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Abstract

In the years before the global financial crisis of 2008–2010, Qatar experienced a huge build-up of liquidity surplus in the banking system, mainly driven by surging net capital inflows. This paper identifies various sources of interbank liquidity in Qatar and discusses the various implications of structural primary liquidity surplus for the money market in particular and the economy at large. The paper attempts to evaluate the Qatar Central Bank policy making and conduct during the pre- and post-crisis periods within a framework of the Austrian monetary overinvestment theories, and concludes that the central bank had forcibly committed several forced monetary policy mistakes, which resulted in a breakdown in the interest rate channel of the monetary policy transmission mechanism. This led to the inability of the central bank to control the interbank interest rate and to an accelerating inflation rate during the pre-crisis years. In contrast, a dramatic change in the central bank's monetary policy framework and a deliberate monetary policy mistake on behalf of the central bank resulted in a restoration of the interest rate channel of the monetary policy transmission mechanism, stabilization of the interbank interest rate close to the central bank's policy rate and a sharp deceleration in the inflation rate in the post-crisis period. The paper concludes by offering brief policy recommendations.

JEL Codes: E51, E52, E58.

Keywords: Monetary policy framework; Monetary policy mistakes; Liquidity management; Structural liquidity surplus; Financial crisis.

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1 Introduction

The Gulf Cooperation Council (GCC)[1] countries have emerged as one of the most financially liquid regions in the world on account of the unprecedented economic boom triggered by high oil prices during the last decade. The current account balance of the GCCs went up from US$32 billion in 2001 to US$256 billion in 2008, compared to the members of the Organization of Petroleum Exporting Countries (OPEC),[2] whose current account rose from US$19 billion to US$184 billion over the same period. Figure 1, adapted from Peeters (2011), illustrates the composition of gross flows of the GCC's current and capital account over this period. As Figure 1 shows, total portfolio investment outflows outstripped total portfolio inflows, reflecting the accumulation of hydrocarbon revenues by the GCC countries. Since 2003, government current spending has risen cumulatively by 58%, mainly reflecting rising wages and subsidies (International Monetary Fund (IMF), 2008). A policy mix of an expansionary fiscal stance and an easy monetary stance (imported via fixed exchange rates) resulted in growing economic deficits to be monetized by the central banks.

The incidence of a liquidity surplus, in its broader sense, has been a common phenomenon observed across the GCC region during oil-price booms. The GCC's high surplus led to strong domestic aggregate demand. Over a span of six years, the average annual growth in private consumption jumped from 8% in 2003 to over 24% in 2008, with Saudi Arabia exhibiting a nearly five-fold increase, and Oman and Qatar both presenting a four-fold increase. Gross capital formation increased from about 35% of the non-oil GDP in 2003 to about 48% in 2007 (IMF, 2008). Investments were broad-based in all countries except the UAE, where they were more concentrated in construction (Khamis et al., 2010). Robust aggregate demand (including exports) led to strong economic growth: over the 2003–2008 period, GCC countries grew at an annual average real rate of 7%. This impressive economic performance has been accompanied by a general increase in consumer prices. Average headline inflation jumped from 1.5% in 2003 to 10.6% in 2008, with considerable variation in the level and volatility of in inflation rates across the six countries.[3]

Being no exception within the GCC, Qatar has witnessed a gradual accumulation of net

[1]The GCC countries include Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates (UAE).

[2]These include Algeria, Angola, Ecuador, Iran, Iraq, Libya, Nigeria and Venezuela. Among the GCC countries, Kuwait, Qatar, Saudi Arabia and the UAE are OPEC members. The authors' calculations are based on the *World Economic Outlook Database*, April 2011, International Monetary Fund.

[3]All numbers, unless otherwise stated, are authors' own calculations based on national sources.

capital inflows since mid-2000 owing to hydrocarbon revenues, geo-political and geo-economic developments. In particular, accumulation of foreign reserves on the asset side of the Qatar Central Bank's (QCB's) balance sheet can be traced back to the fraction of hydrocarbon revenues injected into the domestic economy via (i) the government budget; (ii) net private sector's foreign borrowing; (iii) foreign direct investment (encompassing the cash portion of hydrocarbon-related investment and real estate purchase); and (iv) net short-term foreign portfolio investments (including stocks, bonds, bank deposits, etc.). Moreover, Qatar witnessed a further remarkable surge in foreign currency inflows beginning in late 2007, due to a speculative revaluation attack on the Qatari Riyal (QR). Such net inflows resulted in surges in the economic deficit[4] that the QCB had to monetize. This, in turn, resulted in the accumulation of abundant QR liquidity on the liabilities side of the central bank's balance sheet. This was not sterilized because, unlike some GCC central banks, QCB lacked a number of standard liquidity management tools that are commonly used to drain liquidity off the interbank market. Without effective liquidity management instruments, the imported Federal Reserve (hereafter Fed) easy monetary policy stance became over effective during the pre-crisis period.

This was a serious concern for QCB as the interest rate channel of the monetary transmission mechanism was weakened, and because the potential pass-through of the interbank liquidity surplus to the general consumer price level. Going beyond acknowledging the threat of rising inflation and the subsequent appreciation of the QR real exchange rate, an accumulation of liquidity surplus in the interbank money market posed serious threats to the stability of the financial system, including risks posed by credit and asset prices booms, and sectoral entities' balance sheet vulnerabilities. From a policy perspective, identifying the various channels of liquidity surplus is vital.

The present paper endeavors to evaluate the QCB's experience in managing liquidity in the interbank market under conditions of a structural primary liquidity surplus (PLS) and to provide relevant policy recommendations. Although this paper deals with the experience of Qatar, our analysis may be appropriate for other GCC economies. The rest of the paper is organized as follows: Section 2 introduces the concepts of primary liquidity and structural PLS, and discusses several sources of primary liquidity in the context of the Qatari economy. Section 3 presents important corollaries of the structural liquidity surplus in Qatar. Section 4 focuses

[4]By economic deficit, we mean the proportion of government expenditure financed by hydrocarbon revenues minus the net private sector's transactions compared to the rest of the world.

on QCB's primary liquidity management within the pre-crisis QCB monetary policy framework. In Section 5, we discuss significant post-crisis changes in the QCB monetary policy framework, QCB's monetary policy conduct and the conduct of its liquidity policy. Section 6 attempts to evaluate QCB's pre- and post-crisis experiences. Section 7 concludes the paper and presents some policy recommendations.

2 Primary Liquidity Surplus[5]

The phrase "liquidity" is used in practical central banking in the context of a wide range of measures of the quantity of money (encompassing the whole spectrum of monetary aggregates). Yet, in this paper, we focus on the narrowest liquidity concept most relevant for day-to-day central banking commonly known as "interbank liquidity", "money market liquidity", "QR liquidity", or "primary liquidity." Primary liquidity encompasses the entirety of free reserves held — voluntarily and involuntarily — by the depository institutions in their current deposit (settlement) accounts at the central bank. Voluntarily held free reserves are "excess reserves", conventionally defined as the precautionary demand for banks' reserves,[6] while involuntarily held free reserves in excess of precautionary balances are a primary liquidity surplus. Where and when the cash flows into the money market exceed the cash flows drained into the central bank, the phenomenon of PLS occurs. If such a phenomenon persists for extended period, we have the phenomenon of "structural" PLS. The same process works in reverse for a structural primary liquidity shortage.

2.1 Sources of PLS

Sources of PLS in Qatar can be classified in two categories typically dubbed "pull" and "push" factors. Pull factors operate via the traditional balance of payment transmission mechanism (leading to higher government spending financed by converting foreign currency into QR through the local banking sector) attracting capital inflows as a result of positive changes in the domestic economic conditions. These include political stability, robust economic growth, asset price increases, etc. In contrast, push factors include higher export revenues causing a current account surplus, as well as investment income inflows via the income account of the balance of payments.

[5] This section draws heavily on Elsamadisy (2010a,b).

[6] Since these deposits are held at the discretion of the banks, they are known as "free" or "excess" reserves. See Bindseil et al. (2006) for an illustration of the role of excess reserves in the implementation of monetary policy in settlement accounts in the context of the European Central Bank.

Push factors operate via the budgetary transmission mechanism. Thus, sources of PLS include: (i) a current account surplus; (ii) private capital account flows; (iii) low policy interest rates; and (iv) a speculative revaluation attack on the QR.

