A Monetary Union for the GCC

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Abstract

In this paper, we examine the impact of monetary policy in the GCC on major macroeconomic outcomes as well as dependence of monetary policy within the GCC. We then employ Structural Vector Autoregression methodology to capture dynamics as well as estimate both short and long-run impact of monetary policy shocks within the GCC. We extend this analysis by having a closer look into monetary policy dependence between two largest GCC economies: United Arab Emirates and Saudi Arabia. The results of our Structural Vector Autoregression estimates imply that monetary policy plays a key role and impacts GDP per capita and investments both in the short and long-run. Nevertheless, the impact of monetary policy on each other's economyis somewhat limited.

Introduction

The practicality of a monetary union for a block of countries is usually evaluated by weighing the benefits of joining a currency union (Mundell, 1961 and McKinnon, 1963). Economists have opposing view about the Monetary union in the GCC. Some support the union and explain the use of a single currency leads to the elimination of transaction costs and uncertainties (monitoring exchange rates and predicting their fluctuations, costs of currency conversion, and keeping and managing reserves for intra-regional trade). While others argue that GCC countries have varying policies even with the dollar peg, so a monetary union might not be a good idea as it takes away some autonomy from the individual GCC countries.

Participating in a monetary union will involve losing autonomy over monetary instruments such as exchange rates that serve as stabilizers in the Economy. However, more systematic analysis is needed to ascertain this since not only the downside risks but also potential for increased trade, reduced borrowing constraints and efficiency gains are enormous. Up to this point, present literature has primarily focused on the impact of monetary policy within the GCC countries on macroeconomic indicators (see for instance, Termos et al., 2016). In this study, we investigate the impact of Monetary union on GCC macroeconomic indicators of the country and how similar monetary policies in one country impacts monetary policies in other countries.We contribute to the literature by filling the void that looks at the level of synchronization of monetary policy among the GCC countries (Monnet and Puy, 2016). Therefore, we first examine the impact of monetary policy on GCC GDP per capita and investments and then we examine how major GCC countries impact each other's monetary policy.

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I. Literature Review

I.I. Determinants of Income Growth

When we want to estimate an economic growth equation where GDP per capita is in the regression equation.

It is important to discuss what does the literature in economic growth theory posits on the determinates of economic growth. In his pioneering work, Solow (1956) established the theoretical underpinnings on what determines short as well as long run economic growth. He argued that economies must go through a period of transitional dynamics on their path towards development. The model postulates that capital accumulation through investments in physical capital drives economic growth in the short-run. In this model, a country can induce short-run economic growth by increasing investment and by raising its saving rate. However, by law of diminishing returns, an increase in capital will hit the technological limit and growth will decrease to a "steady state" growth rate. This long-run growth will be equal to Total Factor Productivity (TFP) growth rate, which is the level of technical progress or innovation in the economy. Therefore, in this model, short-term GDP growth is determined by capital accumulation by increased investments and savings and long-run growth by the level of technical progress in the country.

Another key contribution in the growth theory literature is the "augmentation" of human capital within the Solow model. Mankiw, Romer and Weil (1992) have included not just physical capital such as investments but also human capital within the Solow model. This model estimated, and they show that physical and human capital investment explain more than 70% all variation in GDP per capital in their dataset that covers over 150 countries is explained by this model (Mankiw, Romer and Weil, 1992, p. 414). That is, investment in machinery in industry (physical capital) and investment in education (human capital) is what determines growth. Similar to the Solow model, the law of diminishing returns applies not just to physical but also human capital.

Ergo, in any regression equation, based on theoretical contribution of Solow (1956) and Mankiw et al. (1992), we need to include investments (proxy for physical capital) and school enrollment (proxy for human capital) in our regression equation. Therefore, later when we estimate our Vector Autoregression equations, we will include these variables.

