with a higher initial composition of lira-denominated deposits were partly insulated and experienced less of a decline (as observed in a positive interaction term). But this effect is not statistically significant for the sample of all banks.

The currency composition of a bank’s deposits prior to the change in regulation instead has a statistically and economically significant effect on bank lending in 2001-02 when focusing on the sample of 40 domestic banks (col (2)). Lending by the sample of domestic banks fell by 26% in the 2001-02 period but the interaction term between that period and a bank’s share of lira deposits is now significantly positive at the 5% level and is equal to 0.48. This means that a bank in the 25th percentile of its share of lira deposits experienced a 10% greater decline in commercial & customer lending compared with a bank at the 75th percentile²¹. Therefore, the result in 2001-02 is not only statistically but also economically important for the set of domestic banks. This is a reasonable

²¹Note that the 25th percentile of lira deposit share among domestic banks over the sample period was 0.318 compared with 0.527 at the 75th percentile. This difference is also roughly equal to one standard deviation of the lira deposit share.

finding because foreign banks operating in Lebanon are a priori less constrained by domestic policy because they have access to funds from their parent bank. However, even though foreign banks were less constrained, it does not follow that there was no effect on total lending because domestic banks remain the leading source of credit in Lebanon. As seen in Table A1, the share of total banking system assets held by domestic commercial banks was on average 80% over the sample and has gone up over time. Moreover, of the ten big banks, only two are majority foreign-owned (and not fully foreign-owned) while the top three banks are domestic (BLOM, Byblos, and Audi).

Columns (3) and (4) show the results of including foreign currency liquid assets, which are expected to provide banks with a buffer, which they can draw down as a way to support their lending. These liquid assets are defined as securities holdings in foreign currency (where securities are the sum of Lebanese treasury and other government bills, bonds and financial instruments with fixed income, and securities with variable income). The evidence supports this hypothesis and banks were able to partly offset the adverse effect on bank lending coming from the regulatory change. This result holds even for the sample of all banks shown in col (3) and is significant at 10%. The results are slightly stronger in magnitude for the sample of domestic banks, where the coefficient on foreign currency liquidity is 1.043, meaning that the 75th percentile bank reacted by cutting lending 12% less than a bank at the 25th percentile whose liquid assets in foreign currency as a fraction of total assets were only 0.01 compared with the 75th percentile bank that had a buffer equivalent to 0.12. What is interesting is that the interaction coefficient is positive compared with a negative effect for the rest of the sample where the coefficient on the lagged foreign currency liquid asset share is -1.3 in col (4) for domestic banks. That is, banks that held a high proportion of liquid foreign currency assets were overall not oriented towards lending and generally experienced subsequent lending falls as they raised their liquid assets. Note also that the effect stemming from the lira deposit share has a greater magnitude when controlling for the liquid buffer in foreign currency. For example, the coefficient in col (4) on the lira deposit share is now 0.623 compared with 0.480 in col (2). This may be because banks in Lebanon with higher foreign currency deposit shares also hold on average higher foreign currency liquid assets, which would bias the coefficient on LD downwards. Finally, it is worth mentioning that the coefficient on the share of lira deposits is generally not significant – meaning that the observed effect is specific to the 2001–02 event as captured by the interaction term. This is more clearly seen in Tables 4 and 5 which control for other characteristics.

The results for the 2001-02 period dummy and its' interaction with the share of deposits in lira are also robust to using alternative measures of liquidity buffers, such as total liquid securities (which include lira denominated instruments in addition to the foreign currency ones used to construct the foreign currency liquidity buffer) and net total liquidity to total assets (which is a summary measure

roughly equal to the sum of reserves, securities, and net interbank position). The results for net total liquidity are reported in col (5). The sign on the interaction term of various liquidity buffers with the 2001-02 period is positive as expected, although it is not significant for some liquidity measures. But the results for the lira deposit share are robust to all specifications for liquidity. The robustness checks in the sections that follow also control for other bank characteristics that the lira deposit share may be spuriously picking up, as well as for other aggregate conditions that may be related to the demand for credit. Finally, robustness checks were done using different definitions of the explanatory variables, such as the second lag of the deposit share and a dummy for 2001 only. The results also carry through if instead of running a panel regression with a dummy for the 2001-02 period, the sample is split into the 2001-02 period and the results are compared to the 1996-2004 excluding the 2001-02 period. While these specifications do not exploit the panel nature of the banks because the data is pooled, the results are qualitatively similar. For example, the comparable regression to col (2) yields a coefficient of 0.45 on the lira deposit share which is significant at the 10% level, compared with an insignificant effect of 0.09 when estimating the equation on the rest of the sample period only.

Robustness checks: controlling for other bank characteristics The results presented in Table 3 are robust to controlling for other bank characteristics that could be driving the results and that the lira deposit share is spuriously picking up when these characteristics are not controlled for. For example, if banks with a larger share of lira deposits happened to be more profitable during the 2001-02 period, and increased profitability is what drives lending, then it would be wrong to attribute the observed effect to a bank's starting position in lira deposits. Table 4 shows the results of including a broad set of additional bank characteristics and their interaction with the 2001-02 period. The results are robust to these critiques, and in particular the results for the lira deposit share, where its interaction term enters with an even greater magnitude in some specifications (the range is 0.59 to 0.92 compared with 0.62 in the base regression in Table 3 col (4)). The foreign currency liquidity buffer continues to have a positive sign, although it is statistically insignificant in some specifications.

Table 4 col (1) is comparable to the base regression presented in Table 3 col (4) but is augmented with the (lagged) ratio of lira loans to total loans and its interaction with the 2001-02 period. There is no effect on lending arising from the lagged share of lira loans during 2001-02. Indeed, banks that generally extended a higher proportion of lira loans subsequently cut lending. Therefore, the coefficient on the ratio of lira deposits to total deposits is not falsely reflecting currency composition of the loan portfolio and its possible effect on lending. Col (2) repeats the exercise but with

the accounting return on assets (as a measure of profitability). It appears that banks that were more profitable *reduced* lending and more so during the 2001-02 period (though the effects are not significant). The results are comparable if we use return on equity instead. Banks with a higher return on equity generally lend more, although not during 2001-02 (and the estimates are similarly not significant). Similar results are found when controlling for a bank's capital to risk-weighted asset ratio in col (3). Better capitalized banks reduced lending more during 2001-02 and the effect is statistically significant at the 5% level. Replacing the Basel risk-adjusted capital ratio with equity to total assets produces comparably signed results. Col (4) shows the effects for the ratio of provisions to total assets, and the results continue to be insignificant when using the ratio of non-performing loans to total loans instead. To summarize, these additional bank controls do not change the results, and the 2001-02 effect therefore reflects the unique influence that the currency denomination of a bank's deposits had on its lending as a result of the regulatory change.

Columns (5) and (6) explore the role of bank size. In column (5), size is measured by the natural log of a bank's total assets. This does not have a material effect on lending. Indeed, if anything, larger banks cut lending more during the 2001-02 period but the estimate is not significant. Col (6) shows the results of a specification where banks are allowed to have a different response arising from their initial lira deposit share and their liquidity buffer according to whether they were a big bank or a small bank. Big banks are defined as those in the upper 85th of the percentile of the fraction of total real system assets over the 1996-2004 period, which translates to ten banks that together accounted for 65% of total system assets²². The results in column (6) (limited to domestic banks) show that lending by small banks is more sensitive to the foreign currency liquid asset buffer but it is lending by big banks that is more sensitive to the share of lira deposits. One possible reconciliation of these findings is that holding the foreign currency liquid asset share (and all else) fixed, big banks with a higher share of foreign currency deposits may be more adversely affected than a similar small bank because the magnitude of funds necessary to be raised are larger the greater the scale of the bank. Given that all banks were faced with a tightening of foreign currency liquidity in the Lebanese market in 2001-02, big domestic banks would have experienced greater difficulty making up for the necessary funds in order to maintain lending. Fecht et al (2009) document compatible evidence in the German market even prior to the financial crisis beginning in 2007. They find that the price a bank pays for liquidity depends not only on its liquidity position but also on the liquidity position of other banks in the market. Fecht et al also find that the price of liquidity is greater for smaller banks, which could be the reason for why smaller banks in their sample tend to be generally less short of liquidity than the larger banks. A similar experience may also be true in the Lebanese

²²These are BLOM, Byblos, Audi, BankMed, Libano-Francaise, Fransabank, Bank of Beirut, SGBL, Credit Libanais, and BBAC.

context if big banks were closer to being short of liquidity, and were therefore less willing to use their foreign currency liquidity as a buffer unlike small banks²³.

Robustness checks: controlling for aggregate conditions in the economy Another possible criticism is that the results in 2001–02 may be driven by companies’ demand for credit rather than by the supply of bank credit reacting to the regulatory change. For example, banks with a larger share of lira deposits may have been lending to firms whose credit demand happened to be higher during that period than for firms borrowing from banks with a larger share of foreign currency deposits. Because firm demand is not directly observable, I add macroeconomic controls to the regressions that reflect aggregate conditions in the economy. The results are presented in Table 5. Based on the descriptive statistics in Table 2 and also discussed previously in section 2.1, the increase in the reserve requirement in 2001 was accompanied by a tightening of liquidity in the Lebanese market with, for example, the interbank rate rising to an average of 9.7% compared with 7.6% in 2000. This increase in interest rates could have led to a direct fall in borrowers’ demand for credit as well as an indirect effect if the net worth of these borrowers also fell, decreasing their ability to obtain credit²⁴.

To test these ideas, column (1) of Table 5 includes the change in the interbank rate and real GDP growth to the standard panel regression (Table 3, column (4)). As expected, an increase in the interest rate is associated with a fall in lending that is significant at the 10% level and positive GDP growth is associated with an increase in lending²⁵. Liquidity conditions in the domestic interbank market matter more for lending than global (US) liquidity, reflected in an insignificant effect of the US federal funds rate on lending despite the exchange rate peg to the dollar. A rise in the eurobond spread on Lebanon’s foreign-currency denominated debt (a common proxy for country risk) also has a negative effect on bank lending (col (3)). And lending by banks with a greater share of lira deposits goes up more in times of positive real GDP growth but the effect is not statistically significant (col (4)).

Column (5) includes the interaction of the interbank rate with a bank’s share of lira deposits. The coefficient is significantly negative suggesting that the lending of banks with a greater share of

²³Although big banks in Lebanon have higher foreign currency liquid buffers than small banks, these buffers tend to be less variable, which suggests that they are less willing to actively use these as ‘buffers’ to help insulate lending.

²⁴But what would also be needed is that those banks with a greater share of lira deposits lent to borrowers who were not as affected by the tightening in interest rates during that period, such as firms in the tradable sector that are more insulated from domestic conditions. This is not very realistic since banks with a greater share of foreign currency deposits, and not lira deposits, would be expected to be the ones lending to the tradable sector.

