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1. Introduction

The Great Recession epitomizes a period of extraordinary financial stress. The emergence and ignition of the financial crisis of 2007-2008 scarred the US economy and spilled over financial stress to the global economy. Unemployment peaked to dangerous levels, banks that were deemed 'too big to fail' crashed, and default on loans became a norm. Although the proximate cause of the crisis was the turning point in the housing market and an associated rise in misconducts of subprime mortgages, the underlying factors which led to its emergence also include the accelerating rise of credit prior to its occurrence, declines in underwriting standards, diminished lending oversight, low compensation for risk-taking, and the reliance on complex instruments that proved fragile under stress. These inefficiencies resulted in extreme losses for many financial institutions who found their capital eroded and balance sheets plagued by illiquid assets with uncertain prices.

Conventional monetary policy tools were not enough to mitigate the adversities of the crisis, accordingly monetary policy in the US had to transform. In order to prevent the exacerbation of the financial situation, namely deflation and economic depression, the Federal Reserve turned to unconventional policy tools that go beyond influencing interest rates in money markets. This was especially necessary as short-term rates reached the zero lower bound. These tools entailed an expansion of the Fed's balance sheet to historic levels through massive purchases of agency debt, mortgage-backed securities, and long-term government bonds which increased the Fed's assets from \$882 billion in December 2007 to \$4.473

trillion in the first quarter of 2017. The Fed's target was to ease credit markets of financial stress and reduce term premia, thereby committing to its sacred dual mandate – ensuring price stability and full employment.

US monetary policy yields substantial international spillovers, especially to partially dollarized emerging market economies that have a fixed exchange rate regime, such as Lebanon. Given that the Lebanese economy is characterized by partial dollarization – in deposits, loans, and transactions – and pegs its currency to the US dollar, monetary policy in the US can affect Lebanon through several channels. A typical channel is interest rates; if the Fed changes the interest rate in the US, Lebanon has to follow in order to maintain its peg to the dollar. However, as mentioned above, monetary policy developments in the US went beyond influencing interest rates in the past 10 years. Research¹ suggests that this policy, among other factors², led to an increase in capital inflows to emerging market economies and exerted downward pressure on their long-term bond yields and term premia. In Lebanon, the increase in inflows should be amplified by the fact that commercial banks' balance sheets omitted mortgage-backed securities and collateral debt obligations. Furthermore, deposit dollarization and free capital movement allow investors to transfer their foreign capital to Lebanon at minimal costs.

The Fed's present endeavors to normalize its balance sheet and raise short-term rates affects the Lebanese economy in a time of domestic economic stagnation. As distortions from the financial crisis fade and US economic growth recovers, the Fed is decreasing monetary policy accommodation. Accordingly, short-term interest rates are increasing and the size of the Fed's balance sheet is diminishing, reducing downward pressures on term premia. Since Lebanese monetary policy has to follow that of the US to a certain extent, real economic activity in Lebanon, which is currently stagnating, is bound to be affected.

The international spillovers of US monetary policy to Lebanon should be reflected by several variables. These variables include interest rates on LBP and USD deposits (compared with the US policy rate), nonresident deposits and total net foreign assets, the BLOM Stock Index (BSI), the Eurobonds yield curve, and commercial banks' claims on the resident private sector. These variables, analyzed in the context of monetary policy, tend to indicate the degree of domestic independence from foreign policy, capital inflows, stock market health, debt sustainability, credit developments and economic activity.

Naturally, spillovers to Lebanon, such as capital inflows also emanate from monetary policy in countries other than the US. Quantitative easing was also adopted by other central banks, such as the Bank of Japan, the European Central Bank, and the Bank of England and modified to fit each economy's particular needs. Given that Lebanon's economy is substantially open, spillovers from countries that

For example, see Kamin et al. (2018).¹

For example, above average growth rates, healthy financial conditions, and high commodity prices.²

contribute to its deposit inflows and trade balances will most likely arise. In this essay, we focus on the US because of Lebanon's peg to the US dollar and the high concentration of dollars in deposits, loans, and total currency in circulation.

Following this section is an overview of US monetary policy in the last 10 years – monetary policy easing and the three episodes of US Quantitative Easing (QE) in detail – and a discussion of its potential effects on domestic economic variables. Then, the implications of the Fed's policy normalization – the exit plan from unconventional policy – to the Lebanese economy are inspected.

2. Overview of US Monetary Policy and its Impacts on the Lebanese Economy (August 2007 – October 2014)

In the period ranging from August 2007 to October 2014, the Fed adopted an expansionary monetary policy stance and initiated three large-scale asset purchasing programs, coined by the literature as Quantitative Easing (QE). Although the Fed began to decrease short-term rates in the summer of 2007, the distortions stemming out of the crisis proved to be grave. Accordingly, the Fed announced QE 1 by the end of 2008 under which it planned to purchase long-term assets, financed by expanding bank reserves. In March 2010, QE-1 ended, however the Fed decided to announce another program, QE-2, in November 2010 under which it focuses solely on additional long-term government bonds purchases to influence term premia and enhance credit conditions. The final long-term asset purchasing program (September 2012), QE-3 revived the purchase of mortgage-backed securities in addition to long-term government bonds. October 2014 marked the end of additional long-term asset purchasing programs.

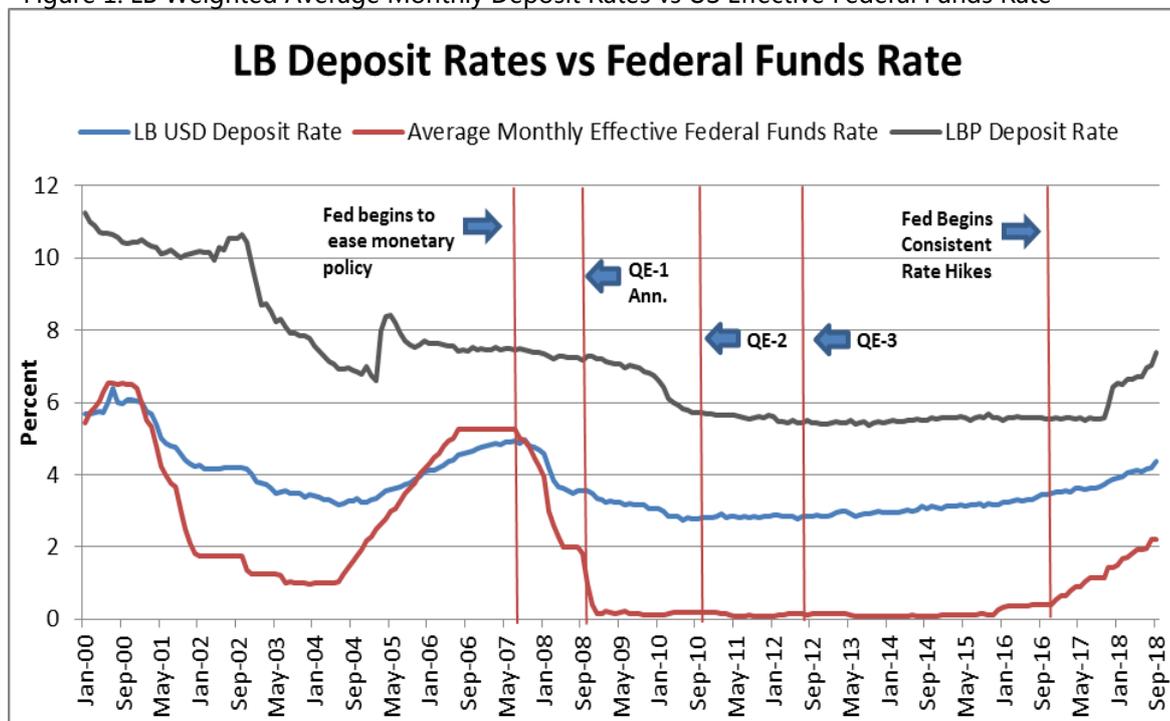
The Fed's monetary policy stance had several implications to the Lebanese economy over the last decade, as will be evident below. In short, interest rates and bonds yields decreased, inflows into the banking sector witnessed substantial growth, the banking system's net foreign asset position was greatly enhanced, and private sector credit, via banks, witnessed an extraordinary expansion.

