

Online Appendix for “Oil and Fiscal Policy Regimes”

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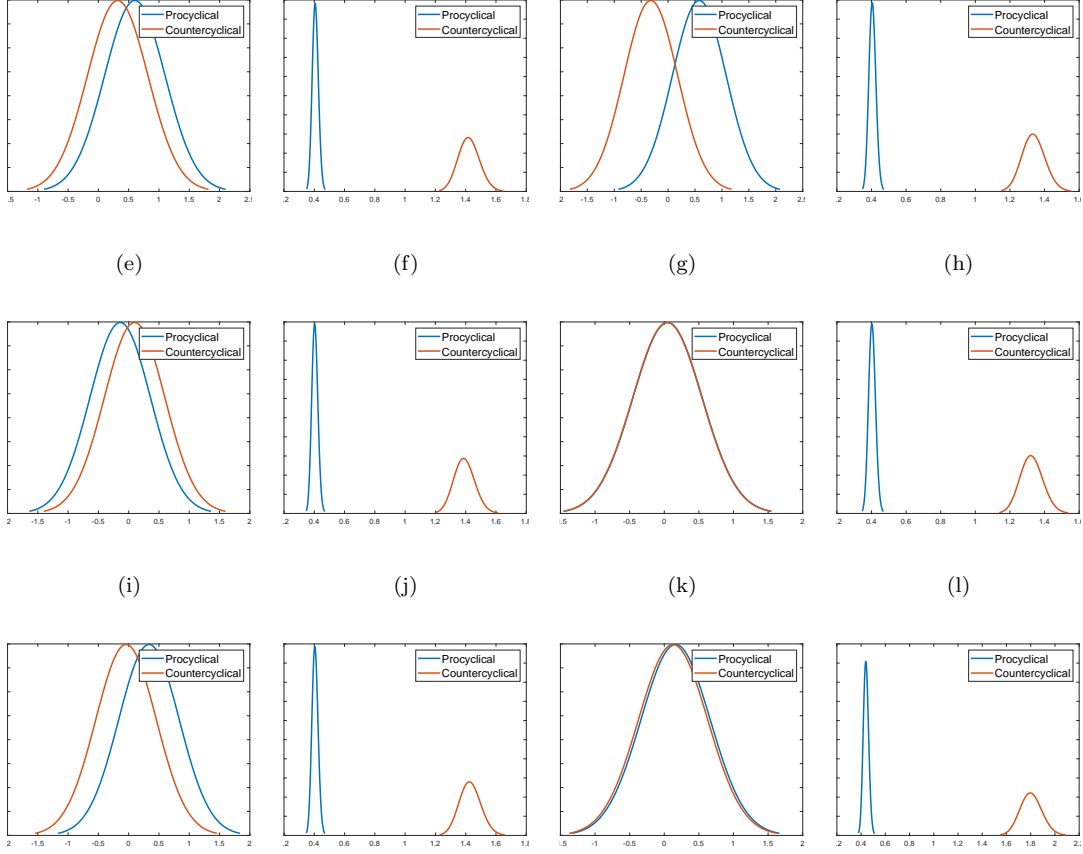
Appendix A: Estimates for intercepts and volatilities for individual countries

Figures A.1-A.20 present a graphical analysis using posterior densities for all the countries of our sample excluding Norway, Russia and Saudi Arabia (for which we present the results in the main body of the paper).

In particular, the figures below show the kernel density estimates of the posterior densities of the Markov-switching intercepts and volatilities for the different countries in the two regimes for the six variables of our model. Such figures present evidence of regime identification and a description of the two regimes.

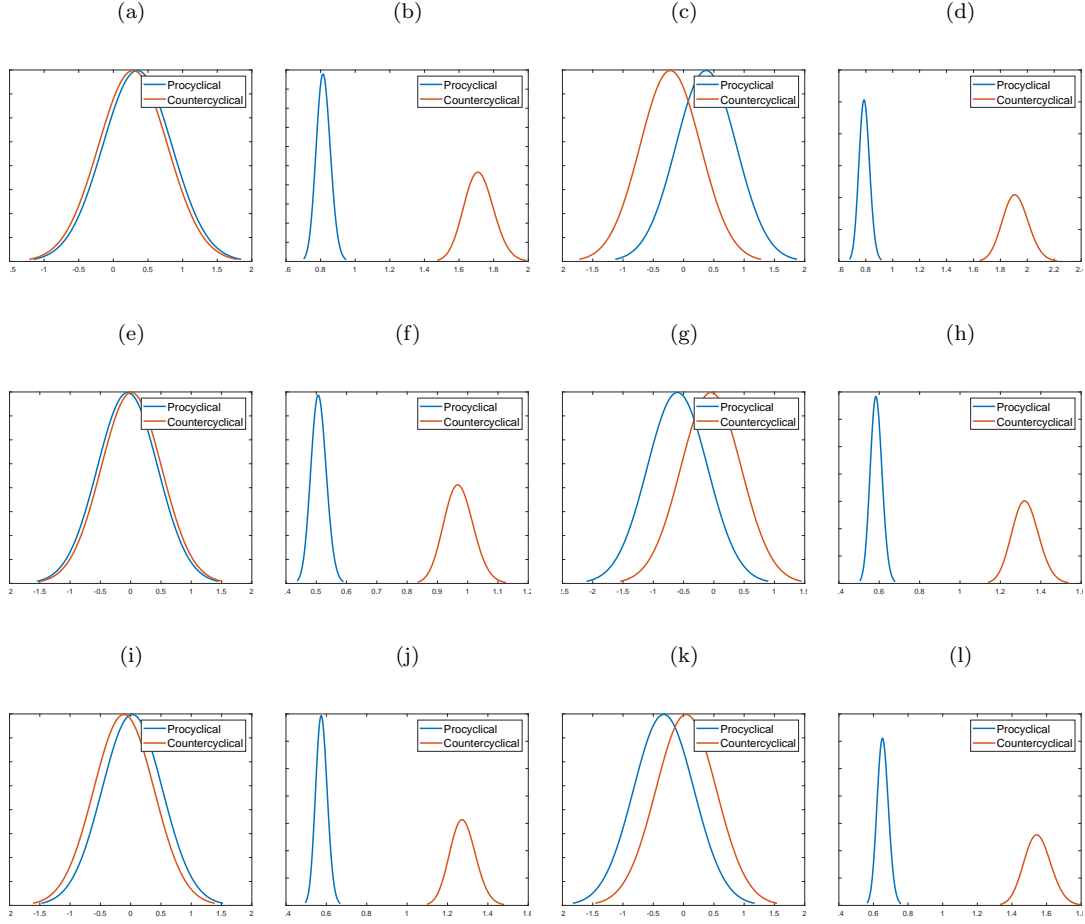
In the left panels of the graphs, the horizontal axes report the values of the intercepts, whereas the vertical axes the probability density functions.

Figure A.1: Intercepts and volatilities estimates for Australia
(a) (b) (c) (d)



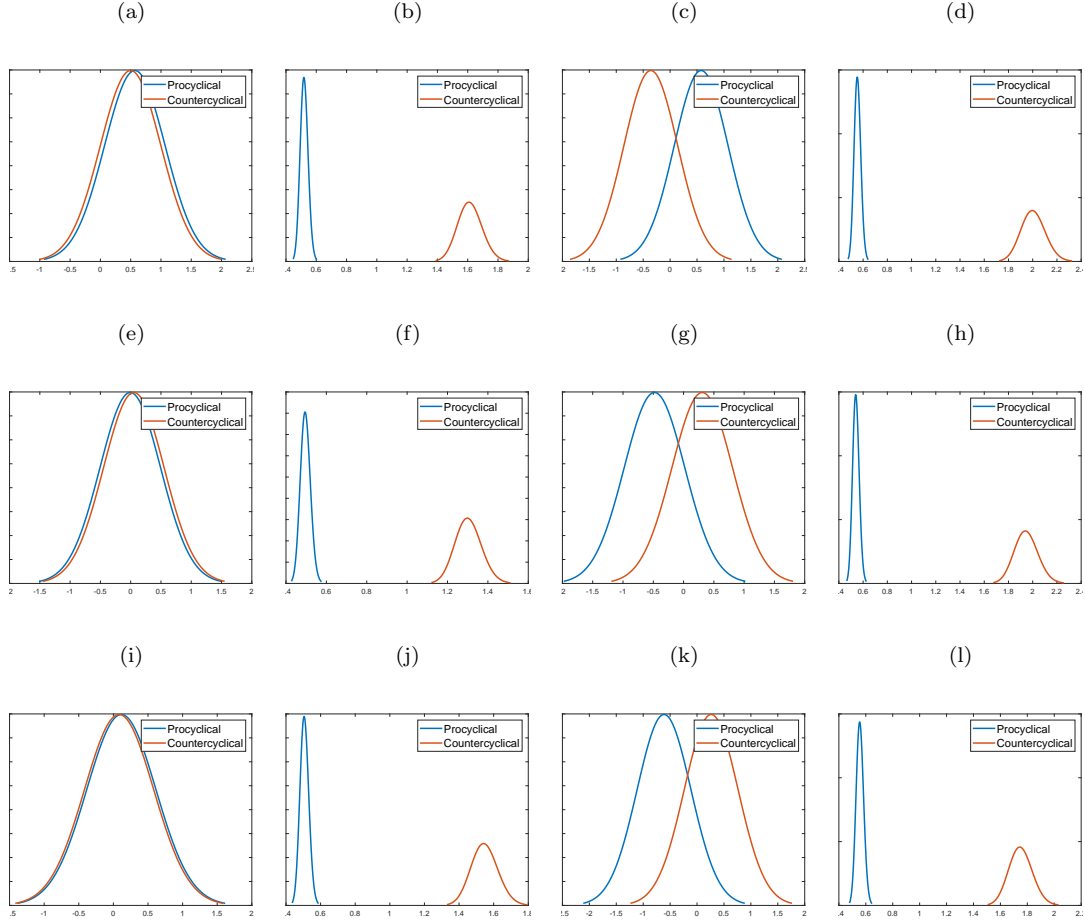
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Figure A.2: Intercepts and volatilities estimates for Canada



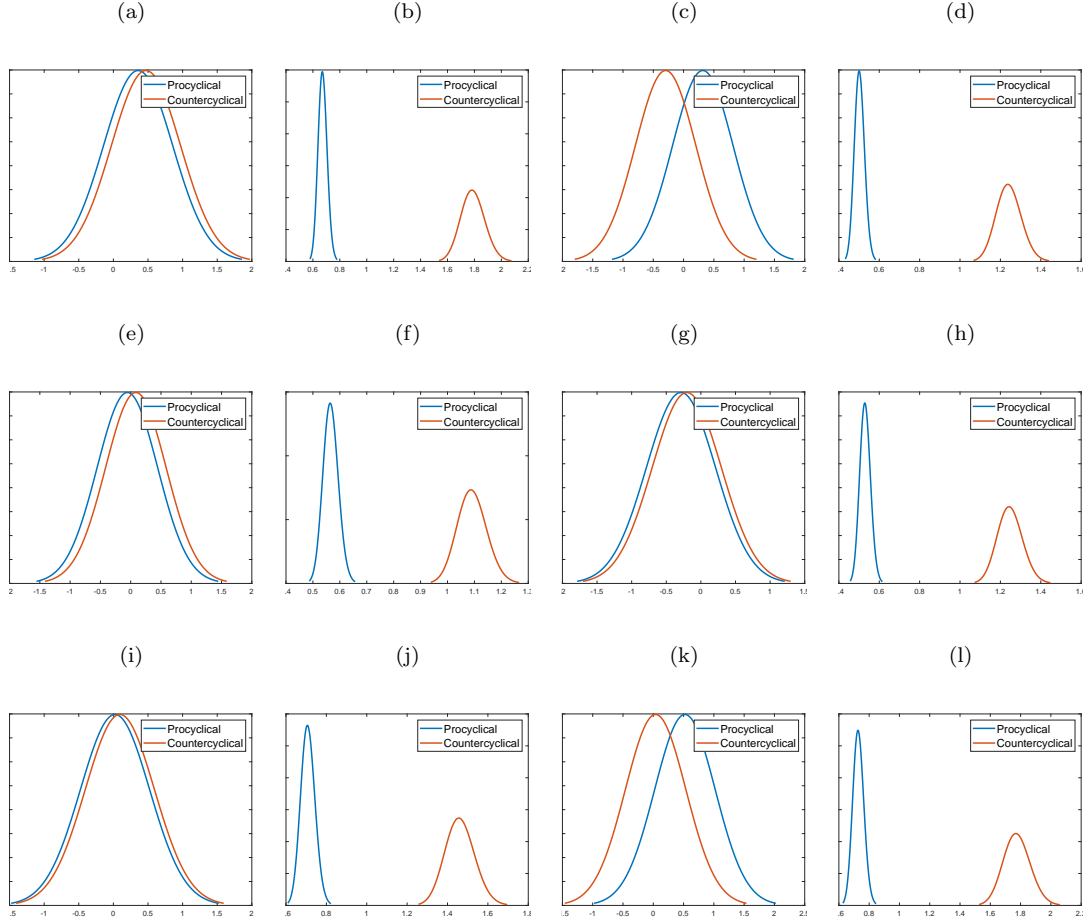
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Figure A.3: Intercepts and volatilities estimates for Mexico