²⁵Although this is only significant at the 13% level. As an alternative to this imprecise estimate of real GDP growth by the IMF, one can use the percent change in the coincident indicator of economic activity which is published monthly by the Banque du Liban and depends on various inputs such as electricity production. The coincident indicator is highly correlated with the IMF measure of growth (a correlation coefficient of roughly 0.8 over the sample period). The results are similar with the annual percent change of the coincident indicator entering significantly at the 10% level with a coefficient of 1.54. The other results remain very similar.

lira deposits is more adversely affected when there is a rise in the interest rate²⁶. The coefficient on the interaction of a bank's share of lira deposits with the 2001–02 dummy remains significant and in fact its magnitude increases when controlling for the interest rate effect and interaction. This is because the interest rate increase in 2001 would have dampened the reserve requirement benefits of having a high lira deposit share in that period. Finally, column (6) shows the results of an alternative specification including money supply and its interaction with a bank's lira deposit share. Arguably, money supply suffers more from endogeneity to the reserve requirement regulatory change than does the interbank rate. Nonetheless, the results are similar, and banks with greater lira deposits are more sensitive to expansionary money supply. Money supply is M3 in column (6) which is the sum of currency, lira sight, lira time and saving, and foreign currency deposits. Results carry through if M3 is replaced with narrower monetary aggregates like M1 (currency and lira sight) or M2 (M1 and lira time and saving). The latter enter with a positive effect on lending and also a positive interaction term with the lagged lira deposit share but are likewise not significant. It is also worth mentioning that the results are robust to using contemporaneous instead of lagged growth, interbank rate, and money supply measures.

More robustness checks Table 6 offers a few more robustness checks with a focus on specification issues. As shown in column (1), the results for the effect of the lagged lira deposit share are robust to replacing the first lag with the second lag of the share of lira deposits so that the results for the 2001–02 period are not contaminated by banks re-optimizing their liability composition during the event period. The results are also similar if we restrict the event period to 2001 in column (2). Given that the announcement took place in the middle of 2001 and only annual balance sheet data is available, it is reasonable, however, to consider the years 2001 and 2002 jointly. Column (3) adds a dummy for 2003 when there was also a large (voluntary) increase in reserves documented in Figure 3. This specification serves as a ‘placebo’ (nonexistent) event because there was no regulatory reserve change at the time. The results indicate that while there was a negative effect on lending in that year, it is economically smaller (-0.084 compared with -0.439 for 2001-02) and statistically insignificant. More importantly, there was no significant differential effect arising from the share of lira deposits in a bank's deposits in that year. These results suggest that banks were in fact constrained by the regulatory-driven increase in reserves in 2001–02, but were not particularly constrained in 2003. These findings are in line with the hypothesis. The increase in excess reserves in 2003 was a voluntary decision on the part of the banks, driven to a large extent by the capital inflows and increase in foreign assets at the Central Bank that followed the agreement of the ‘Paris

²⁶This could be on account of demand for credit but is also consistent with a bank lending channel of monetary policy.

II' donor conference in 2003, discussed in Section 4.1.1. Support for this view was also provided by bankers in response to a question in the bank survey, which will be described in detail below in Section 4.3 (see Table 8). When banks were asked why have commercial bank reserves averaged about 30% of assets since the 2003 period, in excess of the minimum required reserves, they gave answers that suggest that it is a bank-driven choice. For example, that there are no other alternatives for investment, banks are depositing more money at the Central Bank for local settlement-related transactions, and that the reserves are also partly interest-bearing, paying market rates.

Column (4) shows that the results are not sensitive to the way the dependent variable is defined. Column (4) replicates the regression shown in Table 3 column (4) but replaces the growth of commercial and customer loans with the change in the ratio of these loans to the previous year's total assets. Results are very similar when the real growth in lending is used instead of the nominal growth in lending, and accounting for possibly spurious changes in loans arising from exchange rate fluctuations (although these would have been relevant only at the beginning of the sample (from 1996 to 1998) as the exchange rate has since been fixed to the dollar (see Table 2). Indeed, the coefficient on the lira deposit interaction is greater when restricting the sample to the pegged exchange rate sample period from 1998-2004. Finally, the sign on the explanatory terms are also in line with the hypothesis when using broader measures of loans such as total lending, total lending in foreign currency, and commercial lending. These measures of lending are contaminated by substandard loans, and other loans such as overdrafts and related party loans as mentioned at the beginning of Section 4.1.2. This makes them less ideal for capturing total current loans to the private sector. Nonetheless the results carry through and are statistically significant when controlling for macroeconomic variables or other bank characteristics as in Tables 4 and 5.

One final test directly concerns the hypothesis that the reserve requirement is a tax on financial intermediation, whose cost is borne by banks, depositors and borrowers. If borrowers bear the cost of higher reserve requirements (or at least part of this cost), then the lending interest rate would go up in response to the higher reserve requirement regulation but would not go up by as much for banks starting out with a higher lira deposit share. Similarly, if depositors bear the cost (or part of the cost) of the reserve requirement, then the deposit interest rate would go down and not as much for banks starting out with a higher lira deposit share. I find evidence in support of both these hypotheses (results not shown), but the results are not statistically significant and are sensitive to outliers. One caveat is that the loan and deposit rates are most likely mismeasured because they are derived series from combining the income statement on interest revenue and expenses with the balance sheet data on total outstanding loans and deposits, respectively.

4.2 The characteristics of bank borrowers in Lebanon: Mapping firm-bank ties

The findings of the bank panel regressions have shown that the currency-sensitive change in reserve requirement regulation had a differential effect on banks. While lending growth was overall negative in the 2001–02 period due to the tightening in the reserve requirement, the greater the proportion of liras in a bank’s initial deposits, the better insulated was its lending. The range of estimates shown in Tables 3 to 6 imply that a bank in the lower 25th percentile in its share of lira deposits experienced a 10%-15% greater decline in commercial & customer lending compared with a bank at the 75th percentile. Liquidity buffers, in the form of foreign currency liquid assets also helped to cushion against adverse effects on bank lending. These are important credit consequences of the regulatory change. But little information is known on the sectoral distribution of bank credit, beyond total current commercial and customer lending studied in the previous section. No further disaggregation is reported to *Bilanbanques* on the type of borrowers that different banks lend to. This section discusses one approach to glean more information on the distribution of bank credit, in order to understand which sectors of the economy were most exposed to the regulatory credit shock. A secondary contribution is to produce summary statistics on the general characteristics of companies operating in Lebanon, on which very little is known as only a handful of companies are publicly traded.

The approach followed was to link data on banks to borrowers using a random sample from the Kompass business directory database. The main limitation of this database is that it has no information on the quantity of loans extended by a bank to the reporting company (companies only report the names of their main banks). Borrower characteristics were tabulated from a random sample of over 800 companies from the Kompass 2005 database of about 8000 companies²⁷. Information was collected on the characteristics of these firms. Specifically, these characteristics were the company’s name, detailed 5-digit industry code for the company’s three main business lines (e.g. printing and publishing within manufacturing), its headquarters’ location, date of establishment, number of employees, and the company’s three main banks.

The first three rows of Table 7 show that the fraction of firms in Kompass whose main bank is a domestic bank is 0.723 which compares with the average fraction of total system loans in *Bilanbanques* accounted for by domestic banks (0.752). Similarly, the fraction of firms in Kompass whose main bank is a big bank is 0.666 compared with an average fraction of 0.628 of total system loans in *Bilanbanques* extended by big banks. This suggests that using the Kompass directory to

²⁷This involved choosing a random initial number in this business directory (from 1 to 10) and then sampling every 10th company to get a random sample of over 800 companies. This method was employed due to resource constraints in inputting the entire sample of over 8000 companies from the hard-copy directory.

better understand borrower disaggregation is a valid exercise. The second panel of Table 7 consists of five columns that tabulate the Kompass sample of firms. The first column shows the distribution for all the 804 companies in Kompass based on their size, region, age, and industrial sector. The second two columns tabulate the companies according to whether their primary banker is a domestic or foreign majority-owned bank. This involved matching the banks reported by the companies with the bank characteristic information derived from *Bilanbanques*. I also assumed that the first bank reported is the firm's main bank²⁸. The last two columns of Table 7 do a similar decomposition by big bank and small bank, respectively.

Most companies in Lebanon are relatively small by international standards with over 25% of the Kompass sample consisting of firms with five or less employees, and 75% with 24 or less employees. When disaggregated by bank type, domestic banks lend more to the smallest firms (0.276 of companies that cite domestic banks as their main bank are small while only 0.213 of companies that cite foreign banks as their main bank are small). This Kompass data is only cross-sectional from the 2005 edition, but it is reasonable to assume that it reflects the pattern over the recent past. This means that smaller firms would have been more affected by the 2001 change in legislation because it constrained domestic banks more (see Table 3). What is also interesting from the company size distribution is that big banks are more likely to lend to the smallest firms (0.284 of their borrowers), and *not* the small banks (only 0.209 of their borrowers). This is suggestive evidence but would also compound the negative effect on the smallest Lebanese companies because big banks with a larger share of foreign currency deposits were more constrained by the change in the reserve requirement (Table 4). Similarly, a greater proportion of domestic banks' borrowers were young firms (by date of establishment) compared with foreign banks. And the same is true of big banks' borrowers.

In terms of regional distribution, all banks had a comparable regional orientation to the random sample of Kompass companies. However, this regional distribution is highly concentrated in Beirut (0.432) and Metn (0.306), followed distantly by other areas with very few borrowers in the periphery such as Tripoli, Saida and Tyr, and Zahle. Finally, the industry distribution in Lebanon is skewed towards wholesale & retail trade (0.445) and services (0.302), followed by manufacturing (0.194). A noticeable difference exists between big and small banks. Small banks are more likely to lend to manufacturing (0.240 of their borrowers) compared with big banks (0.181 of their borrowers). A larger share of big bank lending is in turn extended to companies in the services sector.

Overall, the results of matching the firms to their main banks imply that the reserve requirement regulatory change had a greater adverse effect on more credit-constrained firms. These more credit-

²⁸This is a reasonable assumption since the banks are not alphabetically listed or ordered by size. However, the summary statistics in Table 7 are roughly similar if they are tabulated by the top 3 banks the firm deals with (repeating firm observations) and not just the first one listed.

constrained firms are typically the smaller and younger companies, that were most tied to the big domestic banks.

