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The Oil Cycle, the Federal Reserve, and the Monetary and Exchange Rate Policies of Qatar*

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Abstract

Supporters of the Arab oil-exporting countries' decades-long fixed exchange rate regime argue that since, oil is traded in United States (US) dollars, pegging to the dollar is optimal. However, the weakening relationship between oil prices and the US economy in terms of the Federal Reserve's expansionary monetary stance amid soaring oil prices for much of the previous decade has raised questions about the viability of the peg. Using Qatar as a case study, this paper empirically analyzes whether the synchronization pattern of business cycles has recently changed between Qatar and the US. The results of the analysis show a pronounced desynchronization or decoupling of business cycles between Qatar and the US during 2001–2010. Moreover, the dissimilarity of demand shocks between the two countries suggests that the imported monetary policy stance of the Federal Reserve has not been viable for Qatar in recent years. A natural implication of our findings is the need for a truly independent monetary policy oriented towards domestic goals.

JEL Classification: E32, E61, F44.

Keywords: Oil price, Business cycle synchronization, Counter-cyclical monetary policy, Exchange rate regimes.

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1 Introduction

A large body of research has considered business cycle synchronization and/or shocks asymmetry to study the feasibility of monetary union between countries. The basic idea is that if business cycles between two countries were synchronized or if two countries experienced the same disturbances, “abandoning policy autonomy for monetary unification will then entail relatively little cost” (Bayoumi and Eichengreen, p. 4, 1994). In addition to the similarity of the shocks and cycles, the literature of optimum currency areas (OCA) that started with the seminal contribution by Mundell (1961) has focused on other inter-relationships such as the extent of trade and the degree of labor mobility, as well as Kenen’s (1969) criterion of fiscal risk-sharing among the members of a potential OCA.

However, without denying the importance of these criteria,¹ this paper focuses on the similarity of the shocks and cycles to evaluate the monetary union between Qatar and the United States (US) which has been in place over the past three decades. In particular, Qatar has maintained a *de facto* fixed peg to the US dollar since 1980 and a *de jure* peg since 2001.² Joining a currency union is costly, as it would seriously constrain a country from using an independent counter-cyclical monetary policy to dampen country-specific shocks (Frankel and Rose, 1998). As the international transmission of real and monetary shocks depends on a country’s choice of exchange rate regime, on the basis of empirical evidence it will be argued why the existing fixed peg is no longer in Qatar’s best interest for dealing with economic shocks that buffet the economy.

Like Qatar, some of its Gulf neighbors have also pegged their national currencies to the US dollar. These include Bahrain, Oman, Saudi Arabia and the United Arab Emirates. Although Kuwait’s currency is tied to a currency basket, it is widely believed that the US dollar has a high weight in Kuwait’s currency basket (Setser, 2007). Therefore, the entire Gulf Cooperation Council (GCC) region, which consists of the six Gulf Arab countries, are in a currency union with the US. Meanwhile, for several years, the GCC countries have been contemplating the creation of a new monetary union (i.e., the Gulf Monetary Union) as a means to intensify regional cooperation on political, economic and security, among other cooperations. The Arab oil-exporting countries’ decision to maintain the long-standing *de facto* dollar peg and the prospect

¹As discussed in Appendix A, in the present context, the importance of the trade, labor and risk-sharing criteria are somewhat weaker than the implications of dissimilar shocks or cycles.

²See Appendix B for a brief history of the exchange rate system in Qatar.

of a Gulf monetary union have prompted a large number of studies analyzing a multitude of economic issues. This is not the occasion to review these contributions; interested readers are referred to available surveys by, among others, Buiter (2007), Alkholifey and Alreshan (2010), and Alkhater (2012). It must be stressed here that this paper is not about the feasibility of the Gulf monetary union; rather, it is related to the strand of the literature that assesses Qatar’s (and thereby the GCC’s) currency peg to the US dollar. A brief overview of the findings of selected studies that are relevant to the present analysis is provided below.

Coury and Dave (2008) reported that over the period of 1980–2006, both the contemporaneous and lagged business cycle components of Qatar were positively correlated with those of the US (0.57 versus 0.32), though the lagged component was not statistically significant. Furthermore, contemporaneous price levels and inflation rates between Qatar and the US were also positively correlated (0.37 versus 0.25), but they were not statistically significant. Cevik (2011) found that the contemporaneous correlation between Qatar’s real non-oil gross domestic product (GDP) cycle and the US’s real GDP cycle over the period 1990–2010 was 0.31, declining to 0.23 during 2000–2010. In addition, the business cycle correlation coefficients of Qatar vis-à-vis Asia and the Eurozone evolved, respectively, from -0.19 and -0.37 in 1990–1999 to 0.34 and 0.35 during 2000–2010. The higher synchronization of Qatar’s non-oil business cycle with Asia and the Eurozone over the past decade compared with the 1990s alongside a less synchronized cycle with the US reflects the changing nature and composition of the Qatari economy.³

Rafiq (2011) demonstrated that the importance of common factor shocks—reflecting the US monetary policy and US demand shocks as well as changes in crude oil prices—have fallen for Qatar over the period 1993–2005. Although his results also show that country-specific shocks play a more important role in driving output fluctuations at very short-term frequencies, common factor innovations still matter at medium-term frequencies. On the basis of symmetric aggregate demand shocks between the GCC and the US, Jean Louis et al. (2012) concluded that the US dollar—rather than the Euro—remains the appropriate currency for pegging for individual countries and the planned monetary union among GCC countries. Kim et al. (2012) reported that US output shocks have a positive and material impact on the aggregate exports

³Although hydrocarbons still account for a sizable portion of GDP in Qatar, the share of non-hydrocarbon sector increased from about 45% in 1980 to around 60% by end-2013. Interestingly, by developing large production capacities of natural gas, Qatar has recently reduced its dependence on oil in favor of natural gas (Basher, 2010). Furthermore, although trade with the US has remained relatively stable over the past three decades, Qatar’s trade with emerging Asian countries has increased impressively (see Appendix A for further details). There is more to Qatar’s resilient economy. In the midst of the recent global financial crisis, Qatar’s economy was relatively unaffected through trade and financial channels (IMF, 2013).

and output of the GCC region.

The rest of the paper is organized as follows. Section 2 discusses the main motivation of the paper. It explains the evolution of the relationship between crude oil prices and the Federal Reserve’s monetary stance, and the resulting implications for the Qatari economy. Section 3 outlines the econometric methodologies used in the empirical analysis. Section 4 presents the findings. Section 5 discusses the policy implications of the results of the analysis. Section 6 concludes the paper. All supporting materials are presented in the Appendix.

2 The Oil–US–Qatar Nexus

The purpose of this section is to shed light on the evolving relationship between the US and the Qatari economy in relation to their dependence on oil. As Qatar (like its other GCC neighbors) is in a monetary union with the US, it is useful to relate the federal funds rate (FFR)⁴ to that of oil. The historical relationship between the US economy and oil prices can be analyzed from both demand and supply side perspectives. From the demand side perspective, positive and sustaining economic growth in the US would increase the world’s demand for oil and therefore international oil prices. Given the prospect that higher oil prices spill over into domestic prices (through import prices), the Federal Reserve would intervene and raise the target for its FFR. From the supply side perspective, a persistent rise in international oil prices (due to reasons beyond the US’s economy, such as war) prompt the Federal Reserve to increase the target for the FFR, thereby slowing the growth of the US economy. This causal chain of actions becomes easy to understand in a flow diagram:

Table 1: The Oil–US Economy Nexus

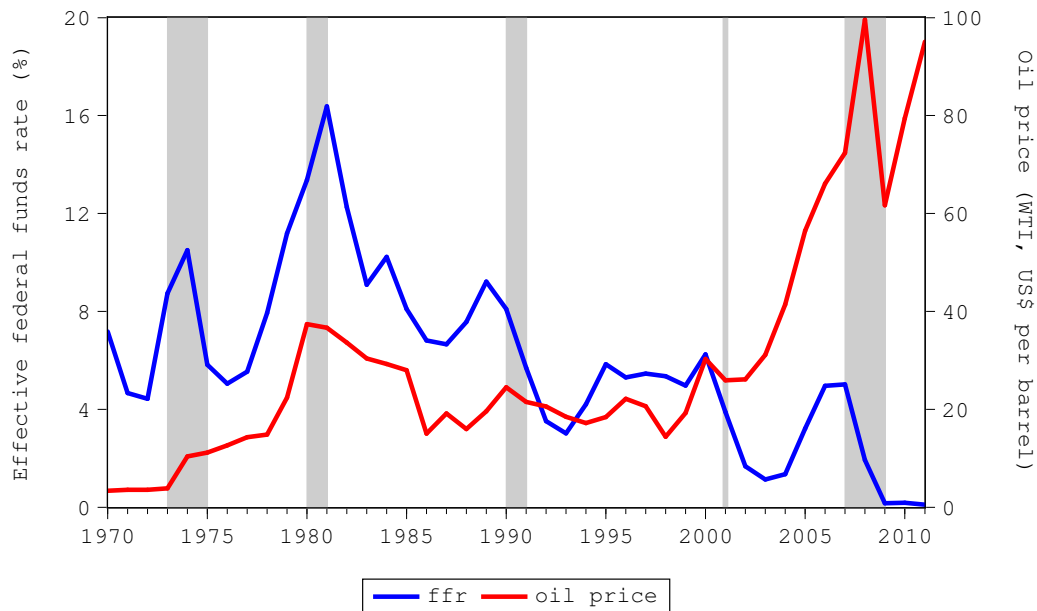
Demand side:	↑ US economic growth	⇒	↑ oil prices	⇒	↑ federal funds rate
Supply side:	↑ oil prices	⇒	↑ federal funds rate	⇒	↓ US economic growth

There is a plethora of empirical research supporting this causal linkage, albeit with mixed evidence. For empirical work related to the demand side analysis, see Gately (1992), Gately and Huntington (2002), Small and Van Dender (2007), and Hughes et al. (2008), among others. Typically, these studies focus in estimating short-run price and income elasticities of gasoline

⁴The FFR is an indicator of the US’s monetary policy stance and henceforth reflects the monetary stance in Qatar because of the fixed peg of the Qatari riyal to the US dollar.

demand in the US, without any explicit attention to the role of monetary policy. For work on the supply side, see Bernanke et al. (1997, 2004), Hamilton and Herrera (2004), and Kilian and Lewis (2011), among many others. These studies debate the rationale for monetary tightening in response to oil price shocks.