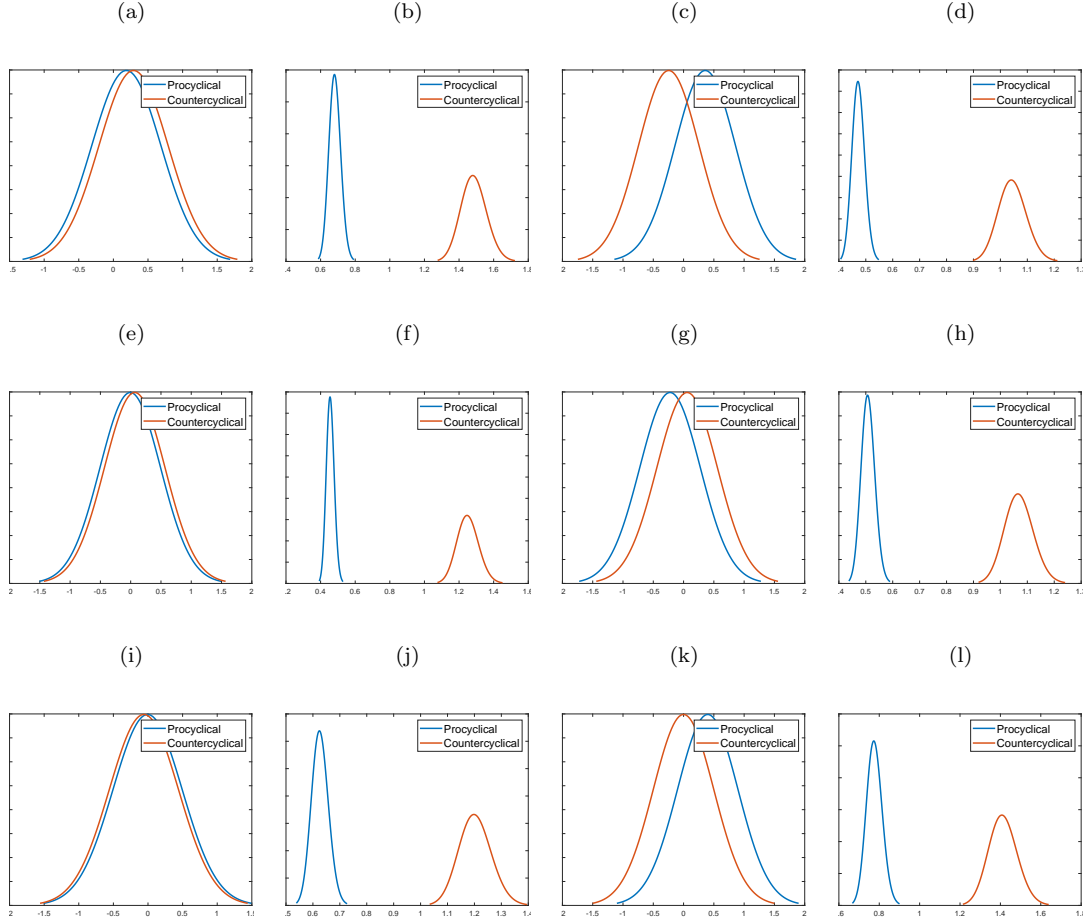
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Figure A.4: Intercepts and volatilities estimates for UK



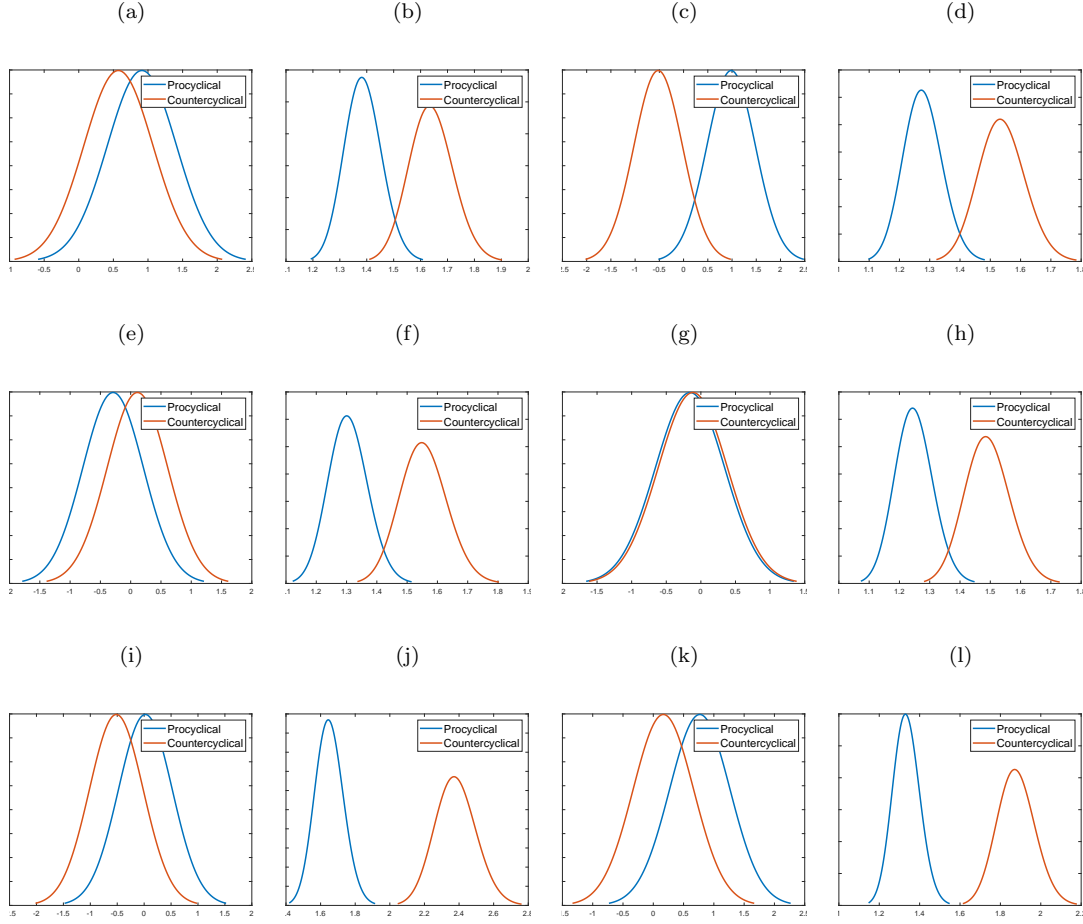
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Figure A.5: Intercepts and volatilities estimates for US



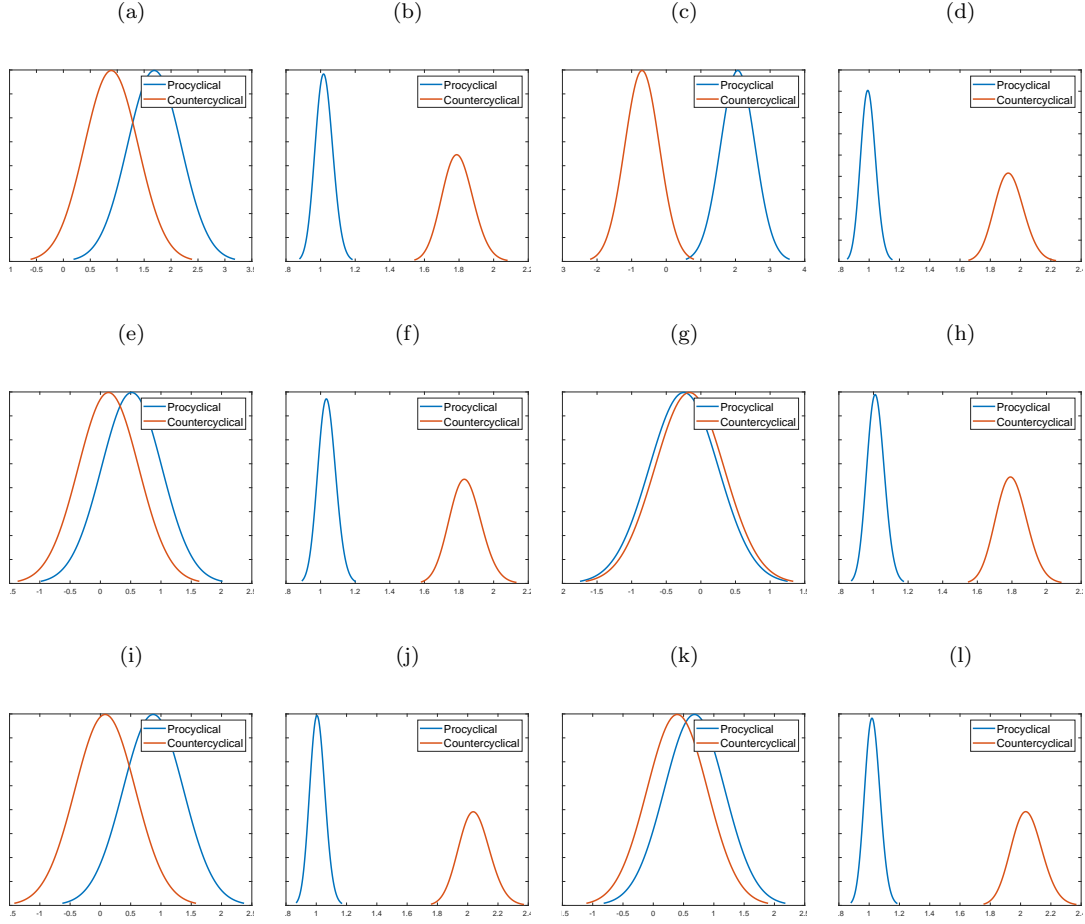
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Figure A.6: Intercepts and volatilities estimates for Algeria



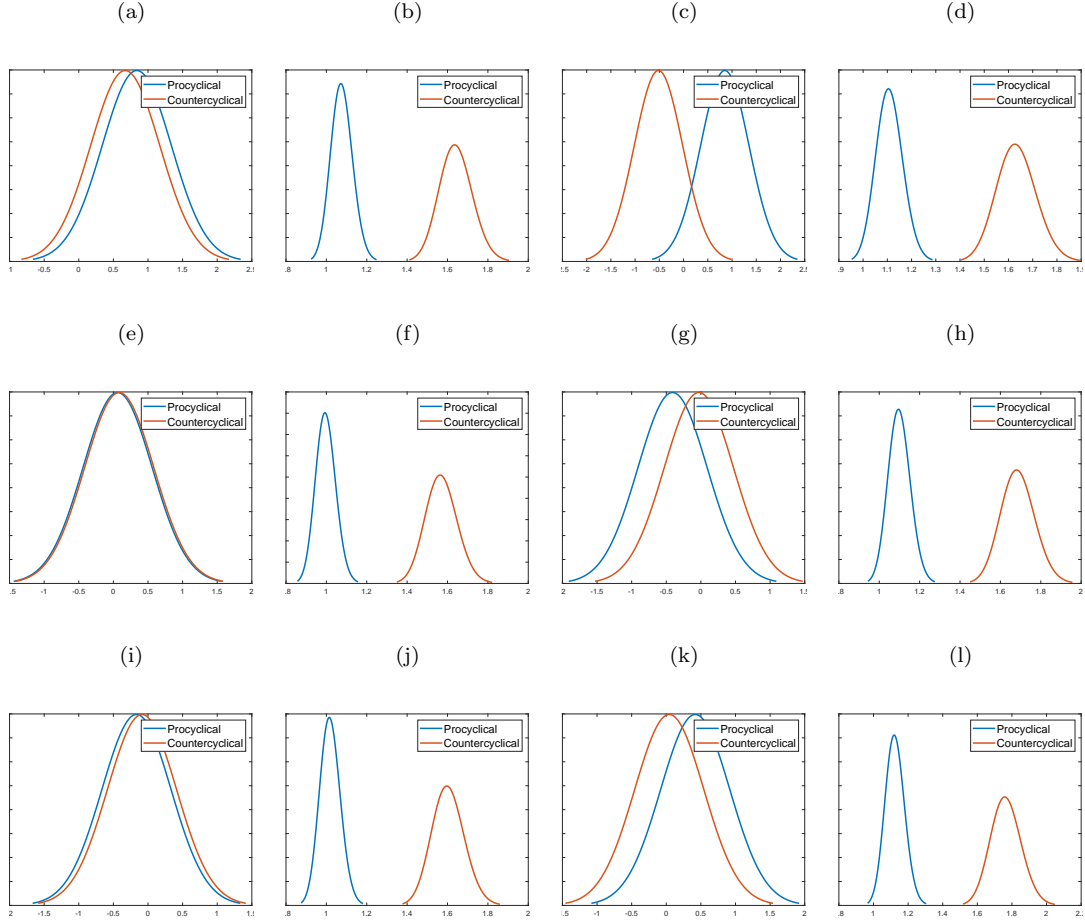
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Figure A.7: Intercepts and volatilities estimates for Angola