4.3 Results of a bank survey

As a supplement to the statistical data collected from *Bilanbanques*, I prepared an original survey of both qualitative and quantitative questions to fill the gaps and residual questions left unanswered by the statistical balance sheet and income statement data²⁹. Survey questions elicited a qualitative rating indicating how important various factors are in a bank's decision to lend to a potential borrower in Lebanon, reasons behind its choice of lending in foreign or domestic currency, and questions about the reserve requirement policy in Lebanon. The survey also included quantitative questions on the collateral, interest rate, and maturity required on the different loans and whether these differ depending on the currency the loan is denominated in. The initial sample of banks was based on the 2004 *Bilanbanques* number of active banks, totaling 58. Of these, eight were investment subsidiaries of commercial banks (e.g. BLOM Invest) and were not separately surveyed and one bank, Allied, has since fully merged with BankMed. This left a sample of 49 possible banks for survey distribution, of which 38 were visited over the period November 2006 to May 2007. There were 15 cooperative banks, of which four were majority foreign-owned and one was a big bank. Therefore, the sample is skewed towards smaller banks but the foreign share is representative of the Lebanese fraction of banking assets that is foreign-owned.

Results of the bank survey we carried out are reported in Table 8. Because not all banks answered all the questions, the number of responses to each question are also reported. The survey results should be interpreted with extreme caution because of the limited sample size but there are a number of interesting findings discussed below. The Lebanese head office is in Beirut for 11 of the 14 banks analyzed and in neighboring Metn, Mount Lebanon, for the remaining 3 banks. The median year of establishment in Lebanon was in 1953, median number of employees is 286, and median capital is USD 35 mn. The principal activity is commercial banking, followed by consumer & credit card banking.

Loan officers were asked to rate how problematic are different factors in their decision to lend to a potential borrower in Lebanon, where a one indicates no obstacle and a four indicates a major obstacle. They were also asked to list the most important obstacle from among the various ones (or name a factor if not in the list). In line with the evidence on the excess holdings of cash and

²⁹A copy of this eight page survey is available upon request. The survey was distributed with a cover page explaining its purpose in both English and Arabic, as well as a confidentiality agreement signed by myself and the graduate student research assistants. The latter administered and collected the survey in person from a senior loan officer at each of the banks visited.

reserves in recent years, no bank cited having insufficient loanable funds as an obstacle. The most important obstacle cited was that Lebanese bank lending rates are too high for potential borrowers, followed by the obstacle that many potential borrowers present projects which banks assess as, on average, profitable but too risky to finance³⁰. There is also evidence that obstacles are greater with respect to foreign currency lending than lira lending.

When asked about their lending preferences, a greater number of banks responded that they prefer to lend in foreign currency (USD) compared with Lebanese lira (LL), and of these the primary reason was perceived exchange rate risk, followed by balance sheet currency matching considerations. Most loans are collateralized with close to half of both USD and LL loans collateralized with cash and financial values in USD. In contrast only 17% of collateral is cash and financial values in LL for USD loans and 29% for LL loans. So even loans in Lebanese lira are more likely to be collateralized in dollars. That is, some sectors of the economy are generally unable to obtain credit because of their limited dollar collateral. A third main type of collateral in Lebanon is real estate, accounting for 31% of USD loans and 19% of LL loans. Interestingly, when asked directly whether the collateral they ask for depends on whether the bank loan is in USD or in LL, banks responded overwhelmingly in the negative, which contradicts the collateral disaggregation they provided in the previous question. This reinforces the view that these bank survey results should be interpreted with a good degree of caution. Banks also responded that the maturity of the loan contract does not depend on the loan's currency.

However, most said that interest rates differ depending on whether the loan is in foreign or domestic currency, with a median interest rate on USD loans of 9.2% and a median interest rate on LL loans of 13.5%, reflecting currency risk. But most banks appear to discount the importance of this currency risk to which they are implicitly exposed because they do not typically buy hedging contracts on their foreign currency exposure, nor do they ask that their borrowers hedge their currency exposures. Most banks also do not typically lend foreign currency loans to borrowers in the tradable sector (the median is only 20% of foreign currency loans). This means that banks transfer the currency risk to their unhedged borrowers but they still retain the resulting credit risk, a point made by Gulde et al (2004). Of the banks that do not hedge their foreign currency exposure, the reasons were equally divided between no perceived exchange risk and because of inability to do so or it is too costly. While the primary reason banks do not typically ask their borrowers to hedge their foreign currency exposure is because of no perceived exchange risk. That there is no perceived exchange rate risk (at least in the short run) is supported in a later question with most banks responding that they expect the exchange rate to be stable over the next year.

³⁰There was also one bank that cited another factor, which was market instability. This can be nested within the excessive riskiness of projects view.

A slight majority of banks consider that the current reserve requirement policy in Lebanon constrains their ability to lend to the private sector, which is a somewhat surprising result given that most banks appear to be holding reserves well in excess of the requirement in recent years. It can therefore be inferred that an even greater number would have perceived the reserve requirement to be constraining in the 2001–02 period when the regulatory change was binding. Banks also responded that they are equally or more constrained by the requirement on USD deposits than on LL deposits and therefore the majority believe that the current reserve requirement policy in Lebanon should be maintained and not equalized or reversed (recall that the current reserve requirement is overall greater on LL deposits – when including both demand and term deposits – than on USD deposits).

5 Concluding remarks

The results of this paper have shown that the currency composition of bank balance sheets matter. The reserve requirement tax on financial intermediation was not equally distributed among the banks. The regulatory change in the reserve requirement may have been introduced to tighten monetary policy in the face of capital outflows, declining foreign assets at the Central Bank and exchange rate pressure. It may have also arisen out of prudential concerns about insufficient liquidity in the banking system, especially dollar liquidity. However, such regulatory changes can have unintended consequences such as a drop in lending as banks scramble to adjust their asset portfolios. In addition, banks may be reluctant to offer credit in domestic currency because of exchange rate risk and currency matching considerations, both documented in the survey responses by banks in this study. If the change in bank regulation led to a decline in lending in foreign currency that was not perfectly undone by an increase in lira loans, then aggregate lending would have been hit. Those banks found to be most constrained are the domestic banks, those with a higher initial share of foreign currency deposits, and those with low buffers of foreign currency liquidity.

The productive sectors of the economy that are most dependent on bank loans would in turn be adversely affected. And some sectors will be more affected than others because they are dependent on the more constrained banks for their external finance. These include the smaller and younger companies, as documented in the findings on bank-firm ties in this study. The results of this research can, therefore, serve to inform monetary and regulatory policy recommendations, which are often intertwined in many developing countries. This can help in avoiding credit distortions to sectors that are dependent on banks for their investment and growth.

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Figure 1a

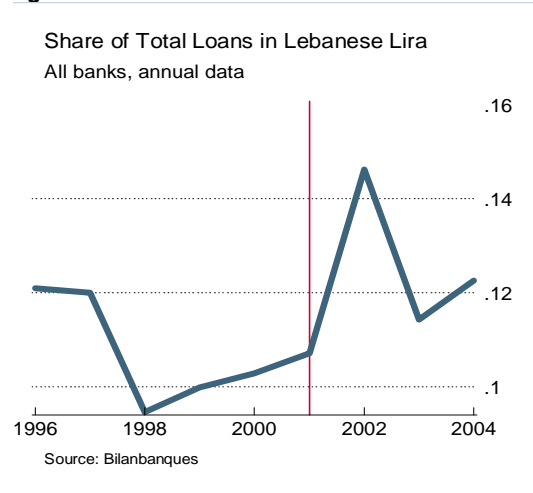


Figure 1b

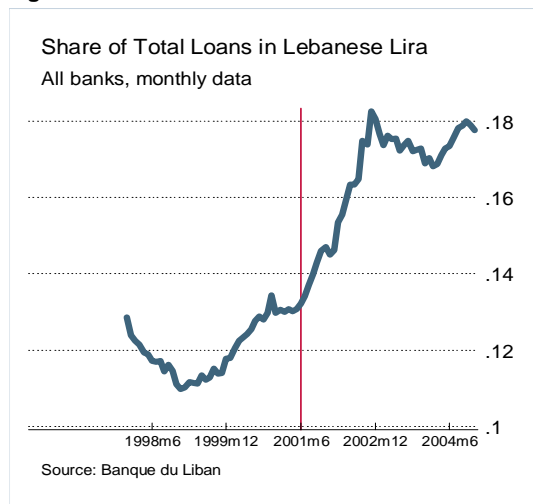


Figure 2

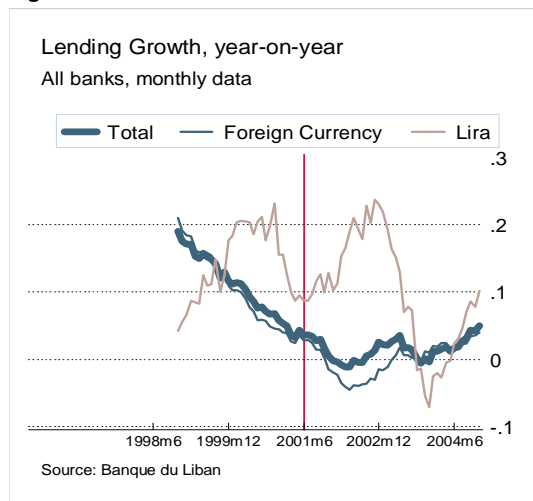


Figure 3a

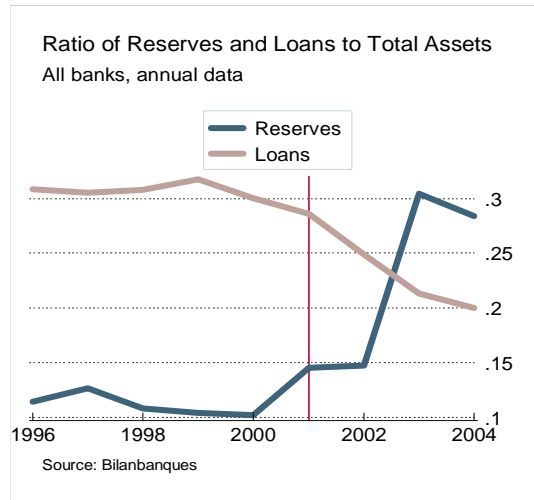


Figure 3b

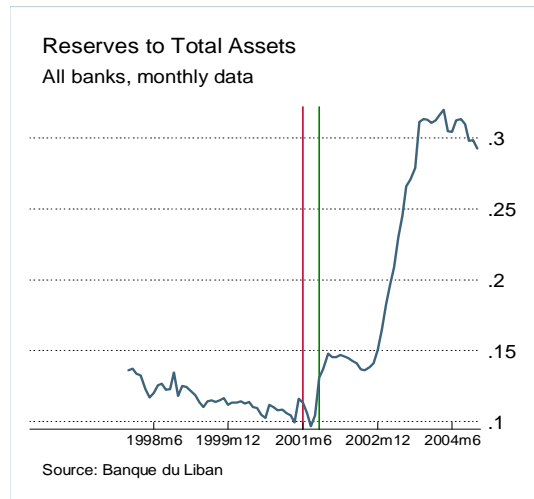


Figure 3c

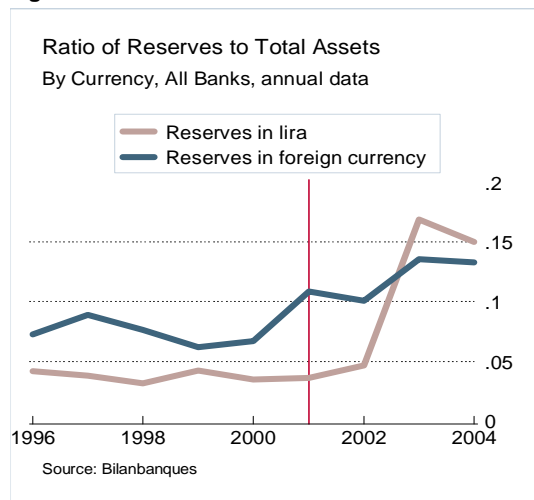


Table 1. Foreign Currency Deposits to Total Deposits (Average 1995 - 2001) and Different Reserve Requirement Regulation