I.II. Literature on Monetary Policy Integration

Economists have long argued that national currency risks and fluctuations has been the main barrier in trade. A whole strand of research shows that currency union reduces trade barriers (see for instance, Glick and Rose, 2002). According to the gravity equation, trade between two countries is an inverse function of the distance and a positive function of combined GDP of the two countries (Rose, 2001). Under this gravity equation framework, Alesina and Barro (2000), show that a combined monetary policy has substantial increases trade which in turn leads to increased trade due to greater credibility of the backing of a currency by a monetary union.

Similarly, proponents argue that the formation of monetary union has allowed the European block to negotiate better terms with the rest of the world (Lama and Rabanal, 2014). They cite Common Agricultural Policy (CAP) for European farmers as an example, but the EU has also emerged as a global leader in environmental policy making. Even though, the EU was not able to escape scrutiny of its many inadequacies in the environmental sector (Eckley and Selin 2004; Jordan 2002), but the main role it played in creating the climate change regime (Vogler and Bretherton 2006) and encouraging sustainable development at the United Nations (Lightfoot and Burchell 2005) supports EU's claim and shows commitment to global environmental norms is integral to the EU's unique foreign policy identity. With the United States refusing to provide leadership and blocking new initiatives (Falkner 2005), the EU has emerged as a pivotal actor in global environmental policy-making.

Nevertheless, a substantial amount of literature argues that monetary integration has minimal benefits (Rose, 2001; Uhlig, 2014). This strand of literature argues that financial instability that comes with the monetary union and the financial contagion risks that come with such a union are too large. One major concern was the protracted during the European Sovereign Debt crisis where some of European countries like Greece defaulted on their debt (Missio and Watzka, 2011). The problem arose when such countries were taking very cheap credit from Europe being a member of the EU and this led to too much borrowing and several countries could not pay back and a large bailout was needed.

Even though the EU was able to put together an impressive $1 trillion rescue package for countries with potential funding problems, the threat of a disorderly default still looms over the EU, creating systemic financial instability at the EU and possibly at the global level (Gros and Mayer, 2010). Monetary union also implies a common monetary policy. Therefore, idiosyncratic monetary policies in respective European countries can no longer be made. Second literature on GCC monetary policies and its similarities. In fact, Abouwafia and Chambers (2015) show that there is great amount of heterogeneity in the monetary policy "frameworks" in various GCC countries. Although, they do not look at the interest rate congruence between the GCC countries, but it is plausible to assume that a different monetary policy framework also translates differently. We hope to examine empirically this translation of framework to actual monetary policy in this research endeavor.

Nevertheless, Monnet and Puy (2016) show for a large group of countries that globalization has led to large synchronization of both monetary and fiscal policies since a crisis is often hit to a large group of adjoining countries instead of being an isolated event in a single country. Some preliminary research shows that GCC countries may have had varying monetary policy, so a monetary union might not be a good idea. However, more systematic analysis is needed to ascertain this since not only the downside risks but also potential for increased trade, reduced borrowing constraints and efficiency gains are enormous.

Up to this point, however, extant literature has primarily focused on the impact of monetary policy within the GCC countries on macroeconomic indicators (see for instance, Termos et al., 2016). We on the other hand want to fill the void in the literature that looks at the level of synchronization of monetary policy among the GCC countries (Monnet and Puy, 2016). Therefore, we first examine the impact of monetary policy on GCC GDP per capita and investments and then we examine how major GCC countries impact each other's monetary policy.

II. Research hypotheses

The research hypothesis based on the two research questions we ask are as follows:
Hypothesis # 1: GCC monetary policy has significant impact on GCC macroeconomic indicators.
Hypothesis # 2: GCC monetary policies are often similar that is monetary policy in one country impacts monetary policy in other countries.

III. Data Section

We take GCC countries data from several sources, such as the World Development Indicators of the World Bank, IMF Financial Statistics, OECD and United Nations Educational Statistics. See Table 1 for the variable sources. For further information, see references where respective links are provided from where the data which we utilized can be retrieved.