Figure 1: Oil Prices and the Effective Federal Funds Rate



Note: Shaded bars indicate periods of recessions (www.nber.org/cycles.html)
Source: FRED – Economic Data, Federal Reserve Bank of St. Louis.

Figure 1 plots the historical relationship between the effective FFR and oil prices over the 1970–2011 period. Until 2000, one can easily notice the positive association (or comovement) between the two variables during both recessionary and expansionary periods, consistent with the demand/supply side perspectives mentioned above. However, since the start of 2001, the relationship between oil price and the FFR has been weakened significantly. Although, both variables moved in tandem over the 2004–2006 period, overall, their paths have diverged since the turn of this century. Several factors explain the recent decoupling of these two economic series.

First, following the September 11 terrorist attacks in 2001, the monetary policy stance of the Federal Reserve (hereafter ‘the Fed’) was primarily expansionary in response to periods of heightened volatility. In particular, the US’s involvement in the wars in Afghanistan and Iraq were the main reason for heightened uncertainty in economic activity. By May 2004, the FFR

dropped to 1%.⁵ However, interest rates began increasing after the Fed started tightening their policy in mid-2004, which resulted in a persistently gradual increase in the FFR that reached 5.25% by June 2006. Shortly after the financial turbulence that began on August 9 and 10, 2007,⁶ the Fed's easing campaign began in September 2007, with a cut of 50 basis points in the target for the FFR. By the end of 2007, the FFR dropped to 4.25%. However, as indications of economic weakness proliferated, the Fed responded by reducing the target rate by an additional 225 points to 2% by May 2008. However, amid continuing deterioration of the global economy, the Fed—in concert with unprecedented coordinated interest rate cuts by major central banks—reduced the target for the FFR by an additional 100 basis points in October 2008 (see Bernanke, 2008). By December 2008, the Fed reduced its target further, setting a range of 0 to 25 basis points for the targeted FFR. Since then, the targeted FFR has remained within that range and is expected to remain at these exceptionally low levels at least as long as the unemployment rate remains above 6.5% and longer-term inflation expectations continue to be well anchored (see Federal Reserve, 2013). It is worth mentioning here that besides cutting the target for the FFR, the Fed deployed a variety of unconventional monetary policy tools including forward guidance that changed the size and composition of its balance sheet (see Bernanke, 2012).

Meanwhile, the annual average nominal price of oil steadily increased from a low of around \$25 a barrel at the end of 2001 to above \$100 a barrel in the first half of 2008, followed by an even more spectacular price collapse with the intensification of the global financial crisis triggered by the collapse of Lehman Brothers in September 2008. Although oil prices had fallen sharply in the final quarter of 2008, but soon thereafter, oil prices have kept rising over the 2009–2011 period. In particular, as Figure 1 shows, oil prices tended to mean-revert over 1973–2000, but since the beginning of 2001, they have exhibited a highly positive trend. Clearly, the super-easy monetary stance of the Fed during a decade of mostly rising oil prices is more than a mere coincidence of the decoupling of oil price and the FFR. Instead, the post-crisis evidence suggests that the policy goal of the Fed has been primarily centered around stabilizing a deterioration housing market and stimulating employment by maintaining a lower (nominal) cost of investment for a protracted period. Needless to say, the Fed is tracking and monitoring

⁵See Neely (2004) for a description of the Fed's reaction to crisis or potential crisis in the financial markets.

⁶On August 9 and 10, of 2007, the spread between the three-month London interbank offered rate (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) and by Taylor and Williams (2009) due to its unusual appearance. See Cecchetti (2008) for a full discussion of the events leading up to and including the crisis. An event timelines of the US and international policy responses to the global financial crisis is available online at: http://www.newyorkfed.org/research/global_economy/policyresponses.html

inflation development, such that “it will take a balanced approach consistent with its longer-run goals of maximum employment and inflation of 2 percent” (Federal Reserve 2014, p. 10).

Second, even after controlling for the various supply disruptions and oil inventories that constantly affect fluctuations in international oil prices,⁷ the evidence suggests that a large fraction of the oil price increase since 2000 has been due to higher global demand for oil—oil consumption in China is particularly noteworthy. Since China’s accession to the World Trade Organization in 2001, the Chinese economy (in real terms) has grown at an annual rate of nearly 10%, versus a less than average annual growth rate of 1.5% in the US. Alongside China’s astonishing output growth has come a voracious appetite for oil. Over the 2001–2009 period, the compound annual growth rate for petroleum consumption in China was 6.7%, compared with a falling demand growth (-0.50%) in the US.⁸ Together with China, much of the world demand for oil has originated from emerging economies in Asia (including the Middle East economies).⁹

Interestingly, over the past few decades, the price elasticity of petroleum demand in the US has reported a sharp decline. Estimates by Hughes et al. (2008) show that the short-run price elasticity of gasoline demand was, in absolute values, in the range of 0.21 to 0.34 over 1975–1980, but only 0.03 to 0.07 for the 2001–2006 period. Of course, the lower price elasticities observed in the recent decade could easily be reversed in the form of a high energy expenditure share, should energy prices take a dramatic upturn. Therefore, it is more instructive to look at the income elasticity of demand, which varies with the stage of economic development within a country. Estimates by Hamilton (2009) show that income elasticity plummeted from 1.04 during 1961–1973 to 0.47 over the 1985–1997 period. The combination of an income and price elasticity below unity pushed down the dollar value of oil expenditure as a share of total GDP at 1.1% in 1998 (compared with the large 8.3% share observed in 1980), before it went up to 5.6% for the first half of 2008 (Hamilton, 2009). However, the impression that the income elasticity of oil has declined in the US becomes easier to notice when comparing results across countries. Gately and Huntington (2002) reported an average income elasticity of 0.55 for 25 OECD countries over the period 1971–1997, compared with 1.17 for 11 other countries characterized by rapid

⁷For the historical journey of the oil industry with a particular focus on the events associated with significant changes in the price of oil, see Hamilton (2013).

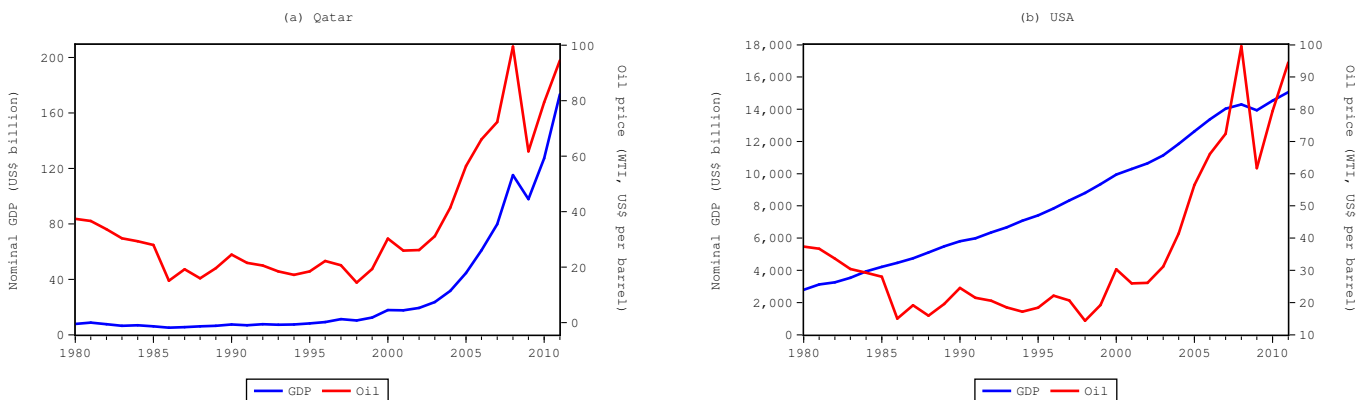
⁸Authors’ calculations using data from EIA (2012).