2.1 Monetary policy easing August 2007 – October 2008:

Since the emergence of the crisis in the summer of 2007, the Fed began to decrease short-term interest rates and ease monetary policy. Explicitly, it cut the discount rate – the rate at which banks borrow from the Federal Reserve – by 50 basis points (from 625 to 575 bp) in August. Given adverse economic conditions, the Federal Open Market Economy started to ease monetary policy in September 2007, diminishing the target for the federal funds rate by 50 basis points. As the crisis weakened the economy, the Fed brought down its target policy rate by a cumulative 325 basis points by mid-2008, as portrayed in Figure 1. Thereafter, the federal funds rate remained stable at 200 basis points until August

2008. As financial turbulence intensified in the US economy, the Fed decided to cut the target further by 100 basis points in October 2008.

Figure 1: LB Weighted Average Monthly Deposit Rates vs US Effective Federal Funds Rate



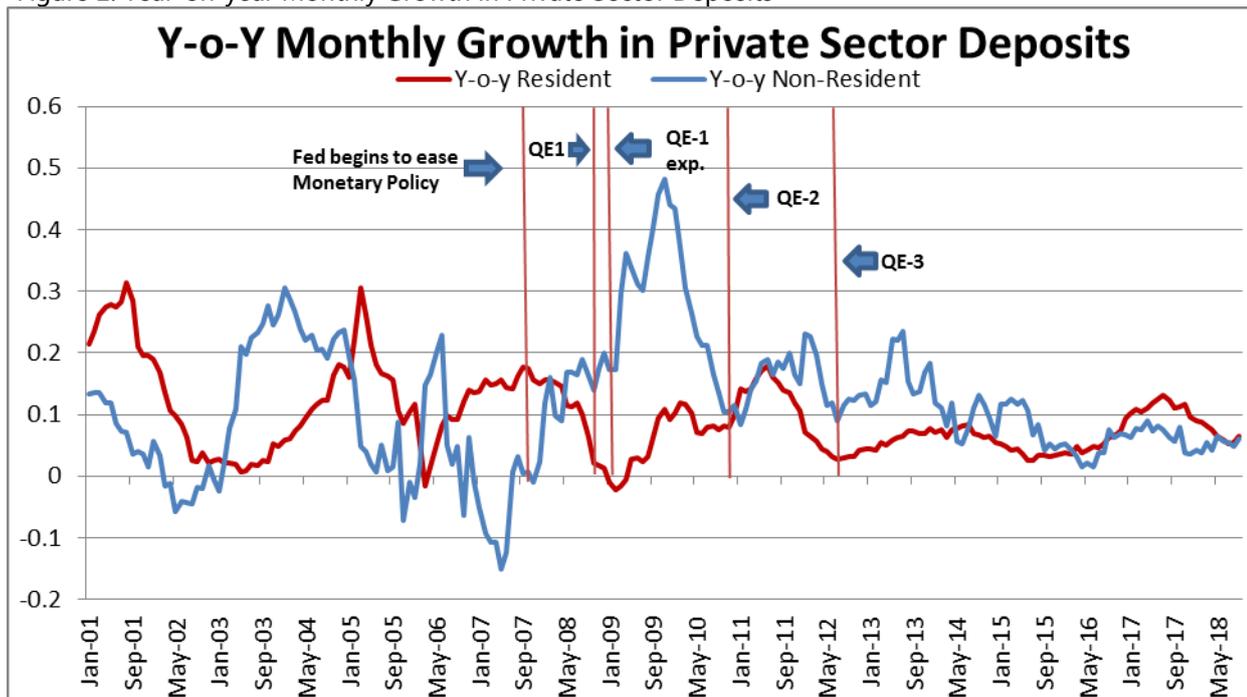
Source: St. Louis Fed, Banque du Liban

The gradual decline in US short-term interest rates stimulated a similar path for US deposit rates in Lebanon. Figure 1 portrays the evolution of LBP and USD deposit rates and the US federal funds rate over the period January 2000 until September 2018. Notice that following the gradual decline in the Fed’s policy rate, the USD deposit rate in Lebanon followed, albeit with approximately a one month lag. The decline in this rate may be attributed to the increased deposit growth, as reflected in figure 2, following an economic expansion during that period. However, an educated guess and thorough observation of the similar paths for the federal funds rate and the LB USD deposit rate point to a robust effect of the former on the latter. It is important to also note that the relationship is not one-to-one, i.e. a change in the federal funds rate by 50 basis points does not necessarily yield an equivalent change in Lebanese deposit and policy rates.

The Fed’s decreasing target for its policy rate also exerted downward pressure on LBP interest rates, but the response was late. As previously mentioned, in a fixed exchange rate system interest rates on domestic currency denominated assets on average follow their foreign counterparts. However, although the LBP deposit rate did exhibit a decrease since the Fed changed its policy stance, significant changes in the LBP interest rates tended to respond to foreign monetary policy later than their USD equivalent. Moreover, it is important to note that we are comparing a deposit rate with a policy rate which further lengthens the

response time. Finally, note that the return on 24-months Lebanese T-bills was held constant by policymakers at around 8.68 from March 2005 until it began to decline in June 2008. Given that a large portion of banks’ LBP deposits are invested in government T-bills, it is only natural that the corresponding deposit rates match the return on those securities.