Our dataset includes the following countries: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates. We use annual data from 1960 to 2016. The use of annual data allows us to have a long time series and hence allows us to assess long run impact of the monetary policy shocks. We use Broad money supply (M2) and GDP per capita as the main variables of interest, where broad money is the proportion of money supply of broad money set by the central bank (M2). The M2 is our measure of money supply as is standard in literature (see e.g. Blanchard and Perotti, 2002). Furthermore, GDP per capita is gross real GDP per person corrected for inflation through considering it at constant 2010 US dollars. These two key variables provide allow us to examine the impact of monetary policy on aggregate macroeconomy.

We use primary school enrollment as a control variable, based on Mankiw, Romer and Weil (1992). This data is retrieved from United Nation education statistics. Furthermore, we also add as a control Gross Fixed Capital formation which is a standard measure of investments (in line with Blancard and Perotti, 2002). Lastly, given that we are studying the GCC countries, it is important to control for the impact of oil rents the meronomy. Therefore, we also add oil rents as a proportion of GDP as controls where the data is retrieved from the world bank. For further information, see below:

Table 1: Variable Sources

Variable Name	Data Source
Broad money M2 (% of GDP)	International Monetary Fund, International Financial Statistics
School enrollment, primary (% gross)	United Nations Educational, Scientific, and Cultural Organization (UNESCO)
GDP per capita (constant 2010 US$)	World Bank national accounts data, and OECD National Accounts data files.
GDP (constant 2010 US$)	World Bank national accounts data, and OECD National Accounts data files.
Oil rents (% of GDP)	World Bank staff estimates based on (Lange et al 2018).
Gross fixed capital formation (constant 2010 US$)	World Bank national accounts data, and OECD National Accounts data files.

Further, we proceed with providing the descriptive statistics of the variables used in the study. Note, we convert log of all variables involved to get a log-log SVAR model. This stabilizes the estimates, mitigates the problems of outliers and give us a percentage interpretation of our unit shocks on macroeconomic outcome variables (as in Blanchard and Perotti, 2002).

Table 2: Descriptive Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
Time	56	1988	16.59819	1960	2016
Log Broad Money	56	3.794397	0.3867794	3.074851	4.48599
Log Primary Enrollment	56	4.423686	0.1105357	4.201967	4.576543
Log Oil Rents	56	2.616402	1.537514	-2.795167	4.009705
Log GDP per capita	56	8.488625	0.1554118	8.249542	8.76998
Log GDP constant 2011	56	27.82445	0.4349347	27.07889	28.59296
Log Gross Investments	56	26.7389	0.4039767	26.12023	27.22906

Table 2 presents the descriptive statistics. All variables are logged. This is done in line of much of literature (See for instance, Blanchard and Perotti, 2002; Mehmood, 2014). The major advantage of taking the natural logarithm of the data is that we are able to have an easy percentage interpretation on the impact of unit shock on our outcome variables (as we will see in the Data analysis section).

IV. Empirical Methodology

The Structural Vector Autoregression (SVAR) is employed to test these two hypotheses. This method is preferred due to multiple reasons. First, the SVAR models the overtime dynamic effect of a unit shock on outcome variable in a transparent manner (Sims, Stock and Watson, 1990). Second, the SVAR is flexible and can estimate macroeconomic series even with relatively small sample size. Third, SVAR addresses the issue of reverse causality and allows to estimate a two-way economic relationship between the two outcome variables. Lastly, SVAR allows us to not only examine the contemporaneous effect but also both short and long-term effects of an economic shock (Blanchard and Perotti, 2002).

The Structural Vector Autoregression model can be written in a simplified form as follows:(1) $B(L)\vec{Y} = C + \vec{\varepsilon}$

Where, $B(L)$ is a lag polynomial equivalent to $B_1 L^1 + B_2 L^2 + B_3 L^3 + \ldots + B_p L^p$, while $\vec{Y}$, $\vec{\varepsilon}$ and C are n x 1 vectors, with $\vec{Y}$ representing a vector of 'endogenous' variables, $\vec{\varepsilon}$ the vector of error terms and C the vector of intercept terms.

