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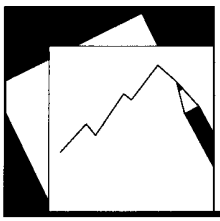

IMF Working Paper

External Linkages and Policy Constraints in Saudi Arabia

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Middle East and Central Asia

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Abstract

The constraints that external linkages impose on domestic policy choices in Saudi Arabia have continuously evolved over the past four decades. This paper argues that two major ongoing developments in particular have affected and will continue to affect policy trade-offs. First, growing oil needs of emerging market economies (EMEs), and specifically those of developing Asia, have strengthened economic links between the Far East and Saudi Arabia. Second, financial sector development in Saudi Arabia has gradually strengthened the monetary transmission mechanism. The former implies the increased importance of developing Asia's growth cycle for the Saudi economy, while the latter suggests greater influence of U.S. monetary policy on the non-oil economy through the peg to the U.S dollar. As a result, divergence between the growth cycles in developing Asia and the United States has the potential to increasingly generate tension between policy objectives in Saudi Arabia.

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I. INTRODUCTION

On September 18, 2007, the U.S. Federal Reserve lowered its policy rate from 5.25 percent, the highest since March 2001, by a surprising 50 basis points, citing tightening credit conditions and an ongoing housing market correction. By the end of October 2008, the federal funds target had been reduced to one percent and the economy was in the midst of a recession. The situation in Saudi Arabia, however, was quite different in mid-2007. The rise in oil prices between 2004 and 2007 had increased oil revenues and raised government spending, boosting consumer and investor confidence. Higher private and public spending increased growth, but it also translated into inflationary pressure. Thus, the Saudi economy was already expanding strongly when crude oil prices surged from over $65 per barrel in mid-2007 to about $130 per barrel by the summer of 2008. Nonetheless, in order to prevent speculative capital inflows and maintain the exchange rate peg to the U.S. dollar, the Saudi Arabian Monetary Agency (SAMA) cut its policy rate from 5 percent in October of 2007 to 2 percent in mid-2008. Annual credit growth increased from 6 percent in early 2007 to over 30 percent in July 2008, while higher world commodity price inflation, coupled with a depreciating dollar, further contributed to domestic inflationary pressure, resulting in double digit inflation by mid-2008.

This episode clearly illustrates how global interconnectedness presented challenges for policymakers in Saudi Arabia. Neither the continued increase in oil prices between 2004 and 2008, nor the lowering of the U.S. policy rate in 2007–08 were under the direct control of Saudi policymakers. It is in this context that this paper attempts to shed some light on the evolution of external linkages and its impact on policy constraints in Saudi Arabia. Indeed, the case of Saudi Arabia is interesting not only in its own right; it also illustrates many characteristics that are common across resource-rich economies. In particular, Saudi Arabia exhibits a low degree of economic diversification, with the oil sector accounting for over half of GDP and oil exports accounting for over 80 percent of export receipts. Furthermore, as oil revenues primarily accrue to the government, the public sector plays a central and dominant role in the non-oil economy. Finally, with the exchange rate pegged to the U.S. dollar and with a relatively open capital account, interest rate policy closely follows that of the U.S. Federal Reserve. All these characteristics can be found in many other resource-rich countries, albeit to varying degrees.

The analysis in the following sections focuses on three main observations. First, the co-movements of the Saudi and U.S. business cycles have changed over the past three decades, with supply-driven oil shocks causing a divergence in business cycle dynamics in the 1980s, while demand-driven oil shocks in the 2000s—reflecting high growth in developing Asia and other EMEs—resulted in a convergence. Second, the pass-through from global oil prices to fiscal spending has fallen over the past three decades, possibly accounting for the observed reduction in output volatility. Finally, financial deepening and greater access to financial services have increased the relevance of monetary policy for non-oil economic activity and also, consequently, the importance of U.S. interest rate policy.

So what are the implications of these trends for Saudi policymaking? Given the commitment to the fixed exchange rate and the ongoing financial deepening, synchronization of the domestic and U.S. business cycles is likely to become increasingly relevant for the stabilizing impact of monetary policy. Furthermore, the increased degree of interconnectedness with developing Asia—through growing trade flows and Asia's rising influence in the global oil market—is likely to reduce the relative importance of external links with the United States. Tensions between policy objectives are therefore more likely to arise when global oil prices and the Asian business cycle move countercyclically with the U.S. business cycle. To mitigate these tensions in the short to medium term, it will be crucial for Saudi Arabia to continue to strengthen fiscal management and further refine macro-prudential instruments to influence monetary conditions, independently of interest rate policy.

The paper is structured as follows. Sections 2 and 3 describe Saudi Arabia's external links and policy objectives, highlighting the growing importance of developing Asia. Section 4 presents an empirical and narrative analysis of these linkages over time, and Section 5 discusses the policy implications. Section 6 concludes.

II. External Linkages

As the world's largest exporter of crude oil, Saudi Arabia's economy is closely connected with the global oil market. Not only do oil products account for the bulk of export revenues, but a large share of non-oil exports are related to downstream industries. Furthermore, a low degree of economic diversification and high demand for imported labor have rendered the domestic economy dependent on imports of goods and services and foreign workers. Capital flows primarily reflect inflows of foreign direct investment (FDI) and the accumulation of external assets. Over the past three decades, the structure of these linkages has changed, increasingly integrating Saudi Arabia with developing Asia.

A. Trade in Goods and Services

Oil products dominate Saudi Arabia's total exports, averaging over 83 percent of annual export revenues for the past three decades. In fact, only during a few exceptional years did oil revenues drop below 80 percent.[1] Saudi Arabia also plays a central role in the global oil market, currently accounting for approximately 19 percent of the world's proven oil reserves and 12 percent of global production.[2]

[1] The data are taken from the WEO database, IMF. Export revenues dropped below 80 percent in the aftermath of the collapse of OPEC in the late 1980s and following the Asian financial crisis in 1998–99.

[2] The data are derived from the BP *Statistical Review of World Energy*, June 2011.

The size and characteristics of Saudi Arabia's non-oil trade largely reflect the absence of a diversified manufacturing base. Over two-thirds of non-oil export revenues are generated by the downstream petrochemical industry. Thus, even a sizable share of the non-oil export sector is directly affected by developments in the global oil market. The low degree of economic diversification has also led to strong demand for a wide spectrum of imports, including food, intermediate and capital goods, and services. Total imports of goods and services have remained high relative to non-oil GDP, reaching an all-time high of 93 percent in 2008. The composition of imports has changed over time—reflecting different stages in the country's development process—with the share of capital goods falling and imports of consumption goods and services rising.

B. Labor Flows

Saudi Arabia has maintained a liberal policy with respect to economically driven labor inflows. Currently, foreign workers make up about one-third of the Saudi population and are primarily employed in the private service sector.[3] The dependence on imported labor had its origin in the 1970s, when the Saudi government initiated large-scale development projects that required a significant increase in manpower. The growth in imported labor remained high throughout the 1980s at about 10 percent per annum, but saw a sharp decrease in the 1990s, only to pick up with the oil boom in 2005. An important consequence of the large expatriate population is the sizable outflows of remittances. In 2010, outward remittances amounted to about $26 billion or 6 percent of GDP.

C. Capital Flows

Capital inflows have played a relatively limited role in the buildup of Saudi Arabia's capital stock. Instead, capital accumulation has largely been financed with oil revenues and domestic credit. Credit to the economy is supplied by the domestic banking system as well as by government controlled Specialized Credit Institutions (SCIs). The SCIs are funded through transfers from the budget, while commercial banks primarily rely on the domestic deposit base. Foreign liabilities of commercial banks only account for about 10 percent of total banking sector liabilities, equivalent to 7 percent of GDP.

Data on private nonbank external liabilities remain limited. According to BIS data, cross-border nonbank liabilities currently amount to 8 percent of GDP. Although portfolio investment inflows have been sizable at times, they have primarily reflected the repatriation of foreign assets in times of uncertainty and the opening of new domestic investment

[3] The dependence on foreign labor is common in the GCC countries. In fact, Saudi Arabia, together with Oman, has the lowest percentage of foreign workers. In Kuwait and Qatar over two-thirds of the population are expatriates (Kapiszewski, 2006).

opportunities (Al-Jasser and Banafe, 2008).[4] However, following the implementation of a new foreign investment law in 2000 and Saudi Arabia's accession to the WTO in 2005, FDI inflows have surged from 0.4 percent of GDP in 2003 to 10 percent in 2009. These flows mostly reflect joint ventures in energy and industrial projects, as well as investments in financial services, real estate, and contracting (SAGIA, 2010).