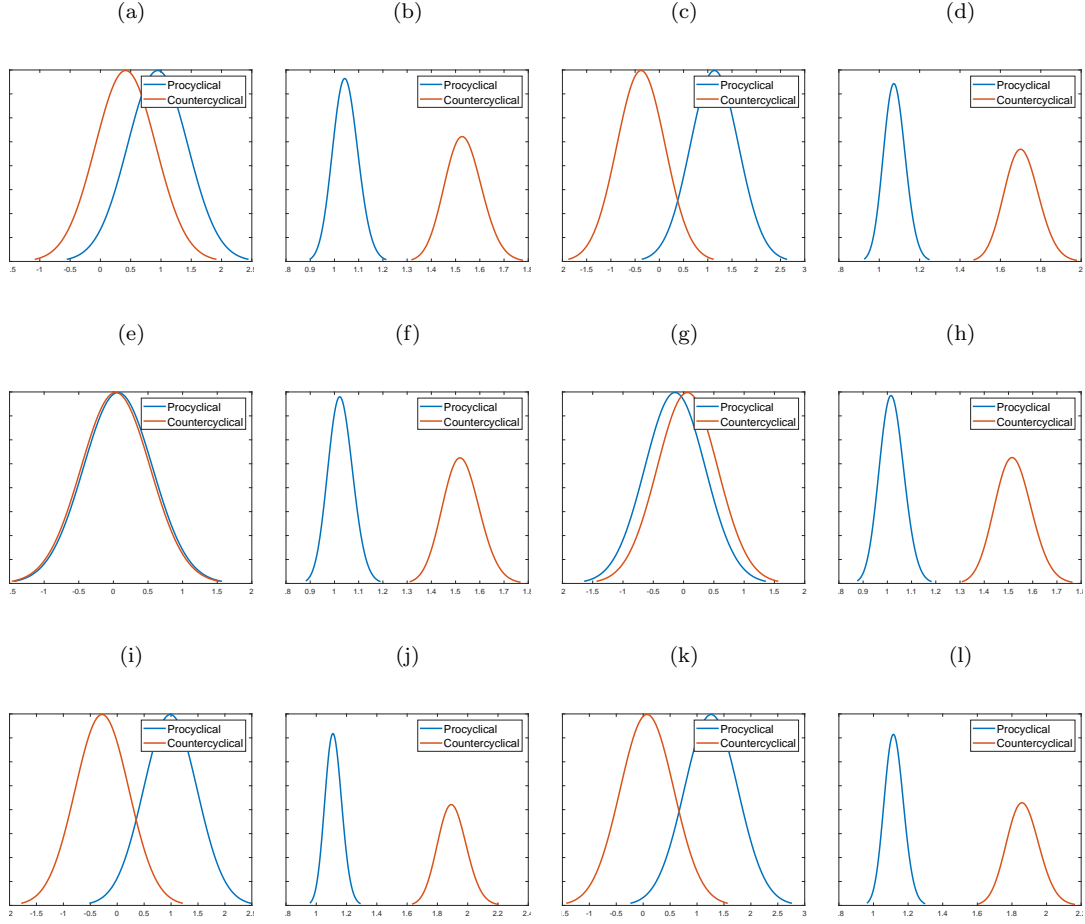
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Figure A.8: Intercepts and volatilities estimates for Azerbaijan



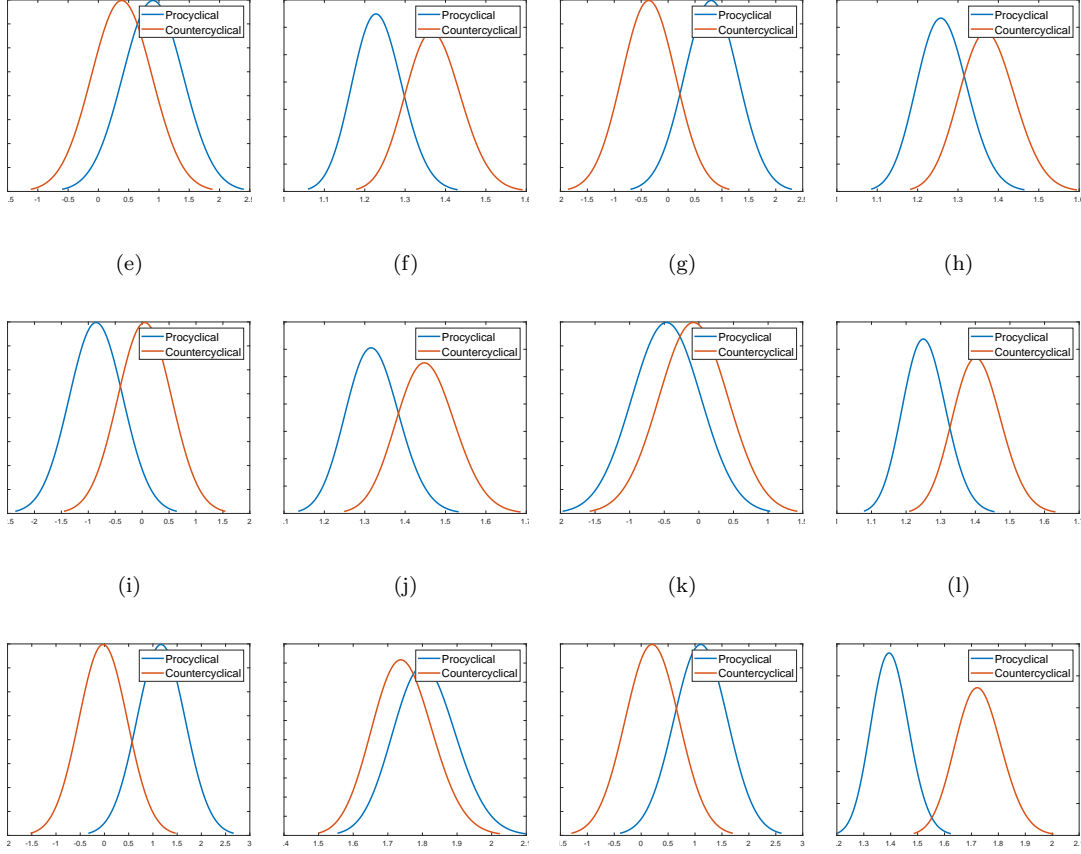
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Figure A.9: Intercepts and volatilities estimates for Colombia



Notes: Graph (a) corresponds to the intercept of total government expenditure / GDP; Graph (b) corresponds to the volatility of total government expenditure / GDP; Graph (c) corresponds to the intercept of government oil revenues / GDP; Graph (d) corresponds to the volatility of government oil revenues / GDP; Graph (e) corresponds to the intercept of non-oil fiscal balance / GDP; Graph (f) corresponds to the volatility of non-oil fiscal balance / GDP; Graph (g) corresponds to the intercept of public employment / total employment; Graph (h) corresponds to the volatility of public employment / total employment; Graph (i) corresponds to the intercept of real oil price; Graph (j) corresponds to the volatility of real oil price; Graph (k) corresponds to the intercept of real exchange rate; Graph (l) corresponds to the volatility of real exchange rate.

Figure A.10: Intercepts and volatilities estimates for Ecuador
(a) (b) (c) (d)



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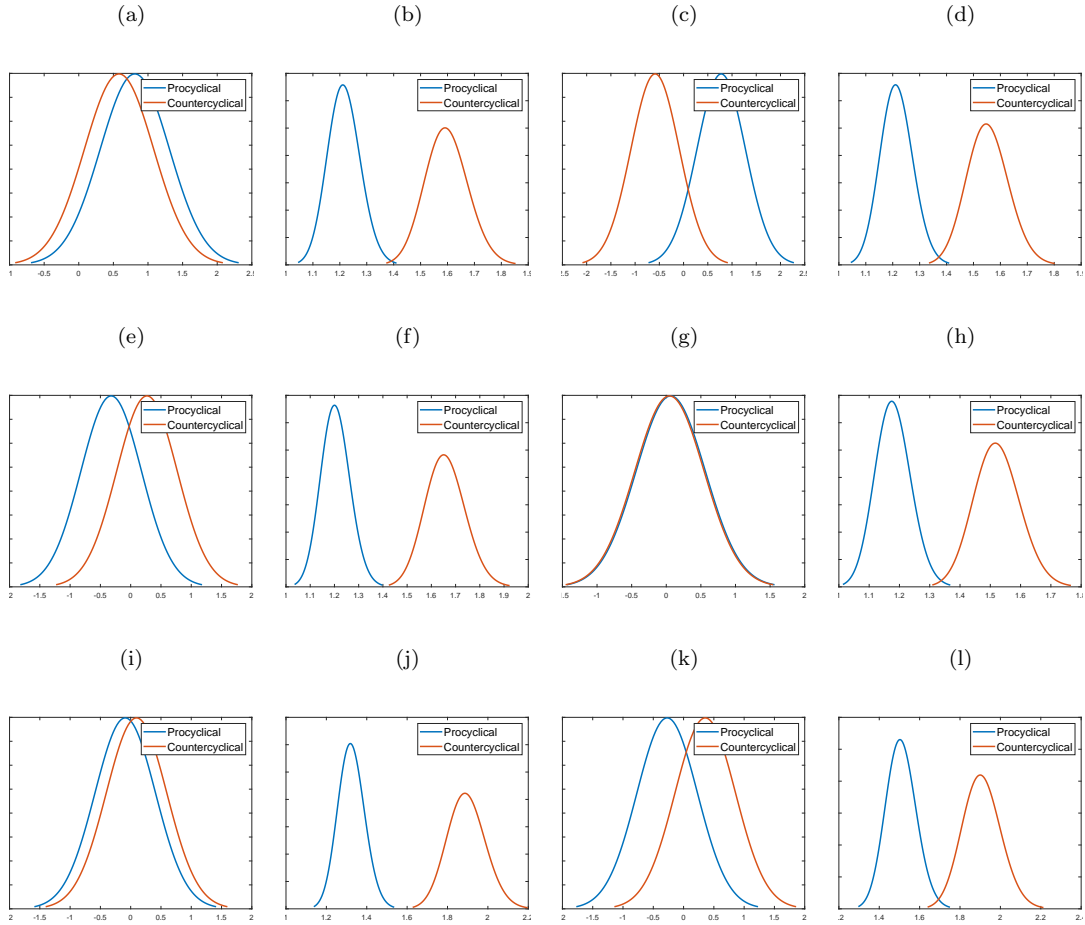
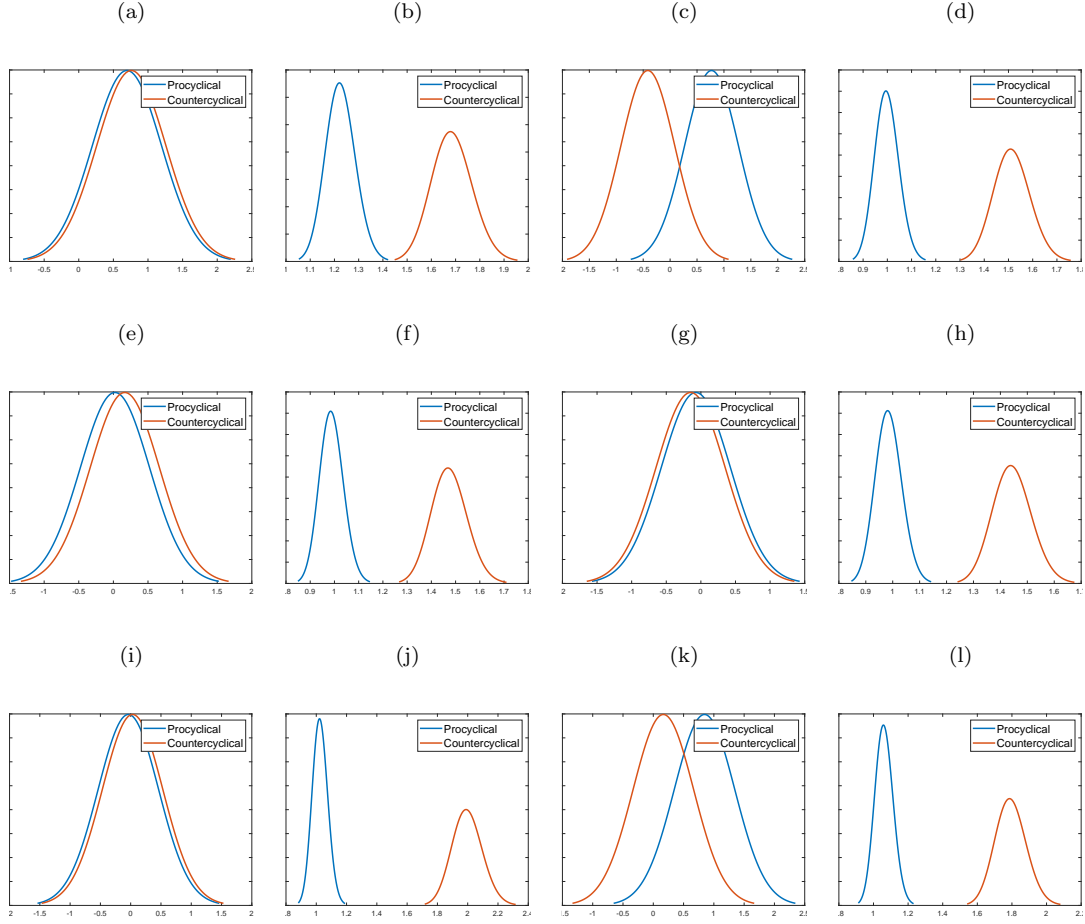