⁹Kilian and Hicks (p. 385, 2013) pointed out that “the unexpected increase in the demand for oil after 2002 was not driven primarily by unexpectedly high growth in the OECD, but to a large extent by unexpected growth from countries outside of the OECD.” Furthermore, Smith (2009, p. 155) concluded that “some combination of unexpectedly energy-hungry growth from China and elsewhere in the world together with a negative shift in oil supply caused by higher production costs can explain a substantial rise in oil prices after about 2004.” See also Hamilton (2009).

income growth and 1.11 for 11 oil-exporting countries.¹⁰

The evidence portrayed above suggests a weakening of the relationship between oil prices and the US economy in very recent years. It also provides an indication that much of the current, as well as future, petroleum growth will originate from emerging economies. To put this shifting of the global oil demand in perspective, during 2006, China used about two barrels of oil per person, against 6.6 in Mexico and 25 in the US (see Hamilton, 2009). Certainly, for China and other emerging economies, there remains a long road ahead before we might expect the income elasticity of the oil demand to fall to the levels of developed economies.

Figure 2: Nominal GDP–Oil Price Nexus in Qatar and the US



Source: Oil price, FRED – Economic Data, Federal Reserve Bank of St. Louis. Nominal GDP, World Economic Outlook (IMF).

We conclude this section by making some causal remarks on the nexus between the Qatari economy and the US economy (in particular, the US dollar); a formal statistical analysis is presented below. Although, the US, as a net oil-importing country, has never been a main buyer of Qatari oil, oil has been the inexorable link between the two economies. The most obvious example of this is the international price of oil, which is traded in US dollars. Perhaps this is why Qatar, like its neighboring Gulf countries, found it optimal to peg its national currency to the US dollar back in June 1980, a system still exists today. Intuitively, for an oil-exporting developing country whose currency is pegged to the US dollar, eliminating the US dollar exchange rate risk through pegging appeared an attractive way to accumulate dollar-denominated oil exports. Further, indexing to the US dollar served as a stimulus due to a high concentration of foreign assets (arising from surplus oil revenues) in dollar-denominated securities (Amuzegar, 1983).

¹⁰Dahl and Sterner (1991) and Espey (1998) provide thorough reviews based on hundreds of gasoline demand studies.

A further justification for the exchange rate peg came from the point of view that it would deliver price stability through a credible currency peg. Most importantly, back in the 1980s, the US economy drove global demand and commodity markets, and hence, *ceteris paribus*, drove commodity prices, including the crude oil price. Hence, from a macroeconomic management perspective, it made good sense for the Qatari authorities to fix the Qatari riyal to the US dollar.¹¹ The Fed’s policy stance that was suitable for the US economy was also deemed to be good for the economy of Qatar.

Figure 2 depicts the historical association between international oil prices and nominal GDP in Qatar and the US. The US’s nominal GDP shows a clear upward trend, irrespective of fluctuations in the oil price. By comparison, the (positive and strong) association between oil price and Qatar’s GDP is clearly discernable from Figure 2, highlighting the dominant role of oil in the Qatari economy.

3 Methodology

3.1 Measures of Synchronization

This section outlines the statistical measures employed in this paper to analyze the degree of business cycle synchronization among the variables of interest. In particular, we have employed four synchronization measures recently proposed in the literature on (international) business cycle synchronization. Our first three measures of business cycle synchronization follow the setup in Kalemli-Ozcan et al. (2013), who employed these measures to examine the dynamics of financial integration and business cycle synchronization for a set of industrialized countries. Our first measure uses the statistic of Giannone et al. (2008), which computes business cycle synchronization with negative divergence, defined as the absolute value of real GDP growth differences between country i and j in year t :

$$SYNCH1_{i,j,t} = -|(\ln Y_{i,t} - \ln Y_{i,t-1}) - (\ln Y_{j,t} - \ln Y_{j,t-1})|. \quad (1)$$

Our second measure follows Morgan et al. (2004), involving two steps. First, we regress real output growth on a country-specific intercept and a time trend:

$$\ln Y_t - \ln Y_{t-1} = \alpha + \phi_t + \nu_t \quad \forall i, j,$$

¹¹The process worked almost identically in other GCC countries.

where the residuals ($\nu_{i,t}$ and $\nu_{j,t}$) reflect how much GDP growth differs in each country and each year compared to average growth in this year and the average growth of this country over the estimation period. The business cycle synchronization measure is then calculated as the negative of the absolute difference of residual GDP growth:

$$SYNCH2_{i,j,t} \equiv -|\nu_{i,t} - \nu_{j,t}|. \quad (2)$$

Intuitively, this index measures how similar GDP growth rates are between two countries in any given year, accounting for the average growth in each country and the average growth in each year.

Our next two measures of synchronicity are based on an output gap approach. Our third measure ($SYNCH3_{i,j,t}$) is based on computing the 5-year correlation of the cyclical component of output (logarithm) as measured with the Hodrick and Prescott (1997) filter. Imbs (2006) and Kalemli-Ozcan et al. (2013) both consider this measure in their studies.

Our fourth and final measure of business cycle interdependence is based on the Euclidean space proposed by Wälti (2010). As the Euclidean distance between two standardized random variables provides the same information as a correlation coefficient, Wälti's (2010) measure of business cycle interdependence between the business cycle of country i , denoted as g_i , and any reference economy, denoted as g_j , in year t is given by:

$$SYNCH4_{i,j,t} = |g_{i,t} - g_{j,t}|, \quad (3)$$

when $SYNCH4_{i,j,t} = 0$, the business cycles of country i and the reference economy are perfectly in tune. Any positive value means less than perfect synchronization: the larger the distance between business cycles, the less interdependent they are.

All four synchronicity measures are applied to nominal GDP, real GDP and inflation rates between Qatar and the US over the 1980–2011 period. Nominal GDP, real GDP and the consumer price index (CPI) for Qatar and the US have been obtained from the IMF's World Economic Outlook database. The GDP figures are expressed in billion of US dollars, while the CPI series are average figures for the period. A summary of data sources and lengths of the variables is provided in Appendix C.

3.2 Structural VAR

Following Mundell's (1961) seminal work on optimal currency area, it has been emphasized in the literature that if the nature of disturbances in two countries are similar, the cost of abandoning policy autonomy for monetary unification will be relatively lower. Thus if Qatar exhibits (large) disturbances that are asymmetric to those of the US, it constitutes a poor candidate for forming a monetary union with the US, because of the substantial loss in utility from forsaking policy autonomy. Bayoumi and Eichengreen (1994) proposed a structural vector autoregression (VAR) approach to identify aggregate supply and demand disturbances so that these estimated disturbances can be used to identify whether groups of countries are suitable for a monetary union. We follow their method to estimate the following VAR model:

$$\begin{bmatrix} \Delta y_t \\ \Delta p_t \end{bmatrix} = \sum_{i=0}^{\infty} L^i \begin{bmatrix} a_{11i} & a_{12i} \\ a_{21i} & a_{22i} \end{bmatrix} \begin{bmatrix} \varepsilon_{dt} \\ \varepsilon_{st} \end{bmatrix}, \quad (4)$$

where y_t and p_t represent the logarithm of real GDP and prices, respectively; L denotes the lag operator; a_{11i} represents elements a_{11} in matrix A_i ; and ε_{dt} and ε_{st} are independent demand and supply shocks, respectively. Bayoumi and Eichengreen (1994) assume that while both demand and supply shocks have permanent effects on the price level, only the supply (demand) shocks have permanent (temporary) effects on the output level. This implies the following restriction: $\sum_{i=0}^{\infty} a_{11i} = 0$. Model (4) is estimated using a VAR where the residuals from the VAR, e_t , are transformed into structural demand and supply shocks using $e_t = C\varepsilon_t$, where C represents the 2×2 parameter coefficient matrix. See Bayoumi and Eichengreen (1994) for further details relating to the identification of the C matrix.

4 Results

This section is divided into three parts. The first part presents some preliminary data analysis based on basic descriptive statistics and graphical analysis of the model's variables. The second part discusses the findings of the synchronization of the (nominal and real) output cycles and inflation rates between Qatar and the US based on the four measures described in the previous section. Finally, part 4.3 presents the results of the nature of the supply and demand disturbances in the two countries based on the structural VAR model outlined above.

4.1 Descriptive Statistics and Graphical Evidence

Our empirical analysis begins by conducting the unit root test for all series. Results indicate that for all series, the null hypothesis of a unit root is strongly rejected. In the interests of brevity, unit root test results are not reported but are available on request. Table 2 presents some basic descriptive statistics of the variables employed in the empirical analysis. Several remarks are in order. First, both GDP and inflation in Qatar have been more volatile than those of the US over the past three decades. This higher volatility is clearly a reflection of the higher oil price volatility observed over the same period (see the second-last row in Table 2). Second, the remarkable reduction in macroeconomic volatility observed in the US during 1990s, the decade coinciding with the so-called “Great Moderation” era,¹² has not spilled over into Qatar, who instead experienced an elevation in macroeconomic volatility during 1991–2000.

Table 2: Descriptive Statistics (percent)

	1981–1990		1991–2000		2001–2010	
	μ	σ	μ	σ	μ	σ
<i>A. Qatar</i>						
Nominal GDP growth	-0.68	12.61	8.81	14.45	19.70	17.23
Real GDP growth	1.47	4.30	6.46	8.22	12.20	6.61
Inflation rate	3.66	2.27	2.75	2.11	5.29	6.97
<i>B. United States</i>						
Nominal GDP growth	7.33	2.31	5.40	0.93	3.78	2.61
Real GDP growth	3.19	2.26	3.35	1.44	1.54	2.10
Inflation rate	4.74	2.31	2.80	0.72	2.40	1.19
<i>C. Oil price & federal funds rate</i>						
Oil price	25.22	7.53	20.28	4.18	56.02	24.67
Federal funds rate	9.44	2.96	4.96	1.05	2.35	1.82

Note: μ (mean) and σ (standard deviation).