2.1.1 Current Account Surplus

Qatar has been running current account surpluses since 1999. Yet, the size of the current account surplus increased noticeably during 2003–2008, thanks to the sustained increase in international oil prices. This surplus rose from about $6 billion (25% of GDP) in 2003 to $34.57 billion (31% of GDP) by 2008.[7] Oil and gas are priced, invoiced and paid for in US dollars directly to the state. As such, current account surpluses do not automatically generate liquidity in the domestic banking system. Rather, it is the utilization of this surplus to finance public spending via the budgetary transmission mechanism[8] that results in a downward shift in the supply of US dollars in the domestic foreign exchange market, forcing on-demand QCB purchases of dollars. This results in foreign exchange assets being injected on the assets side, and free reserves on the liabilities side of the central bank's balance sheet, thus accumulating free reserves in the banking system.

2.1.2 Private Capital Account Flows

Net inflows through the capital and financial accounts of the private sector's balance of payments constituted a significant source of QCB's foreign reserves. Foreign direct investment (FDI), portfolio investments (including financial FDI), reluctance of private capital surpluses to outflow and repatriation of private overseas investments (due to the changes in the geo-political and geo-economic environments in the aftermath of the 9/11 attacks) were the most important determinants of net capital inflow during the pre-crisis period. FDI inflows to Qatar have substantially increased from an average of $0.6 billion in 2003–2004 to over $4.5 billion in 2007–2008 due to growing investment in energy and construction projects as well as notable

[7] The authors' calculation are based on the *World Economic Outlook database* (October 2010), International Monetary Fund.

[8] In financing public spending programs, the government sells a portion of its dollar proceeds to the commercial banks in exchange for QR and thus, ceteris paribus, generates a downward shift in the US dollar supply in the domestic market for foreign exchange. When the government's dollar sales exceed the total quantity of foreign currency necessary to finance the private sector's net commodity imports, net capital exports, net income transfers and expatriate remittances, the residual amount finds its way to the assets side of the central bank's balance sheet via on-demand purchases of US dollars. This residual is nothing but the economic deficit that the QCB has to monetize and therefore results in an injection of free reserves on the liabilities side of the central bank's balance sheet, i.e., an injection of primary liquidity in the interbank money market (e.g., Elsamadisy, 2003a).

improvements in the business environment.[9] These inflows were bolstered by rising oil prices that formed the basis for robust economic growth (UNCTAD, 2009).

After September 11, 2001, many Arab investors investing in Western countries faced diplomatic risk "arising from Western countries' sensitiveness about terrorism and the potential for unexpected deterioration in relations between Arab and Western countries" (Habibi, 2008, p. 14). Growing fears of confiscation or asset-freezing by host governments led small- and medium-sized GCC private investors to withdraw their funds from Western countries in favor of more politically "safe" investment opportunities. In addition to the fear of litigation and asset freezing, after 9/11, obtaining a US travel visa has become more difficult for Arab businessmen owing to security concerns (Habibi, 2008). In the meantime, political stability and the resilient domestic economy presented strong "pull factors" attracting the Qatari and non-Qatari (particularly from within the GCC) private capital surpluses invested in the West to head back home.

In a nutshell, rising capital inflows were, *ceteris paribus*, a liquidity-creating factor working through the conventional balance of payments transmission mechanism. This resulted in a further downward shift in the supply of the US dollar in the domestic foreign exchange market, forcing further on-demand central bank purchases of the dollar that resulted in an injection of foreign exchange assets on the assets side, and free QR reserves on the liabilities side of the central bank's balance sheet, thus generating primary liquidity.

2.1.3 Low Policy Interest Rates

The then prevailing global environment of low policy interest rates, owing to the stimulating monetary policy stance adopted by major central banks, resulted in easing global financial markets. These policies triggered capital flows looking for higher yield into emerging market economies, particularly those with fixed exchange rate arrangements (where there is little or no exchange rate risk). Meanwhile, low interest rates abroad reduced liquidity leakage out of domestic economies. In Qatar, despite the low policy rates due to the QR peg, net foreign currency inflows generated upward pressure on the home currency and forced home currency sales by the central bank. Foreign exchange assets were thus injected on the assets side and free reserves on the liabilities side of its balance sheet, accumulating primary liquidity in the banking system.

[9] Among the Middle East and North African countries, Mina (2010) found that Qatar consistently attracted FDI flows with a positive and highly statistically significant country dummy coefficient.

2.1.4 A Speculative Revaluation Attack on the QR

Speculative revaluation attacks are triggered when and where a home currency is considerably undervalued. Under a fixed exchange rate, speculative foreign exchange assets accumulate at the central bank and speculative home currency funds accumulate in the banking system, leading to the accumulation of free reserves in the banks' current deposits accounts at the central bank, which, therefore, augment an existing PLS or create one. By October 2007, short-term speculative funds had started accumulating in the banking system, with the conjecture that a weakening US dollar and low US interest rates might force the Qatari authorities to revalue the QR. Economic arguments for a revaluation were growing stronger as Qatar's average annual rate of inflation (15%) helped to accelerate the real effective exchange rate appreciation, while the nominal effective exchange rate was heading downward due to the weakening dollar. The inability of QCB to sterilize the large net inflow added further impetus to trigger speculative pressure on the peg. The revaluation attack materialized and started showing up as brisk growth in primary liquidity in late October 2007. Potential interbank liquidity rose sharply from QR2.98 billion to a local maximum of QR24.63 billion by about mid-December 2007 before reaching its global peak of QR38.74 billion by about mid-April 2008.[10]

3 Corollaries of Structural PLS

Structural PLS in the interbank market in the years before the global financial crisis had serious repercussions for the economy of Qatar, which faces a serious problems of limited absorptive capacity that cannot be addressed in the short-run. Below we discuss some corollaries of the structural PLS documented in Qatar during the pre-crisis period.

3.1 The Central Bank was no Longer a Price Setter

Since a central bank is the monopoly supplier of the home currency, one undesirable implication of a structural PLS is the loss of the central bank's status as a price (marginal cost) setter in the interbank market. To appreciate this point, consider the converse condition of a liquidity shortage in the banking sector where a central bank engages in credit transactions with the depository institutions. Being a net creditor to the banking sector, the central bank acts as a

[10] Potential liquidity is defined as the balance of free reserves plus the Qatar Money Market Rate Mechanism's (QMR's) net deposits balance. The QMR is a double-featured QCB standing facility where participating banks can obtain loans from and place deposits with the QCB at pre-specified rates for maturity ranging from 1 to 30 days.

price setter in the market for banks' reserves, where such transactions operate on the liabilities side of the depository institutions' balance sheets. This privilege of setting the marginal costs of the banks' reserves is lost when a structural PLS exists in the banking system.

With a structural PLS, the central bank will rather endeavor to attract banks to access its open market operations and open market type operations' sales, and/or to access its standing deposits facilities. That is, a central bank intervenes to withdraw rather than to inject liquidity, where the transactions operate on the assets rather than the liabilities side of the commercial banks' balance sheets. In other words, the central bank attempts to set the marginal yield on banks' assets rather than the marginal cost of their liabilities. It is then said that the central bank's balance sheet is assets-driven. Yet, the central bank is not a monopoly supplier of financial assets per se (although it still has the status of the last borrower (buyer) of the depository institutions' reserves). Consequently, when a structural PLS situation exists, the central bank may not always be able to drain the surplus. In such cases, while there is neither a risk of failure to meet the required reserves nor a risk of a payment system failure, there are corollaries to the structural surplus that typically run counter to the policy goals of the central bank. Cash flows into the market for banks' reserves continue to exceed the amount of cash flows drained into the central bank. Exogenous and policy-driven rises in the central bank's foreign assets generate balance sheet expansions in excess of those needed to accommodate the economy's demand for the central bank's monetary liabilities in the form of central bank money.

3.2 Weakening the Interest Rate Channel of the Monetary Transmission Mechanism

When there is a structural shortage of liquidity in the interbank market, changes in the central bank policy rates are fully and rapidly reflected in changes in interbank rates (hence the retail interest rates). Conversely, a structural PLS has the potential to disrupt this interest rate channel, so it breaks down or become weak. The central bank practically loses its ability to influence the money market rates. The depository institutions may lend their surplus reserves to the central bank – or otherwise – at their discretion. Consequently, the central bank's ability to transmit its preferred interest rate into the market is weakened. Indeed, the interbank rates will tend towards zero under a massive structural PLS. Figure 2 illustrates this point. The weighted average overnight interbank rate in Qatar (QIBOR) declined from over 4% in October 2007 to 0.75% by the year's end; since then, it remained below 1% (with some fluctuations in the intervening months, including its lowest level at 0.15% in the third week of March 2008). As the left panel of Figure 2 shows, over the 2007:Q3–2008:Q3 period, the QIBOR stood lower than the QCB's deposit interest rate (QCBDR), suggesting a breakdown of the transmission of the central bank's rate into the interbank rate. The immediate consequence is that the shorter-term interbank interest rates can potentially fall close to zero. The implication is that banks would make riskier loans and/or move into foreign currencies in a search for yield, or they may cease to accept interest-bearing customer deposits. The right panel of Figure 2 shows that QIBOR had fallen sharply below the federal funds rate (FFR) and/or the London interbank offered rate (LIBOR), during the same period.