Capital outflows have primarily been associated with the buildup of foreign assets in periods of high oil prices. The main investors have traditionally been commercial banks, pension funds, SCIs, and SAMA. Commercial banks tend to hold a sizable portion of their liquid assets in foreign money market instruments for liquidity management purposes. Foreign assets of commercial banks currently amount to 14 percent of their assets and 12 percent of GDP. The main investor in foreign assets, however, is SAMA, which manages the country's international reserves, currently recorded at over half a trillion dollars (more than 100 percent of GDP).

D. Evolution of External Linkages

The pattern of trade has evolved over time with developing Asia emerging as a prominent trading partner (Figure 1.). During the 1970s, Europe accounted for about 44 percent of Saudi oil exports while Asia only 30 percent. This has gradually been reversed over time. In the 2000s, Asia accounted for over 55 percent of Saudi Arabia's oil exports while Europe's share dropped to 15 percent. Part of this shift is due to the evolving pattern of global oil consumption. Asia's share of global oil consumption in the 1970s amounted to 16 percent while in the 2000s it had increased to 29 percent. This rise is largely due to the region's strong growth, driven by developing economies such as China and India. Europe's share, on the other hand, fell from 39 to 24 percent over the same time period, partially reflecting the development of less energy-intensive industries. Similarly, Asia's importance as a source for merchandise imports has increased over time. In particular, imports from developing Asian economies have increased substantially since the 1970s: and as a share of Saudi Arabian they have risen from 3 percent in the 1970s to 16 percent in the 2000s.

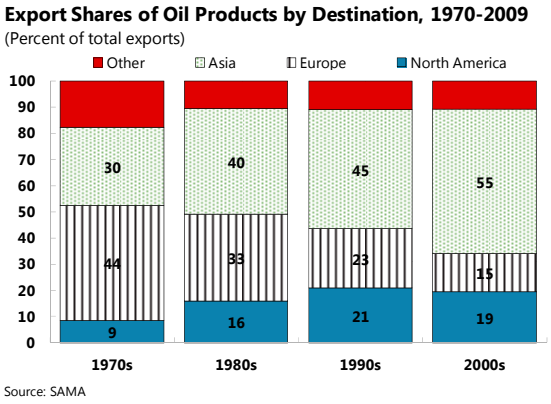
The composition of the foreign labor force has also evolved over time, South Asia having become the main supplier. In fact, prior to and during the initial development phase in the 1970s, foreign labor primarily originated from neighboring Arab countries (e.g., Yemen and Egypt). However, non-Saudi Arabs began increasingly to be replaced by workers from South Asia. According to Kapiszewski (2006), the share of Arabs in the foreign population

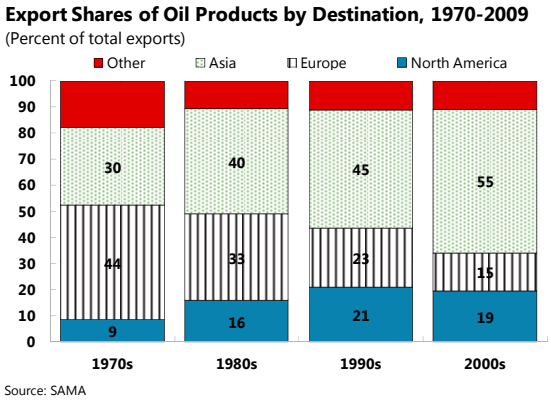
[4] For instance, portfolio inflows increased substantially when the government began to issue government bonds at the end of the 1980s. The bonds were primarily bought by commercial banks and institutional investors which sold foreign assets to finance their purchases. The opening of the domestic equity market in 1980s had a similar effect. However, the shallow domestic debt market and restrictions on foreign participation in capital markets have likely prevented larger portfolio inflows.

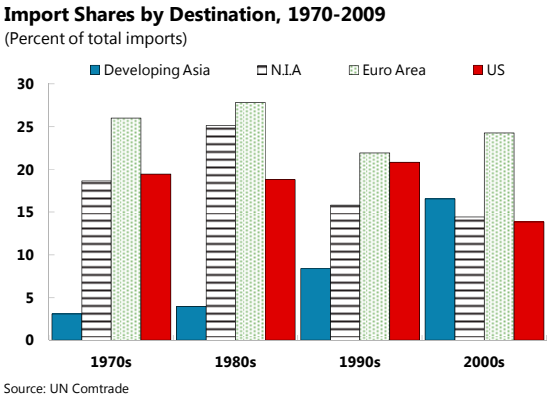
fell from 91 percent in 1975 to 33 percent in 2004. The overwhelming majority of the non-Arabs currently originate from Pakistan, India, Sri Lanka, and Bangladesh.

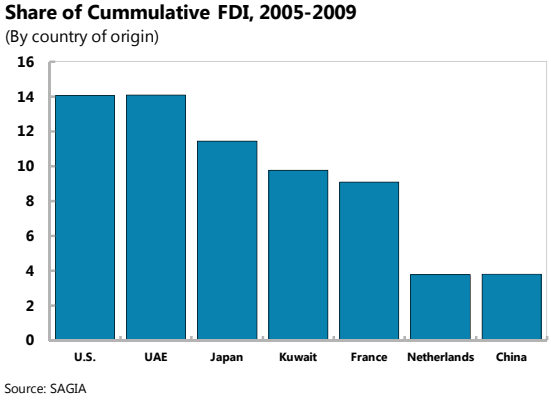
Information on the regional composition of capital flows is limited. FDI data indicate that the United States and the United Arab Emirates have accounted for most of the inflows since 2005 but Japan and China have also made significant investments in the country. The geographic asset composition of SAMA's external assets is not public information. However, given the Agency's preference for low risk investments, it is likely that a large portion of its foreign investment portfolio is kept in sovereign debt securities of advanced economies and other assets perceived as low-risk.

Figure 1. Evolution of External Linkages









III. Policy Objectives

Since the 1970s, the economic policy framework in Saudi Arabia has been underpinned by government-sponsored five-year development plans. Fiscal policy has thus taken a central and dominant role in the economy, creating a strong link between fiscal spending and economic activity. Monetary policy, on the other hand, has been closely linked to U.S. monetary policy through the fixed exchange rate. Hence, with budget revenues heavily

dependent on proceeds from oil exports and the exchange rate tied to the U.S. dollar, external conditions have had a direct impact on domestic policy.

A. Development Strategy

Saudi Arabia's current economic infrastructure and policy framework were developed in the 1970s. With surging oil revenues, the government claimed a more central role in the development of the economy and began implementing five-year strategic plans. The main objective was to engage in a massive industrialization effort and transform the largely agricultural and rural society in the pre-1970s to a modern and diversified economy.[5] As imported capital goods and foreign labor were seen as necessities in this transformation process, the government adopted a relatively liberal attitude towards trade and immigration.[6] The initial development plans focused on improvements in infrastructure and economic resource development, but over time, the emphasis shifted to strengthening education and health care systems. The hope was that economic diversification would eventually reduce the dependence on imports and foreign labor.

Significant efforts were also made to develop the financial system and align it with the overall development objectives of the government. Initially the domestic banking system was limited in its capability to support the government's industrialization efforts. Hence, the government implemented two important reforms to make the financial system better serve the country's development goals. First, six government Specialized Credit Institutions (SCIs) were established.[7] Their purpose was to extend medium- and long-term financing to facilitate capital accumulation by complementing the short-term loan structure of commercial banks (SAMA, 2004). Second, the government rolled out a *Saudization* strategy for the commercial banking system, converting all foreign-owned banks to publicly traded joint-stock companies, and limiting foreign ownership to 40 percent.[8] By 1980, the process was largely completed and the structure of the banking system has remained virtually the same till today.

[5] In the 1970s, the government also nationalized the oil sector, taking full control of ARAMCO by 1980.

[6] Although the government has employed a liberal attitude towards international trade and immigration, it has taken a more active role in domestic markets, making extensive use of subsidies and administered prices of commodities (e.g., petroleum products, energy, water, food staples, and agricultural production). For instance, the pricing policy of feedstock to the petrochemical industry has been an important component in the strategy to attract foreign investors. Protecting the agricultural sector has also long been seen as a national security issue although this support is slowly being phased out.

[7] Saudi Arabian Agricultural Fund, Saudi Credit and Savings Bank, Public Investment Fund, Saudi Industrial Development Fund, and the Real Estate Development Fund. The sixth fund was named Contractors Fund, but no longer exists.(Ramady, 2010)

[8] See Tschoegl (2002).

B. Monetary and Exchange Rate Policy

The main objective of monetary policy is to stabilize the internal and external value of the currency. As a result, monetary policy in Saudi Arabia has largely been dictated by the authorities' commitment to a stable exchange rate. In September 1975, the currency was officially tied to the SDR, but in May 1981, SAMA switched to a U.S. dollar peg. Although the Riyal was devalued in several steps in the first half of the 1980s, the peg to the dollar has remained at 3.75 Riyal per dollar since June 1986.