Figure 2: Year-on-year Monthly Growth in Private Sector Deposits



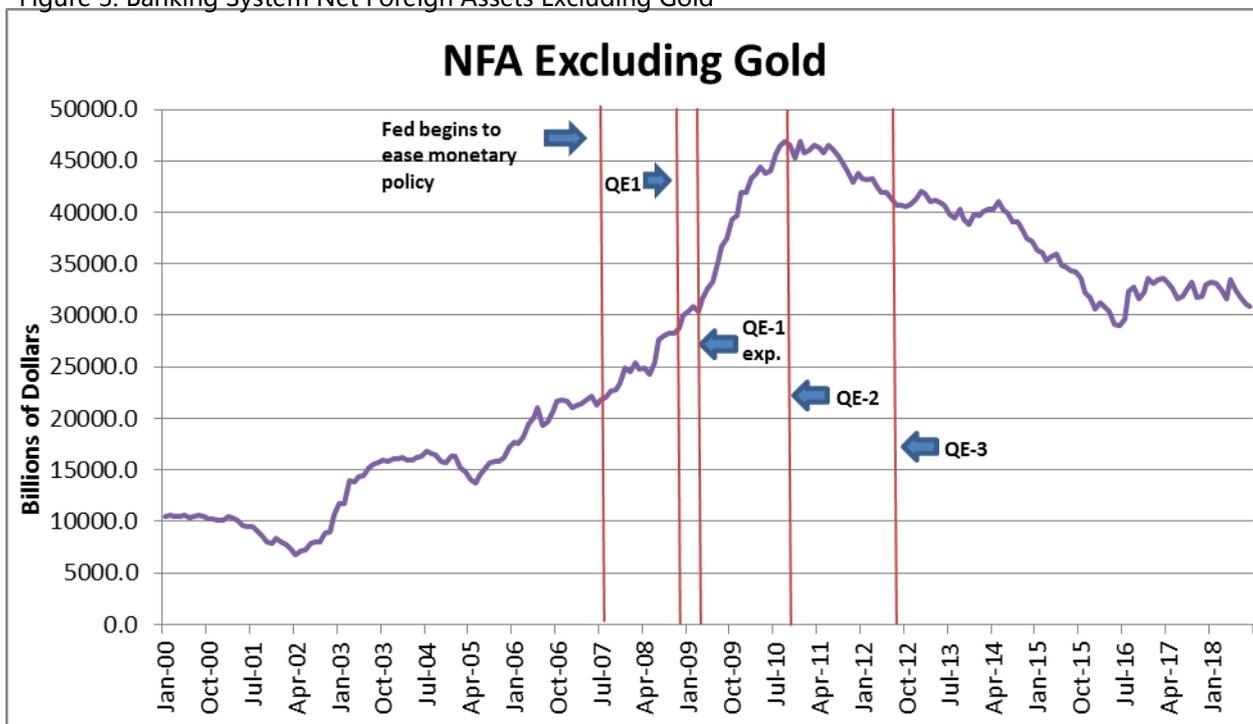
Source: Banque du Liban

As a consequence of financial stress and low returns globally, deposit inflows to Lebanon in the specified period increased considerably. This is portrayed in Figure 2 which shows the developments in the year-on-year growth in private sector deposits. Notice that when the Fed began to ease monetary policy in the summer of 2007, nonresident deposit inflows into Lebanon began to increase drastically on a year-on-year basis. Although deposit inflows were substantially due to favorable economic conditions in Lebanon, financial stress compounded by decreasing returns in the US may have incentivized investors globally – from the GCC countries, Europe, and North America – to invest their money in Lebanon and earn higher returns. Also, notice that nonresident deposits grew significantly more than resident deposits near the end of the specified period. This might indicate that forces alongside domestic economic growth might have affected the augmented increase in nonresident deposits, such as those stated above.

It can be argued that foreign inflows into the Lebanese economy are substantially responsible for the augmented growth period. Given Lebanon’s external position as a net importer and borrower, foreign

direct investment and inflows are a major pillar to its economy. This is partly due to the fact that they finance Lebanon’s current account deficits. Additionally, the increase in foreign inflows provides more liquidity to the banking sector, hence giving banks more room to finance private sector investments. The increase in foreign inflows and direct investment also increases the Lebanese central bank’s foreign currency reserves which reinforces confidence in the financial sector and provides additional space for an expansionary monetary policy stance. Finally, Lebanon has a highly developed banking sector and ample human capital which makes capital inflows more conducive to economic growth. Thus, a cycle of inflows, investment (public and private), and growth emerges.

Figure 3: Banking System Net Foreign Assets Excluding Gold



Source: Banque du Liban

Following the substantial inflows in foreign currencies, the banking system experienced unparalleled growth in its foreign assets. Figure 3 shows the evolution of the banking system’s total net foreign assets (excluding gold) over time. As can be observed in the graph, total net foreign assets increased at a relatively stable rate in the specified period. This is largely due to the substantial inflows received by the banking sector. Moreover, the central bank accumulated significant foreign currencies which grew by a cumulative 58.5 percent from August 2007 to October 2008. Note that the hikes in net foreign assets in periods preceding the summer of 2007 were largely due to foreign aid (Paris II, July war aid) and increased confidence in the economy.

2.2 QE-1 December 2008 – March 2010:

Due to exacerbating economic situation and policy rates at the zero lower-bound, the FOMC commenced its first large-scale asset purchasing program. The crash of Lehman Brothers shocked the entire macroeconomy and the Fed responded by turning to unconventional tools. In addition to keeping short-term rates low, the Fed targeted longer-term yields and focused on easing credit markets. To achieve both these goals, the FOMC announced in late November 2008 that it will purchase agency-backed securities and agency debt in extremely large amounts, highlighted in Box 1. In March 2009, the FOMC expanded QE-1 by purchasing additional agency-backed securities and debt in addition to long-term Treasury securities over time. The target was to keep inflation from decelerating, relieve credit markets of financial stress, adjust market expectations, and stimulate investment and output. The details are summarized in Box 1.

Box 1: QE-1 in Detail

In the end of November 2008, the Federal Reserve announced the first episode of Quantitative Easing. Namely, the Fed articulated that it planned to purchase direct obligations of enterprises which were sponsored by the government – Fannie Mae, Freddie Mac, and the Federal Home Loan Banks – in addition to mortgage-backed securities that were backed by those institutions. According to the Federal Open Market Committee (FOMC) press release on November 25, 2008, purchases of the aforementioned direct obligations amounted to \$100 billion, while the planned acquisitions of MBS amounted to \$500 billion. It is important to note that these operations were financed by crediting banks' excess reserves which increased by historic amounts. In December 2008, the Committee reduced the target federal funds rate to its lowest level, setting a range of 0 to 25 basis points. Moreover, the Board of Governors unanimously approved a cut in the discount rate by 75 basis points to 0.5 percent.

In March 2009, given that the Federal Open Market Committee continued to receive negative implications from key economic indicators, it decided to employ its available tools to enhance the economic recovery. The period was characterized by rising unemployment, declining equity, tight credit conditions and stagnating consumption. Accordingly, the Committee planned to maintain the federal funds rate at 0 to 25 basis points. Furthermore, for the purpose of supporting mortgage lending and housing markets, the FOMC decided to augment the size of its balance sheet by purchasing an additional number of agency mortgage-backed securities and agency debt up to \$750 billion and \$100 billion respectively. As for private credit markets, the Fed scheduled to improve conditions by purchasing up to \$300 billion of long-term Treasury securities over six months.

In March 2010, QE-1 was terminated with asset purchases totaling \$1.55 trillion - \$1.25 trillion in agency debt and securities, and \$300 billion in long-term US Treasury securities. However, the Fed expressed its intention to invest payments from those assets in long-term treasuries in order to maintain the size of its balance sheet and maintain monetary policy accommodation. Although, as will be discussed, the Fed announced two additional episodes of QE, QE-1 was distinct in its large scale and involvement of securities purchases that have some degree of private payoff risk.

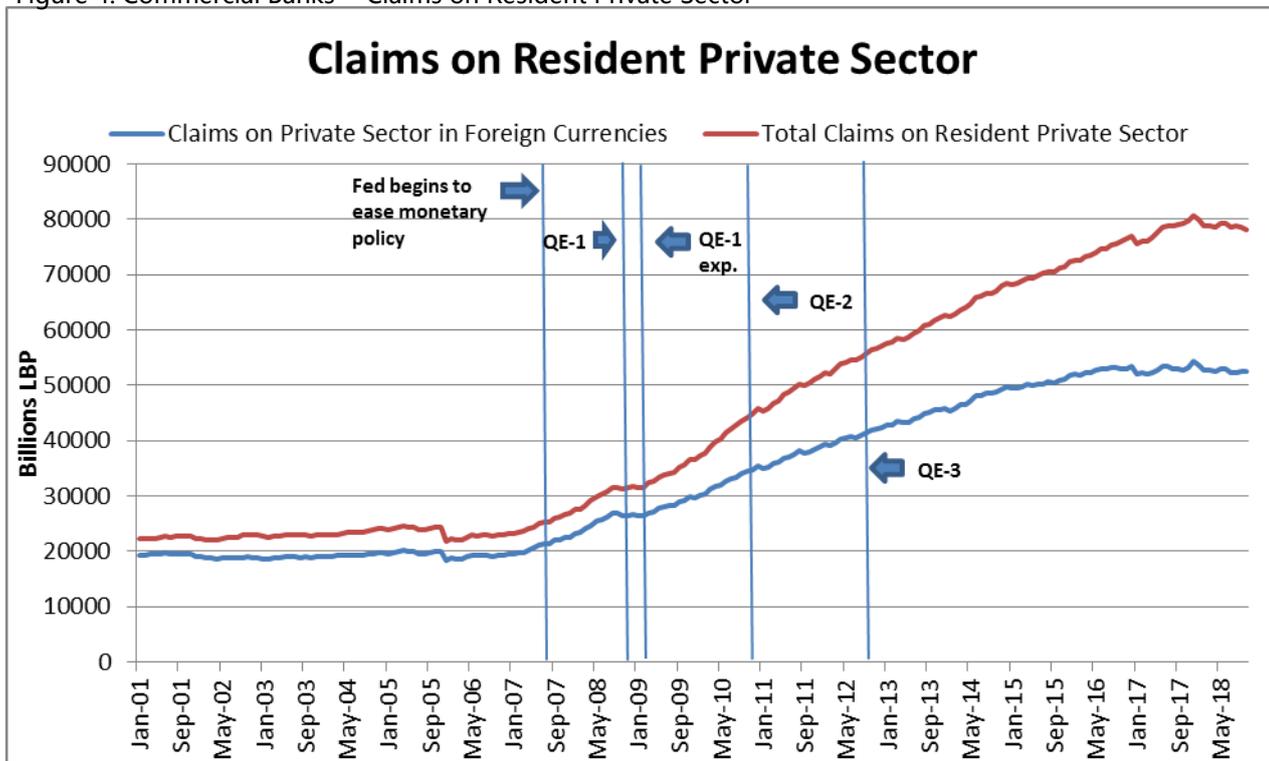
QE-1 amplified the downward pressures on interest rates in Lebanon, especially since it targeted longer-term rates. As mentioned above, the Fed's purchases of long-term assets were aimed at diminishing the term premium. Given Lebanon's monetary policy dependence on the Fed's policy, rates on deposits with higher maturities followed the decline in long-term rates in the US. As previously discussed, time-deposits in LBP tend to follow the return on Lebanese Treasuries which, in turn, by the interest parity condition, follow the yields on US Treasuries. It is important to note that the distribution of deposit maturities in US dollars tends to entail a fat left tail, indicating lower maturities on average. This might explain the reason why the Lebanese US dollar deposit rates are more sensitive to shifts in shorter-term US rates.