3.3 Acceleration in Money and Credit Growth

Excessive money and credit growth are the likely outcomes of the situation of structural a PLS; particularly under inflexible exchange rate regimes. Unless the monetary impact of positive net capital inflow is sterilized, rapid accumulation of undesirable free reserves leads to monetary and credit growth outside the central bank's acceptable ranges. This reflects on the consumption and investment spending fueling aggregate demand, hence triggering inflationary pressures. Extremely low or negative real interest rates for an extended period might lead to sharp and unsustainable increases in asset prices (the experience of the Qatari stock and real estate markets over the period 2003–2008 is an example). Subsequently, if and when the rise in the surplus funds is reversed – owing to, for example, a repatriation of inward capital flows and/or a reversion of the assets' market expectations – it could lead to sharp reductions in the assets' prices and greater overall volatility in market prices. The reversal of capital flows during mid-2008 is a case in point.[11]

Although the QCB attempted to slow money growth by increasing reserve requirements and issuing certificates of deposit, those measures were insufficient in the face of substantial capital inflows driven by fiscal expansion and speculative foreign currency flows. The expansion of the QCB's money, stemming from surging capital inflows, led in turn to a strong growth in broad money supply. Real broad money growth jumped from 8.6% in 2002 to over 34% in 2005, and grew at an average rate of 27% per year during 2006–2007 before falling below 5% in 2008, reflecting the impact of the financial crisis (see Figure 3a). On the credit side, total

[11] From a local peak of QR38.70 billion in mid-April 2008, interbank liquidity began to taper off beginning in May 2008; by early July 2008, the stock of liquidity plunged to QR7.3 billion and continue to erode before winding up around QR4 billion in mid-September 2008.

domestic credit (in real terms) grew even at a stronger pace: from under 5% in 2002 it reached over 45.50% in 2007 before dropping to 32% in 2008 (see Figure 3b). However, credit growth differed widely between the private and public sectors. Over the 2002–2008 period, private real credit grew at an annual average of 27%, while public real credit grew by 15%.[12] The bulk of private credit growth was due to a surge in consumption loans, followed by credit extended to the real estate sector. Over the 2004–2007 period, roughly half of the private sector credit constituted consumption-related loans. Higher money and credit growth led to upward pressure on domestic prices through an expansion of aggregate demand.[13]

4 QCB's Pre-Crisis Monetary Policy Framework

Since the QR was issued in 1973, exchange rate targeting was adopted as Qatar's monetary policy strategy under the conditions of open trade, income, and capital and financial accounts of the balance of payments. Since established in late 1993, QCB inherited the monetary policy strategy of its predecessor (Qatar Monetary Authority). The inherited nominal anchor was a de facto fixed parity between the QR and the US dollar (USD) at QR 3.64±0.0015 per 1.00 USD. Equally, QCB's monetary policy was subordinated to its exchange rate policy. Thus, QCB's pre-crisis monetary policy framework was a fixed exchange rate target subject to QR convertibility, implying interest rate parity between the QR and the USD. As such, maintaining equilibrium in the local USD market at parity was the primary objective of the QCB's monetary policy. Aspects other than the exchange rate are of ensuring priority in relation to monetary policy.[14] Sustaining the peg credibility was imperative for anchoring domestic inflation expectations.

QCB's interest rates framework comprised three policy rates: the QCB Lending Rate (QCBLR), the QCBDR and the QCB Repurchase Agreement (Repo) Rate (QCBRR). Both the QCBLR and QCBDR are overnight rates. Longer maturity rates were monotonically in-

[12]These averages, however, hide rather large variations in time. For example, after consecutive negative growth rates over 2003–2006, the public sector real credit growth jumped to 95% in 2007 before dropping to 55% in 2008.

[13]However, domestic inflation in Qatar was also affected by other external and internal factors. On the external front, soaring global commodity prices and a weakening US dollar adversely impacted Qatar's import bills. On the domestic front, a near doubling of the population within a very short span of time (2005–2008) resulted in a huge pressure on the domestic supply of residential housing units, causing the inflation of house rents to reach its highest level in 2007 at 29.44%. Rising aggregate demand also put pressure on other non-rent domestic items. Over the 2003–2008 period, nontradable inflation more than tripled compared to tradable inflation. Consequently, headline inflation rose from a model 2.30% in 2003 to nearly 12% in 2006 before reaching its highest level 15.25% in 2008 (see Figure 3c). As a result of higher inflation, Qatar's effective exchange rate appreciated over the 2005–2008, as depicted in Figure 3d. See Basher and Elsamadisy (2012) for an empirical analysis on the sources of inflation in GCC countries.

[14]The double constraint of institutionalized QR convertibility and the monetary strategy of exchange rate targeting have imposed stringent restrictions on the scope and effectiveness of QCB's monetary policy.

creasing linear functions of the respective policy rate, subject to formal bank-by-bank ceilings determined by the QCB.

In managing the QR exchange rate, the QCB operated with two instruments: QCB policy interest rates and on-demand exchange market interventions. Whether to intervene or to vary the policy rate are technically separate decisions, since they may be implemented independently. However, they may be seen, to some extent, as substitutes in relation to the QR exchange rate, depending on the magnitude and sustainability of capital flows, particularly financial flows. In the short-term, QCB will only use interventions in defending the peg. Isolated interventions would take place primarily to alleviate temporary pressures in the market. In the long run, QCB keeps the QR stable vis-à-vis the USD by adjusting its policy rates. Having faith in the impossible trinity and the predominance of the uncovered interest rate parity (UIP), QCB was always keen to shadow the Fed's policy rate closely whenever the market is stable; otherwise it would independently adjust its policy rate. This rendered the spread between QCB's policy rate and the Fed's policy rate a key to the QCB's monetary and exchange rate management.

4.1 QCB's Pre-Crisis Liquidity Policy Framework

Within QCB's pre-crisis monetary framework, QCB's liquidity policy was drawn and conducted with the view to manage the interday and the intraday between April 2002 and June 2006 liquidity in the interbank money market in a way to steer the shorter-term (overnight) money market interest rates to keep them as close as possible to the policy rate (the shadow of the Fed policy rate) and hence sustain the exchange rate parity. The key to the QCB liquidity policy is the aggregate net balance of the banks' free reserves account (current deposits or settlement accounts) at the opening time of the Qatar Payment System. The opening balance of this account is dubbed "primary liquidity," "interbank liquidity," "money market liquidity," or "QR liquidity" (c/f Section 2) at the start of the monetary policy day.

Besides a bounded conventional daylight overdraft facility, QCB's pre-crisis liquidity policy framework comprised a narrow set of liquidity management tools: (a) the required reserves ratio (RRR); (b) collateralized loans (repurchase agreements) with two weeks or with a one-month maturity; (c) a hybrid daylight set of central bank standing facilities dubbed the "Qatar Money Market Rate Mechanism" (QMR; the QMR was amended more than once); (d) a QCB end-day standard refinancing standing facility; and (e) QCB certificates of deposits (CDs), which were first launched in March 2008. Starting on 26 January 2008, QMR encompassed a multi-maturity refinance standing facility (up to 30 days) and a multi-maturity deposit standing facility (up to 30 days). As mentioned earlier, QCB's interest rates framework comprised three policy rates: the QCBLR, the QCBDR and the QCBRR.