Third, it is easy to see the divergence in macroeconomic variables between the two countries in the most recent decade (2001–2010), when the level of GDP and inflation in Qatar were higher and they were very volatile, compared with the 1980s and the 1990s. These findings provide preliminary support for the conjecture that since the start of the new millennium, the structure of the Qatari economy has been significantly different from that of the US. The double-digit nominal and real GDP growth rates (along with a high inflation rate) observed during 2000s in Qatar does not seem to be feasible with an exceptionally low interest rate imported from the US. Moreover, these figures defy the very lessons of the standard textbook economic models that

¹²See, among others, Bernanke (2004).

advise fiscal and/or monetary authorities to pursue contractionary economic policies at times when the economy is overheating. Fourth, as already seen in Figure 1, over the past decade, both oil prices and the FFR have shown a striking disconnection where despite the historically high global crude oil price, the benchmark interest rate in the US kept at a low level.

Figure 3: GDP Growth Rates and Inflation in Qatar and the US (percent)



Source: Authors' calculations based on the IMF's World Economic Outlook and Qatar Statistical Authority.

Figure 3 presents graphical evidence of the degree of interdependence among the three macroeconomic variables (nominal and real GDP growth rates, and inflation rates) compared between Qatar and the US over the entire sample (1980–2011). The periods of decoupling are highlighted by the shaded area. Consistent with the statistics reported in Table 2, Qatar's nominal GDP growth rate exhibited more volatility than the real GDP growth rate. In comparison to the US, both output growth rates appear extremely volatile and subject to frequent spikes. Crucially, since the start of 2001, the growth in Qatar's real GDP has clearly diverged from that of the US both *qualitatively* (i.e., growing in opposite direction) and *quantitatively* (i.e., widening growth gaps).¹³ However, it is also evident from Figure 3 that economic conditions in Qatar and the US respond to similar shocks. This is highlighted by the direction (but not size) of their real growth rates in response to the recent global economic crisis, which originated in the US's housing market in 2007. Finally, following two decades of a generally steady relationship, the inflation rate in Qatar was higher and more volatile for most part of the past decade compared to that of the US (see Figure 3c). However, despite the substantial differences in magnitude, the direction of the Qatari inflation rate appears to be consistent with that of the

¹³To find out whether this result was driven by increasing hydrocarbon (i.e., oil and gas) export revenues, we have also examined the extent of interdependence between Qatar's non-hydrocarbon real GDP growth and the US's real GDP growth over the entire sample period. The results are very similar to those shown in Figure 3, supporting the growing growth divergence between the two economies.

US.

4.2 The Decoupling

Table 3 reports the descriptive statistics of the four synchronization measures employed in the analysis to explore the pattern of business cycle synchronization between Qatar and the US over the past three decades. The basis of using a 10-year interval to analyze the business cycles is made purely for convenience. The yearly variation of these measures are depicted in Figures 4–6, which provide a more explicit assessment of the decoupling hypothesis. Let us begin by interpreting the results for nominal GDP growth, which is reported in Panel A in Table 3. As the estimates show, the average divergence in nominal GDP growth, measured by SYNCH1, has increased remarkably in the most recent decade (nearly 20% during 2001–2010, compared with a level of 10–11% during 1980s and 1990s). Once we control for country-specific effects (SYNCH2), the levels of average divergence tend to be somewhat smaller (a mean of 10.48% during 2001–2010). Both synchronization indicators exhibit significant variations over time (the standard deviations are 9.54% and 10.2%, respectively, during 2001–2010 compared with the previous 10-year episodes). Interestingly, over the entire sample, although the average correlations of the cyclical component of nominal GDP growth (SYNCH3) between the two economies remained fairly stable (around 0.70, with the exception of the 1991–2000 period), their volatility has increased tremendously. The standard deviation of SYNCH3 has quadrupled between the 1980s and the 1990s, and then doubled during the 2001–2010 decade. Finally, the SYNCH4 statistics show that the average (Euclidean) distance between the business cycles of Qatar and the US not only increased during the last decade but was also highly volatile. In fact, the extent of the business cycle interdependence between the two economies during the past decade, as measured by SYNCH4, has not been very different from that in the 1980s, when Qatar suffered acute economic hardship in terms of lower growth and a higher inflation rate (see Table 2). Overall, the synchronization statistics for nominal GDP clearly point to a divergence in the economic cycles between Qatar and the US over the past decade starting in 2001.

Panel B in Table 3 reports the results for real GDP growth, which is the main indicator used in the literature when describing the characteristics of business cycles and their evolution among countries of interest. The numbers echo the findings of nominal GDP growth divergence, albeit with a different magnitude. First and foremost, the average divergence in real GDP growth as reported by SYNCH1 and SYNCH2 more than doubled between the 1980s and 2000s. However,

Table 3: Descriptive Statistics for Synchronization Measures

	1981–1990		1991–2000		2001–2010	
	μ	σ	μ	σ	μ	σ
<i>A. Nominal GDP growth</i>						
SYNCH1	-10.27	9.87	-11.35	7.92	-19.62	9.54
SYNCH2	-9.20	4.06	-9.01	7.28	-10.48	10.20
SYNCH3	0.70	0.07	0.52	0.28	0.69	0.57
SYNCH4	1.26	1.41	0.24	0.18	0.98	1.23
<i>B. Real GDP growth</i>						
SYNCH1	-3.22	1.91	-4.87	6.47	-10.66	6.74
SYNCH2	-2.28	1.23	-5.53	4.44	-4.68	2.65
SYNCH3	0.61	0.16	0.50	0.31	0.34	0.22
SYNCH4	0.98	1.36	0.42	0.17	0.94	1.41
<i>C. Inflation rate</i>						
SYNCH1	-1.35	1.02	-1.28	1.54	-4.89	3.59
SYNCH2	-1.21	0.55	-1.43	1.43	-4.82	2.56
SYNCH3	0.19	0.25	0.23	0.55	0.62	0.47
SYNCH4	0.62	0.36	0.66	0.43	0.67	0.66

Note: μ (mean) and σ (standard deviation). SYNCH1 is the negative value of the absolute difference in nominal GDP growth between Qatar and the US in year t . SYNCH2 is the negative of the absolute difference between the residual nominal GDP growth between Qatar and the US in year t . Both SYNCH1 and SYNCH2 are expressed as percentage. SYNCH3 is the correlation of the cyclical component of nominal GDP (logarithm) between Qatar and the US in each five-year rolling period. SYNCH4 is defined as the absolute value of the numerical difference between two business cycles in a given year.

according to SYNCH2, both the level and volatility of the divergence in real GDP growth have slightly declined during 2000s compared to 1990s. This is contrary to the actual real GDP growth rates observed in the two countries in the past two decades (see Table 2). Importantly, we find that the average correlation of the cyclical component of real GDP growth (SYNCH3) has declined from 0.61 in the 1980s to 0.50 during 1990s before falling further to 0.34 in the 2000s. This clearly points to the decoupling of the business cycle between Qatar and the US in the past decade. Further complementary evidence is provided by SYNCH4, which shows that the average (Euclidean) distance between the business cycles of the two economies has more than doubled and exhibited more volatility during the past decade (2001–2010), compared to during the 1990s.

Panel C in Table 3 shows mixed evidence with regard to the inflation rate synchronization between Qatar and the US. The first two non-output gap-based measures (SYNCH1 and SYNCH2) clearly indicate evidence of inflation rate divergence in the most recent decade (2001–2010),

while the bottom two output gap-based measures (SYNCH3 and SYNCH4) show that the inflation cycle between Qatar and the US has either become more synchronized or has remained stable over the past three decades. A likely reason for the low divergence in inflation rates, even though variations in economic growth have remained high, is globalization which has quickened the propagation of price pressures around the world, preventing large and sustained divergences in inflation between countries. Thus, inflation has become more ‘globalized,’ while real demand shocks have remained ‘local.’^{14,15}

4.3 The Nature of Economic Shocks

As mentioned above, one way to gauge the feasibility of a monetary union is by determining whether the countries in question face similar aggregate disturbances. If countries face small, symmetric disturbances, they are good candidates for forming a monetary union. To this end, we estimated the supply and demand shocks for Qatar and the US using the structural VAR method outlined in Section 3. The supply shocks are captured by inflation rates in the respective countries, while the demand shocks are measured by a country’s real GDP. For Qatar, two separate output measures are used. Model 1 uses the total real GDP as an indicator of demand shocks for Qatar. However, as the Qatari economy is heavily dominated by hydrocarbon resources, it may be difficult to distinguish between the aggregate supply and demand disturbances in situations when the underlying output is hit by, say, a rise in oil prices. To deal with this confusion, in Model 2, we have employed the non-oil real GDP as an alternative measure of the demand disturbances for Qatar. The non-oil real GDP reflects the demand side of the Qatari economy more appropriately than the aggregate GDP. Table 4 shows the correlations of the supply and demand disturbances between Qatar and the US over the past three decades.

As Table 4 shows, in general, the supply disturbances exhibit a positive correlation while the demand disturbances are negatively correlated. According to Model 1, the correlations of the supply and demand disturbances have systematically increased in the past three decades.

¹⁴See Borio and Filardo (2007) for cross-country evidence on this issue.