Nonresident deposit inflows to Lebanon expanded gradually and reached a historic peak amidst the Fed's expansion of its first large-scale asset purchasing program. In addition to extremely low short-term interest rates and heightened uncertainty in US financial markets, the specified period entailed a substantial reduction in longer-term returns and premia. Consequently, investors globally sought to earn significant positive returns that entail relatively reasonable risks. Since the Lebanese economy entailed significant deposit rates combined with sound risks, nonresident deposits in commercial banks increased substantially, reaching an unprecedented 48.28 percent y-o-y growth in November 2009 as highlighted by Figure 2.

During that period, Lebanon was perceived as a safe haven for global and regional investors. In the year 2001, the Lebanese central bank issued a circular forbidding local commercial banks to invest in mortgage-backed securities and collateralized debt obligations. By the time these assets' value deteriorated and uncertainty cloaked their price, commercial bank assets in Lebanon were ample and free from their distortions. Globally, however, many banks and financial institutions net worth and bank capital were eroded due to their substantial holdings of the mispriced securities. Hence, Lebanon's financial sector, which has a robust regional reputation as a financial center, was perceived as a safe haven. Accordingly, deposit inflows and foreign direct investment surged after the Lehman crash in October 2008.

Lebanon's net foreign asset position sustained its upward trend and improved substantially. As implied by Figure 3, growth in the banking system's net foreign assets accelerated following the announcement and expansion of QE-1. This significantly followed the extreme rise in inflows and partially pertained to the economy's growth. Moreover, BDL's foreign currency reserves witnessed continuing y-o-y growth that reached 49.22 percent in October 2009, thus ensuring currency stability and further improving investor confidence in the domestic economy.

Figure 4: Commercial Banks' Claims on Resident Private Sector



Source: Banque du Liban

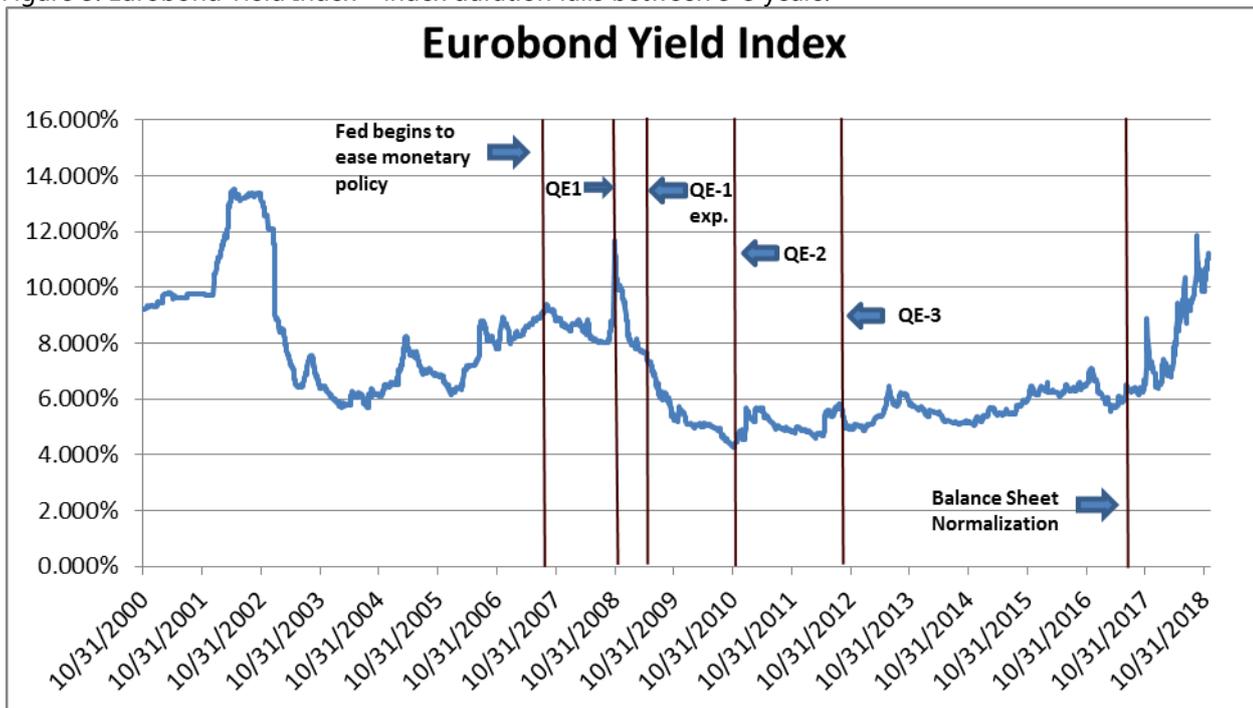
Deposit inflows to Lebanese commercial banks following the Fed's cuts in the policy rate and QE-1 stimulated an increase in bank credit to the resident private sector. The massive increase in deposit inflows provided banks with ample liquidity and, in turn, more room to provide credit to the private sector. This is apparent in Figure 4 which shows a steep slope for the commercial banks' claims on the private sector in the specified period. The expansion of credit contributed to the persistence of the deposit inflows, investment, and growth cycle witnessed in the 2007-2010 period.

There is also some statistical evidence that the FOMC's policies in the above period exerted downward pressure on Lebanese Eurobond yields. Given that both US treasuries and Lebanese Eurobonds are denominated in US dollars, both are affected by US monetary policy³. Assuming that Lebanon's country risk remained constant, we can witness two significant drops in Figure 5. The first commenced around September 2007, when the US began decreasing short-term rates, and the second began in late November 2008, the time QE-1 was announced, and was further complemented by the expansion of QE-1 in March 2009. This, along with significant economic growth rates, reduced previous pressures on the sustainability Lebanese government debt and provided the government with more fiscal space. Note that the peak

It is important to note that yields on Eurobonds are higher on average due to Lebanon's country risk. Therefore, in ³ theory, the spread between the yields on US Treasuries and Eurobonds tends to reflect Lebanon's country risk.

coincides with the crash of Lehman Brothers in October 2008. This is natural as Eurobonds are denominated in US dollars and adverse shocks to US markets are bound to yield spillovers. However, when it was revealed that sovereign risk in Lebanon was in fact stable and low, the market corrected for the peak in Eurobond yields.

Figure 5: Eurobond Yield Index – index duration falls between 3-5 years.