Even though QCB has always endeavored to operate a money market corridor system, a floor system has been the de facto system that QCB actually operated and the QCBDR has been the de facto major policy rate. Changes in this rate manifest shifts in the orientation of monetary policy: reductions signal easing and rises indicate tightening of QCB's (actually the Fed's) policy stance. Consistently, the QCB liquidity policy framework was focused on steering the interbank overnight interest rate to keep it as close as possible to the QCB policy rate. However, QCB's pre-crisis arsenal contained only a few liquidity management instruments (particularly liquidity drainage), thus incapacitating QCB's liquidity management. Several standard monetary instruments were not available at the disposal of QCB, such as:

- Only medium- and long-term government bonds (not treasury bills) were issued to commercial banks during the pre-crisis era, with trading restricted among banks. Moreover, most bonds were issued at higher than market interest rates, thus encouraging commercial banks to buy and hold the securities. Absent a secondary market for public debt securities, open market operations (OMOs) had not been a viable instrument for QCB.[15]

- Likewise, absent deep QR forward market, foreign exchange swaps did not present an effective alternative. Although, in the absence of any exchange rate risk for the QR against the US dollar, foreign exchange swaps could be easily computed between the central bank and commercial banks just like any other day-to-day transaction between the two parties, but this was not an alternative for the QCB. Selling US dollars (the QCB intervention currency) would have intensified the downward pressure on the US dollar in the Doha exchange market, while purchases of US dollar would have aggravated the structural liquidity surplus situation in the interbank market.

- Furthermore, absent effective coordination between QCB and the general government (particularly the Ministry of Economics and Finance, MOEF) during the pre-crisis period, the general government deposits were allocated to commercial banks (mostly to the partly government-owned Qatar National Bank) rather than to the QCB. This denied the central

[15] In Bahrain and Kuwait, the central banks use OMOs on a regular basis to influence the domestic component of the sources of their monetary base, such instruments have not effectively materialized in Qatar. Even open market-type operations such as Repo operations in government bonds (which are regularly used by the Saudi Arabian Monetary Agency) are not used by QCB except to inject liquidity.

bank the flexible liquidity management tool of repatriating public sector deposits between the central bank and its monetary policy counterparts.[16] While repatriating public sector deposits to the central bank is not without caveats, this should be appropriate for Qatar where existing monetary control instruments are insufficient.

- Likewise, absence of such coordination between QCB and the MOEF (during the pre-crisis period) made it infeasible the creation of a special liquidity management fund like that of the "Market Stabilization Scheme" created by the Indian Ministry of Finance and the Reserve Bank of India in 2004–2005, which was financed by the former and independently operated by the later.[17]

- Imposition of capital controls was never a (politically) viable alternative for the QCB.

4.2 QCB's Pre-Crisis Liquidity Management

Only required reserves, QCB hybrid standing facilities and the collateralized loans were utilized after the beginning of the last decade (more precisely, the QMR mechanism was initiated in late April 2002). QCB certificates of deposits were initiated in March 2008, only six months before the blowup of the global financial crisis, and were terminated in May 2011, whence QCB started to issue treasury bills (on behalf of the MOEF) with the same maturity structure.

1. **Reserve Requirements:** QCB has adopted a required reserves regime that neither allows an averaging scheme nor remunerates the reserves (so the maintenance period is one day). A bank that does not meet its required reserves is heavily penalized. The RRR was not utilized before December 2007. Yet, on the backdrop of the speculative revaluation attack on the QR, and within a span of five months (December 2007 to April 2008), QCB increased the RRR on all deposits – from 2.75% to 4.75% – on three occasions: December 2007 (from 2.75% to 3.25%); February 2008 (from 3.25% to 3.75%); and April 2008 (from 3.75% to 4.75%), thus draining the sum of QR3.40 billion off the interbank money market.

2. **QCB Certificates of Deposits:** Mindful of the lack of government securities for the purposes of monetary operations, the QCB opted to issue and auction its own securities.

[16]Public sector deposits account for over 30% of the banking system's deposit base in Qatar. The use of this method has been highly effective in Malaysia, Saudi Arabia and Thailand (e.g., Lee, 1997). In some countries, central banks have been given some control of government deposits by law. The Bank of Canada, for example, can transfer government deposits from commercial banks to itself, and vice versa (Cottarelli, 1993).

[17]See, for example, Ministry of Finance (2012).

However, the QCB's auctioning of its CDs among banks was performed on irregular basis, signaling an absence of short- to medium-term liquidity planning by QCB. Moreover, these securities had short-term maturities (up to 12 months) and offered rather high rates compared to securities with similar maturity structures by the Central Bank of Bahrain. As mentioned earlier, QCB ceased to issue its CDs once the MOEF started issuing treasury bills in May 2011.

3. **Repos:** These are conducted in domestic government securities at the initiative of the commercial banks. The QCBRR is known in advance and provides a means for longer-maturity sources of funds.

4. **The QMR:** This is a monetary instrument through which local banks are allowed to deposit and borrow from the QCB with a pre-specified interest rate. Prior to December 2008, there was an individual bank-by-bank ceiling on the total amount of deposit from the QCB via the QMR mechanism (see Box 1).

5 The Crisis Period

To reiterate, the policy stance of the Fed (and other major central banks) during the pre-crisis era had been primarily expansionary in response to periods of heightened volatility in the aftermath of 9/11. The events that followed – the anthrax attacks, and the invasion of Afghanistan and Iraq – only served to heighten these uncertainties. By May 2004, the targeted federal funds rate (TFFR) dropped to 1%. Yet, the Fed started tightening its policy stance in mid-2004. By June 2006, the TFFR reached 5.25%. Shortly after the financial turbulence started on August 9 and 10 2007,[18] the Fed's easing campaign began in September 2007 by cutting the TFFR by 50 basis points. By the end of 2007, the TFFR was cut to 4.25%. As indications of economic weakness proliferated, the Fed responded by cutting its policy rate to 2% by May 2008 (225 points). Despite the Fed's monetary policy support, the global economic outlook continued to deteriorate. The Fed responded by cutting the TFFR by an additional 100 basis points (in two steps) in October 2008, of which "half of [the] reduction came as part of an unprecedented co-ordinated interest rate cut by six major central banks on October 8" (Bernanke, 2008). Finally, the TFFR was cut down to 0.0–0.25% on December 2008, and stayed there for an extended

[18]On 9–10 August 2007, the spread between the three-month LIBOR and the three-month overnight index swap jumped to unusually high levels and has remained high ever since. This event was dubbed a "black swan" in the money market by Taleb (2007) due to its unusual appearance.

period.

Box 1. The QMR Mechanism

The QMR is a set of QCB's nonstandard standing facilities, used to absorb/inject primary liquidity off/into the banking system as needed. It is nonstandard because unlike clearing-time standard overnight standing facilities, the QMR facilities, at present, operate for a limited daylight hours (from 09:00 a.m. to 10:00 a.m.) on monetary policy days. The QMR facilities also differ from the standard facilities in that they are multi-maturity facilities ranging from 1 to 30 days, during which the QMR deposits/loans are restricted from use before maturity. The deposit facility is designed to 'drain' surplus liquidity and not intended to 'absorb' banks' excess reserves by the end of a monetary policy day.

In the pre-crisis period, individual banks were subject to a deposit 'ceiling' which was determined by the balance of the bank's required reserved account on the 15th of the previous calendar month. Hence, a bank's credit ceiling is a monotonic increasing function of its QMR deposits with a minimum equal to its QMR deposits' ceiling. As can be seen from Figure 2 (left panel), the ceiling was effective during the pre-crisis era, as the QIBOR was well below the QCB deposit rate, mainly because marginal interest rate on deposits was zero. The ceiling was removed in the last week of December 2008, causing the marginal rates on deposits to increase to the level of QCB's deposit rate. Consequently, surplus funds migrated from the banks' free reserve accounts into banks' QMR deposit accounts, resulting in the convergence of QIBOR to QCB deposit rate (see Figure 2). The ceiling was reinstalled in mid-January 2011; however, beginning mid-2011, the ceiling was not effective in the sense that the banks' deposits were lower than the ceiling amount. The bond sales (worth QR50 billion) by the Qatari government in January 2011, policy interest rate cuts by QCB, surplus liquidity-seeking lucrative investment deals overseas and the deleveraging by European banks, among other factors, explain the ineffectiveness of the recent QMR ceiling.

Keeping a strong faith in the impossible trinity and the predominance of the UIP, QCB was keen to shadow the Fed's policy rate closely prior to the eruption of the global financial crisis in mid-September 2008. The QCB policy rate was cut to reach 1.23% in June 2004, was persistently raised to reach 5.15% in May 2006 and was cut to reach 2% in May 2008 (Figure

4). The imported monetary easing has indeed reinforced upward pressures on the QR exchange value vis-à-vis the USD, which resulted in forcing QCB on-demand QR sales and injected foreign exchange on the assets side and free bank reserves on the liabilities side of QCB's balance sheet, thus accumulating primary liquidity in the banking system.