Rank	If different reserve requirement ⁽¹⁾ , then		Rank, cont'd	If different reserve requirement, then		
	LC > FC: 1	FC > LC: 2		LC > FC: 1	FC > LC: 2	
1	Cambodia	93.2	51	Egypt	24.8	1
2	Bolivia	90.0	52	St. Kitts and Nevis	24.8	
3	Uruguay	80.0	53	Hungary	24.3	
4	Bosnia-Herzegovina	73.6	54	Trinidad and Tobago	23.7	1
5	Lao PDR	73.0	55	United Arab Emirates	22.6	
6	Armenia	71.4	56	Uganda	21.9	
7	Croatia	70.4	57	Indonesia	21.4	
8	Nicaragua	67.4	58	Jamaica	21.0	
9	Peru	65.7	59	Poland	21.0	1
10	Angola	65.1	60	Saudi Arabia	20.2	
11	Georgia	64.6	61	Estonia	19.1	
12	Azerbaijan	63.6	62	Israel	19.0	
13	Belarus	63.2	63	Netherlands	17.5	
14	Argentina	61.3	64	Malawi	17.3	
15	Lebanon	60.4	65	Guinea-Bissau	15.5	
16	Tadjikistan	57.6	66	Slovak Republic	14.8	
17	Macedonia FYR	56.8	67	United Kingdom	13.4	
18	Paraguay	55.4	68	Uzbekistan	11.4	1
19	Kyrgyz Republic	51.9	69	Barbados	11.4	
20	Congo Dem. Rep. of	50.6	70	Czech Republic	11.1	
21	Bulgaria	50.5	71	Kenya	10.9	
22	Yemen	49.6	72	China	8.2	
23	Turkey	49.0	73	Mexico	8.1	
24	Mozambique	48.3	74	El Salvador	8.0	
25	Kazakhstan	47.5	75	Japan	6.7	
26	Latvia	47.5	76	Chile	6.6	2
27	Sao Tome & Principe	46.3	77	Antigua and Barbuda	5.4	
28	Hong Kong	45.7	78	Nigeria	4.2	1
29	Bahrain	40.6	79	Netherlands Antilles	4.1	
30	Lithuania	40.6	80	Italy	3.8	
31	Costa Rica	40.4	81	Denmark	3.8	
32	Moldova	38.3	82	Norway	3.7	
33	Romania	37.7	83	New Zealand	3.5	
34	Ecuador	37.6	84	Finland	3.2	
35	Vietnam	37.5	85	South Africa	3.1	
36	Mongolia	37.4	86	Bhutan	2.8	
37	Zambia	36.3	87	Korea	2.7	
38	Slovenia	35.3	88	Malaysia	2.4	
39	Ukraine	35.2	89	Dominica	2.4	
40	Haiti	35.1	90	Belize	2.2	
41	Russia	34.0	91	Bahamas, The	2.0	
42	Turkmenistan	31.3	92	Austria	1.9	
43	Philippines	30.7	93	St. Vincent&Grenadine	1.9	
44	Albania	28.6	94	Spain	1.8	
45	Honduras	28.4	95	Sweden	1.4	
46	Ghana	28.1	96	Thailand	1.0	
47	Tanzania	28.0	97	Guatemala	0.8	
48	Greece	27.4	98	Comoros	0.5	
49	Guinea	25.4	99	Bangladesh	0.3	
50	Pakistan	24.9	100	Switzerland	0.3	
			101	Venezuela	0.2	

Source: Author's calculations based on foreign currency deposit share (1990 - 2001) provided in De Nicolo et al, Journal of Banking and Finance, "Dollarization of bank deposits: Causes and consequences", 29, 2005, Appendix A, Table 4. And author's interpretation of reserve requirements based on Barth, Caprio, and Levine (2001, updated 2003) World Bank, "The Regulation and Supervision of Banks around the World: A New Database", Balino et al (1999), and Gulde et al (2004). For more details, Appendix Table A3 is available upon request.

Note:

(1) The following additional six countries have higher reserve requirements on local currency than on foreign currency deposits (these countries are not listed in De Nicolo et al (2005) but are in the other cited references): Colombia, Cyprus, Kuwait, Morocco, Sri Lanka, and Tunisia. And Vanuatu has a higher reserve requirement on foreign currency deposits.

Table 2. Descriptive statistics for the aggregate economy

	All Years	1996	1997	1998	1999	2000	2001	2002	2003	2004
Real GDP growth (in %)	3.2	4.0	4.0	3.0	-1.2	1.2	4.2	2.9	5.0	6.0
Coincident Indicator of Economic Activity, % change	3.2	1.1	2.3	3.7	0.1	-0.6	6.0	2.1	6.3	8.3
Interbank rate, LL (in %)	8.4	11.2	13.0	11.2	7.5	7.6	9.7	7.6	4.0	3.9
Lebanon Eurobond stripped spread (in basis points)	428.1	na	na	249.9	237.9	205.2	502.4	928.4	511.9	361.1
Exchange rate (LL/\$)	1514.7	1552	1527	1508	1507.5	1507.5	1507.5	1507.5	1507.5	1507.5
Inflation (in %)	2.5	5.2	3.2	1.6	1.4	-1.4	2.9	4.2	2.0	3.0
Money Supply Growth, M1 (LL sight, in %)	7.9	14.2	12.6	-0.4	5.1	9.8	1.1	4.2	13.6	10.8
Money Supply Growth, M2 (M1 + LL time and saving, in %)	12.2	29.3	24.6	1.7	16.3	12.0	-15.0	-0.1	30.3	10.5
Money Supply Growth, M3 (M2 + foreign currency, in %)	12.7	17.8	21.8	16.4	11.9	10.6	7.9	5.2	12.4	10.6
Central Bank foreign assets to total assets	0.5	0.59	0.61	0.62	0.66	0.50	0.34	0.39	0.41	0.36
Central Bank foreign assets to currency in circulation	6.7	7.27	6.84	7.14	7.56	5.34	4.30	4.96	8.95	8.03
Deposits of Banks and Financial Corporations at the Central Bank (Bank reserves) to total assets	0.5	0.28	0.48	0.42	0.40	0.43	0.56	0.62	0.79	0.76

Source: Author's calculations based on Banque du Liban, *Bilanbanques*, IMF Public Information Notices, and JP Morgan Chase EMBIG.

Table 3. The effect of the change in the reserve requirement on bank credit

	(1)	(2)	(3)	(4)	(5)
The dependent variable is the annual growth of commercial & customer loans over the 1996-2004 period					
Share of deposits in Lira, lag 1 year	0.401 (0.427)	0.946 (0.221)***	0.217 (0.422)	0.357 (0.296)	0.999 (0.236)***
Years 2001 & 2002 dummy	-0.150 (0.083)*	-0.263 (0.108)**	-0.326 (0.099)***	-0.424 (0.137)***	-0.528 (0.179)***
Interaction of Dummy 2001 & 2002 with lagged share of deposits in lira	0.171 (0.186)	0.480 (0.234)**	0.398 (0.199)**	0.623 (0.253)**	0.546 (0.243)**
Foreign currency liquid assets to total assets, lag 1 year			-0.597 (0.485)	-1.328 (0.401)***	
Interaction of Dummy 2001 & 2002 with lagged share of foreign currency liquid assets			0.813 (0.436)*	1.043 (0.579)*	
Net liquid assets to total assets, lag 1 year					0.407 (0.251)
Interaction of Dummy 2001 & 2002 with lagged net liquid assets					0.433 (0.208)**
Constant	-0.043 (0.166)	-0.310 (0.102)***	0.066 (0.185)	0.037 (0.152)	-0.564 (0.189)***
Number of banks	63	40	63	40	40
Foreign banks excluded?	N	Y	N	Y	Y
Observations	426	289	414	287	285
R ²	0.03	0.08	0.05	0.13	0.11

Notes:

Robust standard errors in parentheses; standard errors are clustered by bank.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Panel regressions are estimated with bank fixed effects. The reported R-squared is the within R-squared.

Regressions are estimated after trimming the top and bottom 2.5 percent of observations based on the dependent variable.