Figure A.11: Intercepts and volatilities estimates for Gabon

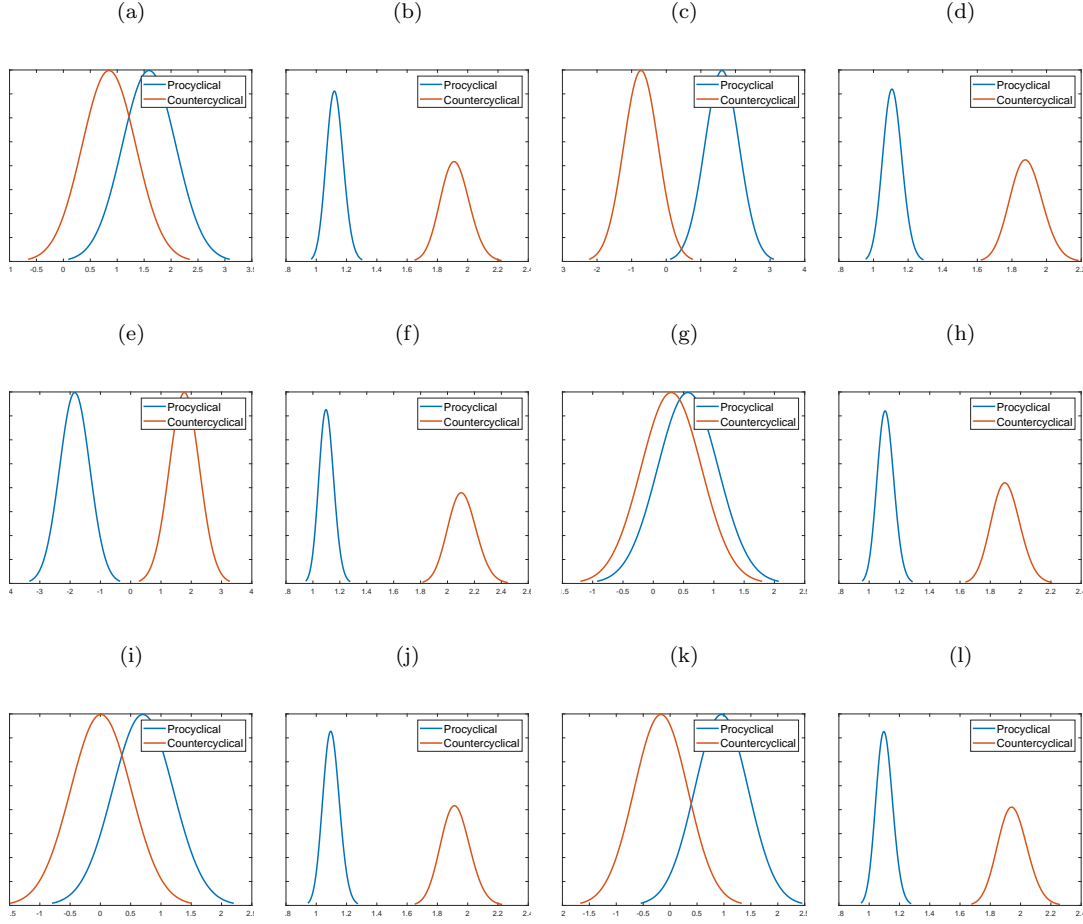
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Figure A.12: Intercepts and volatilities estimates for Iran



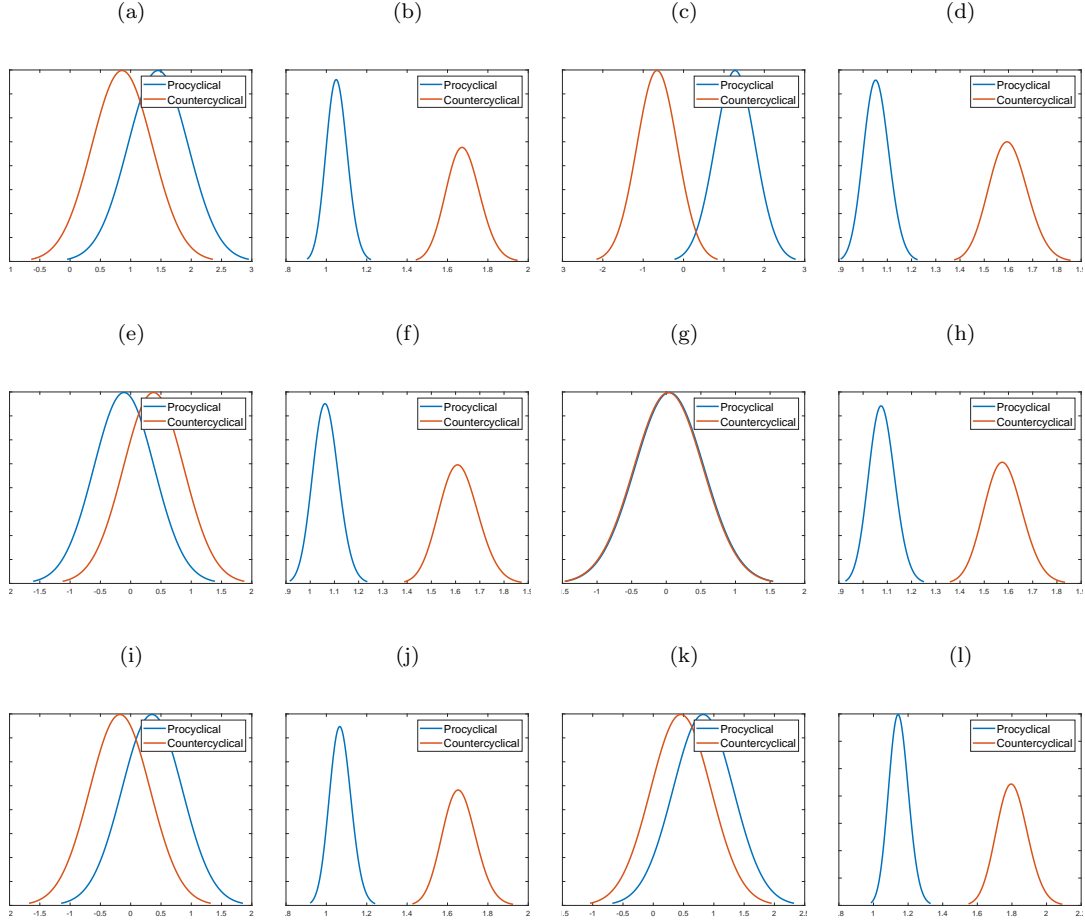
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Figure A.13: Intercepts and volatilities estimates for Iraq



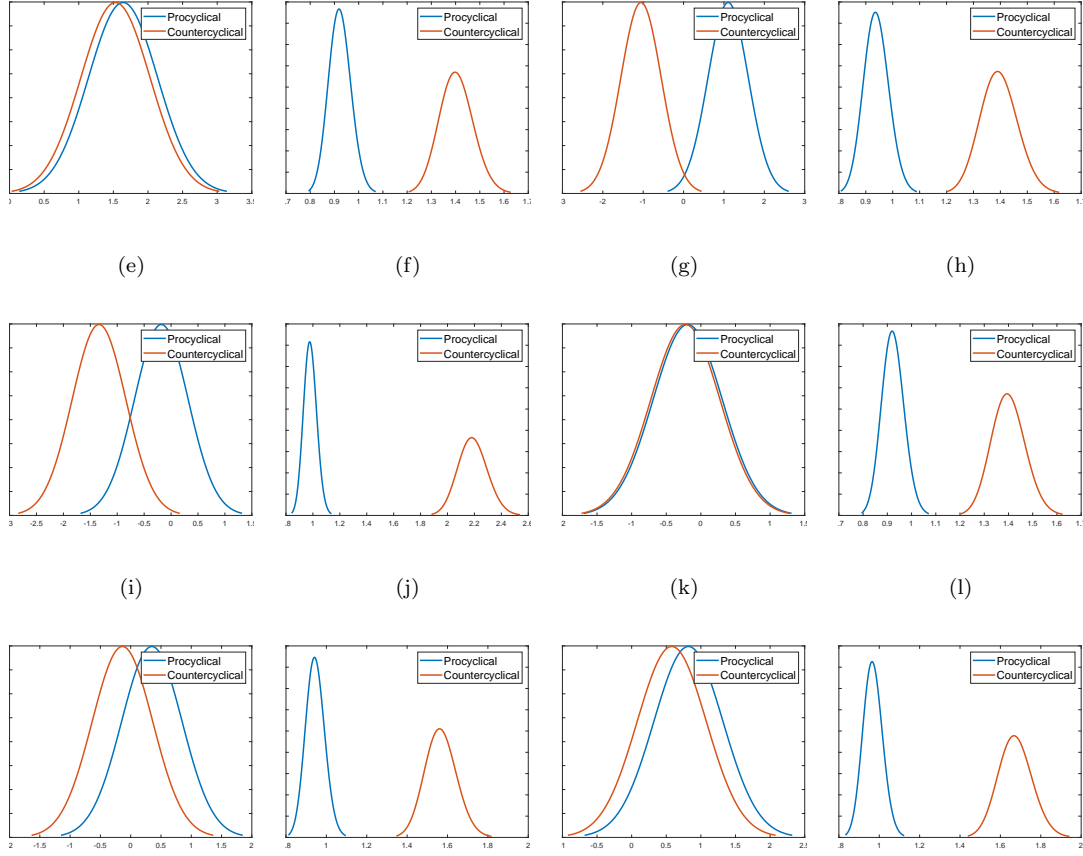
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Figure A.14: Intercepts and volatilities estimates for Kazakhstan



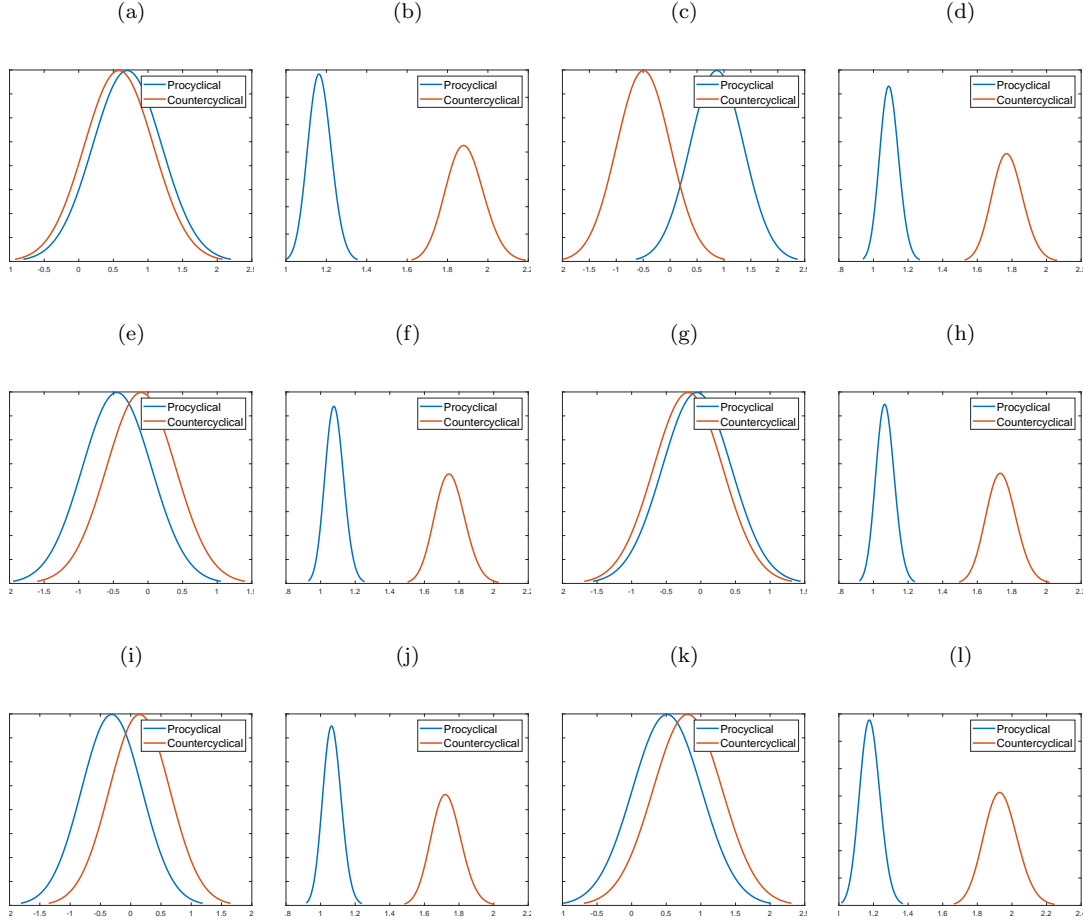
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Figure A.15: Intercepts and volatilities estimates for Kuwait