Source: BLOMINVEST Bank

2.3 QE-2 November 2010 – June 2012:

QE-2 entailed greater Fed purchases of longer-term Treasuries to keep policy in line with its goals. Due to low inflation rates and high unemployment, the FOMC announced a second large-scale asset purchasing program to maintain downward pressures on long-term rates, influence market expectations, and ease credit conditions. Short-term rates were kept at their previous target of 0-25 basis points. In September 2011, the Committee added that it intends to extend the maturities of the securities it holds. These developments flattened the US yield curve and made it easier for credit markets to recover. June 2012 marked the end of asset purchases under QE-2, but policy remained accommodative in terms of low short-term rates and principal reinvestments.

Box 2: QE-2 in Detail

In November 2010, the FOMC announced its plan to promote a faster pace of economic recovery through the purchase of \$600 billion of long-term Treasuries. Although real economic activity was no longer as problematic as it was during the emergence of the crisis, unemployment remained relatively high and inflation low. Ben Bernanke, the Federal Reserve Chairman at that time, expressed that the purpose of this long-term asset purchasing program was to hinder low inflation rates from turning into deflation, which can render economic growth stagnant for long periods of time. Moreover, he explained that although the monetary base did expand as a result of historic levels of excess reserves, the goal of QE is not to expand currency in circulation or broader measures of money. Instead, QE is aimed at lowering term premiums on long-term investments, diminishing rates on corporate bonds, increasing the prices of stocks and, in turn, boosting investment and consumer spending in the economy. Finally, it is important to note that although principal payments from mortgage loans and agency mortgage-backed securities were reinvested in the same assets, this asset purchase program excluded additional purchases of agency loans and securities, which formed the bulk of purchases under QE-1.

In September 2011, the FOMC announced a maturity extension program labeled 'operation twist' and expressed its intention to keep short-term rates low. The purpose of the program was to support further economic expansion and reach an inflation target consistent with its dual mandate. The Committee articulated that it intends to buy an additional \$400 billion of long-term Treasuries with maturities ranging 6 to 30 years and sell an equal amount of shorter-term bonds with an approximate remaining maturity of three years or less. The target was to exert downward pressure on long-term interest rates and make financial conditions more accommodative. Furthermore, the FOMC conveyed that the range of its target for the federal funds rate remains at 0 to 25 basis points and hinted that it aims to keep hovering around that level at least through mid-2013.

Although June 2012 marked the end of QE-2, US monetary policy remained accommodative. The Fed terminated long-term Treasury bond purchases under QE-2 with the total amount purchased amounting to \$827 billion. However, the maturity extension program was extended and until December of the same year. Moreover, the FOMC expressed its intentions to keep the target range for the federal funds at 0 to 25 percent and explained that economic conditions are likely to warrant those low levels through 2014.

While the expansionary effects of QE on macroeconomics variables in Lebanon also emerged after QE-2, they were severely hindered by the war in Syria. The war in Syria yielded regional political and economic turmoil in the Middle East in general. However, given Lebanon's geographical proximity to Syria, it is bound to experience heightened adverse effects. Lebanon has close trade relations with Syria, its only land border through which its exports are transported to regional countries. Accordingly, the war in Syria caused Lebanon's current account deficit to deteriorate further. This naturally leads to an outflow of US dollars from Lebanon, a de facto fuel to its economy. Therefore, we expect to see the positive effects on the previously inspected variables impeded by the adversities of the war.

Interest rates on USD and LBP deposits remained relatively stable following QE-2, as shown in Figure 1. Both rates were not reduced partially due to the need to attract deposit inflows in times of regional

turmoil. Additionally, we previously mentioned that the rate on USD deposits follows the federal funds rate closely. The fact the Fed's policy rate remained stable at its low target rendered the USD deposit rate in Lebanon steadier. The LBP rate witnessed a marginal decrease but remained stable on average. This could be due to a policy decision motivated by maintaining healthy returns on government debt funding and a steady demand for the Lebanese Lira. An educated guess leads to the conclusion that given the absence of expansionary US policy, deposit rate would have witnessed an increase during the above period.

Growth in non-resident private sector deposits was significantly positive following the initiation of QE-2 but less, on average, than its values under the QE-1 period. As QE-2 commenced and short-term rates were kept stable, Figure 2 shows a pick-up in non-resident deposits growth in Lebanon which ranged between 10 and 23 percent y-o-y. This was, as in the case of the first QE, partially due to minor rates of return and lower than average economic performance in the US. However, note that the acceleration in deposits witnessed throughout the QE-2 period was substantially less than its counterpart during QE-1. This could be due to slowing economic growth and adverse political shocks in Lebanon in addition to the smaller magnitude of QE-2 compared to QE-1. Also, after QE-1 Lebanese commercial banks had accumulated substantial foreign deposits, making it harder for y-o-y growth rates to persist at unprecedented levels.

The Lebanese economy's net foreign assets declined in the specified period due to slowing foreign inflows and a deteriorating current account deficit, mainly as a result of the Syrian war. Figure 3 shows that although Lebanon's net foreign assets remained stable at the beginning of the QE-2 period, it began to gradually decline in mid-2011. This is partially due to slowing foreign inflows – investment and deposits – and the reduction in exports which stimulated a worsening current account deficit. If the current account deficit is substantial and foreign inflows are not as high as prior levels, it is natural for the nation's net foreign assets to decrease as they are used to finance expensive, excessive imports. In the absence of inflows stimulated partially by QE-2, the decline in net foreign assets would have been faster and larger in magnitude.

The expansion of commercial bank credit to the private sector in Lebanon continued but at a slower rate, as is portrayed in Figure 4. There could be several reasons for the slowdown. First, growth in total deposit inflows was decelerating which gives less room for banks to provide the private sector with loans given macroprudential policies. Second, investors were uncertain due to the adverse situation in Syria, rendering the demand for loans lower. Third, economic activity in general slowed down which implies decreased demand for loans. The beginning of the year 2011 marks the end of the miracle cycle of inflows, investment, and growth experienced by the Lebanese economy from late 2007 till 2010.

In the wake of a slowdown in growth and rising political turmoil, yields on Lebanese Eurobonds slightly increased in early 2011 but then stabilized at around their initial level by the end of the year partially due to QE-2. The war in Syria increased the risks of the overall Lebanese economy and, in turn, the yield on Eurobonds followed. This is due to the political entanglement between Lebanon and Syria in addition to the dependence of the prior economy's external position, which results in spillovers to its fiscal position. Also, Lebanon was experiencing a government crisis in early 2011 which exerted upward pressures on Eurobonds yields. However, it is important to note that since yields on Lebanese Eurobonds move, on average, in the same direction as yields on US Treasuries, we expect that the increase in Eurobonds rates would have been much more significant in the absence of the second long-term asset purchasing program, which kept rates on longer-term US government securities substantially low. Thus, a slight increase and then gradual stabilization of the rate was not due to a lack of effect of US monetary policy which probably hindered a substantial increase in risk premia on Eurobonds. The response of Eurobond in the specified period is evident in Figure 5.

QE-3 September 2012 – October 2014:

QE-3 entailed additional purchases of agency mortgage-backed securities and long-term Treasuries but was moderated in mid-2013. In order to continue accommodating economic growth and price stability, the FOMC decided to conduct a third large-scale asset purchasing program. QE-3 included mortgage-backed securities at first but was then expanded to also incorporate long-term US Treasuries to maintain credit easing. Although QE-3 ended in late 2014, the policy rate remained at its low level and reinvestments of principal payments persisted. The details of QE-3 are summarized in Box 3.

Box 3: QE-3 in Detail

The final episode of quantitative easing, QE-3, was announced by the FOMC in September 2012. Explicitly, FOMC announced that it will increase policy accommodation through the purchase of additional agency mortgage-backed securities. The purchase pace of those securities will amount to \$40 billion per month which, along with the purchases that correspond to the operation twist, sums up to a total of \$85 billion monthly increase in the Fed's long-term assets until December the same year. The purpose was to support significant economic recovery and ensure the rate of inflation was consistent with the Fed's dual mandate. Furthermore, the Committee stated that its target range for the federal funds rate remains at 0 to 25 percent and that those levels are expected 'to be warranted at least through mid-2015'.