Table 4. The effect of the change in the reserve requirement on bank credit: controlling for other bank characteristics

	(1)	(2)	(3)	(4)	(5)	(6)
The dependent variable is the annual growth of commercial & customer loans over the 1996-2004 period						
Share of deposits in Lira, lag 1 year	0.423	0.431	0.333	0.187	0.344	0.351
	(0.297)	(0.281)	(0.316)	(0.285)	(0.290)	(0.297)
Years 2001 & 2002 dummy	-0.429	-0.433	-0.406	-0.461	-0.318	-0.425
	(0.144)***	(0.127)***	(0.129)***	(0.151)***	(0.242)	(0.138)***
Interaction of Dummy 2001 & 2002 with lagged share of deposits in lira	0.598	0.735	0.916	0.682	0.587	
	(0.355)*	(0.262)***	(0.244)***	(0.244)***	(0.270)**	
Foreign currency liquid assets to total assets, lag 1 year	-1.319	-1.370	-1.249	-1.312	-1.340	-1.328
	(0.403)***	(0.411)***	(0.446)***	(0.400)***	(0.450)***	(0.403)***
Interaction of Dummy 2001 & 2002 with lagged share of foreign currency liquid assets	1.081	1.066	0.607	0.854	1.155	
	(0.620)*	(0.553)*	(0.582)	(0.605)	(0.610)*	
Share of loans in Lira, lag 1 year	-0.476					
	(0.208)**					
Interaction of Dummy 2001 & 2002 with lagged share of loans in lira	0.028					
	(0.390)					
Return on assets, lag 1 year		-1.286				
		(3.196)				
Interaction of Dummy 2001 & 2002 with lagged return on assets		-3.472				
		(2.131)				
Capital to risk-weighted assets (Basel), lag 1 year			0.095			
			(0.065)			
Interaction of Dummy 2001 & 2002 with lagged capital risk asset ratio			-0.293			
			(0.126)**			
Provisions for doubtful loans to asset ratio, lag 1 year				-0.111		
				(0.284)		
Interaction of Dummy 2001 & 2002 with lagged provisions				0.670		
				(0.771)		
Size (ln of total assets)					-0.001	
					(0.055)	
Interaction of Dummy 2001 & 2002 with size					-0.016	
					(0.028)	
Interaction of big bank with Dummy 2001 & 2002 and with lagged share of deposits in lira						1.079
						(0.350)***
Interaction of small bank with Dummy 2001 & 2002 and with lagged share of deposits in lira						0.607
						(0.262)**
Interaction of big bank with Dummy 2001 & 2002 with lagged share of foreign currency liquid assets						0.098
						(0.880)
Interaction of small bank with Dummy 2001 & 2002 with lagged share of foreign currency liquid assets						1.105
						(0.638)*
Constant	0.096	0.020	0.019	0.117	0.049	0.039
	(0.157)	(0.153)	(0.167)	(0.150)	(0.365)	(0.153)
Number of banks	40	40	40	39	40	40
Foreign banks excluded?	Y	Y	Y	Y	Y	Y
Observations	286	281	275	277	287	287
R ²	0.14	0.14	0.14	0.12	0.13	0.13

Notes:

Robust standard errors in parentheses; standard errors are clustered by bank.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Panel regressions are estimated with bank fixed effects. The reported R-squared is the within R-squared.

Regressions are estimated after trimming the top and bottom 2.5 percent of observations based on the dependent variable.

Table 5. The effect of the change in the reserve requirement on bank credit: controlling for aggregate conditions in the economy

	(1)	(2)	(3)	(4)	(5)	(6)
The dependent variable is the annual growth of commercial & customer loans over the 1996-2004 period						
Share of deposits in Lira, lag 1 year	0.241	-0.029	-0.222	0.496	-0.148	0.077
	(0.319)	(0.236)	(0.463)	(0.369)	(0.266)	(0.519)
Years 2001 & 2002 dummy	-0.377	-0.382	-0.388	-0.410	-0.450	-0.420
	(0.137)***	(0.135)***	(0.159)**	(0.142)***	(0.129)***	(0.154)***
Interaction of Dummy 2001 & 2002 with lagged share of deposits in lira	0.649	0.626	0.704	0.641	0.785	0.686
	(0.255)**	(0.258)**	(0.277)**	(0.259)**	(0.244)***	(0.269)**
Foreign currency liquid assets to total assets, lag 1 year	-1.133	-1.144	-0.723	-1.226	-1.221	-1.093
	(0.434)**	(0.462)**	(0.840)	(0.427)***	(0.413)***	(0.565)*
Interaction of Dummy 2001 & 2002 with lagged share of foreign currency liquid assets	0.809	0.909	0.711	0.920	0.863	0.877
	(0.595)	(0.598)	(0.691)	(0.595)	(0.613)	(0.590)
Real GDP growth rate, lag 1 year	1.822			1.484		
	(1.171)			(2.152)		
Change in Interbank rate, lag 1 year	-0.007	-0.008			0.003	
	(0.003)**	(0.003)***			(0.007)	
Change in US Federal Funds Rate, lag 1 year		0.009				
		(0.020)				
Change in Eurobond spread, lag 1 year			-0.0002			
			(0.0001)*			
Interaction of lagged growth with Lagged share of deposits in lira				1.898		
				(4.351)		
Interaction of lagged change in Interbank rate with Lagged share of deposits in lira					-0.023	
					(0.013)*	
Money supply (M3) growth rate, lag 1 year						-0.184
						(1.095)
Interaction of lagged M3 growth with Lagged share of deposits in lira						1.542
						(2.438)
Constant	-0.013	0.160	0.212	-0.099	0.214	0.074
	(0.175)	(0.120)	(0.257)	(0.199)	(0.133)	(0.247)
Number of banks	40	40	40	40	40	40
Foreign banks excluded?	Y	Y	Y	Y	Y	Y
Observations	287	287	179	287	287	287
R ²	0.166	0.16	0.10	0.15	0.16	0.13

Notes:

Robust standard errors in parentheses; standard errors are clustered by bank.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Panel regressions are estimated with bank fixed effects. The reported R-squared is the within R-squared.

Regressions are estimated after trimming the top and bottom 2.5 percent of observations based on the dependent variable.

Table 6. The effect of the change in the reserve requirement on bank credit: more robustness checks

	(1)	(2)	(3)	(4)
	Dependent variable:			
	Growth of Commercial loans & customer loans			Change in ratio of Commercial loans & customer loans to previous year's total assets
Share of deposits in Lira, 2 year lag	0.309 (0.467)			
Years 2001 & 2002 dummy	-0.316 (0.162)*		-0.439 (0.135)***	-0.045 (0.014)***
Interaction of Dummy 2001 & 2002 with two year lagged share of deposits in lira	0.543 (0.268)**			
Foreign currency liquid assets to total assets, 2 year lag	-0.787 (0.455)*			
Interaction of Dummy 2001 & 2002 with two year lagged share of foreign currency liquid assets	-0.046 (0.778)			
Share of deposits in Lira, 1 year lag		0.560 (0.304)*	0.235 (0.290)	0.069 (0.047)
Year 2001 dummy		-0.366 (0.196)*		
Interaction of 2001 dummy with lagged share of deposits in lira		0.662 (0.364)*		
Foreign currency liquid assets to total assets, 1 year lag		-1.192 (0.404)***	-1.139 (0.419)***	-0.189 (0.052)***
Interaction of 2001 dummy with lagged share of foreign currency liquid assets		-0.093 (0.930)		
Interaction of Dummy 2001 & 2002 with lagged share of deposits in lira			0.636 (0.251)**	0.045 (0.026)*
Interaction of Dummy 2001 & 2002 with lagged share of foreign currency liquid assets			0.887 (0.576)	0.146 (0.076)*
Year 2003 dummy			-0.084 (0.103)	
Interaction of 2003 dummy with lagged share of deposits in lira			0.003 (0.242)	
Constant	-0.016 (0.228)	-0.071 (0.158)	0.094 (0.149)	0.004 (0.023)
Number of banks	40	40	40	41
Foreign banks excluded?	Y	Y	Y	Y
Observations	250	287	287	293
R ²	0.07	0.11	0.13	0.13

Notes:

Robust standard errors in parentheses; standard errors are clustered by bank.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Panel regressions are estimated with bank fixed effects. The reported R-squared is the within R-squared.

Regressions are estimated after trimming the top and bottom 2.5 percent of observations based on the dependent variable.

Table 7. Matching industry statistics from Kompass company database to banks

		Domestic bank	Foreign bank	Big bank	Small bank
Fraction of total system assets (Bilanbanques)		0.792	0.208	0.645	0.355
Fraction of total system loans (Bilanbanques)		0.752	0.248	0.628	0.372
Fraction of firms with primary banker (Kompass)		0.723	0.273	0.666	0.329
		Kompass sample			
	All sample	Domestic bank	Foreign bank	Big bank	Small bank
<i>Distribution of firms across Kompass sample, and by primary bank type:</i>					
Size					
Small firms (5 or less employees)	0.265	0.276	0.213	0.284	0.209
Medium-size (6-24)	0.476	0.479	0.511	0.448	0.564
Big (25-59)	0.157	0.153	0.206	0.177	0.151
Very big (60 or more)	0.102	0.092	0.071	0.091	0.076
Region					
Beirut	0.432	0.439	0.421	0.432	0.439
Metn	0.306	0.318	0.306	0.306	0.330
Baabda, Aley, and Chouf	0.103	0.093	0.093	0.101	0.077
Kesrouane, Batroun, Jbeil and Bcharreh	0.114	0.126	0.104	0.121	0.118
Tripoli and Akkar	0.019	0.012	0.022	0.016	0.014
Saida and Tyr	0.012	0.008	0.022	0.011	0.014
Zahle	0.014	0.004	0.033	0.013	0.009
Age					
Old (established <= 1981)	0.259	0.237	0.262	0.234	0.262
Middle (established > 1981 & < 1997)	0.468	0.485	0.459	0.493	0.448
Young (established >= 1997 & < 2000)	0.161	0.164	0.180	0.171	0.163
Very young (established >= 2000)	0.112	0.114	0.098	0.101	0.127
Sector					
Agriculture, hunting, fishing & forestry	0.005	0.006	0.005	0.009	0.000
Mining & Quarrying	0	0	0	0	0
Electricity, gas, and water	0	0	0	0	0
Manufacturing	0.194	0.198	0.208	0.181	0.240
Construction & public works	0.054	0.056	0.071	0.065	0.050
Wholesale/Retail Trade (commerce)	0.445	0.468	0.443	0.450	0.484
Services	0.302	0.272	0.273	0.295	0.226

Source: Author's calculations using Kompass Lebanon 2005 for a random 10% of the companies (804 companies out of the database's 8245 companies). Data on banks from Bilanbanques, various issues.

Table 8. Tabulating results of bank survey

Survey Method:	Initial sample of banks was based on the 2004 Bilanbanques number of active banks (58). Of these, 8 were investment subsidiaries of commercial banks (e.g. BLOM Invest) and were not separately surveyed and one bank, Allied, has since fully merged with BankMed. This left a sample of 49 possible banks for survey distribution (carried out on senior loan officers in 2006/07 by graduate research assistants).
Summary of surveys distributed and completed:	38 banks of the 49 were visited and as of 31/5/2007 a total of 12 were non-responsive, 11 were pending, and 15 banks had completed the survey. This translates to a cooperation rate of 39% based on surveying 78% of the set of Lebanese banks. Of the 38 banks visited, 11 were majority foreign-owned banks, and 6 were big banks. Of the 15 cooperative banks, 4 were foreign and 1 was a big bank. Therefore, the sample is skewed towards smaller banks but the foreign share is representative.

I. Summary of general characteristics on responding banks: The Lebanese head office is in Beirut for 11 of the 14 banks analyzed and in Metn, Mount Lebanon, for the remaining 3 banks. The median year of establishment in Lebanon was in 1953, median number of employees is 286, and median capital is USD 35 mn. The principal activity is commercial banking, followed by consumer & credit card banking.