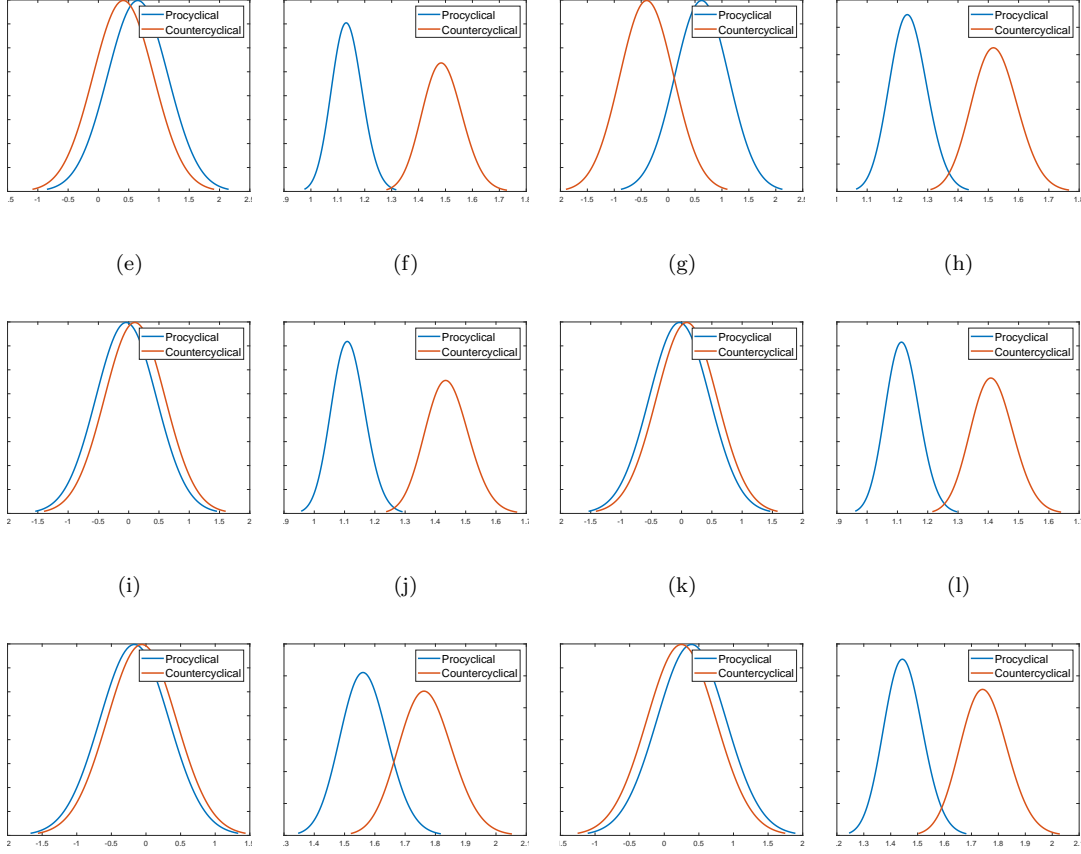
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Figure A.16: Intercepts and volatilities estimates for Libya



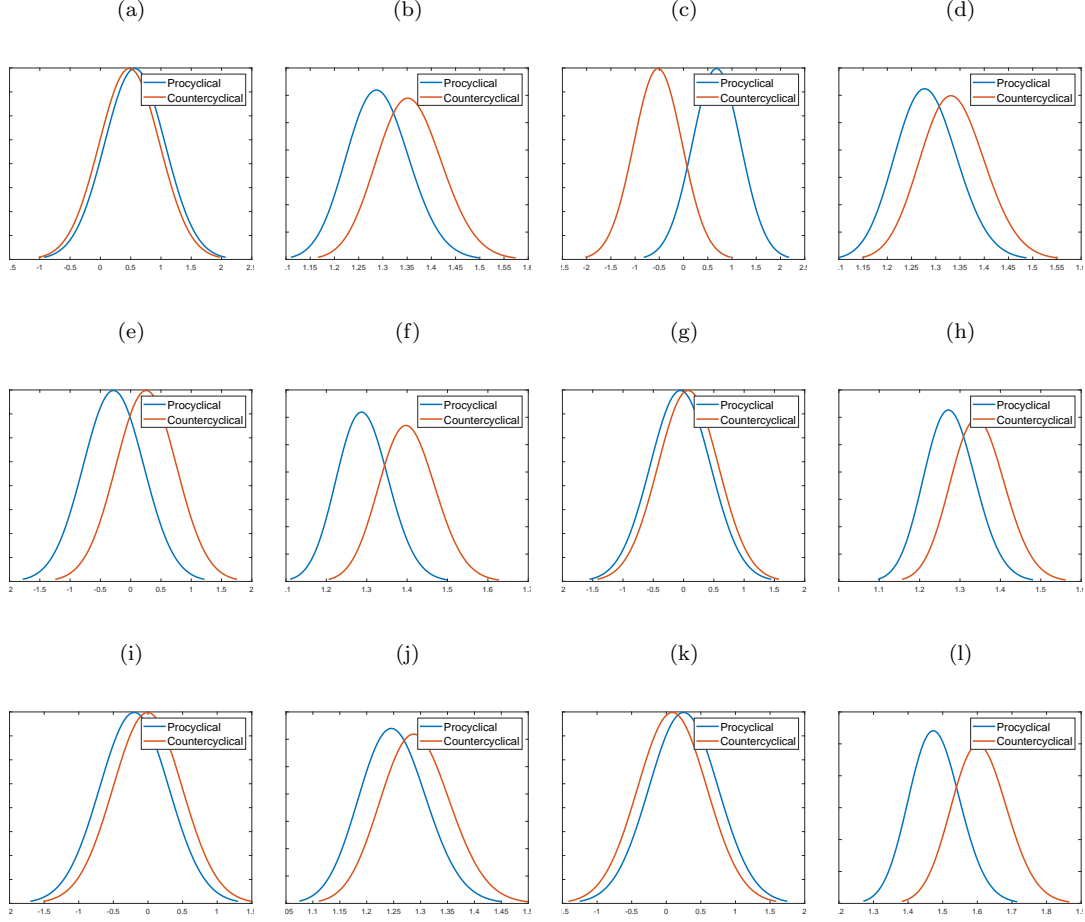
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Figure A.17: Intercepts and volatilities estimates for Nigeria
(a) (b) (c) (d)



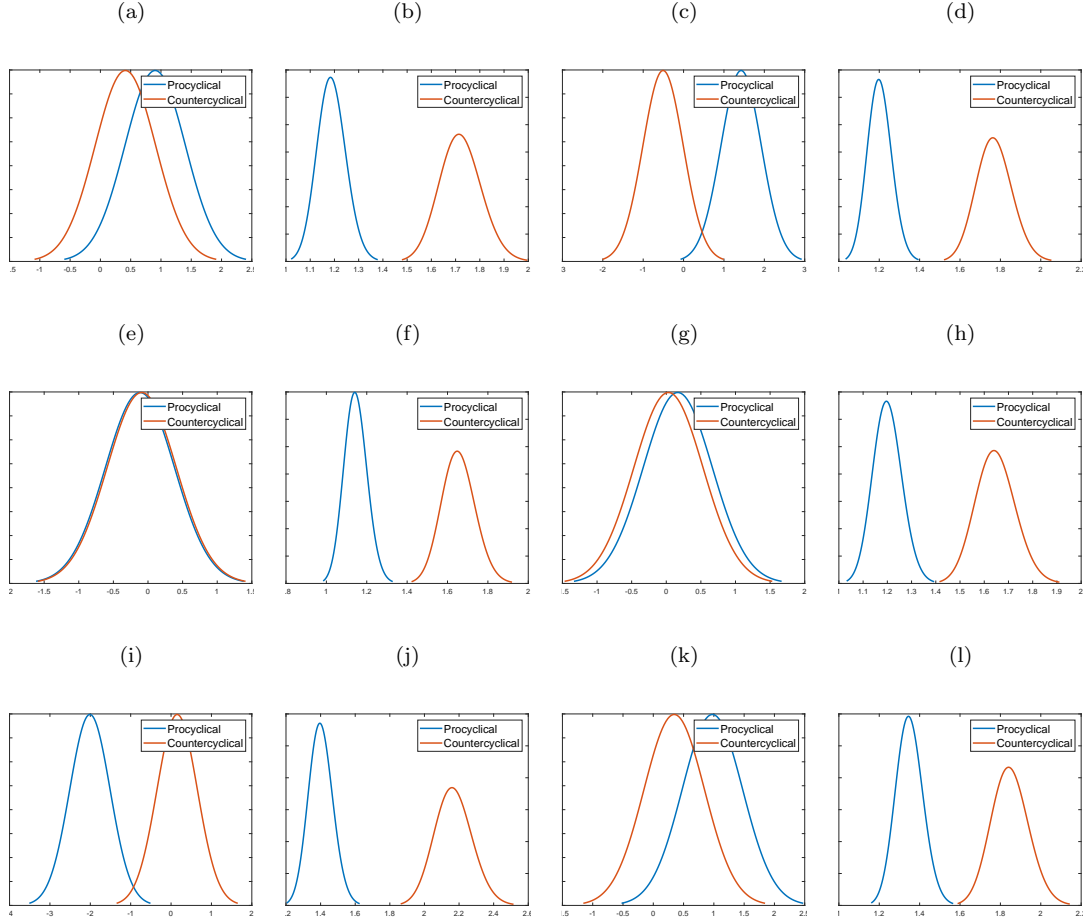
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Figure A.18: Intercepts and volatilities estimates for Qatar



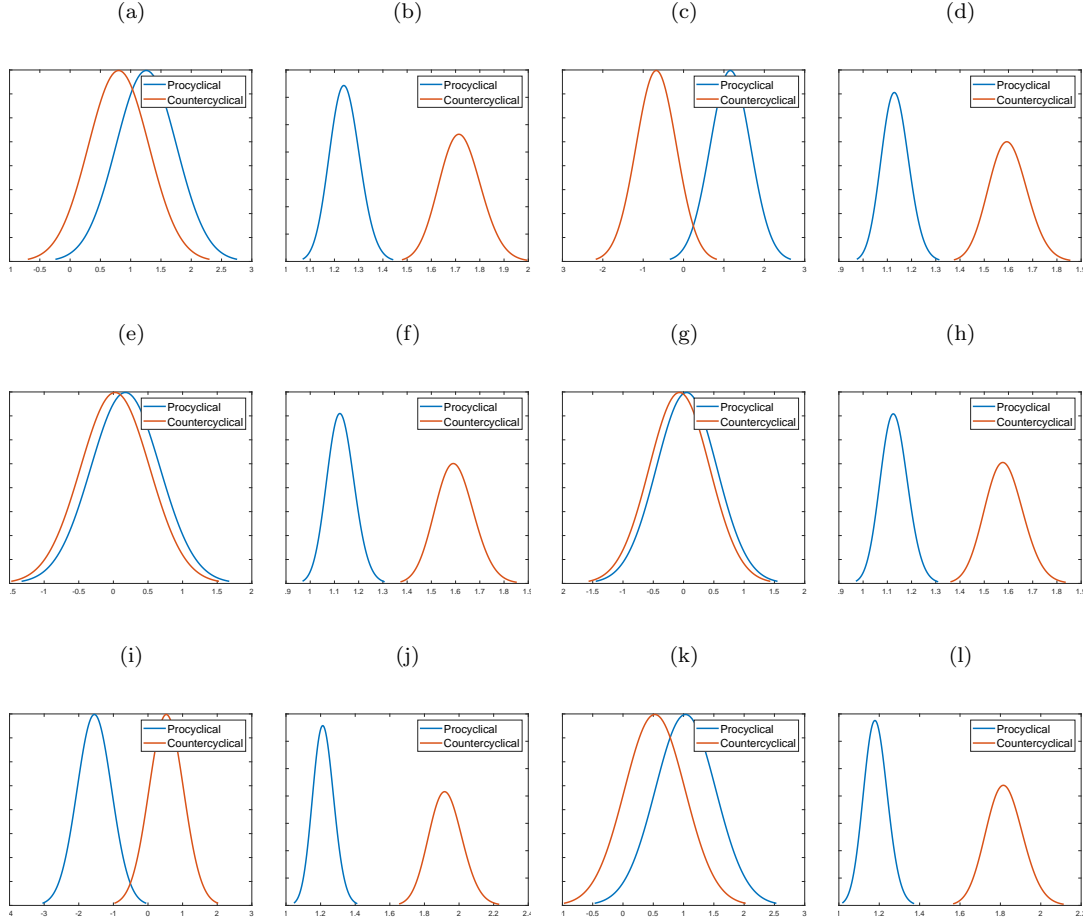
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Figure A.19: Intercepts and volatilities estimates for UAE



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Figure A.20: Intercepts and volatilities estimates for Venezuela



Notes: Graph (a) corresponds to the intercept of total government expenditure / GDP; Graph (b) corresponds to the volatility of total government expenditure / GDP; Graph (c) corresponds to the intercept of government oil revenues / GDP; Graph (d) corresponds to the volatility of government oil revenues / GDP; Graph (e) corresponds to the intercept of non-oil fiscal balance / GDP; Graph (f) corresponds to the volatility of non-oil fiscal balance / GDP; Graph (g) corresponds to the intercept of public employment / total employment; Graph (h) corresponds to the volatility of public employment / total employment; Graph (i) corresponds to the intercept of real oil price; Graph (j) corresponds to the volatility of real oil price; Graph (k) corresponds to the intercept of real exchange rate; Graph (l) corresponds to the volatility of real exchange rate.