The motivations behind the strong commitment to the fixed exchange rate have primarily been to facilitate internal price stability through a credible nominal anchor and to promote trade and investment by reducing exchange rate uncertainty. The dominance of dollar-denominated oil products in exports and the high share of dollar-denominated external assets are frequently cited as arguments for maintaining the U.S. dollar peg, as it stabilizes income flows from abroad and limits fluctuations in financial wealth. Although the purpose of the fixed exchange rate was not to import monetary policy credibility from the United Sates, the open financial account necessitates that the domestic short-term interest rate closely follows that of the United States (Figure 2.).

C. Fiscal Policy

Fiscal policy in Saudi Arabia is discretionary. With government spending amounting to over 80 percent of non-oil GDP, the public sector in Saudi Arabia takes a dominant role in the economy (Figure 2.). Government expenditures are primarily financed with oil export receipts, because non-oil revenues only account for a small fraction of total revenues. Hence, with oil revenues fully accruing to the government and with non-oil tax revenues being limited, the fiscal authorities function *de facto* as the main distributor of oil wealth as opposed to a redistributer of income through taxation.

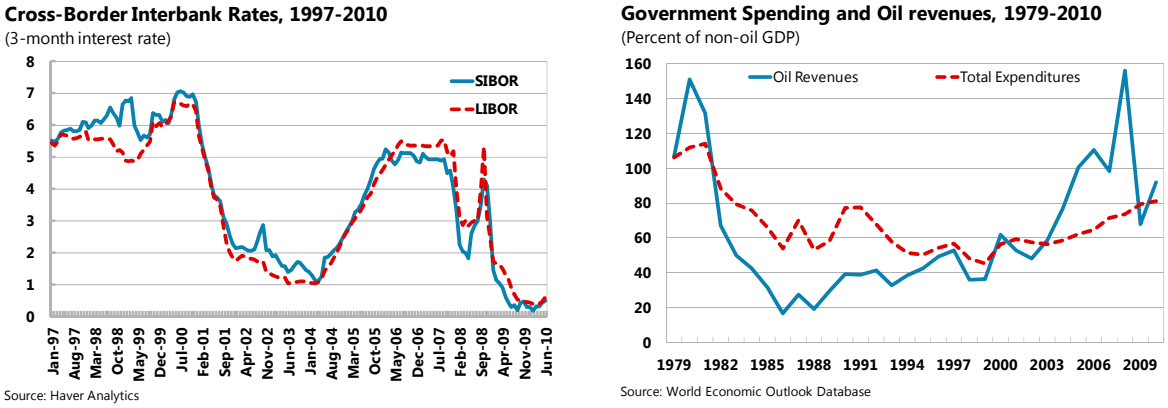
As with all resource-rich economies, the fact that the bulk of budget revenues are generated by an exhaustible resource gives rise to a number of issues such as fiscal sustainability and intergenerational equity. However, given the vast resources of the country, the exhaustibility of oil is currently less of a concern to the government. Fiscal policy is instead more geared towards its development objectives—investing in social and economic infrastructure and diversifying the economy. Furthermore, with the domestic currency tied to the U.S. dollar, fiscal policy has also been shouldered with the responsibility of achieving internal and external stability.

Consequently, balancing development goals with macroeconomic stability in an environment of volatile oil revenues has been the main task for the fiscal authorities. The government has engaged in "countercyclical" fiscal policy with respect to the oil price cycle. That is, when oil prices are low the government either draws down on international reserves or issues debt

to finance its expenditure, and when oil prices are high, part of the surplus is either used to retire existing debt or to build up reserves. Hence, by conducting "counter-cyclical" policy, the government's objective is to smooth fiscal spending over time.

In the 1970s, when oil prices rose sharply, the government not only increased spending substantially in its efforts to develop the economy, but also managed to accumulate large reserves. The reserves came in handy during the 1980s, when oil revenues saw a sharp drop and the budget turned into a deficit. By 1988, the drawdown of reserves had reached a level low enough for the government to decide to issue debt to finance its expenditures. In fact, it was not until 2000 that the budget returned to a surplus. At that point, the government's outstanding debt had reached over 100 percent of GDP. With rising oil prices in the 2000s, however, the government once more began to accumulate substantial reserves and paid down debt to less than 10 percent by the end of the decade.

Figure 2. The Importance of U.S. Monetary Policy and Oil Revenues for Domestic Policy



D. Oil Production and Pricing Policies

Policy objectives with respect to pricing and production of oil have varied over time. For instance, as a member of OPEC, Saudi Arabia benefited from higher oil prices in the 1970s, which increased oil revenues and helped finance its massive development effort. In the first half of the 1980s, however, the main objective shifted to preventing oil prices from falling. This policy was maintained despite necessitating a significant cut in oil production, causing oil export revenues to plunge and public expenditures to fall. In later episodes—reflecting temporary supply shocks such the first Gulf war in 1990 and the recent disruption of Libyan oil supply—Saudi Arabia has made effective use of its spare capacity and raised oil production in order to ensure that the oil market is well-supplied. In recent years, Saudi Arabia has also formally commitment through the G20 to continue to use its systemic role in the oil market to support the global economy.

A major shift in oil price and production policies occurred in connection with the OPEC crisis in 1986. As the global demand for oil fell in the early 1980s, OPEC assigned production quotas to its members to prevent oil prices from falling. However, the strategy was largely unsuccessful, as several OPEC members produced above their assigned quotas. Saudi Arabia, on the other hand, was committed to the official price system of OPEC and its role as the swing producer. As a result, the country bore the brunt of the cutback in production. Indeed, Saudi oil production fell by over 60 percent between 1981 and 1985. The fall in oil revenues and the decline in its global market share eventually prompted Saudi Arabia to reverse its policy stance.

In September 1985, Saudi Arabia stopped its role as a swing producer and raised output, causing oil prices to fall by over 65 percent between October 1985 and July 1986. Following the 1985–86 episode, Saudi Arabia shifted to a policy focused on protecting and expanding its global market share. Furthermore, Saudi Arabia abandoned the official pricing system of OPEC in favor of a more market-oriented pricing method.[9] With growing demand from developing Asia and a geographically advantageous location, Saudi Arabia also became particularly keen on gaining market share in Asia (Al-Naimi, 2001). Indeed, by 2009, approximately two-thirds of Saudi Arabia's oil exports were sold to the Far East.

IV. Empirical Analyses of External Linkages and Policy Constraints

As highlighted in the previous discussion, three dominant external factors affect the Saudi economy: (i) the global oil price, (ii) the U.S. business cycle and (iii) the emergence of developing Asia as a driver of global oil demand and as a major trading partner and exporter of labor. Table 1 presents an overview of the channels through which each of these three factors affect the Saudi economy. The following sections present an empirical and descriptive assessment of the evolution and strength of these external links and the constraints that they impose on domestic policy.

[9] In an interview in 1998 with SPA (Saudi Press Agency), Oil Minister Al-Naimi stated that Saudi Arabia had abandoned the role of swing producer in the 1980s because it had resulted in the loss of both market share and large oil revenues.

Table 1. Main External Factors Influencing the Saudi Economy		
Oil Prices	**United States**	**Developing Asia**
Fiscal policy: Higher oil prices directly translate into higher budget revenues. Depending on how successful the government is in its attempts to smooth spending, swings in the global oil price are likely to be passed through to non-oil economic activity. This is the most important channel through which the oil price affects the Saudi economy. **Consumer and business confidence:** Higher oil prices typically improve consumer and business confidence as they boost overall wealth, raise expectations of higher fiscal spending, and increase investment opportunities. A permanent oil price shock is likely to have a greater impact on current spending and investment than a temporary shock**.** **Equity prices:** Higher oil prices are generally associated with improved corporate profits and higher equity prices, making external financing more attractive to corporations. Furthermore, higher equity prices have a positive wealth effect, which could potentially boost spending. This channel is likely less pronounced, because equity ownership is not widespread and a large volume of the outstanding shares is held by institutional investors. **Bank lending:** Higher fiscal spending increases the money supply (to maintain the exchange rate peg) and the availability of loanable funds through the banking system. Furthermore, higher oil prices are also likely to improve the balance sheets and cash flows of borrowers, which may lower the cost of borrowing and raise access to credit. **Non-oil exports and imports**: Higher oil prices also affect the pricing of petrochemicals and thus increase non-oil export revenue. On the other hand, the cost of imports may increase due to higher transportation costs.	**Oil Trade:** Although the United States' share of global oil consumption has fallen from 28 percent in 1980 to 22 percent in 2010, the United States remains the largest consumer of crude oil in the world followed by China in second place at 10 percent of total consumption. The U.S. business cycle has thus a significant impact on the global demand for oil. **Exchange rate**: A weaker U.S. dollar implies a depreciation of the Riyal against other currencies. A depreciation normally causes an expenditure-switching effect as imported goods become more expensive for domestic consumers while exports becomes less expensive for foreign consumers. However, the expenditure switching effect is likely to be small in Saudi Arabia as there are few domestic substitutes for imported goods and exports are dominated by dollar denominated oil products. A depreciation of the dollar, however, tends to raise the price of oil and thus boost oil revenues. **Monetary policy:** The counter-cyclical nature of monetary policy in the United States implies that interest rates are raised during expansions and lowered during contractions. To avoid pressures on the exchange rate, SAMA has to adjust its policy rate in tandem with the U.S. policy rate. Hence, for monetary policy in Saudi Arabia to be countercyclical, and thus stabilizing, the U.S. and Saudi Arabian business cycles must be synchronized. The cost of the absence of a synchronized business cycle depends on the strength of the interest channel.	**Oil Trade:** India and China's share of global oil consumption has tripled in the last two decades, currently accounting for over 14 percent. Hence, fluctuations in economic activity in these countries have a significant impact on global oil demand and the price of oil. **Non-Oil Trade:** The price of exports from developing Asia, in particular for food items, affects the consumer prices in Saudi Arabia. As there are few domestic substitutes to these imports, a rise in import prices reduces the availability of disposable income for domestic purchases. **Labor inflow:** Foreign workers in Saudi Arabia are predominantly from developing Asia. Economic conditions and wages in these countries have thus the potential to influence the cost of labor in Saudi Arabia. Furthermore, remittances from Saudi Arabia are not only influenced by economic fluctuations in Saudi Arabia but also by those in the home countries of the migrant workers.