II. Bank Loans: LL and USD Lending

How problematic are these different factors in your decision to lend to a potential borrower in Lebanon?

	Number of responses	Median Response (1: no obstacle, 2: minor, 3: moderate, 4: major obstacle)	Number of banks listing as major obstacle	Which is the MOST important obstacle? (Number of banks)
(a) Many potential borrowers present projects which we assess as overall unprofitable and therefore we expect that the borrower will not be able to pay back the loan	14	2.5	3	2
(b) Many potential borrowers present projects which we assess as, on average, profitable, but too risky to finance	14	2.0	2	3
(c) Potential borrowers do not have sufficient guarantees or collateral to post on their loans	14	3.0	2	1
<i>and specifically in:</i>				
Foreign currency (USD) loans	14	2.5	2	
Lebanese lira (LBP) loans	14	2.0	2	
(d) Lebanese bank lending rates are too high for potential borrowers	14	2.5	4	4
<i>and specifically on:</i>				
Foreign currency (USD) loans	12	2.0	3	
Lebanese lira (LBP) loans	13	2.0	1	
Short-term loans	14	2.0	0	
Long-term loans (over one year)	14	2.0	2	
(e) Potential borrowers have insufficient credit history and a relationship with our bank	14	2.0	1	2
(f) We have insufficient loanable funds	12	1.0	0	0
<i>and specifically for lending in:</i>				
Foreign currency (USD)	13	2.0	0	
Lebanese lira (LBP)	11	1.0	0	
Short-term loans	14	1.0	0	
Long-term loans (over one year)	14	1.0	0	
(g) Other factor (please specify) (The bank cited market instability as a factor)	1		1	1

Table 8. Tabulating results of bank survey, cont'd

	Number of responses			
Currency preference for lending?	14			
We are indifferent between lending in USD and in LBP	5			
We prefer to lend in USD compared with LBP	6	Of these banks, the primary reason given was perceived exchange rate risk, followed by balance sheet currency matching considerations		
We prefer to lend in LBP compared with US	3	No consensus reason was given, but reasons also included exchange rate risk and balance sheet currency matching, in addition to likelihood of repayment of borrower, loan duration, and government subsidies.		
II.4 Please provide a distribution of the collateral posted by your borrowers	9	Aggregated Response:		
Type of collateral		% of collateral by type of loan:		
		USD loans	LBP loans	
(a) Cash and financial values denominated in USD		43	46	
(b) Cash and financial values denominated in LBP		17	29	
(c) Real estate (land and buildings)		31	19	
(d) Real guarantees (non-real estate)		1	1	
(e) Personal guarantees		4	3	
(f) Other collateral		2		
(g) Non-collateralized loans (e.g. overdrafts)		2	3	
		100	100	
		No	Yes	
Does the collateral or guarantee you ask for from a borrower depend on whether the bank loan is in USD or in LBP?	14	13	1	
Does the maturity of the loan contract depend on whether the loan is in USD or in LBP?	14	13	1	
Does the interest rate on the loan depend on whether the bank loan is in USD or in LBP?	14	9	5	
			Of these banks, the median interest rate on USD loan is 9.2% and on LL 13.5%	
		No	Yes	If yes, share hedged (median)
Do you typically buy hedging (insurance) contracts on the foreign currency exposure of your bank's balance sheet?	14	11	3	30
Are your foreign currency loans typically lent to borrowers in the tradable sector (such as exporters with a cash flow in foreign currency)? ⁽¹⁾	12	8	4	20
				Note: this is the share of a bank's foreign currency loans which are lent to borrowers with foreign currency earnings abroad
Do you typically ask that your borrowers hedge the foreign currency exposure of their companies and business?	13	9	4	35
		Of the banks that do not hedge their foreign currency exposure, the reasons were equally divided between no perceived exchange risk and because banks are unable to do so or it is too costly. While the primary reason banks do not typically ask their borrowers to hedge their foreign currency exposure is because of no perceived exchange risk. That there is no perceived exchange rate risk is confirmed in a later question when the majority of banks (9) expect the exchange rate to be stable over the next year.		

Table 8. Tabulating results of bank survey, cont'd**III. Lebanese reserve requirements**

	Number of responses
Which of the following two statements best reflects your opinion of the current reserve requirement policy on deposits in Lebanon?	
The requirement constrains our ability to lend to the private sector	7
Our lending decisions are not affected by the reserve requirement	6
If your answer was that the reserve requirement constrains your lending, then which of the following statements best reflects your opinion?	
We are equally constrained by the requirement for lending in USD and LBP loans	6
We are more constrained by the requirement on USD deposits for lending in USD loans	4
We are more constrained by the requirement on LBP deposits for lending in LBP loans	1
Do you believe that the current reserve requirement policy in Lebanon is appropriate? Please select:	
The reserve requirement (rr) on the LBP deposits relative to USD deposits should stay as it is: that is overall (term and demand) $rr\ LBP > rr\ USD$	5
The policy should be reversed so that the $rr\ USD > rr\ LBP$	3
The policy should be equalized across term and demand so that $rr\ LBP = rr\ USD$	2
No opinion	0
In your opinion, which of the following reasons BEST explains the Banque du Liban's motive to raise reserve requirements in June 2001 and especially on dollar deposits? ⁽²⁾	
A general tightening of monetary policy in a stable macro environment	3
A tightening of monetary policy to respond to exchange rate pressures	5
A tightening in the regulatory policy because of concerns of insufficient liquidity in the banking system, and especially dollar liquidity	4
Other reason	1
Total Lebanese commercial bank reserves as a share of assets has averaged about 30% over 2003 - 2005. This figure is in excess of the minimum reserves required on banks total deposits and is an increase over the previous years. There has been no increase in reserve requirements in recent years. What do you think accounts for the fact that banks are holding excess reserves in recent years?	4
Reasons offered by the banks:	
Banks are depositing more money for local settlement related transactions; the reserves are also interest-bearing on USD reserves, paying market rates. No other alternatives for investment. For hedging. And the ability of banks to foresee economic events.	

Notes:

⁽¹⁾ In addition to these questions, bankers were also asked whether they favored Lebanon adopting a policy similar to Chile, which prohibits lending in dollars to borrowers who are not in the tradable (export & import) sector. The 3 responses were in the negative, and suggested that Lebanon has always had a free market and that it will lead to a significant cut in credit because the risk of devaluation of the lira will prohibit aggressive lending in the lira.

⁽²⁾ In addition, banks were asked whether the reserve requirement increase in 2001 came as a surprise, to which the majority replied in the negative. This question was not well designed (in addition to the event having taken place 5 years before the survey was carried out). The regulatory change was announced by the Banque du Liban in circular number 84 in June 2001 but only implemented in October 2001. Therefore, it should not have come as a surprise to banks when the law was made effective in October (and the aggregate monthly data reported by the Banque du Liban suggests that banks increased the ratio of their lira lending in June 2001 and not October 2001). Another vague question elicited a response that the increase in the reserve requirement had no effect on banks' asset portfolios (which could have been interpreted as overall asset levels rather than their composition.)

Other questions:

There was a section IV of the survey on background questions which asked banks to provide various estimates on the composition of their assets and liabilities, shares in lira, and questions relating to the type of lending they extended. Unfortunately, even less banks chose to answer this section (a total of 3 banks), so these results cannot be taken as representative. But some interesting insight is provided: the average fraction of their assets that are in the form of loans & advances is 15%, and less than 2% of these are in lira). The sectoral distribution of their foreign currency loans is (median response): 40% to trade, 15% to services, 27% to construction, 5% to industry, and 15% to individuals (mortgages & credit card). The main use of commercial lending was for working capital (short-term financing) and for foreign trade transactions (over 90%). While only about 10% was for fixed investment purposes. This was confirmed by most loans having a maturity of under one year.

Table A1. Descriptive statistics for Domestic Banks

	All Years	1996	1997	1998	1999	2000	2001	2002	2003	2004
Number of banks	40	40	40	40	39	39	40	41	40	40
Mean assets (1996 USD millions)	912.0	500.1	634.5	776.1	861.3	903.7	936.4	1035.5	1179.3	1379.7
Median assets (1996 USD millions)	312.8	151.5	194.4	245.5	283.1	350.1	376.0	353.9	389.0	461.1
Fraction of total system assets	0.792	0.739	0.746	0.751	0.760	0.773	0.795	0.811	0.830	0.850
<i>Fraction of total assets in type category, all banks (mean)</i>										
Assets, of which:										
Cash and Central Bank (Reserves)	0.157	0.103	0.125	0.105	0.107	0.110	0.149	0.140	0.284	0.283
in Lebanese Lira (LL)	0.066	0.038	0.040	0.032	0.041	0.038	0.040	0.041	0.160	0.159
in Foreign Currency (FC)	0.092	0.065	0.085	0.073	0.066	0.074	0.113	0.099	0.124	0.125
Securities ⁽¹⁾	0.350	0.385	0.337	0.369	0.381	0.367	0.363	0.358	0.294	0.297
in LL	0.258	0.356	0.288	0.310	0.297	0.275	0.241	0.221	0.177	0.154
in FC	0.069	0.011	0.020	0.046	0.057	0.068	0.094	0.114	0.097	0.117
Interbank assets	0.134	0.141	0.149	0.139	0.107	0.135	0.126	0.153	0.121	0.133
in LL	0.016	0.026	0.022	0.015	0.011	0.013	0.008	0.012	0.014	0.018
in FC	0.134	0.128	0.145	0.136	0.107	0.135	0.133	0.153	0.127	0.139
Total loans ⁽²⁾	0.274	0.288	0.303	0.303	0.321	0.307	0.282	0.257	0.208	0.196
in LL	0.054	0.058	0.065	0.052	0.062	0.058	0.055	0.061	0.038	0.040
in FC	0.224	0.230	0.239	0.252	0.259	0.248	0.234	0.202	0.175	0.172
of loans:										
Current Loans (Commercial and consumer) ⁽²⁾ , of which:	0.178	0.181	0.207	0.202	0.203	0.199	0.184	0.166	0.131	0.128
Commercial loans	0.120	0.118	0.136	0.129	0.123	0.148	0.125	0.116	0.092	0.096
Total liabilities, of which:										
Total deposits	0.741	0.756	0.730	0.705	0.726	0.741	0.743	0.759	0.749	0.761
in LL	0.318	0.406	0.326	0.303	0.348	0.318	0.270	0.272	0.320	0.305
in FC	0.434	0.369	0.423	0.399	0.378	0.423	0.474	0.503	0.464	0.471
of deposits:										
Sight	0.065	0.076	0.068	0.069	0.051	0.065	0.057	0.062	0.068	0.065
Time & Saving	0.646	0.657	0.629	0.608	0.648	0.652	0.663	0.662	0.640	0.654
Interbank liabilities (including to BDL)	0.041	0.026	0.026	0.049	0.043	0.045	0.041	0.048	0.045	0.046
in LL	0.019	0.011	0.014	0.023	0.011	0.029	0.014	0.022	0.022	0.022
in FC	0.028	0.023	0.018	0.025	0.031	0.027	0.031	0.032	0.031	0.034
Subordinated & long-term debt	0.016	0.016	0.020	0.009	0.014	0.018	0.017	0.018	0.014	0.012
Other liabilities	0.084	0.102	0.099	0.106	0.104	0.086	0.072	0.066	0.050	0.069
Equity	0.118	0.100	0.125	0.131	0.113	0.110	0.121	0.110	0.141	0.111
<i>Footnotes (mean)</i>										
Percent of total assets in Lebanese Lira (LL)	0.435	0.516	0.457	0.451	0.465	0.422	0.389	0.372	0.438	0.407
Percent of total liabilities in LL	0.461	0.534	0.483	0.477	0.490	0.448	0.418	0.399	0.468	0.430
Percent of total loans in LL	0.183	0.208	0.208	0.157	0.176	0.172	0.171	0.214	0.163	0.177
Percent of total deposits in LL	0.436	0.522	0.432	0.449	0.493	0.445	0.392	0.366	0.418	0.405
Percent of loans that are non-performing ⁽³⁾	0.113	0.047	0.050	0.072	0.100	0.116	0.143	0.144	0.169	0.157
Provisions for doubtful loans (% of assets)	0.061	0.061	0.065	0.073	0.047	0.054	0.057	0.058	0.070	0.062
Net liquid assets (% of assets) ⁽⁴⁾	0.582	0.587	0.572	0.519	0.511	0.538	0.585	0.599	0.658	0.666
Profitability (Return on assets) ⁽⁵⁾	0.011	0.016	0.015	0.015	0.011	0.009	0.009	0.008	0.009	0.007
Interest rate receivable on loans & advances (%) ⁽⁶⁾	0.103	0.120	0.119	0.113	0.105	0.117	0.114	0.094	0.083	0.066
Interest rate payable on deposits (%) ⁽⁶⁾	0.075	0.093	0.088	0.088	0.082	0.085	0.072	0.064	0.057	0.045
Overall interest margin on interest earning assets ⁽⁶⁾	0.033	0.045	0.041	0.038	0.032	0.031	0.027	0.031	0.028	0.023
on LL	0.042	0.053	0.053	0.054	0.038	0.033	0.032	0.041	0.038	0.027
on FC	0.025	0.035	0.029	0.023	0.024	0.026	0.026	0.025	0.023	0.017