Due to concerns over slow economic growth, financial downside risks, and below target inflation, the FOMC decided to expand QE-3 in December 2012. To support an enhanced economic recovery and ensure that inflation is consistent with the 2 percent target, the Committee announced that it will continue with the purchase of additional agency mortgage-backed securities at the same monthly pace. Additionally, it conveyed its intentions to buy additional long-term Treasury securities at a pace of \$45 billion per month after the operation twist program ends. The FOMC also reassured the public that it will continue reinvesting the principal payments received from maturing agency debt and securities in the same assets. As for short-term interest rates, the Committee announced that it decided to keep its range for the policy rate at 0 to 25 percent and that this range will be 'appropriate' as long as unemployment remains above 6.5 percent, inflation between one and two years ahead remains less than 2.5 percent, and long-term inflation expectations remain stable around the Fed's target.

In June 2013, the FOMC discussed 'QE-3 Tapering', which entailed moderating the pace of long-term asset purchases, and initiated the process in December 2013. The announcement was due to optimistic forecasts on the economic situation. However, the Chairman emphasized that the plan will be implemented given future incoming data was consistent with the forecasts. Accordingly, once the proof of stable economic growth towards full employment and a healthy labor market became tangible, the Committee announced that it will reduce the monthly pace of agency mortgage-backed securities and long-term US Treasuries purchases by \$5 billion each – \$40 billion to \$35 billion and \$45 billion to \$40 billion respectively. However, downward pressure on longer-term interest rates remained prevalent as purchases of those assets and reinvestments of principal payments did not halt.

The final episode of long-term asset purchases and balance sheet expansion was concluded in October 2014, but the short-term rate target remained unchanged. The Committee claimed that labor market indicators were positive and the likelihood of inflation persistence below 2 percent was diminished. However, to maintain economic and price stability, the FOMC kept the 0 to 25 percent target range for the policy rate. The decision was justified by the need to adjust inflation expectations to the target of 2 percent. Yet, the Fed hinted that if incoming data indicates quick progress towards the Committee's goals, then increases in the policy rate range are likely to occur sooner than expected.

QE-3 is perhaps the least program that appears to have had some effect on the variables in interest; this is due to adverse economic and political shocks in Lebanon. As the situation in Syria exacerbated and Lebanon developed domestic political issues, stress in the financial sector was building up. Accordingly, uncertainty, adverse selection and moral hazard issues followed and increased downside risks. Moreover, the

influx of refugees proved to be a huge burden on the government which was already experiencing a deteriorating fiscal position. Nevertheless, the period did not entail extreme economic adversities in Lebanon; the nation has witnessed much worse circumstances. This could be due to the strength of the Lebanese financial sector, which is perceived as a panacea to most of its economic struggles, compounded by US monetary policy that yielded necessary capital inflows to the banking system.

Interest rates on deposits in Lebanon remained relatively stable with a slight gradual rise in USD deposit rates. As Figure 1 depicts, since the Fed kept the short-term policy stable at its extremely low target, deposit rates in Lebanon relatively reflect constancy. Yet, it would have been expected that rates would decrease due to the continued suppression of long-term rates and premia by the US. One reason why this did not happen is that growth in foreign inflows, although remaining fairly high slowed down after the war in Syria. As the demand for deposits slackened, downward pressure on deposit rates was mild. Moreover, the augmented country risk in Lebanon implies that investors needed a premium to invest in Lebanon. Accordingly, most rates of return increased. Since the US dollar is a necessary fuel to the Lebanese economy, we witness a steady increase in USD deposit rates throughout the QE-3 period, motivated by the need to attract dollars from abroad.

As discussed, non-resident deposit growth throughout the period remained relatively high and was roughly equivalent to the range witnessed during QE-2. Figure 2 shows a pick-up in y-o-y nonresident deposit inflows into the Lebanese banking sector following QE-3. However, similar to the case observed under QE-2, growth was significantly lower than the 2007-2010 period on average. This was because of the worsening situation in Syria and rising political pressures in Lebanon which increased risks. Accordingly, investors were less willing to transfer their capital or invest in Lebanon. This might also be due to global liquidity shortages in general. The increase in deposits allowed the economy to keep functioning despite adverse shocks and, although they were quite large, partially mitigated a further deterioration of fiscal and current account imbalances.

The downward trend in net foreign assets seen under QE-2 came to a halt. This is partially due to the stability of BDL's foreign currency reserves. Additionally, the robust nonresident deposit inflows provided the banking system with foreign liquidity which also contributed to hindering the further deterioration of net foreign assets. Figure 3 portrays the stability of NFA in the banking system since the beginning of QE-3 until its end, when the decline reappeared.

Commercial bank credit to the private sector remained robust despite the adverse outlook. Figure 4 shows that credit to the private sector continued its gradual rise during QE-3. Given that banks finance their operations mostly using deposits, the relatively high growth rate in nonresident deposits, which was

stimulated partially by high interest rates and a stable banking sector compared to the rest of the world, contributed greatly to the persistence of credit growth. Also, note that during that period, BDL was heavily subsidizing housing loans both directly and indirectly by giving banks proper incentives to provide housing loans. The share of housing loans in total loans to the private sector notably surged throughout the period. This expansion of credit allowed the economy to continue growing at a small rate. In the absence of inflows and credit expansion which boosted investment, we would have expected growth in that period to be much worse.

Given that in QE-3 additional long-term US Treasuries were purchased, the US yield curve flattened and longer-term Eurobond yields declined slightly. Figure 5 shows a decline in the Eurobond Yield Index when QE-3 commenced. The effect would have been larger, just as under QE-2, if risks in Lebanon hadn't heightened. Moreover, the twin deficits were on the rise which boosted the supply of Eurobonds, putting downward pressure on their price and, in turn, upward pressure on their yields. The fact that the US discussed the 'Tapering' process in June 2013 shaped market expectations and decreased the downward pressure on US Treasuries in general and on Eurobonds indirectly which might explain the higher upsurge in yields. This made it costlier for the Lebanese government to borrow funds to finance its intensifying deficits.

3. Future Implications of the Fed's Policy Normalization

After QE-3, the Fed maintained its expansionary monetary policy until it recently began to raise interest rates and normalize the size of its balance sheet. Since the end of additional large-scale asset purchasing programs in October 2014, US monetary policy remained accommodative as echoed by close to zero policy rates and a relatively stable balance sheet size. However, the federal funds rate has been on the rise since late 2016 and has a current target, as highlighted by the FOMC statement last November, of 2-2.25 percent. Moreover, in June 2017, the Fed signaled its intentions to gradually reduce the size of its balance sheet – let its securities mature and reinvest principal maturities only if they exceed progressively increasing caps.

The cyclical nature of monetary policy in the US and Lebanon has been misaligned in the last decade, thereby augmenting expansions and exacerbating recessions in the Lebanese economy. Although the method in which monetary policy is conducted in the US is quite complex, it was counter-cyclical throughout the last decade in general. The counter-cyclical nature of policy in the onset of the Great Recession was characterized by exceptionally low short-term and long-term interest rates. This policy was relatively a rational policy decision in the US as it might have hindered the emergence of a depression. During the period of the Great Recession, Lebanon witnessed an unprecedented expansion. Given that interest rates in Lebanon move in the same direction as those in the US, the expansion was amplified as credit witnessed massive growth and Lebanon's balance of payments recorded historic values. However, as the US exits from

its unconventional policy in a time of economic expansion, policy rates are increasing. Accordingly, Lebanon has to follow. The issue is that Lebanon is currently experiencing a de facto recession, as its growth rates are significantly low relative to other emerging market economies. This renders domestic monetary policy, in a general sense, pro-cyclical.