Appendix B: Regime probabilities for individual countries

Figures B.1-B.3 report the procyclical fiscal policy probabilities for all the countries of our sample excluding Norway, Russia and Saudi Arabia (for which we present the results in the main body of the paper). In what follows, we provide a short description of these probabilities for both OECD and non-OECD countries.

OECD countries:

Australia. Fiscal policy in Australia has been mainly countercyclical in the period considered. There are only two exceptions. The first exception is during the early 1990s when a recession interrupted the fiscal consolidation. This recession originated from the extremely tight monetary policy, which contributed to the bursting of the commercial property price bubble, combined with a worldwide economic recession, see Gruen and Sayegh (2005). The second episode of procyclical fiscal policy was during 2016, when aggregate demand was led by strong public investment growth in infrastructures, see IMF (2018).

Canada. In 1981/1982 Canada experienced a strong economic recession. This was also an era of high federal-provincial tension as the federal government and the provinces dealt with reduced productivity, slower economic growth, and inflation. This resulted in an increase in government spending that caused in budget deficit. As a share of GDP, the deficit peaked during the recession era of the early 1980s, hitting 8.2% in 1984, see Di Matteo (2017).

In mid-1990s Canada faced the federal fiscal crisis. The ratio of net debt to GDP achieved an historical record of 72.8% in 1995. Therefore, in this period debt crisis became a primary issue, see Di Matteo (2017).

Mexico. In the first half of the 1990s, the Mexican government issued a growing amount of short-term debt with nominal value indexed in dollars and payable in

pesos, the so-called “tesobono” debt. This became the largest source of short-term borrowing for the federal government. At end of 1994, the government allowed free floating and the peso lost value. Investors refused to buy new issues of “tesobonos”. This caused a debt crisis, see Meza (2018).

In the second half of the 1990s the Mexican economy experienced a banking crisis. This happened because, at the beginning of 1995, high real interest rates produced an increase in past due loans. As a consequence, both borrowers and banks received financial support from the government. The debt originated by the rescue of banks and borrowers achieved 11.7% of GDP in 1999, see Meza (2018).

In 2009, both primary deficit and domestic debt increased in response to the beginning of the financial crisis. Two additional facts induced an increase in debt between 2008 and 2009. The first was the implementation of the reform to the “Ley del ISSSTE”.¹ The cost of this reform represents 2.6% of the increase in total debt. The second fact was the elimination of a special investment regime for PEMEX.² This accounted for 8.8% of the total increase in debt, see Meza (2018).

According to OECD (2015), between 2012 and 2015, Mexico adopted an expansionary fiscal policy with the peak of government expenditure relative to GDP achieved in 2015.

United Kingdom. In 1986, the UK experienced a drop in the government non-oil balance following a savings and loan crisis. During the 1990s the UK saw the most violent swings in public deficit of the entire post-war era. The decade started with an extremely rapid rise in borrowing, so that in just a few years the surpluses of the late 1980s had turned into a deficit of unprecedented peacetime proportions. In 1993, the public sector net borrowing reached 7.8% of GDP. Between 1994 and 1997, according to Clark and Dilnot (2002), there can be no doubt that fiscal policy was significantly expansionary.

¹The ISSSTE was an institution that provided health and other services to workers in the public sector.

²PEMEX is the Mexican state-owned petroleum company.

At the end of 2007 the first consequences of the Global Financial Crisis started to be evident in the UK. The economy was particularly exposed to the crisis because of its large financial sector, high household indebtedness, and strong cross-border links. Economic activity contracted sharply, the unemployment rate increased, property prices plunged, and inflation decreased despite a significant depreciation of sterling. The financial crisis led to a dramatic deterioration in public finances, see IMF (2009c).

The current account deficit continued to increase after the Global Financial Crisis. It reached 5.1% of GDP in 2014. The increase was due almost entirely to a weaker income balance. Part of this decline could reflect structural factors, such as the UK's increasingly favourable corporate tax rates attracting more inward FDI. However, part of the decline in the income balance was temporary, reflecting factors such as unusually low returns on British investments abroad, possibly due to relatively subdued growth in major investment destinations such as continental Europe, see IMF (2016).

United States. In 1972/1973, the US government non-oil balance deteriorated due to stagflation induced by both the oil crisis and stock market crash, see Merrill (2007).

In 1976/1977, President Carter adopted fiscal policy measures that were expansionary. In particular, the US government proposed a reduction in personal and business taxes. Moreover, an expansion in public works and job training programs were adopted, see May (1993).

In 1982/1983, the US economy experienced an economic recession induced by the increase of oil prices after the Iranian Revolution. Tight monetary policy was adopted by the US FED in order to control inflation. This induced a fall in GDP. In that period, the government non-oil balance deteriorated, see Sablik et al. (2013).

The combination of the 1990 oil price shock, the debt accumulation of the 1980s, and growing consumer pessimism combined with the weakened economy produced a brief recession in the early 1990s. This caused the deterioration of the

government budget between 1990 and 1993. In subsequent years, President Clinton aimed at reducing the budget deficit as well as tackled the public investment deficit, see Elmendorf, Liebman, and Wilcox (2001).

In 2004/2005, tax cuts and expenditure increases turned the US public sector into a significant borrower. The federal government budget shifted from a 2.5% of GDP surplus in 2000 to a 3.5% of GDP deficit in 2004, see IMF (2005c).

The US general government deficit was at about 9.5% percent of GDP in 2011, one of the highest among major advanced economies, reflecting both cyclical weakness and a supportive structural stance. Policy-makers have provided support to the weak recovery by extending the payroll tax cut and emergency unemployment benefits through 2012, see IMF (2012b).

Non-OECD countries:

Algeria. From Figure B.2, first panel, we observe that procyclical probabilities are high during 2000, 2004 and 2005. According to IMF (2001a), the combination of high oil revenues and increased political and social tensions led the authorities to announce a 2001-2004 recovery plan involving a substantial boost to aggregate demand. At the same time, hydrocarbon production increased by 5%. With the surge in oil prices, hydrocarbon revenues reached 30% of GDP. Government expenditure, fuelled by a surge in capital outlays, increased by 22%, see IMF (2001a).

During 2004-2005, Algeria experienced a period of economic growth led by increased output in the hydrocarbon sector and sustained activity in the construction and services sectors. In light of Algeria's buoyant hydrocarbon revenue, the government decided to boost public spending. In this regard, the authorities launched the "Growth Consolidation Plan", a public investment program for 2005-2009 that amounted to US\$50 billion. As a result, government spending in 2005 increased by 4% of non-hydrocarbon GDP, see IMF (2001b).

Angola. Figure B.2, second panel, shows the regime probabilities for Angola. We note that procyclical probabilities are high during 2011-2012. This period was characterized by larger than expected spending on goods and services, surging subsidies, and quasi-fiscal operations conducted by Sonangol³ on behalf of the government contributed to widen the non-oil primary deficit. In late 2011, Angola introduced important institutional reforms to enhance accountability in public spending and predictability of oil revenue transfers to the budget. Despite these efforts, transfers of 2012 oil revenues from Sonangol to the budget were delayed. These delays undermined the major source of budget revenue and required unplanned adjustment to the pace of budget execution, see IMF (2012a).

Azerbaijan. Focusing on Azerbaijan, we observe high procyclical probabilities in 2005, 2007, 2013 and 2014 (Figure B.2, third panel). In 2005, the oil boom resulted in exceptionally high real GDP growth and a significant improvement in the external position. It also made it possible to increase government expenditure by almost 30%. Capital expenditure more than tripled, and wages, pensions, and other current expenditure increased by about 50%, see IMF (2007a).

In 2007, Azerbaijan experienced a strong economic growth led by a major increase in oil production. Non-oil GDP expanded rapidly and was pushed by large increases in public expenditure, including wages and pensions.⁴ Oil revenue grew by about 60%, and rising incomes and consumption (together with improved tax administration) boosted non-oil revenue, see IMF (2008a).

During the period 2013-2014, in Azerbaijan, the growth of non-oil GDP reached almost 10% supported by high public spending and a rapid increase in consumer loans, see IMF (2014a).

Colombia. Turning to Colombia, we note that procyclical probabilities are high in 2008 and 2010 (Figure B.2, fourth panel). During 2008, fiscal policy contributed

³Sonangol is the state-owned oil company in Angola.

⁴Wages and transfers together increased by 46%.

to support demand. With respect to 2007, total revenues were broadly constant in real terms, as oil revenues compensated for weak proceeds from the VAT and international trade.⁵ Meanwhile, total spending grew by 7% in real terms, with capital expenditure increasing by 25% in real terms, see IMF (2010a).

During 2010, in Colombia, fiscal policy continued to support domestic demand. An important tax reform was enacted. President Santos used flood-related state of emergency powers to adopt reforms that broadened the tax base (by eliminating the fixed asset tax credit in 2012 and closing loopholes in the financial transactions tax) and increased the net wealth tax, see IMF (2011a).

Ecuador. Figure B.2, fifth panel, shows the regime probability for Ecuador. We note that procyclical probabilities are large in 2000, 2006, 2007 and 2009. Ecuador went through a difficult period during 1990's but in January 2000 the economic activity began to turn around. Oil prices recovered and domestic demand increased due to the start of the construction of a new private oil pipeline (Oleoducto de Crudo Pesados) as well as higher public spending. Primary expenditures surged. The main drivers were an increase in the wage bill, increases in purchases of goods and services and capital spending, and a boost in social security benefits. Revenue gains automatically resulted in higher expenditures, see IMF (2003a).

In Ecuador, between 2006 and 2009, social spending nearly doubled as a percent of GDP. As reported by Ray, Kozameh, et al. (2012), government spending on education doubled (from 2.6 to 5.2% of GDP) and spending on social welfare more than doubled (from 0.7 to 1.8% of GDP).

Ecuador's economy suffered only a mild recession during the 2008-2009 global downturn. The government fought the recession in two main ways: through expansionary fiscal policy and through what limited monetary policy it had available, keeping interest rates low and limiting the amount of bank reserves that could leave the country. The government implemented fiscal stimulus by extending

⁵Government oil revenues related to transfers of dividends from Ecopetrol (89% government-owned petroleum company) to the government.

widespread housing assistance programs to low income households, nearly doubling the amount of housing finance. The 2009 stimulus was funded largely from reserves, which had accumulated during the oil boom prior to the last quarter of 2008, more than doubling in two years, see Ray, Kozameh, et al. (2012).

Gabon. From Figure B.2, sixth panel, we note that procyclical probabilities in Gabon are high in 1999, 2008, 2009, 2011, 2012 and 2014. According to IMF (2003b), during the 1990s, the authorities did not take sufficient actions to reduce Gabon's oil dependency and pursued a procyclical fiscal policy that did not encouraged diversification and failed to improve the country's poor social indicators. The dependency on oil led to a high-cost structure across the economy, with a high salary level in the public sector, excessive dominance by the public sector in the economy and weak governance.

During 2008-2009, public spending substantially increased due to higher government investment and wages, see IMF (2009a). Real GDP growth was about 6% on the back of substantial scaling-up of public investment. Higher oil and manganese export prices improved the external current account balance. However, the fiscal position came under pressure due to a very rapid increase in spending, especially on investment, notwithstanding high oil prices. Government expenditure increased from 38% of non-oil GDP in 2009 to 47% in 2013, see IMF (2014b).

In 2014, Gabon was still oil-dependent and therefore highly vulnerable to oil price shocks. The continued drawdown of fiscal buffers increased the risks of fiscal sustainability and the adequate financing of needed investment, see IMF (2015).