Source: Author's calculations based on Bilanbanques.

Notes:

⁽¹⁾ Securities are the sum of Lebanese treasury bills and other government bills, Bonds and financial instruments with fixed income, and securities with variable income.⁽²⁾ Total loans are the sum of commercial loans, other loans to customers, overdraft accounts, net debtor/creditor accounts and cash collateral, loans and advances to related parties, and doubtful loans. Current loans are defined as the sum of commercial and other loans to customers after deducting information on substandard loans.⁽³⁾ Calculated as the sum of doubtful and substandard loans (note that this information is under-reported by the banks).⁽⁴⁾ Net liquid assets is a summary measure not precisely defined in Bilanbanques. But it is roughly equal to the sum of cash and central bank, securities, and net interbank.⁽⁵⁾ Defined as the ratio of net after-tax profit to total assets. Note that the profit and loss account is under-reported by banks.⁽⁶⁾ Interest rate on loans calculated as ratio of interest income on loans & advances to related parties to total loans and advances to customers. Interest rate on deposits calculated as ratio of interest expenses on deposits from customers and other creditor accounts to deposits from customers. Finally, overall interest margin is calculated as the difference between interest received and interest paid as a ratio of average interest-earning assets (and similarly on LL and FC because data is provided by currency breakdown on the overall interest margin).

Table A2. Descriptive statistics for Foreign Banks

	All Years	1996	1997	1998	1999	2000	2001	2002	2003	2004
Number of banks	20	21	21	23	21	21	21	18	18	18
Mean assets (1996 USD millions)	486.6	353.5	411.4	468.3	504.7	518.6	536.3	535.5	535.5	540.2
Median assets (1996 USD millions)	134.8	95.4	124.7	136.1	160.3	146.3	178.2	165.0	140.4	172.8
Fraction of total system assets	0.208	0.261	0.254	0.249	0.240	0.227	0.205	0.189	0.170	0.150
<i>Fraction of total assets in type category, all banks (mean):</i>										
Assets, of which:										
Cash and Central Bank (Reserves)	0.171	0.149	0.171	0.133	0.121	0.144	0.166	0.179	0.257	0.239
in Lebanese Lira (LL)	0.050	0.053	0.052	0.035	0.036	0.035	0.035	0.052	0.090	0.065
in Foreign Currency (FC)	0.123	0.096	0.119	0.105	0.085	0.113	0.131	0.128	0.167	0.174
Securities ⁽¹⁾	0.234	0.257	0.221	0.237	0.293	0.250	0.223	0.224	0.185	0.208
in LL	0.172	0.231	0.210	0.207	0.222	0.175	0.139	0.138	0.095	0.105
in FC	0.067	0.020	0.016	0.036	0.090	0.113	0.072	0.074	0.095	0.112
Interbank assets	0.116	0.108	0.126	0.154	0.115	0.112	0.124	0.104	0.097	0.099
in LL	0.013	0.006	0.008	0.039	0.012	0.013	0.006	0.005	0.010	0.008
in FC	0.115	0.105	0.122	0.121	0.114	0.106	0.132	0.118	0.105	0.110
Total loans ⁽²⁾	0.275	0.300	0.295	0.291	0.285	0.268	0.275	0.253	0.255	0.245
in LL	0.034	0.043	0.056	0.043	0.046	0.025	0.023	0.022	0.019	0.022
in FC	0.261	0.270	0.244	0.270	0.261	0.252	0.278	0.256	0.262	0.250
of loans:										
Current Loans (Commercial and consumer) ⁽²⁾ , of which:	0.148	0.155	0.170	0.162	0.147	0.149	0.132	0.135	0.137	0.133
Commercial loans	0.104	0.118	0.126	0.110	0.104	0.110	0.086	0.091	0.095	0.088
Total liabilities, of which:										
Total deposits	0.691	0.728	0.673	0.644	0.664	0.659	0.708	0.720	0.716	0.725
in LL	0.183	0.254	0.199	0.198	0.201	0.161	0.156	0.160	0.160	0.143
in FC	0.512	0.474	0.474	0.478	0.462	0.498	0.552	0.559	0.556	0.582
of deposits:										
Sight	0.104	0.104	0.096	0.073	0.077	0.079	0.091	0.131	0.137	0.164
Time & Saving	0.569	0.611	0.561	0.560	0.574	0.571	0.603	0.561	0.553	0.525
Interbank liabilities (including to BDL)	0.055	0.035	0.032	0.049	0.048	0.046	0.072	0.078	0.080	0.068
in LL	0.028	0.037	0.028	0.035	0.036	0.013	0.017	0.027	0.036	0.015
in FC	0.035	0.011	0.019	0.035	0.032	0.059	0.059	0.048	0.028	0.038
Subordinated & long-term debt	0.002	0.000	0.005	0.004	0.003	0.002	0.002	0.000	0.000	0.000
Other liabilities	0.131	0.149	0.151	0.146	0.139	0.166	0.112	0.103	0.103	0.094
Equity	0.121	0.087	0.138	0.156	0.146	0.126	0.106	0.099	0.101	0.114
<i>Footnotes (mean)</i>										
Percent of total assets in Lebanese Lira (LL)	0.304	0.374	0.347	0.350	0.406	0.260	0.233	0.246	0.243	0.244
Percent of total liabilities in LL	0.328	0.391	0.364	0.379	0.426	0.291	0.259	0.271	0.268	0.267
Percent of total loans in LL	0.128	0.169	0.176	0.140	0.146	0.113	0.087	0.095	0.088	0.118
Percent of total deposits in LL	0.250	0.353	0.291	0.282	0.271	0.225	0.215	0.208	0.204	0.178
Percent of loans that are non-performing ⁽³⁾	0.140	0.053	0.078	0.102	0.140	0.152	0.168	0.178	0.193	0.199
Provisions for doubtful loans (% of assets)	0.073	0.059	0.049	0.051	0.063	0.072	0.079	0.086	0.101	0.106
Net liquid assets (% of assets) ⁽⁴⁾	0.515	0.511	0.509	0.506	0.516	0.454	0.497	0.543	0.535	0.572
Profitability (Return on assets) ⁽⁵⁾	0.008	0.010	0.010	0.011	0.005	0.009	0.007	0.008	0.006	0.005
Interest rate receivable on loans & advances (%) ⁽⁶⁾	0.100	0.122	0.121	0.104	0.100	0.096	0.094	0.084	0.085	0.091
Interest rate payable on deposits (%) ⁽⁶⁾	0.052	0.071	0.064	0.065	0.060	0.055	0.052	0.038	0.031	0.027
Overall interest margin on interest earning assets ⁽⁶⁾	0.033	0.041	0.036	0.038	0.031	0.033	0.035	0.028	0.028	0.027
on LL	0.048	0.046	0.050	0.056	0.030	0.063	0.073	0.044	0.039	0.036
on FC	0.030	0.030	0.024	0.042	0.031	0.027	0.039	0.028	0.026	0.027

Source: Author's calculations based on Bilanbanques.

Notes:

⁽¹⁾ Securities are the sum of Lebanese treasury bills and other government bills, Bonds and financial instruments with fixed income, and securities with variable income.

⁽²⁾ Total loans are the sum of commercial loans, other loans to customers, overdraft accounts, net debtor/creditor accounts and cash collateral, loans and advances to related parties, and doubtful loans. Current loans are defined as the sum of commercial and other loans to customers after deducting information on substandard loans.

⁽³⁾ Calculated as the sum of doubtful and substandard loans (note that this information is under-reported by the banks).

⁽⁴⁾ Net liquid assets is a summary measure not precisely defined in Bilanbanques. But it is roughly equal to the sum of cash and central bank, securities, and net interbank

⁽⁵⁾ Defined as the ratio of net after-tax profit to total assets. Note that the profit and loss account is under-reported by banks.

⁽⁶⁾ Interest rate on loans calculated as ratio of interest income on loans & advances to related parties to total loans and advances to customers. Interest rate on deposits calculated as ratio of interest expenses on deposits from customers and other creditor accounts to deposits from customers. Finally, overall interest margin is calculated as the difference between interest received and interest paid as a ratio of average interest-earning assets (and similarly on LL and FC because data is provided by currency breakdown on the overall interest margin).