Note that $Y_t \in \vec{Y}$ and in our case, $Y_t = [GDPpc_t \quad MoneySupply_t]^T$ is the simplest iteration of the two-variable SVAR.

We later augment on this two-variable SVAR with a multiple variable SVAR to include physical investments (based on Solow, 1956), human capital (based on Mankiw, Romer and Weil, 1992) that are both theorized to be crucial in explaining economic growth.

Furthermore, we also take into account the current context under study and given the nature of historical resource rents within the GCC, we also add oil rents and school enrollment in the full SVAR with controls as per (Mankiw, Romer and Weil, 1992). Nevertheless, to get the one-way relationship between an economic shock (money supply in our case) on various outcome variables (GDP per capita, investments) in the present case, we need to impose ordering restrictions in the structural error term of SVAR (Blanchard and Perotti, 2002). This is achieved by putting the restrictions on the Z matrix in the following equation:(2) $u_t = Ze_t$

From imposing restriction on Z (as in Blanchard and Perotti, 2002), we can compute the Impulse Response Functions (IRFs). This gives us the effect of one-time typical monetary policy shock on current and future values of macroeconomic outcomes. Furthermore, to select the optimal lag length in the SVAR, we will use both Akaike (AIC) and Bayesian information criteria (BIC), see for instance, Mehmood (2014) for more details on this.

V. Results: Data Analysis

We begin the analysis by specifying the number of lags for the SVAR model. As we do not need to do the Unit Root Test since we do not estimate SVAR reduced form (Stock, Watson and Sims, 1990). We find lags for every equation based on AIC and BIC criteria. All specifications give the same result for both AIC and BIC lag length selection.

To answer the first hypothesis, i.e, to study the impact of monetary policy on aggregate macroeconomic outcomes, we will estimate the impact of money supply on GDP per capita and investments in the GCC countries as a whole. We cannot use interest rates since the dollar peg implies the interest rate are similar in the region. Hence the useof broad money for our measure of money supply. The broad money supply in different GCC countries can vary in the short-run and we use this to estimate the impact of monetary policy on aggregate macroeconomic outcomes. It is well established that the manipulation of broad money supply can be used as a monetary policy too (see for example, Blanchard, 2018). Likewise, we employ this technique to examine the second hypothesis. To examine the impact of monetary policy dependence on each other, we take the case of GCC's two largest economies, Saudi Arabia and UAE and estimate how shocks to each other's money supply impact each other.

The main results of the data analysis are as follows:Figure 1 plots the impulse response function of the impact of unit shock (one standard deviation shock increase) in money supply on GDP per capita. The results imply that about 5 years following the shock, the GDP per capita growth is 1 percentage higher relative to no such expansionary monetary policy shock. Although, we add lagged dependent variable of GDP which acts as proxy for omitted variables that impact GDP (as suggested by Sims, Stock and Watson 1990) through information criteria selection but still it is possible that some theoretical factors are missing that impact GDP per capita growth. Therefore, based on theoretical models that explain determinants of GDP per capita growth, we add human as well physical capital in the SVAR equation (Solow, 1956; Mankiw, Romer and Weil, 1992). Furthermore, since oil rents play a substantial role within the GCC, we also add oil revenue in the equation. These results are provided in panel B of Figure 1. We notice that the results are similar, still expansionary monetary policy has positive shock on GDP per capita growth with magnitude similar to before. Although, inclusion of controls has made the estimates more precise. This can be seen through a narrowing of the confidence intervals. Similar results can be seen for other macroeconomic outcome variables. For example, investments rises by about 4% after 5 years because of a similar money supply shock (see Figure 2).