In contrast with the pre-crisis years – but still keeping faith in the trilemma and the predominance of the UIP – and foreseeing the intensity of the overseas deleveraging process, the global liquidity shortage and the global credit crunch, in the aftermath of the global financial meltdown, QCB anticipated capital mobility to freeze globally. Qatar could therefore maintain a large positive interest rate differential vis-à-vis the US since "the risks that an interest rate differential favoring Qatari riyal deposits would attract sizeable capital flows via the 'carry trade' had largely dissipated" (General Secretariat for Development Planning, 2012, p.34). Capital immobility is equivalent to closing the capital and financial accounts of the balance of payments, and hence indicates a breakup of the UIP and the neutralization of the QR peg. This frees QCB's policy rates for domestic policy goals, and extends potency to the QCB monetary policy stance independent of the Fed's monetary stance. Thus, anticipating a countercyclical fiscal stance, and the Qatari government's rescue package in support of the national commercial banks, QCB decided to fully break up with the Fed and adopt a relatively tightening monetary policy stance. Monetary tightening reinforced the domestic impact of the global financial crisis, lowered inflationary expectations at home and helped to deflate the economy (with no sacrifice of monetary stability or suspicions of triggering pressures in the exchange market as long as capital mobility remained paused).

Such QCB's vision signified a dramatic switch from a monetary policy strategy of exchange rate targeting to a (seemingly temporary) monetary policy strategy of implicit inflation targeting and exchange rate targeting. That is, QCB's monetary policy framework was replaced by a "dual mandate framework", which required: (i) separating QCB's monetary policy from QCB's liquidity management; so that the policy rate would no longer be instrumental for liquidity management; (ii) untying QCB's monetary policy from exchange rate management, so that only QCB's exchange market interventions (and not the policy rate) would be utilized to neutralize pressures in the market; (iii) no monetary easing, but gradually tightening the QCB monetary policy stance via freezing QCB policy rates; (iv) directly injecting liquidity into the banking system as needed; and (v) draining liquidity surplus off the banking system as needed.

Meanwhile, financial stability and monetary policy came to be seen as "co-equal" responsibilities of central banks in several developed and emerging countries. QCB was no exception. In the aftermath of the global financial crisis, and in parallel with government intervention in support of the banking system, QCB had restricted banks from taking on new exposures in the equity and real estate markets. Complementing ongoing global regulatory reforms, QCB initiated a comprehensive review of its prudential regulations, strengthened its department of financial stability, established a new credit bureau, started setting up a new risk monitoring department and reformed its regulatory framework.[19]

Nevertheless, the QR liquidity surplus was renewed in the aftermath of the global financial crisis, created and sustained by the gradual implementation of the state's pre-emptive interventions in the banking sector. While the average daily deposits via the QMR standing deposits facility recorded QR17.1 billion in 2009 and QR38.8 billion in 2010, QCB's lending facilities were hardly used during this period, indicating that the interbank market was flooded with liquidity surplus. Certainly, successful implementation of QCB's liquidity policy within its new monetary policy framework under these conditions demanded much more coordination between QCB and the MOEF, particularly in the domains of augmenting QCB's arsenal of monetary instruments and fiscal actions in support of QCB's liquidity management. QCB introduced its own securities (CDs) in March 2008 and an overnight liquidity window at 3% interest rate in October 2008, and eliminated the ceilings on bank deposits via the QMR standing deposits facility. These were highly effective (new) tools of liquidity management. Unlike other GCC countries (Bahrain, Kuwait and the UAE), Qatar did not provide guarantees for deposits at local commercial banks. Meanwhile, in coordination with QCB, the MOEF issued government securities amounting to QR10 billion in June 2010 and QR50 billion in January 2011, contributing to absorbance of interbank liquidity surplus. The outcome had been stabilizing QIBOR close to QCB's deposit rate (which was about $\frac{2\%}{0.0125\%} = 160$-fold compared to the mid-range of the FFR).

Noticeably, since it coincided with reluctance on behalf of commercial banks to extend credit to the private sector, a soft landing real estate sector, a bust in the stock market and

[19]Major regulatory developments during 2009–2010 include: (i) external auditing of the banks' off-balance sheet items; (ii) classification and valuation of financial investments inside and outside Qatar in accordance with International Accounting standard IAS-39; (iii) elimination of credit for purposes of trading in securities; (iv) external auditing of banks' exposure to real estate risks; (v) timely disclosure of banks' financial statements and those of their branches abroad and their subsidiaries and (vi) external auditing to evaluate the effectiveness of corporate governance with respect to the performance and the responsibilities of members of boards of directors and executive management, and the relationship between both. See Qatar Central Bank (2009, 2010) for further discussion.

a reluctance on behalf of households to access the consumer credit markets, the accumulated PLS in the money market was not inflationary. Within this environment, QCB's new monetary policy framework, the new liquidity management approach that was independent from the QR peg, the improved regulatory framework, and the coordination between QCB and the MOEF have been a success, resulting in: (i) significantly slower annual money (M1 and M2) growth; (ii) significantly slower growth in credit extended to the private sector; (iii) overall annual consumer price index (CPI) deflation; (iv) preserving banking and financial stability; (v) a soft landing in the real estate market; (vi) positive and increasing real interest rates; (vii) stabilizing the QIBOR at a much higher level than the LIBOR or the FFR (2.09% daily average over the period of January 2009–July 2010). While interbank markets were clogged in many countries, it was stabilized in Qatar.

6 Discussion

This section attempts to evaluate QCB's monetary policy across the mid-September 2008 global financial meltdown. But first, recalling some major aspects of the monetary policies of some major central banks, it is worth noting that the monetary counterrevolution of the early 1980s marked the return to assigning a heavy weight to price stability in the process of monetary policy making. Since then, the policy rate levels continued to structurally decline in the major advanced economies. While this was driven by an asymmetric exchange rate policy in Japan (Danne and Schnabl, 2008), it was driven by an asymmetric monetary policy response towards developments in the stock markets (Hoffmann, 2012). Figure 5 shows that the Fed's monetary policy tended to respond strongly to the bear markets but not as strongly to the bull markets (Hoffmann, 2009). It was Alan Greenspan who developed a central banking practice keen to stabilize financial markets in time of crisis but be inactive during boom times, in line with the Jackson Hall Consensus.[20] Such a practice prevailed during the pre-crisis era, during which QCB strictly shadowed the Fed's policy interest rate. We opt to employ the Austrian monetary overinvestment theories (Wicksell 1898; von Mises 1912; von Hayek 1929, 1935) to interpret the policy actions of the Fed and the QCB during the pre- and post-crisis periods.

Although the monetary overinvestment theories were originally introduced to model the real

[20] According to the so-called "Jackson Hall Consensus", the US central bankers have determined that central banks have no sufficient information to recognize and forestall stock market bubbles, but should intervene in times of financial turmoil (Blinder and Reis, 2005).

business cycles, they can be utilized as a framework to analyze monetary policies and to identify policy mistakes committed by central banks. We are therefore keen to use them as a framework for our analysis attempting to explain the developments in the QR liquidity surplus in the Qatari interbank market. Four interest rate concepts are identified within the framework of the Austrian monetary overinvestment theories: (1) the "internal interest rate" that reflects the expected rate of return on an investment; (2) the "credit market interest rate" charged by the private financial (banking) sector on credit provided to private enterprises; (3) the "central bank policy interest rate" set by the central bank; and (4) Wicksell's (1898) theoretical concept of the "natural interest rate" that balances supply (savings) and demand (investment) in the domestic capital market. The "natural interest rate" is not known to the policy makers. Accordingly, only when the credit market interest rate is equal to the central bank policy interest rate and both are equal to the natural interest rate, will savings and investment decisions be in equilibrium in an economy.

A deviation from the (unknown) natural interest rate would result in a monetary policy mistake. Two types of monetary policy mistakes can be identified (Hoffmann and Schnabl, 2011). A Type I monetary policy mistake is committed where and when the central bank keeps the policy rate below the natural interest rate for too long during the upswing of an economic cycle, triggering an overinvestment boom that leads to crisis and recession. A Type II monetary policy mistake is committed where and when the central bank keeps the policy rate above the natural interest rate for too long during the downturn of an economic cycle, thereby aggravating the recession. The policy implication is that the central bank should keep its policy rate as close as possible to the (unknown) natural interest rate in order to smooth economic cycles. Since the natural interest rate remains a theoretical concept unknown to the central bank, it is the task of the central bank to gain sufficient information to approximate the natural interest rate (in this spirit, Taylor's (1993) rule is an example).