¹⁵An anonymous reviewer suggested to test the long-run relationship between federal funds rate and oil prices as an alternative to analyze the decoupling hypothesis. Following this suggestion, we performed cointegration analysis between federal funds rate and real price of oil using monthly data for two samples: full sample (1970–2011) and the pre-decoupling sample (1970–2000). For the pre-decoupling sample, both trace and maximum-eigenvalue statistics suggest a unique cointegrating vector with test statistics 18.24 (p -value: 0.01) and 15.36 (p -value: 0.03), respectively. Interestingly, for the full sample, the cointegration relationship does not hold. In this case, the trace and maximum-eigenvalue statistics are 8.15 (p -value: 0.44) and 6.15 (p -value: 0.59), respectively. These results suggest that the inclusion of the 2001–2010 data, which coincides with the decoupling episode hypothesized in the paper, leads to a breakdown of the long-run equilibrium relationship between federal funds rate and real oil price. We thank the anonymous reviewer for making this suggestion.

Table 4: Correlations of the Supply and Demand Disturbances between Qatar and the US

	Model 1			Model 2		
	1981– 1990	1991– 2000	2001– 2010	1981– 1990	1991– 2000	2001– 2010
Supply shocks	0.05	0.54	0.72**	-0.81**	0.69**	0.62
Demand shocks	-0.25	-0.53	-0.89**	-0.80**	-0.47	-0.90**

Note: In Model 1 (Model 2), the demand shock in Qatar is represented by real GDP (real non-oil GDP). The demand shock for the US is measured by its real GDP. The supply shock is represented by inflation rates in each country for both models. ** indicates statistical significance at the 5% level.

Particularly in the 2001–2010 period, which is the time period of interest in this analysis, the results reveal that the correlations of demand disturbances between Qatar and the US are highly negative and statistically significant. Moreover, results are almost identical regardless of the output measures used (Model 1 versus Model 2). As the management of demand shocks (instead of supply shocks) is more pertinent for a country’s monetary policy, the near-perfect negative correlation of demand disturbances casts doubt on the validity of the monetary union between Qatar and the US. It also supports the notion that Qatar should strive for an independent monetary policy to deal with its unique demand disturbances. On the other hand, the positive correlation of supply disturbances implies that both Qatar and the US are likely to be impacted by similar global factors (albeit of different magnitude) such as changes in global commodity prices (oil, food) and other structural factors (e.g., global supply chain disruptions). This finding is consistent with the path of their inflation rates depicted in Figure 3c.

Table 5: Disturbances and Adjustments in Qatar and the US

	Supply disturbances		Demand disturbances	
	Size	Adjustment speed	Size	Adjustment speed
Qatar (Model 1)	0.146	0.523	0.016	n.a.
Qatar (Model 2)	0.199	0.445	0.019	n.a.
United States	0.033	0.604	0.009	n.a.

Note: In Model 1 (Model 2), the demand shock in Qatar is represented by real GDP (real non-oil GDP). The demand shock for the US is measured by its real GDP. The supply shock is represented by inflation rates in each country for both models. n.a., not applicable.

While the correlation of disturbances conveys important information about the (a)symmetric nature of economic shocks, the structural VAR defined in (4) allows us to obtain the size and the

speed at which the respective economies adjust. As the variance of the estimated disturbances is restricted to unity, their magnitude is inferred by using the associated impulse response functions, which trace out the effect of a unit shock on prices and output. Following Bayoumi and Eichengreen (1994), the magnitude of the supply disturbances is measured by the long-run output effect. Whereas the size of the demand disturbances is calculated as the sum of the first-year impact on output and prices.¹⁶ The supply speed of adjustment is computed by the response after two¹⁷ years as a share of the long-run effect, while the long-run response of real GDP to a demand shock is zero by construction.

Table 5 displays the results. As the figures show, Qatar faces much larger supply and demand shocks compared to the US. Further, Qatar has a relatively slower speed of adjustment, as at most half of the shocks to prices are dissipated within two years. The adjustment speed is even slower when its output is measured by the non-oil GDP. In contrast, over three-fifths of adjustment is completed within two years in the US. These findings are not surprising, given that Qatar historically experienced a pro-cyclical fiscal policy and a limited (or no) monetary policy flexibility for dealing with idiosyncratic shocks facing the economy. The asymmetry of shocks as well as their larger size (relative to those of the US) undermine economic viability of the monetary union between Qatar and the US. Recent findings by Koren and Tenreyro (2011) complement our results. They found that GCC economies are characterized by high levels of country-specific volatility and a high positive covariance between sectoral shocks and country-specific shocks. Their findings, like ours, suggest that more aggressive fiscal and monetary counter-cyclical policies could be used to lower the impact of volatility on economic performance.

5 Discussion

If one considers business cycle synchronization as a major determining factor in the choice of exchange rate regime, recent evidence of the decoupling of economic cycles between Qatar and the US, as shown above, then raises questions on the validity of Qatar’s decades-long exchange rate peg to the US dollar. Put differently, if the variations in Qatar’s aggregate output and price are not significantly explained by US shocks, why should its exchange rate be determined by movements in the US dollar alone? The US follows a counter-cyclical monetary policy in

¹⁶Unlike Bayoumi and Eichengreen (1994), who employed a GDP deflator to measure prices, we used the CPI as an indicator of the domestic price level. The GDP deflator is not an appropriate measure of the domestic price level in Qatar due to the high share of oil in aggregate output and the exclusion of imports in the price basket.

¹⁷Alternative choices yield the same results.

that interest rates are raised during expansions and lowered during contractions. However, for the Fed’s counter-cyclical monetary policy to be appropriate for Qatar, the US and the Qatari business cycles must be synchronized—a pre-condition that no longer holds for Qatar according to our analysis.

Historically, for the oil-exporting Gulf Arab states whose national currencies are tied to the US dollar, fiscal policy has been shouldered with the responsibility of achieving internal and external stability. For example, in the run-up to the 2008–09 global financial crisis, counter-cyclical fiscal policies and financial sector support measures helped GCC countries to cushion the impact of the crisis. However, with the decision to host the FIFA World Cup in 2022, Qatar has lost—to a great extent—the flexibility to maneuver its fiscal policy for domestic needs. This is because of the very large amount of fiscal spending that needs to be set aside to finance the required infrastructure to host the World Cup. A recent estimate by Deloitte (2013a) suggests that Qatar plans to invest over \$200 billion on the 2022 World Cup-related construction projects. To put the figures another way, this represents \$100,000 per capita for Qatar, compared to \$350 per capita for the 2014 Winter Olympics in Russia, \$73 per capita for the 2014 FIFA World Cup in Brazil and \$54 per capita for the 2010 FIFA World Cup in South Africa. Hence, Qatar will spend 1852 times more per capita to stage the same event that South Africa did in 2010 (Gregory, 2013). Even if one assumes that Qatar is building its infrastructure from scratch, these figures are staggering for a small country like Qatar, whose estimated nominal non-oil GDP in 2012 stood at around \$80 billion. Therefore, the non-oil sector is at a greater risk of overheating and rising inflation from spending on infrastructure for the World Cup.

The upshot of all this is that Qatar’s fiscal policy is now on autopilot to follow an expansionary fiscal stance over the next decade. The Qatari government’s commitment to finance an ambitious infrastructure target and the resulting loss of discretionary power in fiscal policy implies that the government will not be able to use a ‘counter-cyclical’ fiscal policy in the environment of an overheated economy. This presents a unique challenge for policymakers in Qatar. On the one hand, its monetary policy is constrained by the fixed dollar peg; on the other hand, its fiscal policy is now much less flexible and may be unable to adjust its spending in response to changes in the economic environment. The loss of both fiscal and monetary policy tools has exposed the Qatari economy to the vagaries of internal and external shocks. It is at this crucial moment that Qatar needs to reconsider the riyal–dollar fixed peg in order to attain

monetary policy independence that is oriented towards purely domestic goals. A pro active monetary policy is also a necessary condition to offset any unwanted effects of an expansionary fiscal policy on the economy. Moreover, financial deepening and greater access to financial services have increased the relevance of monetary policy for non-oil economic activity in Qatar. A need, therefore, has arisen for credible monetary plans and coordination strategies to ensure an optimal fiscal–monetary mix that is consistent with growth, inflation and financial stability.

As the world’s largest exporter of natural gas, Qatar’s economy is closely connected with the global gas market. Energy prices are, in part, a function of global demand. As a result, the GDP growth of energy exporters are highly pro-cyclical with the global growth rate, particularly China’s growth rate. Growing trade flows and Asia’s rising influence in the global energy market has increased the degree of interconnectedness between Qatar and the developing Asian markets, while simultaneously weakening the relative importance of external links with the US (see the Table in Appendix A). More fundamentally, the US shale gas boom will work as a key contributing factor to the divergence between these two economies. Predicted to be a big gas importer only a few years ago, the US is now emerging to become a major exporter of liquefied natural gas (LNG). As a result of a largely unforeseen surge in US shale gas production, LNG generation from Qatar’s mega-trains 6 & 7 at its Ras Laffan complex, once earmarked for the US, has had to be diverted to other markets. Moreover, with the big increase in global gas supply, Qatar will be forced to accept a more competitive price for its LNG that might fall below the current oil-indexed prices.¹⁸ The expected decline in revenues due to price erosion and/or supply displacement will have a significant impact on Qatar’s gas industry, which has overtaken its crude oil industry as its biggest contributor to GDP. Last but not least, the bulk of Qatar’s foreign investment is allocated to markets in Europe and the Middle East.¹⁹ Qatar Investment Authority (QIA), the country’s sovereign wealth fund, has favored the UK and France over other destinations in snapping up landmark buildings and football clubs, global banks and famous brands (Financial Times, 2013). As can be seen, in all aspects of the Qatari economy, the degree of reliance on the US economy is much less than is usually considered to be the case.