A. Business Cycle Correlations and Global Oil Prices

A reduced-form examination of the interconnectedness between Saudi Arabia, the United States, and developing Asia can be conducted simply by looking at business cycle correlations. Figure 3 compares real non-oil GDP of Saudi Arabia with (i) U.S. real GDP, (ii) developing Asia's real GDP, and (iii) the average global oil price.[10] The annually de-trended data cover three decades from 1980 to 2010.[11] The solid lines in all three figures correspond to economic fluctuations of Saudi Arabia's non-oil GDP, expressed as percentage deviation from trend, while the dotted lines in each figure refer to the other three comparator variables. Four observations immediately stand out.

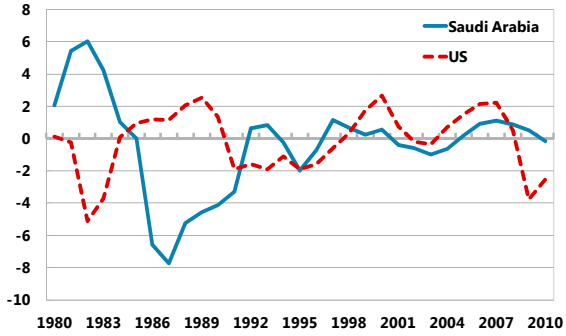
- There is a clear negative relationship between U.S. and Saudi Arabian economic fluctuations in the 1980s. The negative correlation is later reversed and a positive relationship emerges in the mid-1990s.
- Economic fluctuations in developing Asia do not appear to be well correlated with non-oil GDP in Saudi Arabia in the first half of the sample, but become positively correlated at the end of the 1990s and throughout the 2000s.
- Oil prices appear to be positively correlated with Saudi non-oil GDP throughout the whole sample period.
- The volatility of Saudi non-oil GDP falls significantly in the 2000s. This also appears to be true in comparison to the United States and developing Asia.

[10] Developing Asia includes Afghanistan, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, China, Fiji, India, Indonesia, Kiribati, Lao PDR, Malaysia, Maldives, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Samoa, Solomon Islands, Sri Lanka, Thailand, Timor-Leste, Tonga, Vanuatu, and Vietnam.

[11] The data are de-trended using the Hodrick-Prescott filter.

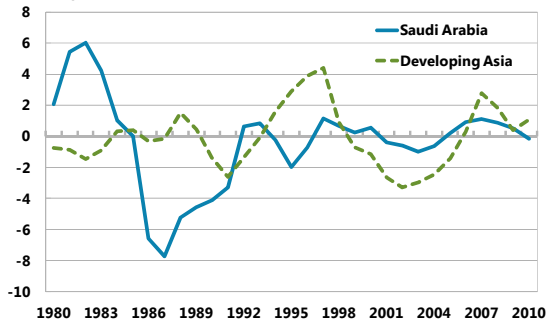
Figure 3. Business Cycle Correlations, 1980–2010

Detrended Output of United States and Saudi Arabia
(Percentage deviation from trend)



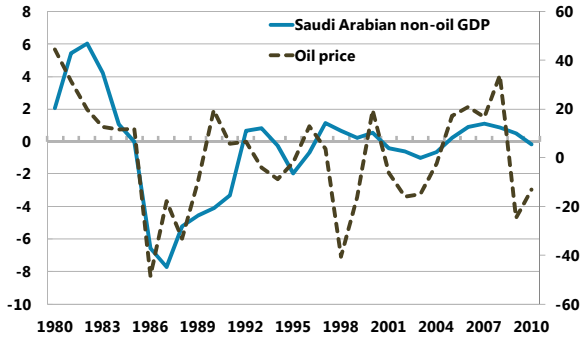
Sources: WEO, CDS, and author's calculations

Detrended Output of Developing Asia and Saudi Arabia
(Percentage deviation from trend)



Sources: WEO, CDS, and author's calculations

Oil Price and Saudi Arabia Non-oil Output
(Percentage deviation from trend)



Sources: WEO, CDS, and author's calculations

Conditional Analysis of Cyclical Output Dynamics

	Sample Period		
Independent Variables[1]	**1980-2010**	**1980-1995**	**1996-2010**
U.S GDP	**-0.66***	**-1.02***	**0.20***
Std. error	(0.24)	(0.48)	(0.10)
Developing Asia GDP	**-0.05**	**0.43**	**0.21***
Std. error	(0.21)	(0.48)	(0.06)
Oil Price	**0.18***	**0.25***	**-0.01**
Std. error	(0.04)	(0.07)	(0.02)
R-squared (adj)	0.49	0.69	0.40

[1] All variables are detrended using the HP filter
*Significance level of 0.05
Source: Author's calculations

To explore the conditional relationship between the three external factors and the Saudi non-oil economy, a simple regression is specified with Saudi Arabia's de-trended non-oil GDP as the dependent variable and the de-trended series of U.S. and developing Asia's real GDP together with the oil price as independent variables. The assumption of exogeneity of the explanatory variables is fairly non-controversial: economic fluctuations in the United States and developing Asia and movements in the global oil price are unlikely to be affected by Saudi non-oil GDP. Given the observed reversal in business cycle correlations, the regression analysis is conducted on the full sample as well as on two subsamples i.e., 1980–95 and 1996–2010. The table in Figure 3 shows the results.

Despite the simplicity of the analysis, the three exogenous variables appear to explain a large share of economic fluctuations in Saudi non-oil GDP. The explanatory power of the exogenous variables increases substantially for the first subsample but falls in the second half of the sample.[12] When the full sample is used, U.S. real GDP is negatively and significantly related to Saudi non-oil GDP. When the sample is split, the negative relationship only holds for the 1981–95 period but turns positive in the 1996–2010 period. As expected, developing Asia's real GDP is not statistically significant when the full sample is used, but is positive

[12] A simple Chow break-test rejects the null hypothesis that there is no break in the coefficient in 1996.

and statistically significant for the 1996–2010 period. Finally, the oil price has a positive impact on non-oil GDP in the first period, but is neither economically nor statistically significant in the second period. The latter may reflect both that oil prices were primarily driven by global demand—captured through the Asian and U.S. business cycle dynamics—and that the pass-through from oil revenues to fiscal spending may have declined.

B. Oil Shocks and Business Cycle Dynamics

What could explain the divergence in the U.S. and Saudi business cycles in the 1980s and the subsequent correlation reversal in the late 1990s and 2000s? To a large degree, the answer is related to whether the oil price cycle was driven by supply or demand. For Saudi Arabia, as a net oil exporter, it is largely irrelevant (at least in the initial stage) whether a rise in the global oil price is due to a positive demand shock or a negative supply shock. Both will cause oil export revenues to rise.[13] However, for a net oil importer such as the United States the economic impact of a supply driven or demand driven oil shock is quite different. For instance, suppose U.S. output is initially at its long-run potential. A positive U.S. output shock would cause the oil price to rise, which in turn, along with the rise of other input prices, would help cool off the economic expansion. A rise in the oil price due to a supply shock, however, increases the cost of production and depresses real wages, pushing output below its potential. Furthermore, if the impact on global growth is large and persistent enough, oil demand may fall and eventually adversely affect oil exporters. Thus, one possible explanation for the observed reversal of the observed business cycle correlation is that oil price shocks were primarily supply-driven in the 1980s and early 1990s, but demand-driven in the late 1990s and 2000s.

