



# IMF Working Paper

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## Policy Coordination in Fiscal Federalism: Drawing Lessons from the Dubai Debt Crisis

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**IMF Working Paper**

Middle East and Central Asia Department

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Authorized for distribution by Ralph Chami

June 2011

**Abstract**

Using the cyclically adjusted non-hydrocarbon primary balance, this paper investigates the evolution of the fiscal policy stance in the United Arab Emirates at consolidated and sub-national levels in the run-up and after the crisis. The empirical findings show that procyclical fiscal policies prior to the crisis reinforced the financial sector cycle, exacerbated the economic upswing, and thereby contributed to the build-up of macro-financial vulnerabilities. The paper also sets out policy lessons to develop a rule-based fiscal framework that would help strengthen fiscal policy coordination between the various layers of government and ensure long-term fiscal sustainability and a more equitable intergenerational distribution of wealth.

JEL Classification Numbers: E32, E62, E66, H1, H30, H50, H60, H63, H68, H81, H83

Keywords: Fiscal imbalances, business cycles, cyclically-adjusted budget balance, debt sustainability, fiscal federalism, contingent liabilities, statement of fiscal risks

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\* The author would like to thank Serkan Arslanalp, Joshua Charap, Kevin Carey, Borja Gracia, Vincenzo Guzzo, Mark Horton, Alfred Kammer, Taline Koranchelian, Ananthakrishnan Prasad, Agustin Roitman, Abdelhak Senhadji, and Gabriel Sensenbrenner for their insightful comments and suggestions. Arthur Ribeiro da Silva and Renas Sidahmed provided excellent research assistance.

Contents	Page
I. Introduction .....	3
II. Fiscal Federalism in the U.A.E. ....	4
III. Measuring the Fiscal Stance .....	5
A. Estimation Methodology .....	6
B. A Consolidated View .....	8
C. Abu Dhabi .....	9
D. Dubai .....	11
IV. Assessing Fiscal Sustainability .....	12
V. Conclusion .....	17
References .....	22
 Figures	
1. U.A.E.: Oil Price and Budget Balance, 1990–2010 .....	6
2. U.A.E.: Output Gap, Inflation, and Expatriate Workers .....	7
3. U.A.E.: Fiscal Policy Stance and the Output Gap, 2000–10 .....	9
4. Abu Dhabi: Fiscal Policy Stance and the Output Gap, 2000–10 .....	10
5. Dubai: Fiscal Policy Stance and the Output Gap, 2000–10 .....	12
6. U.A.E.: Fiscal Sustainability Analysis, 2010–16 .....	13
7. Abu Dhabi: Fiscal Sustainability Analysis, 2010–16 .....	14
8. Dubai: Public Sector Debt Sustainability Analysis, 2010–16 .....	17
 Appendix	
I. Dubai: Public Sector Debt Sustainability Framework, 2007–16 .....	21

## I. INTRODUCTION

**Procyclical fiscal policies and the build-up of contingent liabilities during the boom years exacerbated the severity of the crisis.** The crisis in the global financial system was a complex event with far-reaching consequences, especially in countries that had had expansionary fiscal policies and a build-up of contingent liabilities prior to the crisis. While the world economy is now in the recovery stage, the debate on the preponderant causes of the financial meltdown is still far from over. Given the unprecedented severity and complexity of the crisis, it would be misleading to put the entire onus on financial excesses and regulatory weaknesses and ignore the role of fundamental imbalances. The United Arab Emirates (U.A.E.)—a major hydrocarbon-exporting country with diversified sub-national economic structures—experienced its own unraveling of macro-financial imbalances and thus presents an interesting case to analyze the underlying fragilities.