Proponents of pegged exchange rates often argue that small oil-exporting city-states in the

¹⁸See Deloitte (2013b) for the projected price impacts of US LNG exports on Qatar and other gas exporters.

¹⁹See Table 7 in EIB (2012) for a geographical breakdown of the GCC’s sovereign wealth funds investments. Over 50% of the GCC’s sovereign wealth funds are allocated to equity portfolios, followed by fixed income, infrastructure and alternative investment (e.g., private equity, hedge funds, commodities).

Arabian Gulf should peg their currencies to the US dollar for much the same reason that Hong Kong pegs to the dollar: their small, open economies particularly need a stable anchor.²⁰ However, in comparison to GCC states or, more specifically with Qatar, Hong Kong’s business cycle is still more synchronized with the US cycle today (even stronger than with that of Mainland China), which might justifies the city-state’s nearly 30-year-old peg to the US dollar (see Genberg et al., 2008). Moreover, in Hong Kong, there are two legal tenders: the Hong Kong dollar (HKD) and the Chinese renminbi (RMB). Residents in Hong Kong are free to pay for their purchases in either currency and are free to hold deposits in either currency. Thus, as the RMB gradually erodes the market share of the HKD (RMB’s current market share is about 25%), the HKD may one day cease to be an important currency for Hong Kong, as it could simply be replaced by the fully convertible RMB. Hence, Hong Kong may never be forced—in the conventional economic sense—to de-peg from the US dollar.²¹ Moreover, in relation to small open economies, we can look at the solid track record of Singapore’s managed float regime in maintaining price stability and tying inflation expectations at the right level over the past three decades.²² The Singaporean experience tells us that even for the small open economies of the GCC, an independent monetary regime with a flexible exchange rate system is not only feasible but also desirable in their quest for national economic transformation.

As a final remark, the usual rhetoric states that since oil is priced in dollars, pegging the currencies of oil-exporting countries would help reduce the volatility of oil revenues. This logic, however, is fatally flawed, since large swings in the dollar price of oil are automatically transmitted into large swings in government’s oil export revenues. As argued by Frankel (2005) and demonstrated by Setser (2007), the right way to deal with the dollar-induced volatility is to allow the revenue stream from oil to have risen and fallen with the price of oil so that the revenue from oil exports in the oil-exporting economy’s own currency becomes less volatile. Concretely, by allowing the local currency to appreciate (depreciate) when oil price is high (low), the volatility of local currency revenues from oil is minimized. Under this arrangement, the currencies of the GCC countries would have appreciated during the oil boom of 2003–2008, helping central banks in the GCC to partially deal with rising imported inflation and to

²⁰See Setser (2007), which offers an erudite critique of the dangers associated with a fixed peg to dollar for the GCC states.

²¹We thank Stephen Jen for bringing this unique case of Hong Kong to our attention.

²²See Khor et al. (2007) for an assessment of Singapore’s experience with the managed floating exchange rate system. Singapore’s exchange rate system is characterized by the so-called BBC (Basket, Band and Crawl) principle popularized by Williamson (1998). For a discussion of the applicability of the BBC system to GCC countries, see Basher (2015).

preserve the external purchasing power of local wages. To be sure, a more flexible exchange rate regime demands the need to strengthen financial sector reforms and decision-making processes to operationalize a floating regime (cf. IMF 2008). Fortunately, Qatar has recently initiated a six-pillared strategy²³ of financial sector reforms to strengthened its financial sector.

Summing up, fixed exchange rate systems are dangerous because they may deliver ‘micro’ gains (e.g., firms do not need to worry about exchange rate risks) at the risk of ‘macro’ costs (e.g., inflationary pressure). The Gulf states’ decades-long peg to the dollar has created a ‘Gordian Knot’ in the thinking among policymakers in the Gulf Arab states, which now requires a bold stroke and fresh thinking to untangle this knot.²⁴ As Victor Hugo once remarked, “You can resist an invading army; you cannot resist an idea whose time is come.” Today de-pegging is such an idea for Qatar and her Gulf neighbors.

6 Conclusions

Qatar’s—and, by extension, the GCC’s—exchange rate peg to the US dollar has been a subject of keen interest to economists, policymakers and the general public. Using the traditional OCA framework (Mundell, 1961; Kenen, 1969), we examine to what extent the variations in Qatar’s output and price are explained by the US’s demand and shocks. A generally accepted rule of thumb is that if shocks are symmetric across countries or regions, then a common monetary policy response is appropriate. However, if shocks are asymmetric, countries are better off with separate currencies so that the exchange rate can be used as a tool of adjustment. Applying various measures of business cycle synchronization, we found that the business cycles between the two countries have experienced greater divergence or decoupling during the opening of the 21st century. Moreover, the results from a standard structural VAR model shows that the correlations among demand shocks between the two countries are dissimilar, suggesting that the imported monetary policy stance of the Fed has not been viable for Qatar in recent years. As a policy implication of our findings, a more independent monetary policy oriented towards

²³This entails enhancing regulation by developing a consistent risk-based micro-prudential framework, expanding macro-prudential oversight, strengthening financial market infrastructure, enhancing consumer and investor protection, promoting regulatory co-operation and building human capital. See QCB (2013) for further discussion.

²⁴The legend of the Gordian Knot is associated with Alexander the Great. In 333 BC, when Alexander arrived at the town of Gordium in Asia Minor, he attempted to untie an intricate knot tied to an ox cart. In front of a crowd, Alexander struggled to undo the knot and became frustrated. He drew his sword and severed the knot in one stroke. This famous incident is commonly called the “Alexandrian Solution.” Recently, the President of the Federal Reserve Bank of Dallas, described the recent post-crisis evolution of the Fed’s ballooning balance sheet as a ‘monetary Gordian Knot,’ a result created from each round of quantitative easing (Fisher, 2013).

purely domestic goals is recommended.

Appendix: Supplementary Materials

A Trade, Labor Mobility and Risk-Sharing Mechanisms between Qatar and the US

The purpose of this section is to assess the inter-relationships of trade, labor mobility and risk-sharing between Qatar and the US over the past three decades. This is necessary to evaluate the strength of the current monetary union in light of these additional criteria of the OCA theory, in addition to the similarity of shocks and cycles between these two countries.

Table A: Qatar’s Trade Integration with the Rest of the World (percent)

	Exports to				Imports from			
	1981– 1990	1991– 2000	2001– 2010	1981– 2010	1981– 1990	1991– 2000	2001– 2010	1981– 2010
United States	0.79	2.76	1.32	1.62	8.99	11.47	11.79	10.75
European Union	25.78	1.90	4.54	10.74	41.70	37.45	35.44	38.20
Japan	42.23	53.11	40.39	45.24	18.54	12.94	9.19	13.56
EM and Developing	19.95	17.98	17.12	18.35	19.42	28.54	34.02	27.33
MENA	5.92	6.23	4.60	5.58	8.14	16.38	17.66	14.06

Note: Figures are given as a percentage of total exports or imports. The authors’s calculations use data from Direction of Trade Statistics, IMF.

As the movement of goods is a key criteria of the OCA theory, Table A looks at the extent of trade integration between Qatar and the US, as well as other countries and regions. We find that, on average, less than 2% of Qatar’s exports (mainly oil and natural gas) are sold in the US, while the US’s share in Qatar’s aggregate imports is about 10–11%. These figures are very low compared with Japan (in terms of exports) and the European Union (in terms of imports), implying that the US is not a key trading partner of Qatar. Even in the oil boom years of 2000s when Qatar’s import spending grew by nearly 500% between 2001 and 2010, the US’s market share in Qatar’s total imports remained stable at the level seen during 1990s. A likely explanation for the puzzling stagnation of the US market share in Qatar’s imports is the rise of China’s market share, which grew from about 1.70% in 1991–2000 to 4.85% during 2001–2010 (a 185% increase). In particular, the US, the European countries and Japan faced strong competition from Chinese manufactured goods, machinery and transport equipment.²⁵

²⁵See Habibi (2011) for an investigation of the market shares of advanced countries and China in the import markets of Arab countries over the past few decades.

Furthermore, geo-political developments such as the September 11 terrorist attack and the US's war with Afghanistan and Iraq may have played an indirect role behind the market gains for Asian and Middle Eastern products, compared with US and European goods (Habibi, 2011). This evidence suggest that trade between Qatar and the US is not a strong argument to support an OCA between the two countries.

Although non-nationals account for over 80% of the total population in Qatar, less than 2% of Qatari citizens have sought migration outside their home country as resident.²⁶ Hampered by a small population size, Qatar—like her other Gulf neighbors—depends heavily on foreign workers to support domestic economic activities. Although thousands of American employees (civil and defense) are working in Qatar in a range of sectors; Qataris, in general, demonstrate a marked preference for employment at home, especially in the public sector, where superior benefits, higher wages and shorter working hours are seen as more appealing (Babar, 2011). Furthermore, unlike their American counterparts, skills and capacity levels among Qataris, up until now, have been inadequate in terms of providing a match for the skills required by the US employers.²⁷ Thus a high reservation wage and a limited skill set constrain Qataris from taking advantage of employment opportunities in the US. However, the movement of the US workers in Qatar mainly reflect the latter's demand for highly-skilled Western workers in its non-oil sector. It is worthwhile to mention here that Qatar currently serves as host to major US military facilities as support for its domestic security. Furthermore, Qatari law does not recognize dual nationality and requires that Qatari citizens only hold Qatari citizenship, suggesting that the share of people in Qatar who were born outside the country or in the US would be negligible. All in all, the labor mobility criterion for an OCA between Qatar and the US can be characterized by essentially one-way flows of labor. The levels of mobility and integration seen among the US states or Eurozone countries remain a distant prospect for Qatar, given distance, mismatched incentives, language and other barriers.