Given the heavy integration of global financial markets and Lebanon's peg to the US dollar, the present path for US monetary policy has many adverse implications to the Lebanese economy's fate.

For example, the upsurge in short-term interest rates and decrease in long-term asset holdings by the US Fed is expected to exert upward pressure on interest rates of all types in Lebanon. As a result of the rise in interest rates, the Beirut Stock Exchange will face adverse effects. Moreover, deposit inflows to Lebanon from foreign countries will be more difficult and costly to attract as the US is experiencing an expansion, high stock market profitability, and rising deposit rates. Finally, government debt will probably become more unsustainable since yields on long-term Lebanese government bonds will most probably rise as the term premium of long-term US securities corrects for its artificially low value under unconventional monetary policy and economic growth slows down due to rising interest rates.

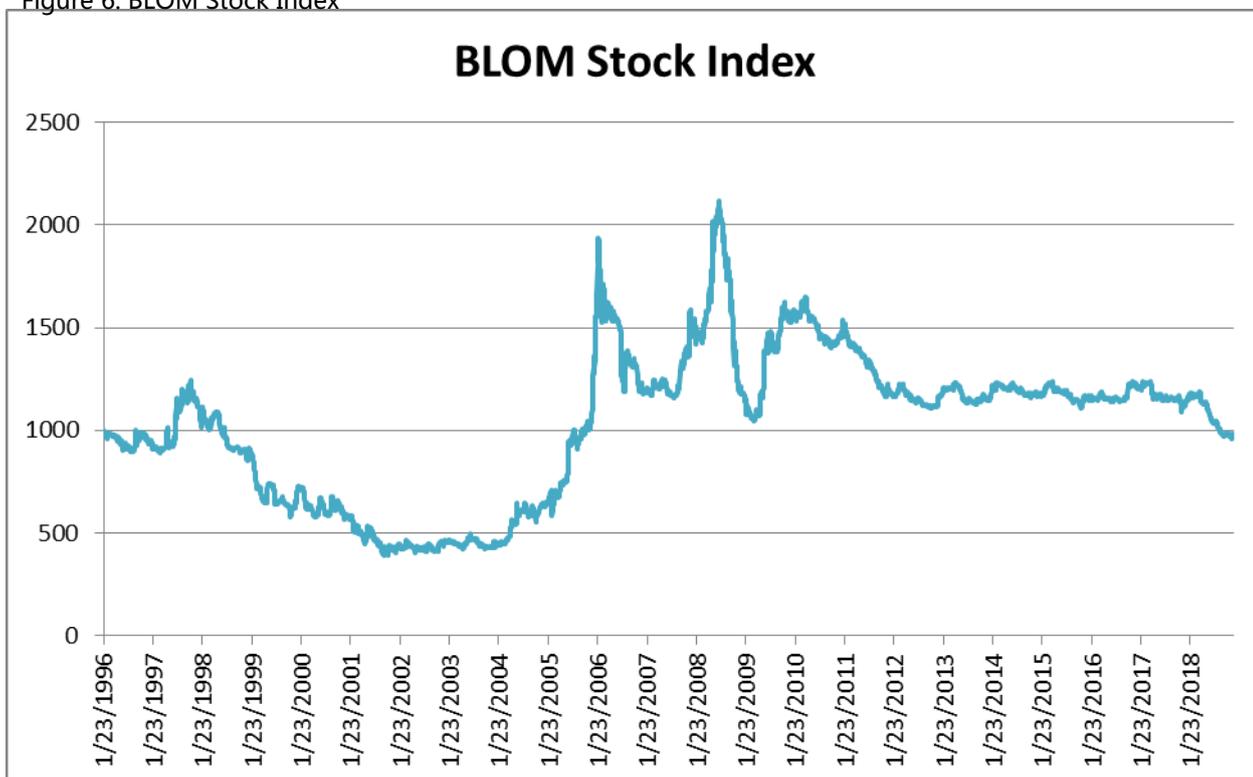
The upward pressure on interest rates in Lebanon partly emanates from US monetary policy, however domestic interest rate changes do not happen simultaneously with foreign ones. The trend in rising interest rates throughout the last few years is evident in Figure 1. Although a substantial fraction of this increase can be attributed to the unconventional policies of BDL, which were taken to reinforce foreign currency reserves in times of financial and political stress, this increase also partially follows the rising rates in the US. The underlying force behind that relationship stems from Lebanon's peg to the US dollar combined with its preference for free capital flows. Figure 1 confirms that monthly weighted average interest rates on USD deposits in Lebanon have historically moved in the same direction as the Federal Funds Rate. The difference in magnitude can be attributed to country risks and the term premium. Moreover, it is important to reiterate that on average, the change in interest rates in Lebanon does not happen simultaneously with that in the US.

The rise in interest rates following US policy augments their increase as a result of uncertainty and amplifies financial stress. An increase in interest rates is problematic since, according to standard economic theory, all else equal, a rise in interest rates decreases investment and, in turn, economic growth. The present rise in interest rates presents a greater issue since it is caused by foreign monetary policy and political shocks which yield uncertainty and, in turn, adverse selection and moral hazard problems in the financial sector. More importantly, in a time of low economic growth (estimated at around 1 percent for 2018) and a build-up in financial stress, the increase in interest rates may exacerbate economic stagnation.

The upsurge in interest rates will also greatly impede the private sector’s ability to finance its large debts. As portrayed by Figure 4, private sector credit expanded greatly throughout the last 10 years. This may have significantly resulted from the massive inflows into the banking sector, which was complemented by QE in the US, during the same period. The expansion in credit was supplemented by lower interest rates and economic growth in 2007-2010. However, in our present time, which is characterized by economic stagnation and high interest rates, commercial banks’ claims on the private sector are around 100 percent of GDP and therefore unsustainable if the economy remains on its current trajectory. This is expected to prolong the economic downturn if firms and individuals turn to default.

An increase in interest rates implies a negative effect on the Beirut Stock Exchange. The value of a stock is largely determined by the net present value of future profits. Given that an increase in interest rates in the US leads to a similar rise in Lebanese rates, the net present value of future profits and, in turn, the value of stocks will decrease. It is important to note that the BSE mostly consists of banks. Since in Lebanon banks are mostly financed by deposits, an increase in interest rates makes it costlier for them to finance their operations and, all else equal, decreases their current and future profits. Note that this case might not occur if BdL keeps ensuring healthy bank profits. As portrayed in Figure 6, the BLOM Stock Index has been on a downward trend throughout 2018. Although this can be partly attributed to an increase in interest rates, it also reflects negative investor sentiments due to political and economic uncertainty.