Figure 1: Money Supply Shock on GDP per capita
Panel A: Impact of Money Supply Shock on GDP per capita

Unit Shock of Money Supply on GDP per capita
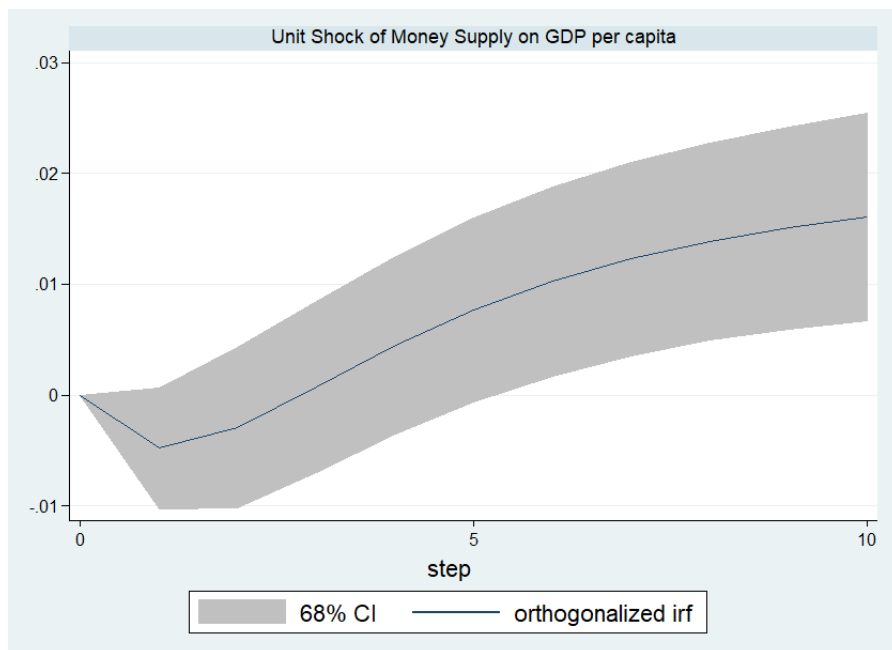
Panel B: Impact of Money Supply Shock on GDP per capita with full controls