As regards to the risk-sharing criterion, cross-border automatic stabilizing mechanisms—such as those involving national fiscal taxes and transfers that vary with the local business cycle—are absent in both Qatar and the US because of the non-standard nature of the currency union. Qatar is in a monetary union with the US in the sense that its national currency

²⁶ Authors' calculations are based on statistics from the Qatar Statistical Authority and the International Organization for Migration.

²⁷ A 2009 Arab Knowledge Report reported that annually only a limited number of nationals graduated with scientific or technical qualifications across the GCC. See UNDP and MBRF (2009) for further details.

maintains a fixed parity with the US dollar and therefore adopts the Fed’s monetary policy as its own. However, its fiscal policy is carried out independently from that of the US and they are not in a ‘fiscal union’ in the sense that one central authority is in charge of the union-wide fiscal policy. Recent developments in the Eurozone underscore the significance of a fiscal union in allowing smoother and more symmetrical adjustment between its members in times of crisis. Furthermore, although the OCA theory neglects the role of a banking union, the banking and financial crisis facing the Eurozone suggests that a banking union—involving common banking supervision, common resolution procedures and common deposit insurance—is also essential for the survival of a union.

Summing up, the discussion above makes it clear that on the OCA grounds of the integration of trade, labor mobility and fiscal risk-sharing mechanisms, Qatar and the US appear poor candidates for forming a monetary union. This is because of the non-standard nature of the currency union between the two economies, in which Qatar only maintains a fixed exchange rate parity with the US dollar, an arrangement that does not necessarily ensure the benefits of increasing trade integration, enhancing labor mobility or making a stronger fiscal center.

B A Brief History of the Exchange Rate System in Qatar

Following the collapse of the Bretton Woods monetary system in 1971, Qatar adopted the monetary policy rule of targeting the exchange rate.²⁸ The Qatar Monetary Agency (QMA) was established in 1973 and the new issue of Qatari riyal (QR) replaced the previous notes issued by the Qatar and Dubai Currency Board. Initially, the QR was pegged to the US dollar, conditional on keeping its par value against pure gold (equivalent to 0.21 units of special drawing rights or SDRs). This was followed by pegging the QR to the SDRs at the rate of 0.21 SDRs with a fluctuation margin of $\pm 2.25\%$. Under this arrangement, the US dollar exchange rate against the QR was to be determined on the basis of its exchange rate against the SDRs, as the latter is determined by the IMF. The exchange rates of all other currencies against the QR were to be determined on the basis of the respective currency’s exchange rate against the US dollar in the international financial markets. Subsequently, the tolerable fluctuation margin of the QR against the SDR was increased to $\pm 7.25\%$ in early 1976, due to the appreciation of the US dollar against the SDRs in late 1975. The QMA adopted the US dollar as the intervention currency.

²⁸This section draws heavily on Elsamadisy and Hamadi (2008).

The exchange rates of currencies other than the US dollar against the QR were determined in line with their market values against the dollar. The QMA revalued the QR against the US dollar during the second half of the 1970s—whenever the latter depreciated sharply—to stabilize the QR against the currencies of Qatar’s major import-trading partners other than the US to alleviate the pressure of imported inflation.²⁹ Eventually, when the US dollar started trending upward (in July 1980) vis-à-vis other major currencies, this led the QMA to maintain the *de facto* exchange rate of QR3.64 per US\$1 unaltered. The immediate impact was the appreciation of QR with the appreciating dollar against the major currencies of Qatar trading partners, particularly the European countries.

Table B: Chronology of Qatar’s Exchange Rate System

Period	Currency in circulation	Nominal anchor	National currency per Pound Sterling/SDRs/USD
Prior to June 1966	Indian Rupee & Gulf Rupee	Sterling Pound	
June–Sept. 1966	Saudi Riyal		
Sept. 1966–Nov. 1967	Qatar-Dubai Riyal	Sterling Pound	13.33
Nov. 1967–Nov. 1967	Qatar-Dubai Riyal	Sterling Pound	11.76
Aug. 1971–Aug. 1971	Qatar-Dubai Riyal	USD	Par value against gold at 0.186621g of fine gold
May 1973–May 1973	Qatari Riyal	USD	”
March 1975–March 1975	Qatari Riyal	SDRs	4.7619±2.25%
Jan. 1976–Jan. 1976	Qatari Riyal	SDRs	4.7619±7.25%
July 1980–July 1980	Qatar Riyal	USD	3.64
Present	Riyal		

Source: Department of Research and Monetary Policy, Qatar Central Bank.
SDRs: Special Drawing Rights; USD: US dollar.

The Qatar Central Bank (QCB) was established in 1993 by Decree Law No. 15/1993. Since its inception, QCB has inherited QMA’s monetary policy strategy of targeting the exchange rate. The *de facto* fixed parity between the US dollar and the QR (i.e., QR3.64 per dollar) is the inherited nominal anchor for the QCB’s monetary policy. The heritage has been constantly

²⁹Over the period March 1976 until June 1980, the QR was revalued twelve times—adding up to 8.5%—against the US dollar, compensating for the depreciation of 13.4% in the dollar’s value against the SDRs.

honored and the peg has always been highly credible. The peg target was made *de jure* in 2001 by Decree No. 34/2001, replacing the *de jure* exchange rate arrangement of the QR/SDRs peg that had been in effect since 1975. Other currencies are traded based on the QCB-determined QR-dollar exchange rate and the market-determined exchange rate of a given currency against the US dollar. A timeline of Qatar's exchange rate at different points in time is shown in Table B.

C Data

The following table reports data sources and lengths of the variables used in the study.

Table C: Data Sources

Variable	Year	Source
Oil price (WTI, US\$ per barrel)	1970–2011	FRED
Federal funds rate	1970–2011	"
Nominal GDP	1980–2011	WEO
Real GDP	1980–2011	"
Inflation rate	1980–2011	"
Qatar's exports to abroad	1981–2010	DOTS
Qatar's imports from abroad	1981–2010	"

Source: FRED is the electronic economic database maintained by the Federal Reserve Bank of St. Louis (<http://research.stlouisfed.org/fred2>). DOTS (Direction of Trade Statistics) and WEO (World Economic Outlook) are published by the International Monetary Fund (IMF).