The 1980s and early 1990s

Three major oil supply disruptions occurred between 1978 and 1991: the Iranian Revolution (1978–79), Iraq's invasion of Iran (1980–81), and the first Gulf war (1990). Hamilton (2009) calculates the average monthly shortfall of global supply during each particular episode (as a share of global production in the month prior to the episode) as well as the associated cumulative increase in the oil price (Table 2.). All three episodes led to a large disruption in the global oil supply and were associated with a significant increase in the price of oil.

Table 2. Quantity and Price Changes in Past Oil Shocks

Episode	Supply reduction (percent) 1/	Increase in price (percent) 2/
November 1978 -July 1979	1.3	38.7
October 1980 - March 1981	1.2	25.8
August 1990 - October 1990	2.9	71.6

Source: Hamilton (2009)
1/ Average monthly shortfall of global production of crude petroluem over the episode as a share of global production in the month before the episode.
2/ Peak value during the episode of the cummulative change in price, calculated as 100 times the logarithm of the ratio of the current monthly refiner acquisition cost at the beginning of the period.

[13] The assumption is that the oil shock has not originated in Saudi Arabia.

The impact of these shocks on the Saudi Arabian economy was significant. The rise in the oil price in 1978–81 caused oil export revenues in Saudi Arabia to increase by over 90 percent from approximately $58 billion in 1978 to $111 billion in 1981.[14] This sizable windfall was partly spent—as fiscal spending rose by 41 percent over the same time period—and partly saved as international reserves. As a result, non-oil growth increased from 6 percent in 1979 to 10 percent in 1981.

In contrast to Saudi Arabia, the impact on the U.S. economy was far from favorable. Although many factors contributed to the U.S. recessions of 1979–80 and 1981–82, the rise in the price of oil is generally viewed as an important contributor.[15] It is also possible that the resulting inflationary pressure from the oil price shocks helped push the U.S. Federal Reserve to take an anti-inflationary stance and tighten monetary policy, thus further contracting the economy.[16]

The economic downturn in the United States and Europe in the early 1980s (which was similarly affected by the oil shocks and a shift in monetary policy) ultimately led to a sharp decline in oil consumption. To support the high oil price, OPEC assigned production quotas to each member. However, the bulk of the burden fell on Saudi Arabia, which was operating as the swing producer and committed to the official price system. As a result, Saudi oil production fell sharply from 10 mbd in 1980 to about 3 mbd in 1985. Hence, at a time when the U.S. economy was recovering, the favorable conditions in Saudi Arabia began to deteriorate. Oil export revenues fell from $111 billion in 1981 to $11 billion in 1986 and spending fell from $84 billion to $37 billion over the same time period. The effect on growth was substantial: non-oil GDP contracted by 1.2 percent in 1984 and by 5.7 percent in 1986. With abandonment of its role as the swing producer in OPEC, Saudi Arabia's oil revenues slowly began to recover, and the non-oil economy began to expand by the end of the decade.

By the end of the 1980s, the U.S. economy was at its business cycle peak. However, a lingering financial crisis, coupled with tighter monetary policy, started to weigh on the economy, and it fell into a recession in 1990. The oil price shock following Iraq's invasion of Kuwait in August 1990 came therefore at an unfortunate point in time for the U.S. economy and likely worsened the downturn. Meanwhile, the oil price spike—coupled with an increase in Saudi Arabian oil production to compensate for the disruption in global supply—increased oil revenues in Saudi Arabia and further helped the domestic economy in its post-1986 recovery as non-oil growth rose above 5 percent in 1992.

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[14] In fact, it was not until 2004 that oil export revenues surpassed the $100 billion dollar mark again.

[15] See Hamilton (1983 and 2003) and Barsky and Kilian (2004) for a discussion of the link between oil price shocks and U.S. economic activity.

[16] For instance, Goodfriend and King (2005) claim that Volcker and other members of the Federal Open Market Committee argued that inflationary pressures and expectations were rising in 1979 in the face of the impending oil shortage and urged tighter monetary policy.

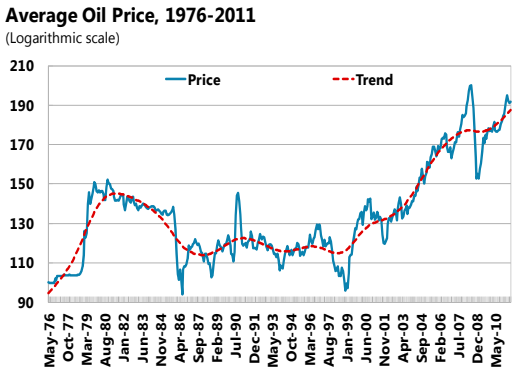
The late 1990s and 2000s

Although several events occurred in the late 1990s and 2000s that had a significant impact on global oil prices (e.g., the Asian crisis, the OPEC meeting in 1999, the recession in 2001, and the second Gulf War in 2003), the most striking characteristic of oil price dynamics has been the consistent upward trend since 1998 (Figure 4.).

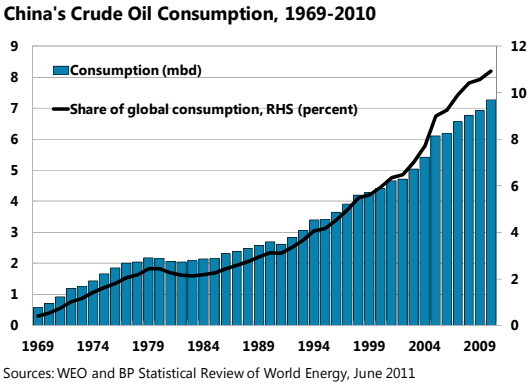
Hamilton (2009) and other observers have attributed this upward trend to the strong growth performance of developing Asia and its impact on global oil demand. Indeed, the sharp increase in crude oil consumption in China, the main consumer within the block of developing Asian economies, is particularly impressive. Since the mid-1990s, crude consumption in China has increased from 3 mbd to above 8 mbd in 2010. The country's share of global consumption increased from 4 percent to 10 percent over the same time period. Meanwhile the share of global crude oil consumption of developing Asia as a whole increased from 11 percent in 1995 to over 19 percent in 2010 (Figure 4.). Developing Asia's rising demand for oil was particularly apparent in the period 2004–08, when the price of oil climbed from an average of $40 per barrel to over $130 per barrel. During this period, developing Asia accounted for over 43 percent of the global increase in crude oil consumption, while North America and Europe combined for 21 percent. Another contributing factor to the sharp rise in oil prices during this period was the stability in global oil production. While the global economy grew by over 19 percent from 2004 to 2008, total oil production only rose by 1.8 percent (from 80.6 mbd to 82.0 mbd).

As oil price dynamics in the 2000s began primarily to reflect demand forces, the oil price cycle became increasingly pro-cyclical. This, in turn, implied that the Saudi non-oil GDP began to co-move positively with both the U.S. and developing Asia's GDP. The sharp increase in oil revenues in the latter part of 2000s translated into stable annual non-oil growth rates of 4 to 5 percent.

Figure 4. Oil Prices and Crude Oil Consumption in China



Sources: WEO and author's calculations



Sources: WEO and BP Statistical Review of World Energy, June 2011

C. The Time-Consistency Problem and Counter-Cyclical Fiscal Policy

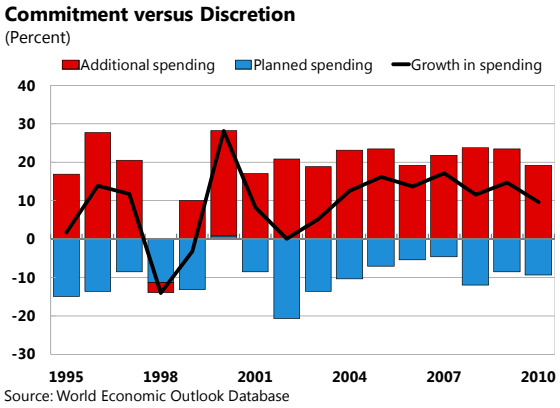
One of the main challenges for policymakers in oil-exporting countries is the so-called time-consistency problem. When policy is discretionary in nature, policymakers tend to be more susceptible to pressure from special interest groups. This susceptibility creates an overemphasis on short-term gains and pushes policy away from the dynamically optimal long-run path, especially in countries where the bulk of government revenues stem from commodity exports. When oil revenues rise, the political pressure on the government to spend increases and may lead to undesirable economic outcomes (e.g., inflation, real appreciation, and fiscal sustainability concerns). Since fiscal policy in Saudi Arabia is the main driving force of the non-oil economy, the degree of pass-through from oil revenues to fiscal spending is an important determinant of fluctuations in non-oil GDP. The more reactive spending is to changes in oil revenues the greater the correlation should be between the oil price cycle and non-oil GDP growth. Indeed, as discussed earlier, one of the main objectives of fiscal policy in Saudi Arabia has been to smooth fiscal spending in the face of highly volatile oil revenues.