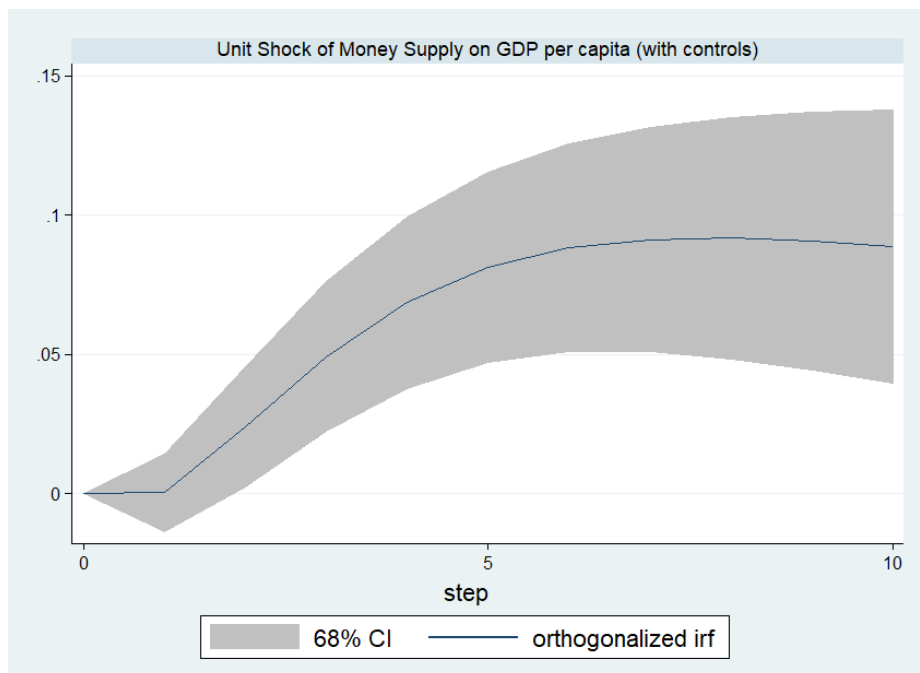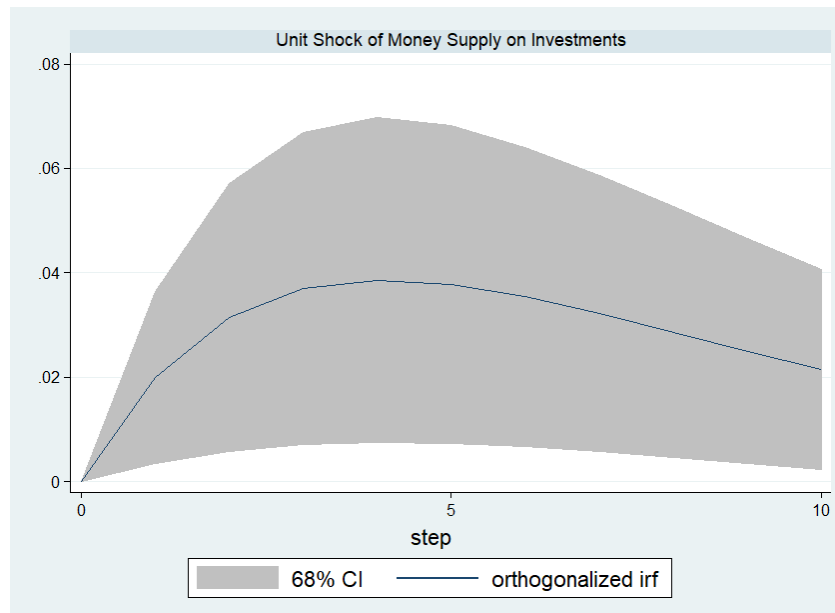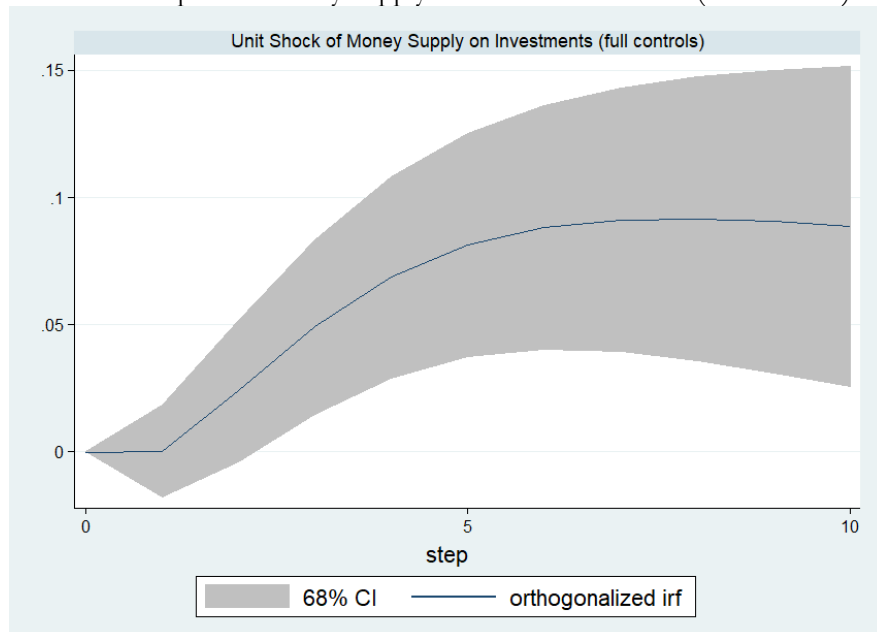Unit Shock of Money Supply on GDP per capita (with controls)

Figure 2: Money Supply Shock on Investments
Panel A: Impact of Money Supply Shock on Investments