Figure 4: Nominal GDP Synchronization across Time

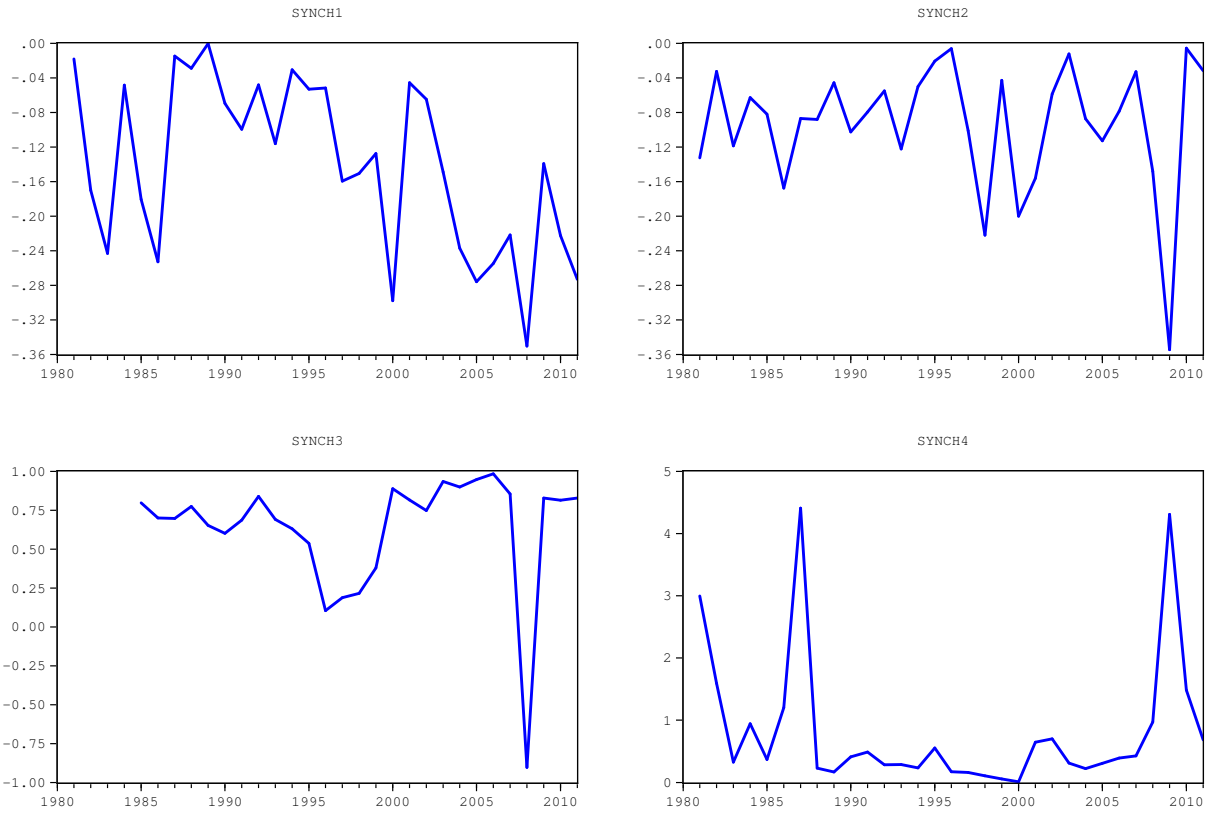


Figure 4 plots the evolution of the four synchronization measures employed in the empirical analysis across the 1980–2011 period. SYNCH1 is the negative value of the absolute difference in nominal GDP growth between Qatar and the US in year t . SYNCH2 is the negative of the absolute difference of the residual nominal GDP growth between Qatar and the US in year t . SYNCH3 is the correlation of the cyclical component of nominal GDP (logarithm) between Qatar and the US in each five-year rolling period. SYNCH4 is defined as the absolute value of the numerical difference between two business cycles in a given year. Low values of SYNCH1 and SYNCH2 indicate greater divergence, while high values of SYNCH3 and SYNCH4 indicate greater divergence.

Figure 5: Real GDP Synchronization across Time

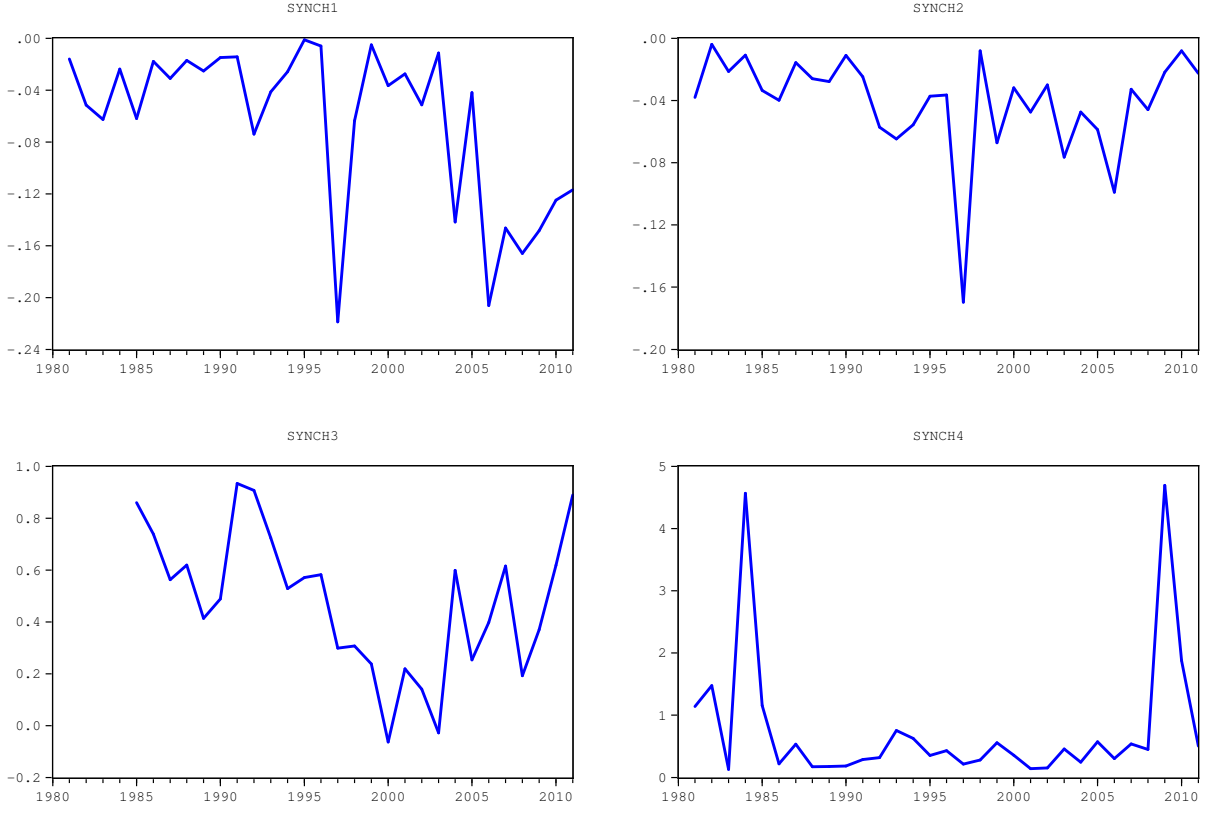


Figure 5 plots the evolution of the four synchronization measures employed in the empirical analysis across the 1980–2011 period. SYNCH1 is the negative value of the absolute difference in nominal GDP growth between Qatar and the US in year t . SYNCH2 is the negative of the absolute difference of the residual nominal GDP growth between Qatar and the US in year t . SYNCH3 is the correlation of the cyclical component of nominal GDP (logarithm) between Qatar and the US in each five-year rolling period. SYNCH4 is defined as the absolute value of the numerical difference between two business cycles in a given year. Low values of SYNCH1 and SYNCH2 indicate greater divergence, while high values of SYNCH3 and SYNCH4 indicate greater divergence.

Figure 6: Inflation Synchronization across Time

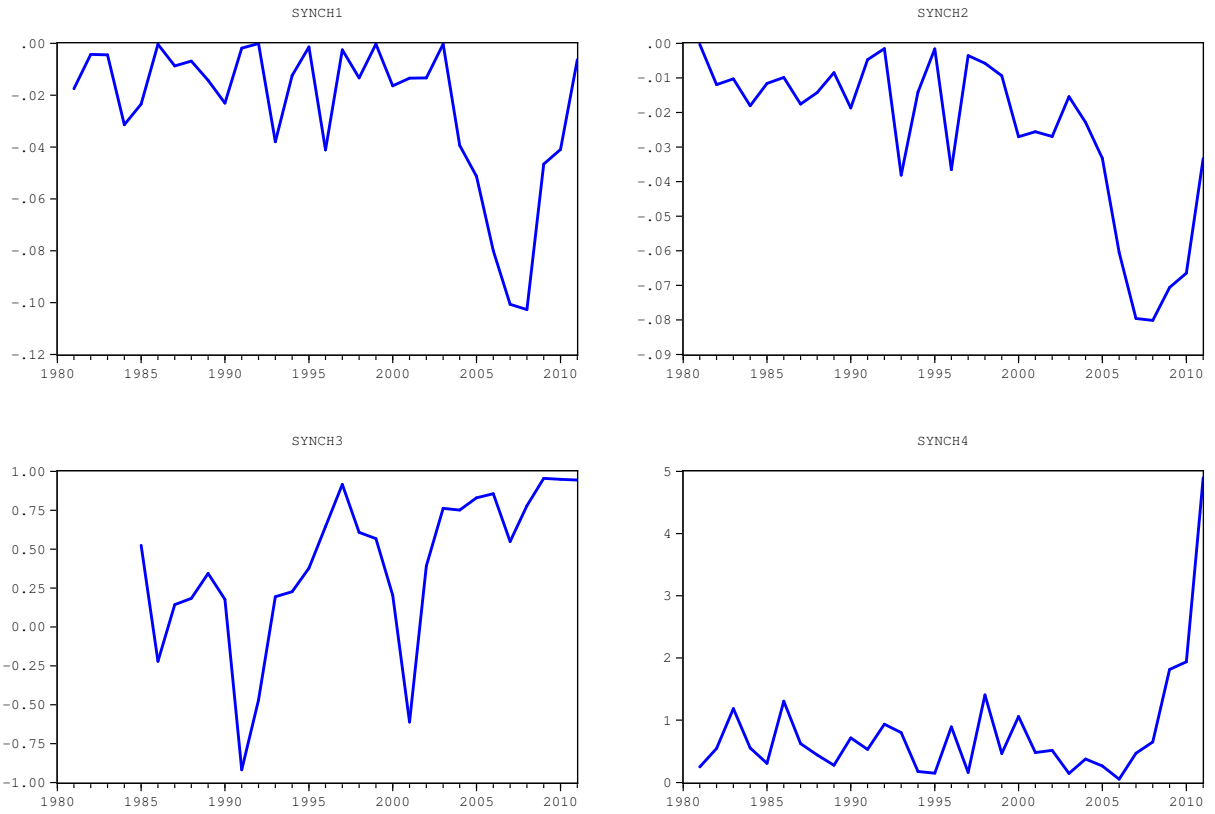


Figure 6 plots the evolution of the four synchronization measures employed in the empirical analysis across the 1980–2011 period. SYNCH1 is the negative value of the absolute difference in nominal GDP growth between Qatar and the US in year t . SYNCH2 is the negative of the absolute difference of the residual nominal GDP growth between Qatar and the US in year t . SYNCH3 is the correlation of the cyclical component of nominal GDP (logarithm) between Qatar and the US in each five-year rolling period. SYNCH4 is defined as the absolute value of the numerical difference between two business cycles in a given year. Low values of SYNCH1 and SYNCH2 indicate greater divergence, while high values of SYNCH3 and SYNCH4 indicate greater divergence.

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