During the pre-crisis period, the Fed (under Alan Greenspan) started cutting its policy rate in January 2001 – in the aftermath of the burst of the dotcom bubble – from 6.5% over May-December 2000 to 3.5% in August 2001. The Fed continued to cut its policy rate – in the aftermath of the September 11th 2001 – to reach 1% in July 2003 and stayed there for a whole year. Only in June 2004, the Fed started to remove its monetary policy stimulus by continuously raising its policy interest rate to reach 5.25% in June 2006 and to remain untouched until August 2007. Notably, the Fed policy rate fell faster during recessions than it rose during booms (Figure

5). In this manner, within the framework of the monetary overinvestment theories (Wicksell-Mises-Hayek), the apparent behavior of the Fed may be judged as mixed. The implications for QCB's monetary management (and the Qatari economy) were mysterious.

Under the restrictive conditions of QR convertibility and the QR hard-peg, QCB had postulated (i.e., accepted the untested hypothesis of) the UIP implied by the QR-USD exchange rate parity. Figure 5 shows that the Fed's monetary policy stance had been seemingly consistent with the slowing US economy during the period 2000:Q1–2001:Q3, showing that the Fed committed no monetary policy mistakes. Nevertheless, the Qatari economy was on the rise during that period. By importing the Fed's easy monetary policy stance, the QCB was forced to commit a Type I monetary policy mistake, accommodating the expansionary fiscal stance and paving the way for heating the economy. Yet, while the US economy was on the rise during the period 2001:Q4–2004:Q1, the Fed had apparently committed a Type I monetary policy mistake (continuing to cut its policy rate). Shadowing the Fed policy rate, the professed Fed Type I monetary policy mistake was transmitted to the Qatari money market via a forced QCB Type I monetary policy mistake, thereby aggravating the already heating economy.

Starting June 2004, the Fed began removing its monetary policy stimulus by continuously raising its policy rate to reach 5.25% in June 2006 to remain untouched until August 2007, thus committing a Type II monetary policy mistake. The Fed's Type II monetary policy mistake came in favor of the overheating Qatari economy during this period, as QCB shadowed the Fed's policy rate. However, the pace of the Fed's monetary tightening was insufficient to mitigate the situation in Qatar; headline CPI inflation reached 17% in 2008:Q2. Apparently consistent with a slowing US economy, the Fed's easing campaign began in September 2007 by cutting the TFFR 50 basis points. The TFFR was cut to 4.25% by the end of 2007 and to 2% by May 2008. The QCB followed by cutting its policy rate down to 2% by May 2008, hence committing a Type I monetary policy mistake.

This sequence of QCB's typical QR peg-forced monetary policy mistakes resulted in a forced pro-cyclical monetary policy stance that was combined with the prevailing pro-cyclical fiscal policy stance and a countercyclical local public debt management approach; the most awful policy mix to embrace during economic booms, which produced a colossal PLS far beyond the QCB's capacity to sterilize. However, on the monetary policy front, QCB did not do what it takes to effectively sterilize the monetary impact of the expansionary fiscal stance, the countercyclical local public debt stance and the net speculative foreign currency inflows.

QCB should have recognized the de-synchronization of the US and the Qatari economic cycles, emerged early in the 21st century; the changing geo-political and geo-economic environments in the aftermath of the 9/11 and the Afghanistan and Iraq invasions that turned GCC liquidity-leaking into liquidity-attracting economies (under fixed exchange rates); the higher degree of sophistication of the economy at large, and the realized developments in the domestic banking sector and the financial system.

Within such an environment, QCB could have used reserve requirements more frequently as a prominent policy instrument.[21] If used prudently, reserve requirements could have served as an unconventional monetary policy tool for price stability as well as a financial stability tool to deal with volatile capital flows (Glocker and Towbin, 2012). Also, QCB could have endeavored to create – in coordination with the MOEF – a special fund for the purpose of liquidity management analogous to the Market Stabilization Scheme successfully operated by the Reserve Bank of India since 2004.[22] The QCB could have followed suit by enacting a similar practice of issuing government securities by the Central Bank of Bahrain.[23] Further, the QCB could have made the QR exchange rate more instrumental by widening the margin around the central parity. This would have addressed exogenous shocks somewhat better than the hard-peg regime.[24] Finally, QCB could have considered the role of capital controls in tilting the composition of capital inflows away from short-term towards medium-and long-term maturities; however, QCB did neither of these. The outcome was an overheating economy accommodating two stock market bubbles, and a real estate market bubble, heightened inflationary expectations, accelerating inflation rates and an appreciating real effective exchange rate – all typical symptoms of an overheating economy faced with large international (net) capital inflows.

Comes the early phase of the global financial crisis, the (seemingly shocked) Fed continued to (nervously) cut its policy rate down to 2% by May 2008. Following the blowup of the crisis in mid-September 2008, the Fed cut its policy rate in steps to 0.00–0.25% by December 2008. In the meantime, the Fed started launching its unconventional Credit Easing policy in the form of a series of non-standard refinancing facilities, followed by "Large-scale Asset Purchases I" or

[21]For example, the People's Bank of China raised its reserve requirements six times in 2010 but moved its policy interest rate only once (Kashyap and Stein, 2012).

[22]Such funds could have made it feasible to expand QCB's OMOs via selling treasury-like bonds and bills to the banks and the public.

[23]See, http://www.cbb.gov.bh/page-p-issuance_of_govt_securities.htm.

[24]For example, when the domestic inflation rate is significantly and persistently higher than in trading partner countries, the problem can be dealt with by a pre-emptive move by the central bank towards an upward adjustment in the exchange rate. Similar actions can be used if the inflow of "hot money" seeks short-term profits.

"Quantitative Easing I," then Large-scale Asset Purchases II (Quantitative Easing II) in 2010. This was an ultra-easy monetary stance. While all other GCC central banks cut their policy rates following the Fed after the collapse of Lyman Brothers, QCB – for the first time since it was established – decided not to follow. All three QCB policy rates were frozen: the QCBDR at 2%, the QCBLR at 5.50% and the QCBRR at 5.55%. That was a deliberate Type II monetary policy mistake, aimed at deflating the economy (by reinforcing the local impact of the global financial crisis) so that the economy reaches the next (anticipated) self-triggered boom at low base inflation rates. Later on, it was proved that QCB had acted promptly and capably.

QCB's post-crisis decisions were based on theoretical analysis that – postulating the impossible trinity and assuming capital immobility – concluded a breakdown of the UIP and the neutrality of the QR peg. While Elsamadisy (2003b) could not reject the UIP for the Kuwaiti data over 1989-2001, we ask if the Qatari data supports QCB's (theoretical) conclusion of the UIP being void for Qatar since the blowup of the crisis. In an attempt to answer this question, Appendix A empirically tests and rejects the UIP hypothesis. That is, our empirical results confirm the QCB's theoretically derived conclusion that the QR peg would be futile following mid-September 2008 and therefore appraises QCB's new monetary policy framework and policy conduct.

Noticeably, the PLS accumulated in the interbank market over 2009–2010 was almost fully created and sustained by the gradual implementation of the government's interventions in rescue of the Qatari banks. The surplus was not at all inflationary, owing to the banks' reluctance to extend credit to the private sector and the shrinking private sector demand for credit among other factors including reassessment of risks. QCB's objective was achieved, since inflation was indeed falling sharply getting into negative boarders during 2009–2010 (CPI inflation dropped from an annual average of 15% in 2008 to -5% in 2009 and continued to decrease during 2010) while the banking and financial stability was preserved. It is thus concluded that breaking up with the Fed, adopting a dual mandated monetary policy framework, separating monetary policy from liquidity policy and conducting liquidity policy independent of the QR peg was in fact, a highly successful QCB experience that was widely recognized (IMF 2009, 2010). The interest rate differential between the QCB and the US Fed policy rates was expected to remain safe until well into 2011. Disinflation provided a silver lining for Qatar, presenting an opportunity that QCB should not have missed in order to discipline the QR real exchange rate as a requisite to preserve the relative national wealth and relative size of the economy within the unified GCC currency area (among other policy goals).

7 Concluding Remarks

This paper considers the phenomenon of structural PLS over the last decade of QCB's liquidity management. The paper defines structural PLS in view of practical central banking, identifies various sources of PLS in the context of the Qatari economy, and its consequences for the QCB monetary policy transmission mechanism and for the economy at large. The paper discusses the causes of QCB's unsuccessful experience over the years preceding the crisis and those of its highly successful experience in managing interbank liquidity over the crisis years. The effectiveness of the QR hard peg is identified as the major cause in the first case and its ineffectiveness is identified as the major cause in the second case. Our main conclusions can be summarized as follows:

- While the build-up of primary liquidity in the banking system during the pre-crisis years was mainly driven by surging capital inflows due to record hydrocarbon export revenues, FDI (including financial FDI) and speculative funds in expectation of QR appreciation during the pre-crisis years. The build-up was driven by the gradual implementation of a large scale state rescue package in support of the Qatari commercial banks during the post-crisis years.