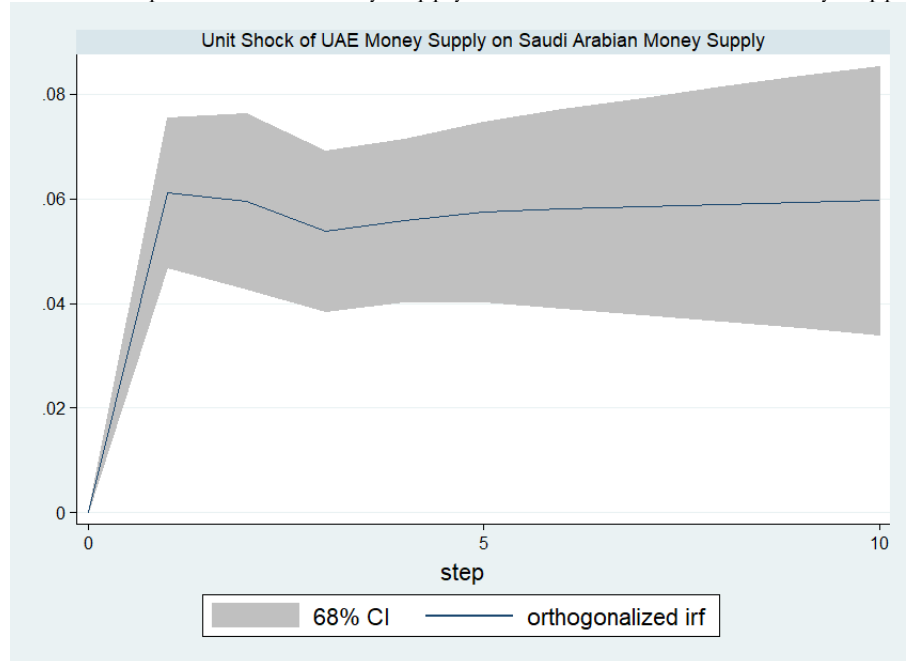Panel B: Impact of Money Supply Shock on Investments (full controls)

We next turn to testing hypothesis 2. We want to assess the degree of monetary policy dependence within the GCC. A natural starting point is to examine the monetary policy dependence of the biggest economies in the GCC: Saudi Arabia and United Arab Emirates. Therefore, in the next exercise, we ask how an increase in monetary supply in UAE impacts money supply in Saudi Arabia. A positive relation points towards monetary policy dependence. It also points towards the efficacy of dollar peg to impact each other's monetary policy. Figure 3, panel A, shows the impact of a unit shock of money supply of UAE on Saudi Arabia's monetary policy. We notice, that 5 years after the shock, Saudi Arabia money supply also rises by the order of about 6%. However, the permanent effect of UAE monetary policy does not hold when we add our full list of control variables. Panel B of Figure 3 presents the results of this impulse response function whose underlying SVAR has a full set of control variables as in panel B of Figure 1 and 2. Similar to before, addition of control variables increases precision of estimates where the confidence intervals become narrower. Nevertheless, the impact of unit shock of monetary policy is much smaller now.
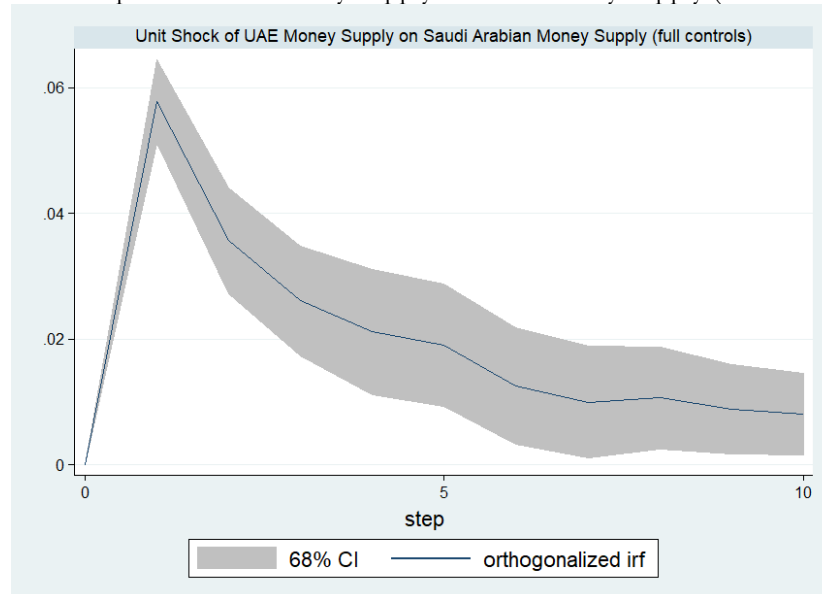
That is, instead of a 6% increase monetary supply, we observe that a UAE monetary policy shock impacts money supply of Saudi Arabia by 2%.