[Not for publication] Table A3. Comparing reserve requirement regulation across countries

	Income Level (Grouping according to Caprio et al 2001). High Income = 0; Other = 1	What percent of the commercial banking system's assets is foreign- currency denominated?	What percent of the commercial banking system's liabilities is foreign-currency denominated?	Author interpretation of whether there are different FC/LC reserve requirements (based on responses to questions 7.3-7.6 in Caprio et al): Different? 1 Equal? 0	If different, then LC > FC: 1 and if FC > LC: 2	RR on LC	RR on FC if different
Summary statistics on the data	38 high income countries and 111 other	Median: 26.8%	Median: 24.5%	28 Countries	10 countries with LC > FC req and 18 countries with FC > LC req.		
Lebanon	1	66.30%	64.50%	1	1	25% on demand; 15% on time	15%
Albania	1	37.6%	37.2%	0		10%	
Algeria	1	2.35%	10.71%	0		6.25%	
Anguilla		14.30%	61.10%	0		6%	
Antigua and Barbuda	1	17.13%	14.20%	0		6%	
Argentina	1	74.70%	73.20%	0		17%	
Armenia	1	60.10%	80.80%	0		8%	
Aruba	0	26.80%	21.50%	0		7%	
Australia	0	7.20%	39.10%	0		0	
Austria	0	N/A	N/A	0		N/A	
Azerbaijan	1	N/A	N/A	0		10%	
Bahrain	1	52%	43%	0		5%	
Belarus	1	50.30%	N/A	0		10%	
Belgium	0	28%	30%	0		0	
Belize	1	11.30%	15.20%	0		6%	
Benin	1	0	0	0		N/A	
Bhutan	1	37.35%	0.08%	0		20%	
Bolivia	1	83.20%	91.10%	0		12%	
Bosnia and Herzegovina	1	50.00%	64.00%	0		5%	
Botswana	1	1%	18%	0		3.25%	
Brazil	1	22.40%	21.40%	0		60% demand; 20% savings; 15% time	
British Virgin Islands	0	N/A	N/A	0		Lump sum	
Bulgaria	1	55.10%	56.60%	0		8%	
Burkina Faso	1	0	0	0		N/A	
Burundi	1	20%	20%	0		8.50%	
Cambodia	1	98%	98%	0		8%	
Cameroon	1			0		7.75% on demand; 5.75% fixed term	
Canada	0	42%	45%	0		0	
Central African Republic	1			0		5% on demand; 3% fixed term	
Chad	1			0		5% on demand; 3% fixed term	
Chile	1	32.60%	32.70%	1	2	9% on demand; 3.6% on time deposits	13.6 - 19%
Colombia	1	6.20%	6.00%	1	1	N/A	0
Commonwealth of Dominica	1	10.50%	2.39%	0		6%	
Congo	1			0		7.75% on demand; 5.75% fixed term	
Costa Rica	1	57.16%	54.38%	0		5%	
Côte d'Ivoire	1	0	0	0		N/A	
Croatia	1	28.83%	71.66%	0		19%	
Cyprus	0	34%	34%	1	1	6.50%	0
Czech Republic	1	18%	17%	0		2% for up to 2 year maturity	
Denmark	0	47.71%	48.86%	0		0	
Ecuador	1	100%	100%	0		4%	
Egypt	1	29.80%	29.60%	1	1	14%	10%
El Salvador	1	100%	100%	0		N/A	
Equatorial Guinea	1			0		7.75% on demand; 5.75% fixed term	
Estonia	1	63.60%	45.60%	0		13%	
Fiji	1	10.50%	9.52%	0		5%	

Finland	0	29%	26%	0			N/A
France	0	16.30%	15.00%	0			N/A
Gabon	1						5% on demand; 3% fixed term
Gambia	1	2.89%	0.40%	0			16%
Germany	0	6.50%	5.70%	0			N/A
Ghana	1	30%	27%				9% primary reserve; 25% secondary reserve (these earn t-bill interest)
Gibraltar	0	N/A	N/A	0	1	1	9% across the board
Greece	0	16.26%	17.20%	0			2% on mostly up to 2 year maturity
Grenada	1	10.80%	21.56%	0			6%
Guatemala	1	15%	14%	0			14.60%
Guernsey	0	66%	67%	0			0
Guinea	1	28.20%	19.50%	0			5.50%
Guinea Bissau	1	0	0	0			N/A
Guyana	1	7.40%	2.49%	0			12%
Honduras	1	33.20%	33.70%	1	2		12% 50%
Hong Kong, China	0	57%	53%	0			0
Hungary	1	35.30%	34.70%	0			5%
Iceland	0	37%	46%	0			1.5-4%
India	1	6.61%	6.73%	0			5.50%
Ireland	0	40.10%	42.90%	0			N/A
Isle of Man		35%	35%	0			0
Israel	0	32%	31%				6% up to 6 days 3% 1wk - 1yr and 0 for > 1yr
Italy	0	11.50%	14.50%	0			2%
Japan	0	N/A	N/A	N/A			N/A
Jersey	1			0			0
Jordan	1	38.50%	37%	0			8%
Kazakhstan	1	65.11%	83.75%	N/A			N/A
Kenya	1	6%	14%	0			10%
Kuwait	0	20.20%	20.40%	1	1		20% 0
Kyrgyzstan	1	53.60%	64.50%	0			10%
Latvia	1	65.10%	65.80%	0			3%
Lesotho	1	22%	3%	0			3%
Liechtenstein	0	N/A	N/A	0			0
Lithuania	1	51.30%	52.30%	0			6%
Luxembourg	0	40%	45%	0			N/A
Macau, China	0	68.28%	66.06%				3% demand; 2% liabilities up to 3 months; and 1% liab > 3 mo
Macedonia, Republic of	1	64%	53%				10% on LC demand and up to 3 mo; and 5% on other term LC deposits
Madagascar	1	18.70%	18.10%	0	1	1	24% on demand
Malaysia	1	7.10%	6.20%	0			4%
Mali	1	0	0	0			N/A
Malta	1	50.77%	51.68%	0			4%
Mauritius	1	10.20%	9.30%	0			5.50%
Mexico	1	17.10%	16.60%	0			0%
Moldova, Republic of	1	39.68%	47.29%	0			8%
Montserrat	1	14.89%	2.33%	0			6%
Morocco	1	4%	5%	1	1		14% 0
Namibia	1	5%	6%	0			1%
Netherlands	0	N/A	N/A	0			2% for up to 2 year maturity
New Zealand	0	8.42%	22.97%	0			0
Nicaragua	1	51.80%	71.30%	0			19.25%
Niger	1	0	0	0			N/A
Nigeria	1	15.21%	4.61%	1	1		0
Norway	0	22.20%	32.70%	0			0
Oman	1	25%	21%	0			N/A
Pakistan	1	18.30%	22.20%	1	2		5% 20%
Panama	1	100%	100%	0			0
Papua New Guinea	1	3.60%	7.60%	0			5%

Paraguay	1	61.14%	64.98%	1	2	15% for up to 2 yrs	6.5% for up to 2 yr
Peru	1	73.41%	72.24%	1	2	6%	6%+20%
Philippines	1	28.57%	32.49%	1	1	17%	0%
Poland	1	23.90%	18%	1	1	4.50%	
Portugal	0	8.20%	9.60%	0		N/A	
Puerto Rico	1	0	0	0		0	
Qatar	0	50%	33%	0		2.75%	
Romania	1	50%	47.07%	1	2	18%	25%
Russia	1	37.90%	32.10%	1	2	7%	10%
Rwanda	1	30%	26%	0		8%	
Saint Kitts and Nevis	1	18.70%	5.30%	0		6%	
Saint Lucia	1	13.40%	4.60%	0		6%	
Saint Vincent and The Grenadines	1	13.00%	8.00%	0		6%	
Samoa (Western)	1	17%	25%	0		4.80%	
Saudi Arabia	1	26%	24%	0		N/A	
Senegal	1	0	0	0		N/A	
Serbia & Montenegro	1	65.00%	61.60%	0		20%	
Seychelles	1	0.06%	3.75%	0		2.50%	
Singapore	0	75%	75%	0		N/A	
Slovakia	1	18.50%	17.30%	N/A		N/A	
Slovenia	0	34.40%	35.30%	1	1	7%	2%
South Africa	1	10.50%	9.10%	0		2.50%	
South Korea	1	10.14%	9.66%	0		N/A	
Spain	0	9%	11%	0		2% for up to 2 year maturity	
Sri Lanka	1		15%	1	1	10%	0
Sudan	1	23%	30%	0		14%	
Suriname	1	25.80%	45%	N/A		N/A	
Swaziland	1	30%	0.80%	0		3%	
Sweden	0	N/A	N/A	0		0	
Switzerland	0	56%	54%	0		0%	
Taiwan	0			0		5%-10.75%	
Tajikistan	1	70%	73%	0		18%	
Thailand	1	12.20%	4.00%	0		6%	
Togo	1	0	0	0		N/A	
Tonga	1	18%	16%	0		15%	
Trinidad and Tobago	1	27.58%	32.58%	1	1	18%	0
Tunisia	1	7.40%	8.80%	1	1	2% for < 3 mo; 1% for 3-2 yrs; 0 otherwise	0
Turkey	1	45.60%	56.60%	1	2	6%	11%
Turkmenistan	1	N/A	95%	0		N/A	
Turks and Caicos Islands	0			0		10%	
Ukraine	1	38.00%	37.40%	N/A		N/A	
United Arab Emirates	1	33%	11%	0		14% demand; 1% on time	
United Kingdom	0	53%	53%	0		N/A	
United States	0	N/A	N/A	0		N/A	
Uruguay	1	77.64%	89.98%	1	1	27.5% < 30 days; 21.5% for 30 - 180 days; 5% for > 180 days	10% < 180 days; 4% > 180 days
Vanuatu	1	53%	8.50%	1	2	10%	50%
Venezuela	1	17%	2%	0		15%	
Zimbabwe	1	2.60%	5.70%	0		50% demand; 20% saving	
Other ctries in Balino et al (1999) but not in above Caprio et al sample:							
Malawi				0		20%	
Maldives				0		35%	
Nepal				0		12%	
Sao Tome and Principe				1	2	15%	30%
Tanzania				1	1	12%	0%
Lao PDR				0		12%	12%
Uzbekistan				1	1	25%	0%
Vietnam				0		10%	

Source: Author's calculations based on Barth, Caprio, and Levine (2001, updated 2003) World Bank, "The Regulation and Supervision of Banks around the World: A New Database", and the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER), various issues.