- While the structural PLS was highly inflationary during the pre-crisis years (in an environment of over-heating economy), the surplus was not at all inflationary during the crisis period, due to negative shocks in the market for loanable funds, a shift in liquidity preference and re-pricing risks on behalf of banks (operating in an uncertain environment), and shocked demand on behalf of the non-bank private sector.

- While QCB's capacity to drain liquidity off the interbank market was minimal over the pre-crisis period because QCB was short on monetary tools and lacked government coordination, QCB's liquidity draining capacity rose significantly during the crisis period due to significantly greater government coordination and the augmentation of its arsenal with new monetary tools.

- While the QCB failed to control inflation during the pre-crisis years, it had contributed successfully to deflating the economy during the post-crisis years.

- The effectiveness of the interest rate channel of the monetary transmission mechanism was dramatically improved due to the change in the QCB monetary policy framework.

Since Qatar is committed to a decade-long program of expansionary fiscal stance within the framework of Qatar Vision 2030[25] and the FIFA World Cup event of 2022, the major policy recommendation relating to the role of QCB during the upcoming decade (2011–2020) is that the QCB should strive for a proactive monetary policy that responds to the economic challenges of the decade. There are two relevant policy recommendations:

- QCB can use reserve requirements more frequently as a prominent policy instrument and can create – in coordination with the MOEF – a special fund for the purposes of liquidity management, analogous to the Market Stabilization Scheme successfully operated by the Reserve Bank of India since 2004. Finally, if necessary, QCB may consider the role of capital controls in tilting the composition of capital inflows away from the short-term towards medium- and long term maturities. A proper cost-benefit analysis should be undertaken before considering new instruments for utilization.

- QCB can alter the QR exchange rate arrangement by widening the margins around the central parity (better still, it can adopt a more flexible exchange rate regime), in which case QCB can have the policy interest rate instrumented for domestic policy goals, while have QCB interventions instrumented for stabilizing the exchange rate. This pact would render the exchange rate more instrumental for addressing exogenous shocks.

[25] Qatar Vision 2030, General Secretariat for Development Planning, Qatar.

Appendix: A Test of Uncovered Interest Rate Parity in Qatar

The general specification of uncovered interest rate parity (UIP) is given as,

$$(s_{t+n} - s_t)^e = (i_t - i_t^*) + rp, \tag{1}$$

where $(s_{t+n} - s_t)^e$ is the expected change of the logarithm of the exchange rate (s_t is the logarithm of the spot exchange rate in units of domestic currency per unit of foreign currency); $(i_t - i_t^*)$ is the interest rate differential relative to the foreign country and rp is the risk premium. For simplicity, we make the weak assumption that the expected rate of change in the domestic currency is stationary. We also assume the risk premium to be stationary, which is a reflection of Qatar's relative economic stability and low political risk observed in the past decade. The (indirect) test of UIP can be expressed as:

$$i_t = \alpha + \beta i_t^* + \varepsilon_t, \tag{2}$$

where ε_t is a stationary disturbance term encompassing the expected rate of change of the domestic currency and the risk premium. Under the null hypothesis of UIP, the intercept estimate should be zero and the slope estimate should be one (i.e., $\alpha = 0$ and $\beta = 1$). The data span from July 2004 to December 2011 and is dubbed the "full" sample, which is further divided into two sub-samples: the "pre-crisis" period (July 2004 to September 2008) and the "crisis" period (October 2008 to December 2011). The interest rates used in this analysis are the annualized three-month deposit interest rate in Qatar and the three-month eurodollar deposit rate (London), which is a more relevant foreign interest rate from Qatar's perspective due to geographical proximity as well as financial and trade integration with Europe.

As a first step, we tested for the order of integration of the two interest rates. The augmented Dickey-Fuller unit root test statistics suggest that both interest rates have a unit root, while their first differences are stationary across the three sample periods (i.e., pre-crisis, crisis and full sample). Results are not affected by the choice of the deterministic component (i.e., the intercept and linear trend) in the test regression. We base our inference on the 5% level of significance.

Given the finding of nonstationarity interest rates, we then tested for bivariate cointegration between the two interest rates using the well-known Johansen cointegration approach. The results show no evidence of cointegration between the two interest rates over the pre-crisis sample. The null of one cointegrating relationship cannot be rejected over the crisis sample.[26] However, this finding is sensitive to the choice of lag length and the type of deterministic component considered in the test regression. Moreover, over the full sample, the null of no cointegration cannot be rejected at the 5% level, suggesting the non-existence of a long run equilibrium relationship between domestic and foreign interest rates. Overall, the absence or lack of a bivariate cointegration between the domestic and foreign interest rates can be interpreted as an empirical failure of the UIP.

In the final step of our empirical analysis, we tested for the joint hypotheses (i.e., $\alpha = 0$ and $\beta = 1$) using the Wald test based on the ordinary least squares (OLS) estimation of equation (2). The results show that for the three sample periods, the F-statistics strongly reject the null hypothesis of joint restrictions. We have also examined the normality assumption of the OLS regression errors and are unable to reject the null hypothesis of normality in all three sample periods. Finally, the Breusch-Godfrey LM test indicates no evidence of serial correlation in the regression errors. Nevertheless, in the light of our findings (i.e., non-stationarity and non-cointegration), these results should be carefully interpreted. These unreported results are available from the corresponding author on request.

[26]However, we observe that both post-crisis LIBOR and the FFR stabilized at a very low rate, while the QIBOR stabilized at a relatively very high rate (see Figure 2).

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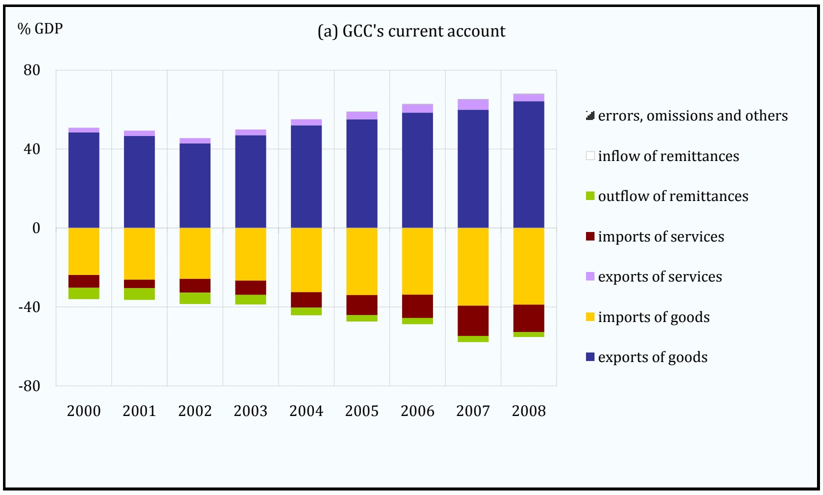
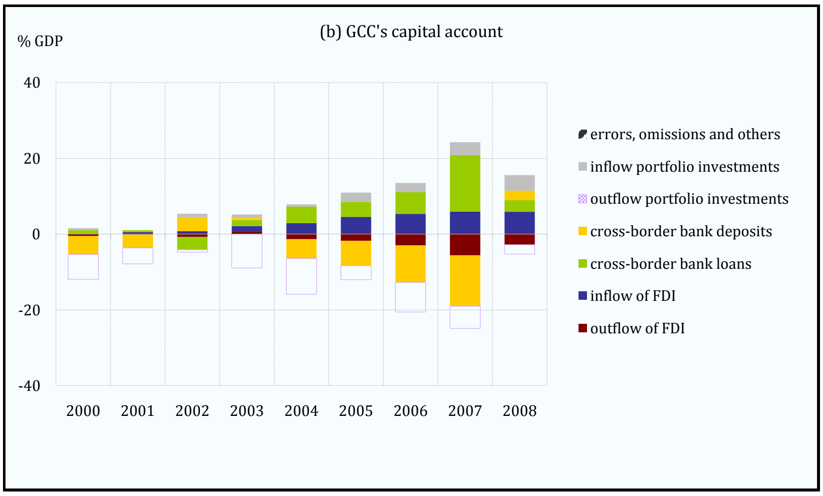
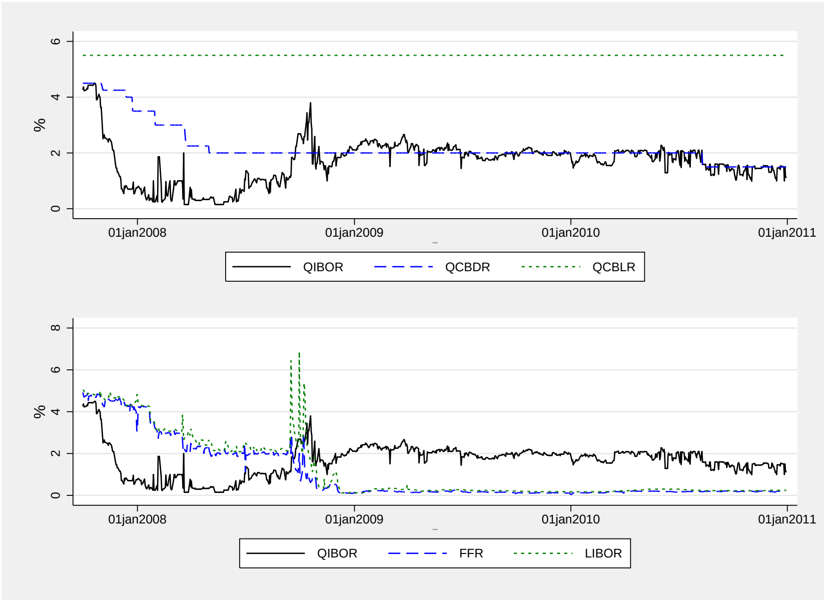
Figure 1: Composition of gross flows of the capital and current accounts of the GCC countries