Time-consistency problem and the budgetary process

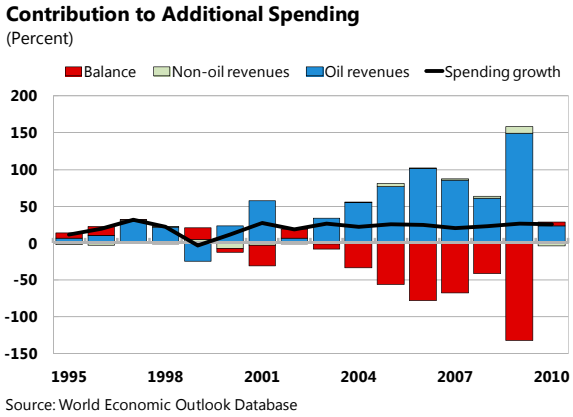
Awareness of the time-consistency problem is clearly displayed in the budgetary process in Saudi Arabia. Each year the budget is approved with a fairly conservative projected oil price. This is a commitment mechanism frequently employed in resource-rich economies; its aim is to limit the pressure on the government to spend. By comparing the budgeted or planned spending with actual spending at the end of the fiscal year, it should be possible to get a sense for how well this commitment mechanism works. The left-hand chart in figure 5 shows the contributions of committed spending (i.e., the difference between planned spending and the previous year's outcome) and additional spending (i.e., the difference between actual spending and planned spending) to realized spending growth. The figure clearly shows the struggle between discretion and commitment. Each year the budget commits to a lower spending level, but each year actual expenditures increase as additional spending predominates.

To further understand what drives this additional spending, one can look at how increases in oil revenues, relative to the budgeted amount, affect spending. In other words, how much of the extra revenue is spent and how much is saved? The right-hand chart in Figure 5 shows the contributions of realized extra oil revenues (i.e., the difference between the projected oil revenues in the budget and the realized level) and extra savings (i.e., the difference between the projected balance and the realized balance) to additional spending growth. Not surprisingly, the figure shows that, in general, increases in oil revenues relative to the budget translate into extra spending. That said, since 2004, as oil revenues surged, the government appears to have been more successful in limiting the impact on additional spending by consistently generating large surpluses.

Figure 5. Discretionary Fiscal Policy and Oil Revenues, 1996–2010



Source: World Economic Outlook Database

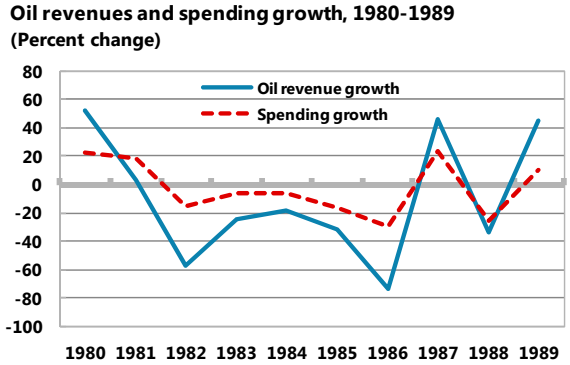


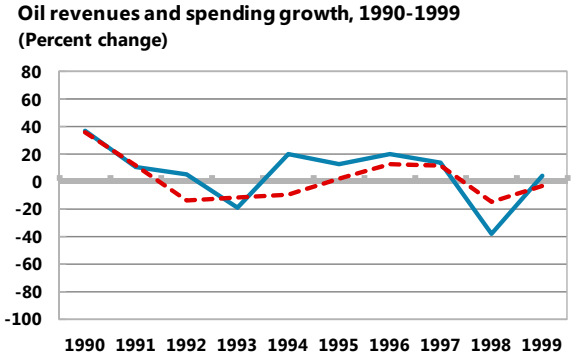
Source: World Economic Outlook Database

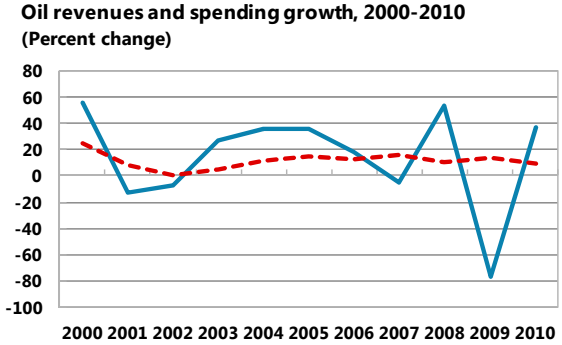
Evolution of countercyclical fiscal policy over the past three decades

How successful has the Saudi government been in its attempt to smooth spending in the face of volatile oil revenues? Charts in Figure 6 plot the growth rate of oil revenues to the budget and the corresponding growth rate of fiscal spending for each of the past three decades, and the table summarizes the volatility of each series and the correlation between oil revenue growth and spending growth for each decade. Three broad observations can be made.

Figure 6. Smoothing Fiscal Spending Against Volatile Oil Revenues







Volatility and Correlation of Oil Revenue, Spending and Non-oil growth

	Oil revenue growth volatility (std)	Spending growth volatility (std)	Correlation between oil revenue and spending growth	Non-oil growth volatility (std)
1980s	44.4	19.8	0.9	4.6
1990s	21.1	16.2	0.7	1.6
2000s	38.5	6.4	0.2	0.7

Sources: National authorities; and IMF staff calculations

- There is a positive relationship between oil revenue growth and spending growth over the past three decades.
- Oil revenue volatility was higher in the 1980s and declined in the 1990s only torise again in the 2000s. Spending volatility, however, has fallen consistently over the past three decades.
- The correlation between revenue and spending was high in the 1980s and 1990s, but fell significantly in the 2000s.

Interestingly spending growth was much smoother in the 2000s than in the other two decades despite only slightly lower oil revenue volatility than in the 1980s. One major difference between the 1980s and 2000s was obviously that oil revenues were declining for a significant portion of the 1980s while the opposite was true for the 2000s. There might thus be an asymmetrical response to increases versus decreases in oil revenues. Nevertheless, it is fairly clear that fiscal policy has become more successful over time in its attempt to smooth spending. This could also potentially explain why non-oil GDP in the 2000s has been less volatile than in previous decades, and why the conditional correlation of the oil price cycle is economically and statistically insignificant.

D. Financial Deepening and the Monetary Transmission Mechanism

In Saudi Arabia, however, the U.S. dollar peg, combined with a relatively open capital account, limits SAMA's ability to independently set short-term interest rates and engage in active exchange rate policy. Of course, the extent to which the peg truly constitutes a constraint depends on the effectiveness of the monetary transmission mechanism. For instance, if the monetary transmission mechanism is weak, imported monetary policy is likely to play a minor role in affecting overall economic activity. Furthermore, as discussed in Table 1, the exchange rate channel in Saudi is also weak for structural reasons (i.e., few domestically produced import substitutes and oil-dominated exports). Although several factors determine the strength of the monetary transmission mechanism in developing and emerging economies, access to finance and the degree of competition in the banking system are generally viewed as crucial (Mishra, Montiel, and Spilimbergo, 2011). The former affects the leverage of monetary policy and the latter the pass-through from policy instruments to the cost and supply of bank credit.