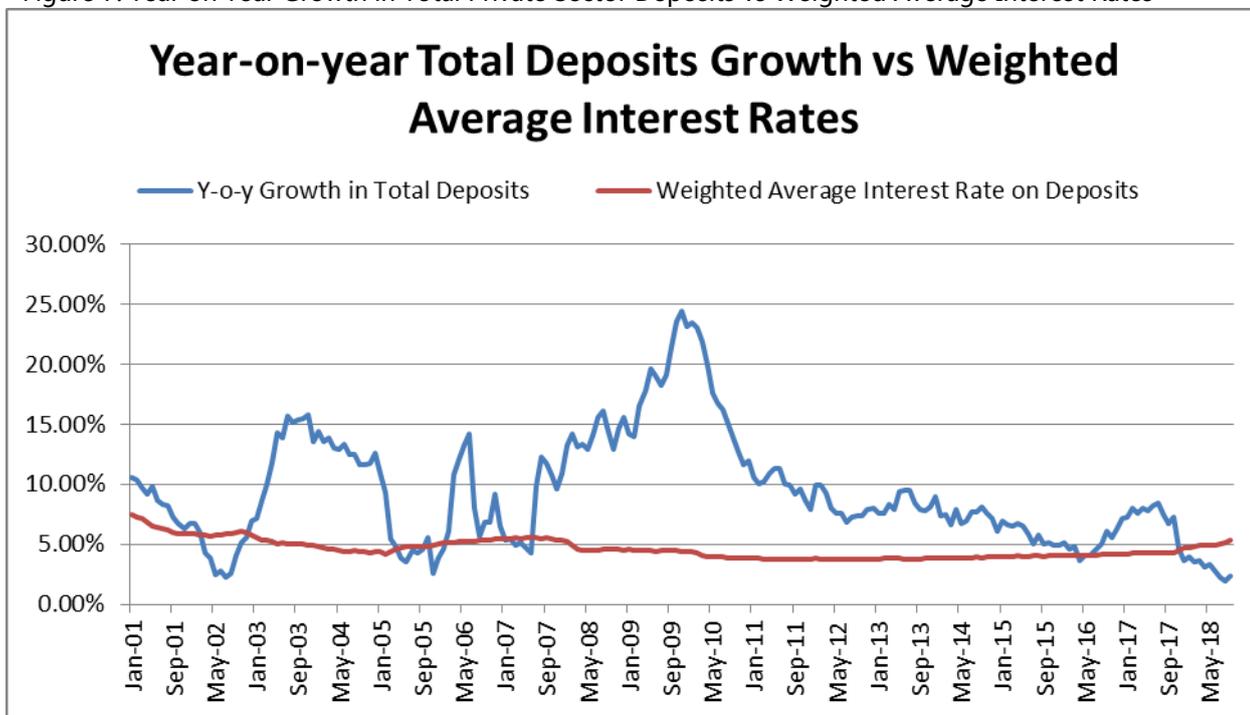
Figure 6: BLOM Stock Index



Source: Banque du Liban

Rising interest rates and economic growth in the US, combined with uncertainty in Lebanon, makes it difficult for the banking sector to attract capital inflows to the system. During the emergence and ignition of the global financial crisis, Lebanon received abundant inflows into its economy. This was partially due to the fact that it abstained from integrating mortgage-backed securities and collateralized debt obligations into its financial system and hence, was perceived as a safe haven by foreign investors during that time. However, the global economy, especially the US, has relatively recovered from the crisis. The US is experiencing unprecedented growth and the stock market was booming on average in 2018. Moreover, investors are receiving relatively high returns on their deposits and government bond investments partially as a result of the Fed’s current policy. Therefore, the tables have currently turned; Lebanon is facing heightened risks and a recession while the US is a current safe haven for investors. This renders the costs of attracting foreign capital to Lebanon high due to both increased risk and its price. The difficulty Lebanon is facing in attracting deposit inflows, for example, is reflected by the low y-o-y growth rate in total deposits throughout 2018, as presented in Figure 7. What stands out in the figure is the weighted average interest rates on deposits denominated in LBP and USD is that presently greater than the growth in deposits. This phenomenon epitomizes the struggle in attracting new inflows into the banking sector.

Figure 7: Year on Year Growth in Total Private Sector Deposits vs Weighted Average Interest Rates



Source: Banque du Liban

The difficulty to attract foreign inflows is problematic and unsustainable as Lebanon faces excessive external imbalances. Following the war in Syria, Lebanon's external position deteriorated. Current account deficits were greatly amplified and the fiscal deficit has been significantly high since 2012, adding to the overall sovereign debt. Typically, Lebanon finances those deficits through foreign capital inflows. However, this channel has been greatly obstructed by local and regional turmoil. Additionally, investors now require greater incentives largely due to the amplified country risks and partly as a result of higher, safer returns in the US. If the foreign inflows channel to financing external imbalances remains blocked, Lebanon may face accelerating sovereign debt and risks to the financial sector.

An increase in long-term yields on US securities renders yields on Lebanese government bonds higher and augments the fiscal burden. The exit strategy of the Fed from unconventional monetary policy entails the normalization of its balance sheet by allowing its long-term securities to mature absent a complete reinvestment of principals. This policy will diminish the downward pressure on long-term bonds in the US and will most likely result in an increase in their yields. Yields on long-term bonds in the US have already increased slightly since the Fed commenced its normalization plan although the yield curve presently seems relatively flat. Furthermore, there is a risk of a snapback of term premia after their exceptional compression throughout the past decade. If yields on long-term US government bonds increase further, those on Lebanese Eurobonds and Treasury bills are expected to follow because of Lebanon's country risk. This makes it more costly for the government to borrow and satisfy its debt payments in both foreign and domestic currencies in a time when the fiscal burden is already unsustainable. If the increase in long-term yields in the US resulted from a sudden snapback in term premia, the adverse effects are expected to be even greater.

4. Conclusion

The financial crisis pushed monetary policy to transform from influencing short-term rates through canonical open market operations to affecting longer-term rates and other macroeconomic variables through unconventional tools. When the policy rate hit the lower bound and the adverse economic and financial conditions aggravated, the Fed turned to quantitative easing – purchasing long-term assets via crediting banks' reserves – in an attempt to ease the distortionary effects of the crisis, hinder price deceleration, and restore credit conditions. This put downward pressure on term premia and hindered bank failures.

The shift from influencing short-term rates solely to also reducing long-term rates entailed spillovers to many emerging market economies. In our global world, a massive shift in monetary policy in its biggest economy is bound to affect many countries, especially those that witness some financial and policy dependence on it. Being a small open economy, Lebanon is naturally exposed to global policy changes

through various channels including interest rates and capital movements. The fact that Lebanon is partially dollarized and adopts a currency peg to the US dollar intensifies its sensitivity to shocks in the US.

As we showed above, there are many changes in key economic variables following the financial crisis and shift in US monetary policy. Namely, interest rates on deposits decreased, capital inflows increased, the banking system accumulated ample net foreign assets, Eurobond yields diminished, and commercial banks' claims on the resident private sector surged. These led to a 4-year period of prosperity in Lebanon with economic growth rates above 9 percent.

As regional political turmoil and economic adversities intensified – the war in Syria and the oil price crisis – growth in Lebanon started to decelerate. The war in Syria had severe damaging effects on Lebanon's external balance and increased the risk of capital outflows. Lebanon also witnessed many periods of domestic political conflict and distortions that further impeded economic growth. Through that period – 2011 till 2016 – policy in the US was still accommodative and partially hindered the negative effects of domestic and regional shocks on the Lebanese economy.

The issue is that the US has been lately reversing its policy stance by increasing short-term rates in addition to diminishing the size of its balance sheet. This put upward pressures on interest rates in Lebanon which makes it costlier for both banks and investors to finance their operations. It also increases the fiscal burden through upward pressures on Eurobond yields. Additionally, banks will experience difficulties in attracting deposit inflows as the US shows relatively high rates of returns and an economic expansion while Lebanon is plagued by political distortions and low economic growth. Finally, the stock market in Lebanon will suffer due to diminished profits and higher interest rates which decrease the net present value of future profits and, in turn, the value of stocks on the BSE.

The way forward remains mystified by uncertainty over the capacity of a new government to implement necessary reforms. The economy's fundamental problem is the lack of inclusive institutions. An obvious and effective step is to relieve the public and investors of ambiguities over the government's establishment and efficiency. This will diminish Lebanon's country risk greatly and, in turn, deflate the premium on deposits and government bonds. It will also improve developments in CEDRE and restore some confidence in the economy. However, this does not solve Lebanon's fundamental problem. For the economy to prosper, it needs proper inclusive institutions that make it easier for our nation's greatest resources – its human capital – to invest their skills and entrepreneurial energy domestically. We also need urgent fiscal reforms that turn government spending and taxation from a burden on the economy to a policy in line with long-run productivity growth. One of the economy's greatest inefficiencies is its external imbalances; institutions that diminish those imbalances, such as sound trade policies and those that ease export

operations are of vital need. Those would complement the inclusive institutions that should develop net exporting industries. Finally, given Lebanon's geographical proximity to countries that witness frequent shocks, it needs to improve its financial infrastructure to hinder capital outflows in times of financial and political stress.

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