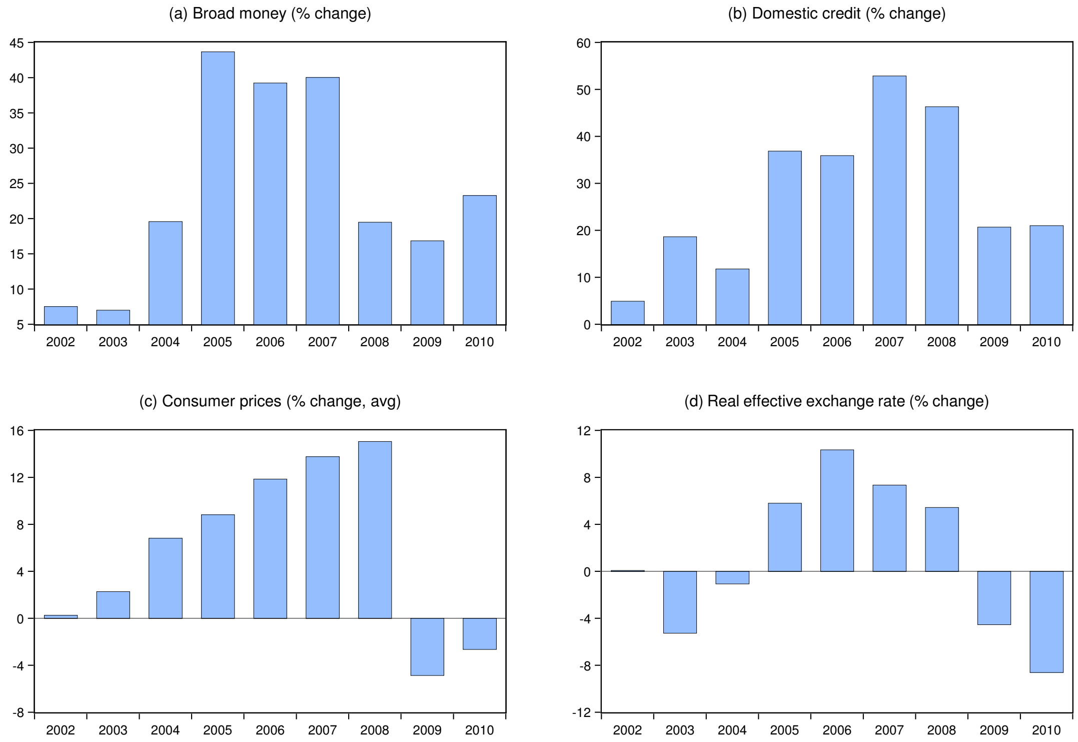
Source: Peeters (2011).

Figure 2: Interbank and policy interest rates in Qatar against FFR and LIBOR



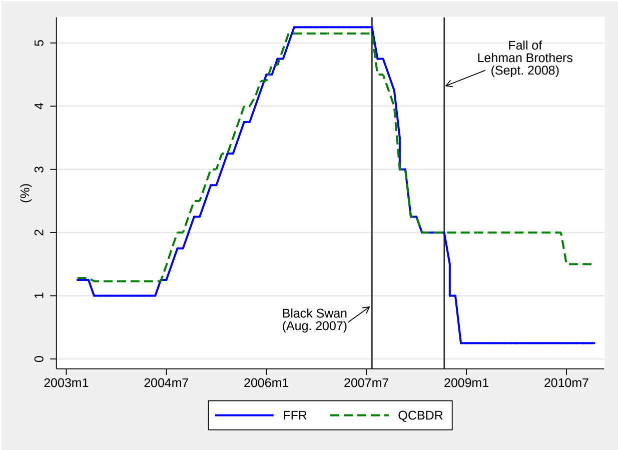
Note: Note: Average overnight interbank rate in Qatar, QIBOR; Qatar Central Bank deposit rate, QCBDR; Qatar Central Bank lending rate, QCBLR; effective federal funds rate, (FFR); London interbank offered rate, LIBOR. Source: Federal Reserve Bank of St. Louis; Qatar Central Bank.

Figure 3: Implications of liquidity surplus on major economic variables in Qatar



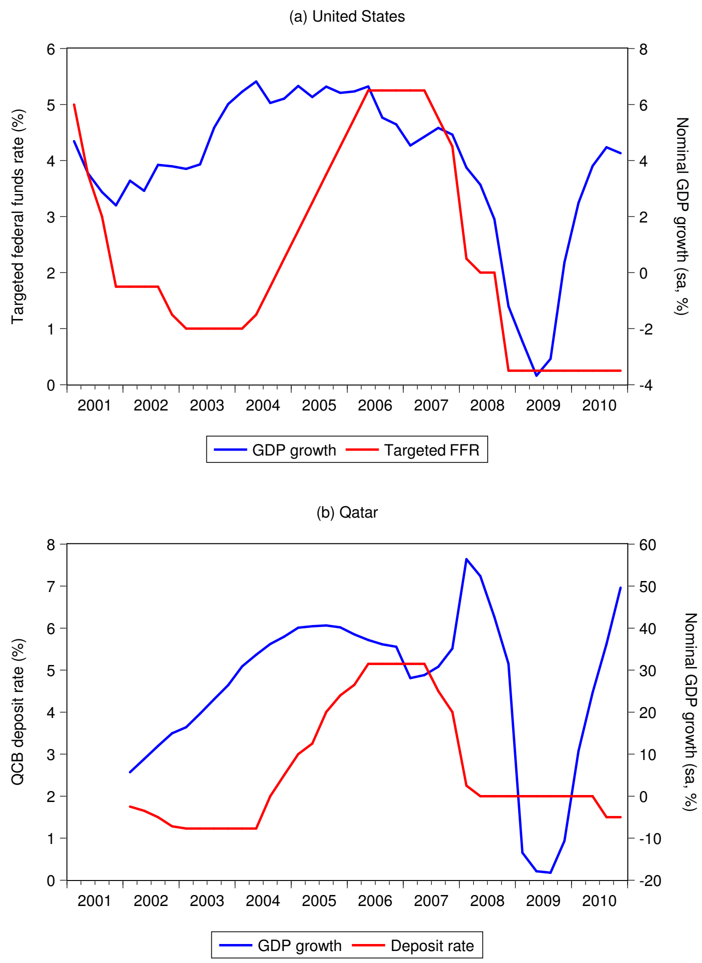
Source: Institute of International Finance Database, Washington DC.

Figure 4: Policy interest rates in Qatar and the United States



Note: Qatar Central Bank deposit rate, QCBDR; effective federal funds rate, FFR. `Source:` Federal Reserve Bank of St. Louis; Qatar Central Bank.

Figure 5: GDP growth versus policy interest rates in Qatar and the United States



Source: Federal Reserve Bank of St. Louis; International Monetary Fund; Qatar Central Bank.