Iran. Since 1979 Iran has suffered from several rounds of international sanctions. The first round of sanctions was imposed by the US in November 1979 after a group of radical students seized the American Embassy in Tehran and took hostage the people inside. These sanctions included freezing Iranian assets and a trade embargo. The second round of sanctions was imposed by President Reagan in 1987 after Iran's actions from 1981-1987 against US and other shipping vessels

in the Persian Gulf and support for terrorism. The third round of sanctions was in 1995, when the US banned trade and investment activities in the oil sector with Iran. The fourth round of sanctions was imposed by the UN in relation to Iran's proliferation of its nuclear program. Initially, these sanctions targeted investments in oil, gas, and petrochemicals, exports of refined petroleum products. Successively, this round of sanctions has been extended in 2007, 2008, 2010, 2011 and 2012 including a long list of individuals and entities subject to a travel ban and assets freeze, see Levs (2012).

Figure B.2, seventh panel, shows that procyclical probabilities are high in 1999 and 2007. In 1999, crude oil production was 3.4 million barrels per day (mbpd), in line with the quota set by OPEC 1999. The average price for crude oil exports was approximately US\$ 19 per barrel and led to an increase in oil exports earnings by 64%. The net exports of refined product increased from 113,000 barrels per day (bpd) in 1998 to 197,000 bpd in 1999 representing over 74% increase, see IMF (2000).

Iran has a tradition of relatively prudent budgetary management. In 1999-2000, mirroring the oil price increase, budget performance improved sharply. This strong improvement in budgetary performance reflected primarily higher oil revenue. Government expenditure (mainly capital outlays) adjusted in response to fluctuations in oil and gas revenues. Current expenditures expanded significantly, largely reflecting a significant increase in the wage bill, which was facilitated by oil and gas revenues, see IMF (2000).

In 2006, Iran had the second largest proven oil and gas reserves, and it was the fourth largest oil producer in the world. However, its oil production has remained virtually flat due to insufficient investment. Real GDP growth was 6.6% in 2007, see IMF (2009b). Increased direct government support to priority sectors, scaled-up budgetary capital expenditure, and strong credit growth underpinned a robust and broad based growth of the non-oil economy. Fiscal policy had a significant fiscal relaxation during 2006-2007. Central government increased transfers to

households, subsidies and capital expenditure.

Iraq. Focusing on Iraq, from Figure B.2, eightieth panel, we observe that procyclical probabilities assume high values during 2005, 2006 and 2010. In 2004, GDP increased by nearly 50% driven mainly by the recovery of the oil sector 2005. Oil production expanded by 74% from 2003, see IMF (2005a).⁶ Non-oil GDP expanded more moderately, as lack of security, electricity shortages, and poor communications hampered the recovery in private sector activity. The fiscal deficit for 2004 was slightly larger than envisaged under the Emergency Post Conflict Assistance (EPCA) program. While wage and pension outlays were slightly lower than budgeted for 2004, spending on goods and services was higher than under the budget, see IMF (2005a).

In 2006, Iraq's economic situation was very difficult, mainly due to the deterioration in security, but progress was made in strengthening macroeconomic management while structural reforms continued. Official fuel prices were increased to regional levels and progress was made in modernizing public financial management, strengthening central bank safeguards, and banking sector reform. The 2006 Iraqi budget included an ambitious investment program, while maintaining overall fiscal sustainability. The authorities took a number of administrative measures to increase the execution rate of investment projects, including accelerating cabinet approval of large projects and shortening the procurement period. At the same time, they were determined to keep current spending, notably on wages and pensions, within budget to make room for public investment and security outlays, and to avoid putting excessive demand pressures on Iraq's small non-oil economy, see IMF (2007b).

In 2010, although the Iraqi economic outlook was more favourable, it still presented large risks. Oil production increased substantially as domestic and foreign investment in the sector started to bear fruit. Moreover, oil prices in the first half of 2010 were higher than assumed under the program. With the

⁶Although the production level in 2004 was still below the pre-war production level.

higher-than-budgeted oil prices more than offsetting the lower export volumes, government oil revenues were higher than projected in the first half of the year 2010. However, a prolonged political vacuum resulted in a worsening of the security situation. This created risks for the development of new oil fields by the international oil companies, which delayed the envisaged increase in oil production 2010, see IMF (2010b).

Kazakhstan. Figure B.2, ninth panel, shows that, in Kazakhstan, procyclical probabilities are high in 2000, 2002 and 2003. In particular, during 2000, the real GDP had a strong increase driven by the strong growth in the petroleum sector. Petroleum production grew by 15% from the previous year, and the oil sector alone accounted for approximately one quarter of GDP. Similarly, government revenues surged. Revenue performance was very strong, one-quarter of which was from the petroleum sector. There was also an increase in expenditure of about 1% of GDP, largely to provide capital for a new development bank and to clear more social arrears, see IMF (2001c).

In 2002-2003, Kazakhstan's economy was booming, with average annual growth of more than 10%. Economic growth was driven by increasing oil production, supported by high oil prices and rising foreign investments. The production of oil and gas condensate reached 51 million tons in 2003, an increase of 9% over the preceding year. Led by the petroleum sector, other key sectors such as services, manufacturing, and construction had significant gains, with an average growth rate of 9%. The rise in expenditures by 2% of GDP was mainly driven by higher outlays for infrastructure, and construction of the new capital Astana, see IMF (2004). Capital injections to state-owned development institutions were also significant, while the increase in social spending remained limited.

Kuwait. Figure B.2, tenth panel, shows that procyclical probabilities for Kuwait are large in 2005, 2010 and 2013. During 2004 and 2005 Kuwait's macroeconomic performance was strong. Real GDP expanded at an average rate of 7.5%, as a

result of higher oil production and buoyant non-oil activity. Central government budgetary position strengthened further due to higher oil revenues. Fiscal policy was expansionary as expenditures increased by more than 14%. The expansionary fiscal stance was primarily attributable to sharply higher subsidies and transfers and higher capital outlays, while the growth in the wage bill was moderate and expenditures on goods and services declined after a sharp pickup in 2003-2004 associated with emergency security spending. In that period, Kuwait's government saving rate of 28% of GDP was the highest amongst all Gulf Cooperation Council (GCC) countries, see IMF (2005b).

In 2010, real GDP growth was at 3.3%, comprising oil growth of 3.2% and non-oil growth of 3.4%. Activity was driven mostly by government expenditure; credit growth was small, with lending growth of 3.3% to the productive sectors (industry, services, and trade) partially offset by a reduction in credit to the real estate and financial sectors. At the same time, Kuwait increased its oil production to assist in the effort to stabilize the global market. The fiscal stance was expansionary. Government expenditure in fiscal year 2010-2011 (excluding energy-related subsidies and recapitalization of social security) increased by 21.5%. Higher international oil prices bolstered revenue with oil export receipts increasing by 19%, see IMF (2011b).

In 2013, non-oil growth was 2.8%, driven by a combination of continued increase in domestic consumption and some pickup in government capital spending and private investment. Fiscal surplus was supported by high oil prices but increases in salaries and subsidies put under pressure the public sector. Wages and salaries constituted 50% of total expenditure. Total spending increased by 25% in the budget, reflecting both increased current and capital expenditures, see IMF (2014c).

Libya. Focusing on Libya, Figure B.2, eleventh panel, show that procyclical probabilities assume large values during 2004, 2005 and 2007. Historically, Libya has been a hydrocarbon rich country but has been one of the least diversified

economies in the Maghreb region and among the oil producing countries. Libya has suffered from central economic management and excessive reliance on the public sector and started its transition to a market economy in 2002, after ten years of international economic sanctions related to the Lockerbie bombing of 1988, see IMF (2006a).

In 2004, Libya's macroeconomic performance was satisfactory with strong economic growth and large fiscal and external current account surpluses, reflecting higher oil prices and increased oil output. Growth in the construction, utilities, and mining sectors reached 5%, boosted by increased government spending. The fiscal stance was expansionary. However, reflecting high oil revenues (about 51% of GDP) the overall fiscal surplus rose to about 17.5% percent of GDP, see IMF (2006a).

Contrary to previous years, overall economic growth in 2005 was generated mainly in the non-oil economy. While activity in the oil sector grew only 1.5% percent due to output capacity constraints, pick-up in the non-hydrocarbon sector's activity was essentially the result of increased government expenditure. Oil revenues reached 68% of GDP. Non-oil revenue declined by about 15% because of the non-transfer of the interest on the Oil Reserve Fund (ORF) balances by the Central Bank Libya, and lower collections by customs and local governments, partly reflecting the downside effects of the new tax law and customs tariff. Government spending increased by about 33%, reflecting a sharp increase in the wage bill and an improved execution of the development budget, see IMF (2006a).

In 2007, Libyan macroeconomic performance strengthened, notwithstanding an acceleration in inflation. Real GDP grew by 6.8%, supported by an expansion in the hydrocarbon sector and a rapid increase in non-hydrocarbon activities, see IMF (2008b). Despite higher oil revenues, Libya's fiscal surplus narrowed to 26 percent of GDP. This reflected a rapid increase in virtually all expenditure items. The wage bill increased by around 50%. The raise in public wages was accompanied by an initiation of a large civil service reform, with about one third of public employees

being transferred to a central labour office for retraining or retrenchment.

Nigeria. Historically, Nigeria's fiscal operations have relied heavily on oil sector receipts. This reliance started in mid-1970's and, despite numerous efforts by the authorities to diversify the revenue base, continues still today. Figure B.2, twelfth panel, shows that procyclical probabilities assume high values during 1993, 1994, 2002 and 2014. In 1993, government oil revenues accounted for the 84% of total government revenues, see IMF (1994). In terms of government expenditure, the share of government capital spending was well over 50% of total investment. In 1994 government and community services increased by nearly 10%, see IMF (1995).

In 2002, Nigerian fiscal policy was highly expansionary. Despite the cut in oil production, oil revenues were higher than expected. Expenditure pressures stemmed primarily from recurrent budget which, in turn, largely reflected an oversized civil service and related pensions costs. Moreover, government capital spending increased by 7.2%, see IMF (2002).

In 2014, while the Nigerian economy was more diversified even if the oil sector remained a critical source for fiscal revenues and foreign exchange. In particular, non-oil revenue was just 4.5% of non-oil GDP (compared to an average of 10-15% of non-oil GDP for other oil producers) providing inadequate financing for infrastructure and social needs and leaving the budget vulnerable to oil shocks, see IMF (2014d).

Qatar. As we can observe from Figure B.3, first panel, procyclical probabilities have large values in 1994, 1995, 2000, 2001, 2002, 2003, 2004, 2007, 2008 and 2010. During the period 1994-1995, the value of the oil sector product increased by 4%. This led to an increase of the oil sector product's relative importance in GDP from 32% in 1994 to 33% in 1995. Total government increased because of the rise in the oil price and, in turn, higher oil revenues. Oil and gas revenues represented the main source of public revenue. Actual total expenditure increased by 7% in the same period, see QCB (1995).

In 2000, the oil and gas sector increase by 75%. Such increase was a result of both price and production increases. Qatar crude oil production increased by 54%. The relative importance of oil and gas sector on GDP increased to 58% compared to 45% in 1999. Public revenues soared and government expenditure increased as well, see QCB (2000).

In 2004, GDP registered an increase of 20%. Thus, the Qatar economy extended five years of rapid growth since the year 2000. Most of the economic sectors achieved a high rate of growth in 2004. The product of the oil and gas sector increased by 24%. Such increase came as a result of increases in oil and gas production and in the price of oil. Crude oil production increased by 5% to reach 754 thousand barrels per day. Public expenditure was the main source of the domestic liquidity, and a vital source for the economic and social development projects in Qatar. During the period 2001-2004 the increase in government expenditure was substantial. This spending was distributed upon wages and salaries, loan interest payments and infrastructure projects allocations. Public revenues in Qatar were mainly achieved from oil and gas sector with an increase of such revenues of 64% in 2004, see QCB (2004).

In 2008, the oil and gas sector, the major component of GDP, recorded a substantial increase despite the sharp decline in oil prices during the second half of the year. This sector increased by 52%. Public revenues increased by 16%, compared to an increase in the public expenditures by 15%. The significant increase in government revenues was driven primarily by the rapid development of the hydrocarbon sector. Public expenditure increased because various measures were undertaken by the government to ensure substantial spending in key areas such as infrastructure, education and healthcare, see QCB (2008).

During 2010, the oil and gas sector witnessed a growth during of almost the 50%. This growth was mainly attributed to the higher international oil prices. The developments in the oil and gas sector led to an increase in its relative share of GDP by 7% achieving the 52%. Oil and gas government revenues, which

represented the first main source of public revenues in Qatar, increased by 17%. Public expenditures also increased at about the same pace of growth witnessed of previous years to accelerate the pace of economic development QCB (2010).

UAE. Figure B.3, fourth panel, shows that the regime probabilities for the UAE are high during 2003 and 2005. In 2003, the real GDP grew by 7%. The output of oil and natural gas sector constituted the 77% of the GDP value and it increased by 14% with respect to the previous year. The manufacturing sector (mainly constituted of liquefied gas and petroleum products) achieved the highest rate of increase compared to other sectors, reaching a 10% increase. The increase in output of this sector was mainly due to the increase in the refining capacity. In the same year, government revenue increased by 32% mainly due to the increase in oil and gas earnings. Similarly, government expenditure increased by 3%. Current expenditures (such as salaries, wages, expenditures on goods and services, subsidies and transfers) constituted the 83% of total government expenditure, see UAE CB (2010).