Figure 3: UAE Money Supply Shock on Saudi Money Supply

Panel A: Impact of UAE Money Supply Shock on Saudi Arabian Money Supply

Panel B: Impact of UAE Money Supply on KSA Money Supply (full controls)

VI. Conclusion

The results imply that monetary policy impacts GDP per capita and investments in the GCC. These results hold even if we control for oil rents and several other important variables that impact economic growth (such as physical and human capital investments). Therefore, for hypothesis 1 quantitative evidence are in line with our expected results: indeed, monetary policy impacts aggregate macroeconomic variables. However, the results of hypothesis 2 are less clear cut. The two largest GCC economies seem to monetarily dependent on each other, however, inclusion of control variables greatly reduces the impact of monetary policy on each other.

This implies that there are several factors impact the monetary policy in both UAE and Saudi Arabia rather than money supply. Political reasons might be one of them. However, as far as hypothesis 2, is concerned we cannot make a conclusive statement on the degree of dependence of UAE monetary policy on Saudi monetary policy. Our first sets of research are in line with much of literature where monetary policy shocks impact aggregate macroeocnomic outcome variables. The positive impact of money supply shocks on GDP per capita and investments are consistent with evidence in the United States (Blanchard and Perotti, 2002), United Kingdom (Cloyne and Hurgen, 2016), as well as France (Monnet, 2014). Therefore, results of this paper imply that GCC region obeys the same economic principles as in much of the developed world. This is true even if we exclude oil rents from the equations, that implies that oil does not cause a different set of relationship within the GCC as some had argued (Mankiw et al., 1992). The second set of results however, are less clear cut where much of literature finds impact of monetary policy in the region (e.g. Rey, 205), where there is a currency peg to be large and permanent (See e.g. survey of literature on European monetary policy integration by Rey, 2015).

Going forward, a more careful analysis of the second hypothesis is needed. From these results it is still not clear why monetary policies in the two largest GCC economies are not responding even when there is a dollar peg. The SVAR equations need to take into account other important variables, that are more political as opposed to economic in nature. Therefore, a political economy approach to structural vector autoregression analysis as in Romer and Romer (2010) might provide a fruitful path for future research.

Policy Implications:

The overall aim of this paper was to examine the impact of monetary policy in the GCC on major macroeconomic outcomes as well as dependence of monetary policy within the GCC. We used Structural Vector Autoregression methodology to capture the dynamics as well as estimate both short and long-run impact of monetary policy shocks within the GCC. We outspread our analysis by analyzing more carefully monetary policy dependence between two largest GCC economies: United Arab Emirates and Saudi Arabia. The results of our analysis estimate that monetary policy plays a key role and impacts GDP per capita and investments both in the short and long-run. Nevertheless, impact of monetary policy on each other's economies is somewhat limited.

We expect significant implications of these findings. The results for this study can be useful to originate future research on how dependence on other economies effect monetary policies. We can also enhance our study the effect of formulation of own monetary policies on other countries in a union setting.

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