Financial development

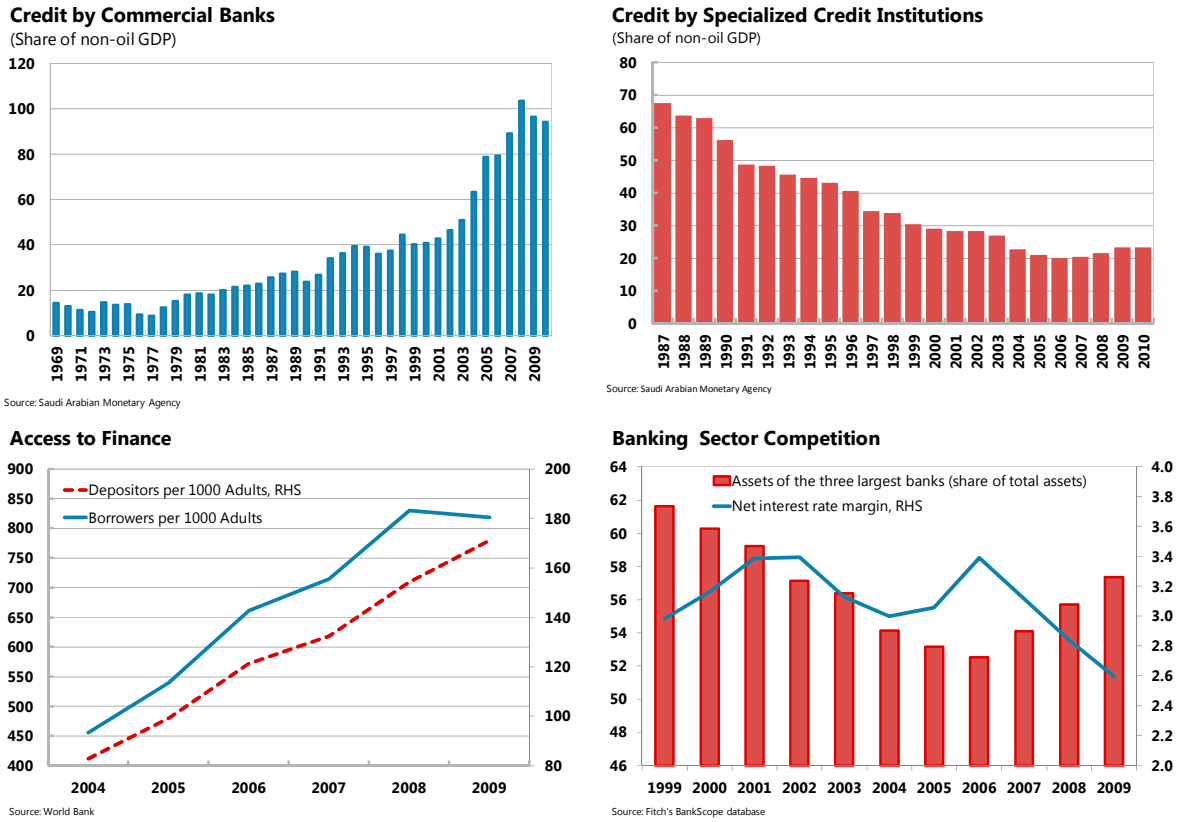
The financial system in Saudi Arabia is dominated by 12 national commercial banks and five SCIs. Although, the equity market has grown remarkably in the past 10 years in terms of market capitalization (from 36 percent of GDP in 1997 to 79 percent in 2010), equity ownership is not widespread, and institutional investors, who own a large share of the outstanding stocks, typically employ a buy-and-hold strategy. Furthermore, the private debt market is negligible and the secondary market for government bonds is basically nonexistent,

as banks and other institutions tend to hold these securities to maturity. As a result, the banking system remains the main channel through which monetary policy affects domestic activity.

In an interesting BIS policy paper in 1998, Mohammad Al-Jasser (former governor of SAMA) and Ahmed Banafe lay out the channels of the monetary transmission mechanism in Saudi Arabia. They argue that monetary policy has the potential to affect the domestic economy through four channels: (i) availability of credit, (ii) the interest rate, (iii) wealth, and (iv) the exchange rate. They view the last two channels as largely mute due to limited collateralization of assets and the exchange rate peg. The authors further argue that the interest and credit channels are also likely to be weak due to the presence of SCIs, lack of financial leverage, and imperfect pass-through of the policy rate to the lending rate.

Since 1998, however, the banking system in Saudi Arabia has grown significantly in size while the relative importance of SCIs has declined. Figure 7 shows bank credit to non-oil GDP from 1969 to 2010 and its components by economic activity, as well as credit extended by SCIs as a share of non-oil GDP since 1987. Bank credit to non-oil GDP did not increase much in the 1970s, but did grow from about 20 percent to 40 percent over the next two decades. The real expansion of the banking system, however, took place in the 2000s, with credit to non-oil GDP rising from 40 percent in 2000 to over 100 percent in 2008. At the same time, low-cost credit extended by SCIs fell from about 70 percent of non-oil GDP in 1987 to around 20 percent by the end of the 2000s. Direct measures of access to credit depict a similar pattern. Between 2004 and 2009, the number of borrowers and depositors (per 1000 adults) in commercial banks almost doubled (see Figure 7).

Figure 7. Measures of Financial Deepening, 1969–2010



Assessing the degree of competition in the banking sector and the strength of the interest rate pass-through is difficult due to lack of official data on lending rates. However, some inference can be drawn from looking at various indicators commonly used as measures for banking sector competition. The lower right hand chart in Figure 7 shows how the net interest rate margin and asset concentration in the banking system evolved between 1999 and 2009. The share of assets belonging to the top three banks decreased steadily between 1999 and 2006, but has since increased, reaching about 57 percent in 2009.[17] The net interest rate margin has more or less consistently fallen over the past decade with the exception of 2005–06, when a speculative bubble in the stock market caused personal loans, which generally carry higher average interest rates, to soar. SAMA has also taken important steps to liberalize the banking system and allow for increased competition. For instance, accession to WTO in 2005 required allowance for the increased presence of foreign banks. In sum, financial sector development over the past decade suggests that the effectiveness of monetary policy should have increased as the frictions indentified by Al-Jasser and Banafe (1999) have loosened up.

[17] This rise may be due to the ramping up in government capital spending and the need for project financing, as large banks are better positioned to finance these projects.

Relationship between credit and non-oil GDP

A first step to assessing the evolving relevance of monetary policy is to examine whether credit has become increasingly important to business cycle dynamics. One way of testing this is to see whether the ability of real credit to forecast fluctuations in non-oil GDP has improved over time. That is, using time-series terminology, does real credit *Granger-cause* non-oil GDP? Of course, because of the endogenous relationship between growth and credit the reverse may also be true.

Table 3 shows the results of the Granger causality test using annual de-trended data between 1980 and 2010 of real credit and non-oil GDP.[18] Interestingly, the test clearly fails to reject the null of no Granger causality for both the full sample as well as for the 1980–95 period. However, for the sample period 1996–2010 the null is rejected at a 5 percent significance level. Thus, it appears that credit has indeed become more relevant for non-oil activity and
vice versa.

Table 3. Granger Causality Test for Real Credit and Non-Oil GDP

	1981-2010	1981-1995	1996-2010
Does real credit Granger cause non-oil GDP?	No	No	Yes
(p-value)	(0.93)	(0.52)	(0.00)
Does non-oil GDP Granger cause real credit?	No	No	Yes
(p-value)	(0.79)	(0.39)	(0.05)

*The test was conducted with two lags but the results are robust with three and four lags as well
Source: Author's calculations

To further investigate the relationship between bank credit and non-oil economic activity, a simple two-variable vector autoregressive model (VAR) is constructed using annual data from 1980 to 2010. Again, the model is first estimated for the full sample and then for the subsamples 1980–95 and 1996–2010. The purpose is to use innovation accounting and compare the impulse responses and variance decompositions for the two subsamples in order to see whether the influence of credit on the non-oil economy has increased over time. Because of the small sample size, 30 observations, the model is purposely kept parsimonious with de-trended data on real credit and real non-oil GDP as endogenous variables and the oil price as an exogenous variable.[19]