In 2005, reflecting high oil prices and production, UAE real GDP grew by 9% percent. Growth was broad-based and most sectors grew at historically high rates. Real non-hydrocarbon GDP growth was 13%. The hydrocarbon sector registered a growth rate of 2%. Government expenditure grew by 8% largely due to the outsourcing of some services previously provided by the municipality to the private sector. The sectors that were largely transferred off-budget included housing and community centre programs and general administration. Oil revenues increased by 7% and constituted the 50% of total government revenues IMF (2006b).

Venezuela. At the end of the 1990's, the oil sector played a dominant role in Venezuela as it contributed to about 25% percent of its total GDP, 50% of public sector revenues, and about 80% of exports.⁷ As a result, Venezuela's macroeconomic stability was highly dependent on, and therefore vulnerable to,

⁷These percentage refer to the sample period 1991-2002. For more details, see Baldini (2005).

the oil sector. The oil sector component of the GDP of Venezuela was also highly correlated to oil price fluctuations. Moreover, Venezuela recorded both high public sector revenue and expenditure volatility, with an annual average standard deviation of around 4% of GDP.⁸

In 2002, Venezuela held proven oil reserves of about 78 billion barrels. Moreover, Venezuela was one of the top suppliers of US oil imports and was among the top ten crude oil producers in the world. The petroleum industry was the mainstay for Venezuela's economy, accounting for more than 3/4 of total Venezuelan export revenues, about half of total government revenues, and about one-third of GDP. Crude oil production was around 2.5 million barrels per day, see US EIA (2005).

In 2010, Venezuela contained some of the largest oil and natural gas reserves in the world. In particular, it had 211 billion barrels of proven oil reserves. Moreover, Venezuela was one of the world's largest exporters of crude oil and the largest in the Western Hemisphere. The country had net oil exports of 1.7 million barrels per day. The oil sector was of central importance to the Venezuelan economy. The national oil industry (PDVSA) accounted for a significant share of the country's GDP, government revenue, and export earnings, see US EIA (2012).

In 2013, Venezuela was the world's 9th largest exporter and 12th largest producer of petroleum and other liquids. It had nearly 298 billion barrels of proved oil reserves, the largest in the world. After Chavez's death in 2013, President Maduro continued Chavez's policies implementing the nationalization of oil exploration and production in Venezuela through the PDVSA. Venezuela also increased pressure on foreign operators that remained in the country to increase investment to offset production declines, see US EIA (2014).

⁸The estimated values are for the sample period 1990-2002. For more details refer to Baldini (2005).

Figure B.1: Procyclical fiscal policy probabilities: remaining OECD countries

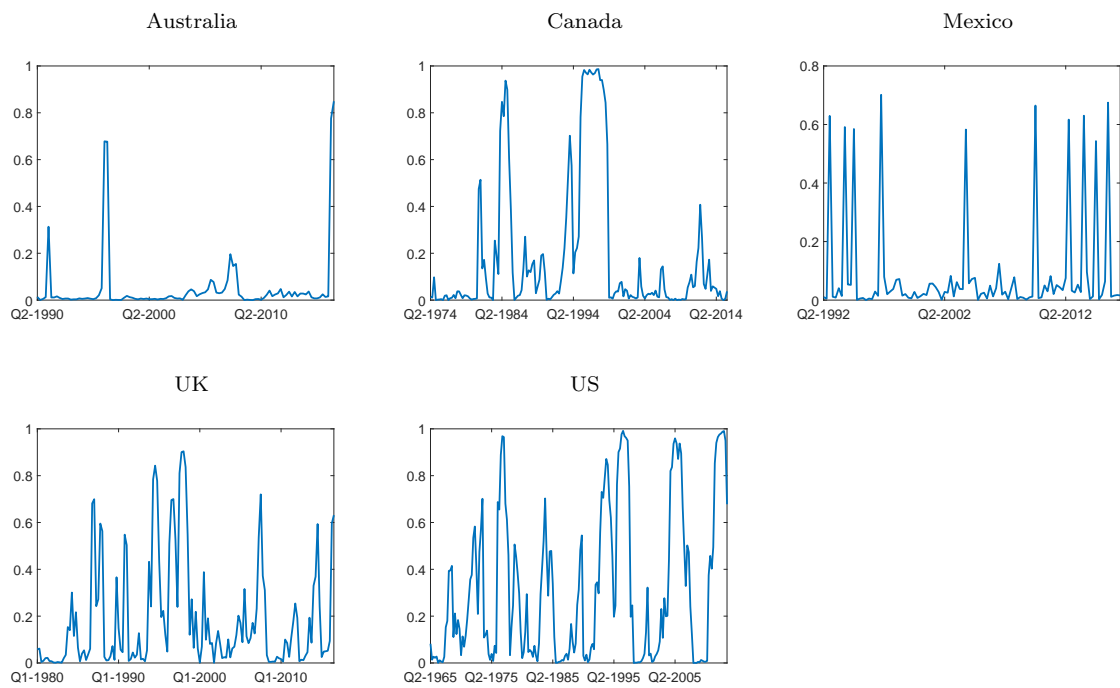


Figure B.2: Procyclical fiscal policy probabilities: remaining non-OECD countries
(1)

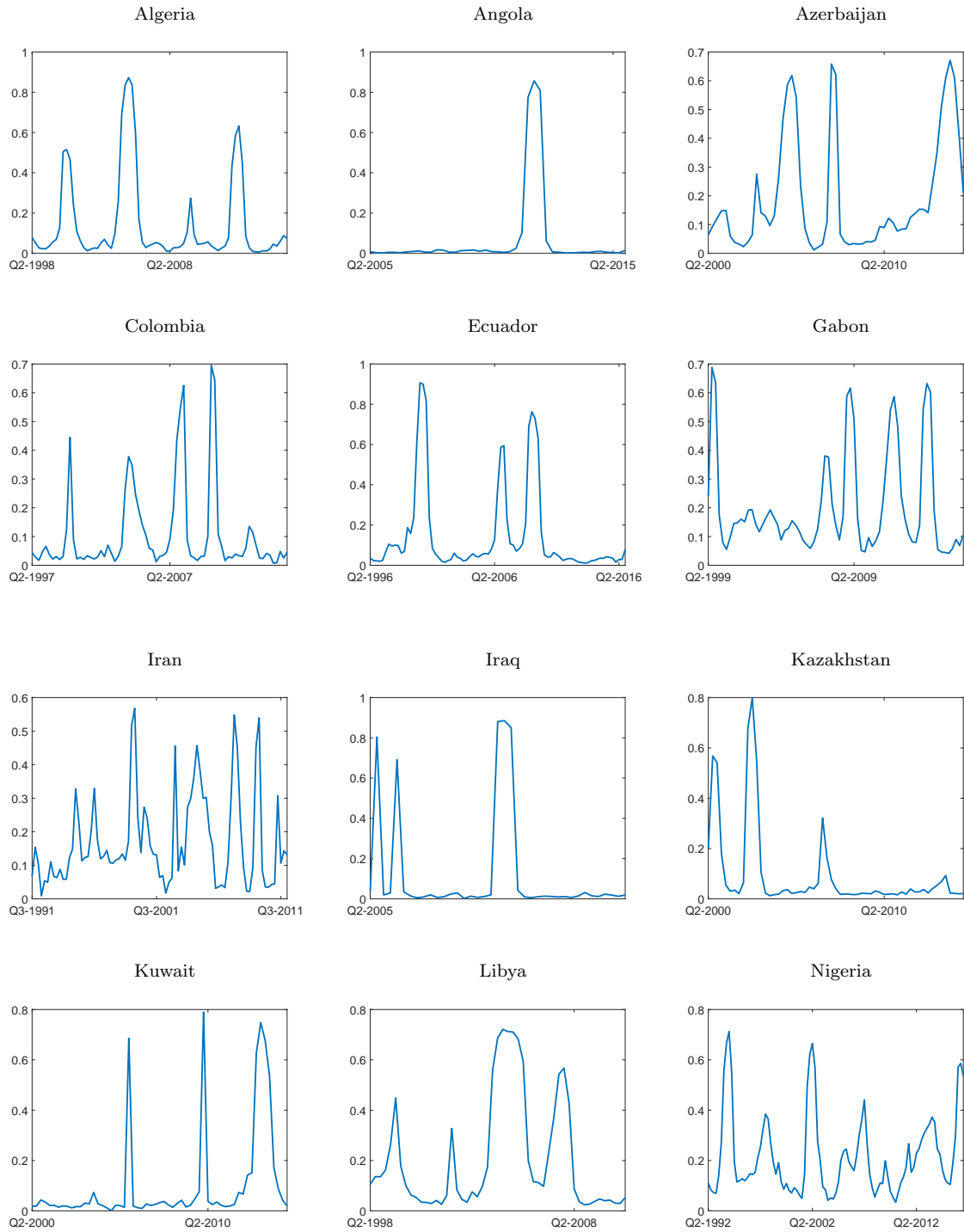
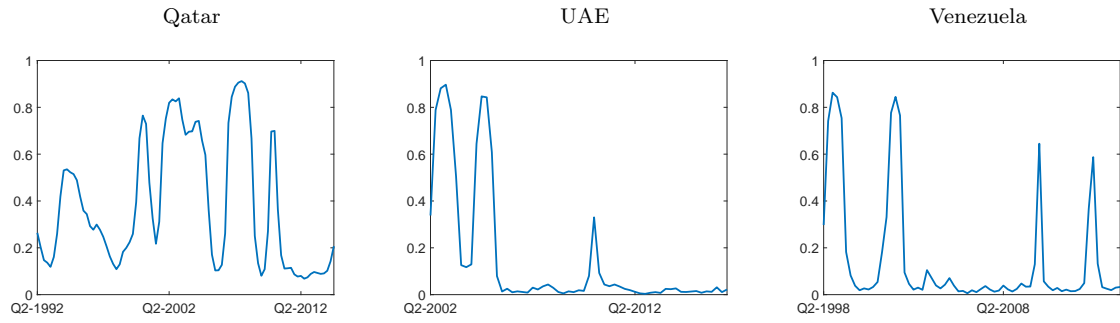


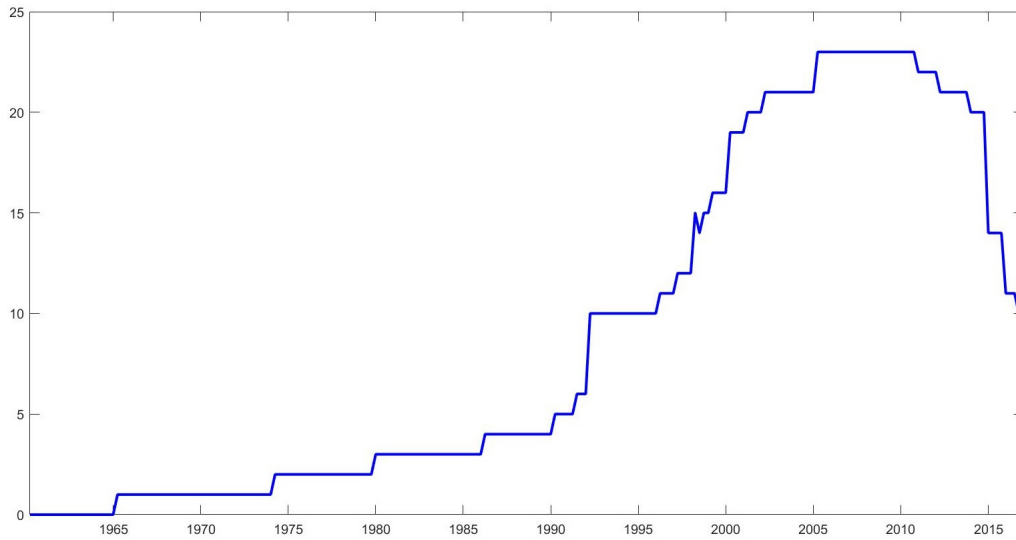
Figure B.3: Procyclical fiscal policy probabilities: remaining non-OECD countries
(2)



Appendix C: The number of countries in the sample

Since we have an unbalanced panel, it is important to see the size of the sample in the different periods of time.

Figure C.1: The number of countries in the sample, 1960-2016



The figure above shows that between 1965 and 1980 the number of countries was relatively low. The US has been part of the sample since the beginning of the sample period. During this period, the share of global oil production of the countries included in the sample was more or less 15%. Between 1980 and 1990, Australia, Canada, Norway, UK and US were part of the sample. The share of global oil production of these countries is approximately 24%. Between 1990 and 1995, Iran, Mexico, Qatar and Saudi Arabia joined the sample. The share of global oil production of the countries included in the sample during this period was approximately 40%. Starting from 2000 the number of countries grew to 20. The share of global oil production of the countries included in the sample during this period was more or less 76%. The last countries included in the sample were Angola, Iraq and UAE. The maximum number of countries was reached between

2005 and 2010. At the peak, the share of global oil production of the countries included in the sample was approximately 84%.

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