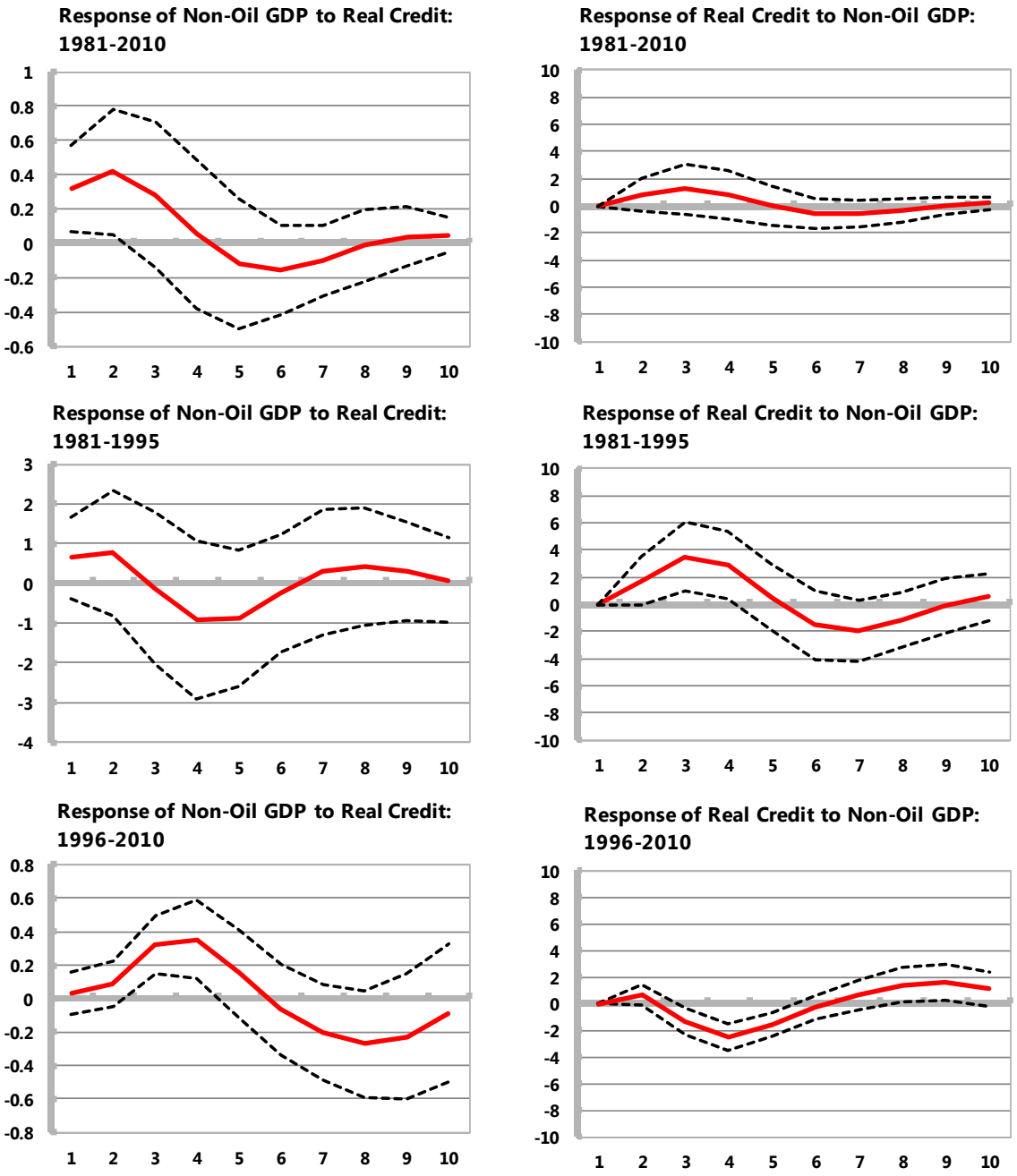
[18] The test is conducted using two lags of the dependent variable. However, the results are robust to three and four lags as well.

[19] Including the oil price makes sense because both credit and non-oil GDP may be heavily influenced by government spending, which in turn is to a large extent driven by oil revenues.

Figure 8 shows the impulse response functions for real credit and non-oil GDP for the full sample and the two subsamples. For the full sample, the response of non-oil GDP to a one standard deviation shock to real credit is positive in the first two years but statistically insignificant. Also, real credit responds positively to a shock to non-oil GDP but is also not statistically significant. The dynamics change substantially when the sample is split. Non-oil GDP still responds positively initially to real credit shocks in both sub-periods. However, although the magnitude of the response is smaller, the positive effect is more prolonged and statistically significant in the 1996–2010 period. The reverse is true for the response of real credit to a non-oil GDP shock. Interestingly, the positive effect is much stronger and persistent in 1980–95 than 1996–2010.

Finally, Table 4 shows the results from the variance decomposition for the two subsamples as well as the full sample. For the five- and 10-year horizons, the results shows that that real credit explains more of the forecast error variance of non-oil GDP in the 1996–2010 period than in the 1980–95 period. Again, this seems to indicate an increased relevance of credit for the non-oil economy.

Figure 8. Impulse Responses from the Real Credit/Non-Oil GDP VAR
(Response to a one standard deviation innovation with plus/minus 2 standard errors)



The model was estimated with two lags as suggested by the Akaike Schwartz criteria. The identification scheme assumes that non-oil GDP reacts contemporaneously with a shock to credit but not the reverse. The results do not change markedly if the reverse ordering is used.

Table 4. Variance Decomposistion

	Horizons	1981-2010	1981-1995	1996-2010
Percentage of forecast variannce of non-oil GDP explained by shocks to real credit	**1**	0.0	12.9	0.2
	5	20.5	40.1	58.4
	10	24.2	40.5	63.8
Percentage of forecast variannce of real credit GDP explained by shocks to non-oil GDP	**1**	0.0	0.0	0.0
	5	0.8	7.5	8.1
	10	0.9	7.7	8.4

Source: Author's calculations

Relationship between LIBOR, inflation, and credit

Although the results from the annual data indicate evidence for the increased relevance of credit for non-oil activity, it would be useful to examine high-frequency data to capture short-run dynamics. Unfortunately, there does not exist a quarterly GDP series covering a long enough time period to facilitate such an analysis. High-frequency data do, however, exist for some monetary variables starting in the late 1990s. Thus, it should be possible at the very least to estimate the relationship between credit and the short-term interest rate.

To do so, a monthly VAR was specified with credit and the CPI as endogenous variables and the three-month LIBOR, the oil price, and an international food price index as exogenous variables. The VAR is estimated by log-differencing the variables (except for the LIBOR). The main objective is to test whether the LIBOR significantly impacts credit and inflation. Table 5 displays the results from the VAR with respect to the exogenous variables. The full sample is 1997:1 to 2008:9. The end date was chosen to exclude the global financial crisis as it represents a structural break in U.S. monetary policy, as well as a sharp disruption in the overall economic environment. Furthermore, the model was estimated for two sub samples (1997:1-2003:12 and 2003:9-2008:9) to evaluate the evolution of the interest rate channel over time.

When the full sample is used, LIBOR is negatively correlated with credit growth and positively related to inflation, but the net effect of a rise in LIBOR would be a decline in real credit growth. However, none of the exogenous variables are statistically significant. When the sample is split, statistical significance emerges in both subsamples. In the first period, a statistically significant relationship between LIBOR and credit growth is not established. However, for the later period LIBOR has a negative and statistically significant impact on credit growth. Interestingly, the reverse is true for LIBOR and CPI inflation. In the first period, LIBOR has a negative and statistically significant effect on inflation, while the relationship breaks down in the second period. Note that the influence of an increase in LIBOR on real credit growth is positive in the first period but negative in the second. The period 2003:9-2008:9 also shows some significance in terms of other exogenous variables. As expected, the oil price has a positive impact on credit growth, and international food

prices have a positive impact on inflation. Perhaps more surprising is that the nominal effective exchange rate (NEER) is positively and significantly correlated with credit growth. These results appear to indicate that the relevance of imported monetary policy for credit rose in the 2000s. That said, although the sample size might be adequate for statistical analysis, the short sample period may raise the concern that the results are period-specific.

Table 5. The Impact of LIBOR on Credit and Inflation

	1997:5-2008:9		1997:6-2003:8		2003:9-2008:9	
Exogenous Variables	**Credit**	**CPI**	**Credit**	**CPI**	**Credit**	**CPI**
3-Month LIBOR	**-1.20**	**0.08**	**1.29**	**-0.71***	**-4.55***	**0.54**
	(1.14)	(0.17)	(1.37)	(0.19)	(1.87)	(0.32)
Oil price	**0.03**	**0.01**	**-0.03**	**0.00**	**0.15***	**-0.01**
	(0.02)	(0.01)	(0.02)	(0.00)	(0.03)	(0.01)
International food price	**-0.01**	**-0.00**	**0.03**	**-0.02**	**-0.10**	**0.04***
	(0.07)	(0.00)	(0.85)	(0.11)	(0.09)	(0.01)
NEER	**0.00**	**-0.01**	**-0.27**	**0.02**	**0.49***	**-0.04**
	(0.14)	(0.02)	(0.16)	(0.02)	(0.22)	(0.04)
R-squared (adj)	0.13	0.35	0.19	0.29	0.27	0.41
Optimal Lag length*	3		4		1	
Number of observations	137		75		61	

* The optimal length criteria was chosen based on five different lag order selection criteria.

Source: Author's calculations

V. CONCLUSION

This paper examines the evolution of Saudi Arabia's interconnectedness with the global economy and the constraints that these linkages impose on domestic policy. Two important developments over the past couple of decades were emphasized. First, the growing need for oil need in developing Asia has become increasingly important for oil market dynamics. Second, financial sector development in Saudi Arabia has strengthened the monetary transmission mechanism. The former implies that developing Asia's economic fluctuations will have greater influence on Saudi oil export revenues, while the latter suggests that U.S. monetary policy will have more influence on the Saudi non-oil sector.

As external links continue to evolve, it is important to understand the implications for domestic policy. Given Saudi Arabia's growing interconnectedness with developing Asia (e.g., China and India) and the continued commitment to the U.S. dollar peg, tension between policy objectives could arise when global oil prices move countercyclically with the United States business cycle. These developments underline the importance for Saudi Arabia of effectively using fiscal policy as a stabilizing tool, and of further refining macro prudential instruments to influence monetary conditions independently of interest rate policy. Encouragingly, there seems to be some evidence that fiscal policy has been increasingly successful in smoothing spending despite continued volatility in oil revenues, possibly accounting for the lower output volatility in 2000s.

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