**Fiscal policies, in the absence of coordination among the emirates, complicated macroeconomic management at the federal level.<sup>1</sup>** Since the U.A.E. has a pegged exchange rate regime and consequently a limited scope to use monetary policy, the burden of macroeconomic stabilization falls on fiscal policy. On the contrary, procyclical fiscal policies prior to the crisis reinforced the “financial accelerator” effect, exacerbated the economic cycle, and thereby contributed to the build-up of economic and financial vulnerabilities in the U.A.E. With the global financial crisis, the bursting of the real estate bubble and the ensuing recession in Dubai also raised concerns over the sustainability of public finances, especially in light of the risks stemming from government-related enterprises (GREs). In addition to the contingent liabilities that contaminated the sovereign balance sheet, the crisis also revealed the predicament of implicit government guarantees—a manifestation of moral hazard in a federal system with an asymmetric distribution of resources—and the lack of policy coordination among various layers of government. While the empirical findings of this paper are directly relevant to macroeconomic policymaking in the U.A.E., they also provide pertinent insights about the importance of policy coordination in other federal fiscal systems—and monetary unions, as brought to light by the recent developments in Europe.

**This paper analyses fiscal policy in the run-up and after the crisis and suggests a set of measures to strengthen fiscal policy management in the U.A.E.** Because the crisis is partly a manifestation of heterogeneous and diverging sub-national fiscal capabilities, Section II describes the main institutional features of fiscal federalism in the U.A.E. Section III explains the methodology for decomposing non-hydrocarbon GDP into trend and cycle components at the aggregate and emirate level and estimating the cyclically adjusted non-hydrocarbon primary budget balance before and after the crisis. This disaggregated approach

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<sup>1</sup> After a decade-long above-trend expansion at an annual real GDP growth rate of 7 percent between 1999 and 2008, the U.A.E. economy is estimated to have contracted by 2.6 percent in 2009, as a result lower hydrocarbon prices and the shutdown of international capital markets that led to the bursting of the real estate bubble.

provides a better understanding of the economic structure and vulnerabilities at the emirate level, considering the asymmetric distribution of resource wealth. Section IV analyzes fiscal sustainability in the U.A.E. as a whole and at sub-national level in the emirates of Abu Dhabi and Dubai. Finally, Section V sets out policy lessons to develop a rule-based framework that would help enhance policy coordination between various governments and ensure long-term fiscal sustainability and a more equitable intergenerational distribution of wealth.

## II. FISCAL FEDERALISM IN THE U.A.E.

**The U.A.E. is a confederation of emirates, with each maintaining autonomy over hydrocarbon resources and fiscal policies.** The origins of the U.A.E. go back to the early 20<sup>th</sup> century, starting with a series of agreements between Britain and various tribes in the region. In 1952, the seven emirates—Abu Dhabi, Ajman, Dubai, Fujairah, Ras al-Khaimah, Sharjah and Umn al-Qaiwain—formed the Trucial State Council as a platform for policy discussion and cooperation. Over the years, the Council expanded in formality and administrative structure, although some emirates remained in favor of preserving sub-federal autonomy. In 1971, the emirates formed the U.A.E. with a provisional constitution, which reflected a compromise between the emirates favoring an integrated federation and those preferring the autonomy of individual emirates. As a result, compared to other federal regimes, the U.A.E. is closer to a confederation—a union of equal but sovereign states that retain their own international status and greater autonomy on economic affairs.

**The U.A.E. federal government lacks an independent fiscal base and remains dependent on transfers from Abu Dhabi.** Although the literature on fiscal federalism tends to focus on fiscal decentralization, the issue in the U.A.E. appears to be the lack of policy coordination between sub-national governments. The constitution states that each emirate can exercise power in all matters that are not assigned to the jurisdiction of the federal government, thereby allowing the emirates significant autonomy. Furthermore, the constitution considers the natural resources and wealth in each emirate to be the public property of that emirate. As a result, while monetary and exchange rate policy is managed on a federal basis by the Central Bank of the U.A.E. (CBU), each emirate manages its own budget independently and no emirate has an obligation to contribute to the budget of another emirate. Given the asymmetric distribution of natural resource wealth, the fiscal capacity of individual emirates is heterogeneous and the federal government has no independent source of revenue. The largest and wealthiest emirates of Abu Dhabi and Dubai make contributions to the federal budget in agreed amounts, and Abu Dhabi also separately contributes to fund security and defense, which are federal responsibilities but managed by Abu Dhabi.

**The federal budget is about 4 percent of GDP and just 11 percent of total public expenditure in the U.A.E.** The federal structure is decentralized by international standards, with the federal government accounting for 11 percent of all government spending in the U.A.E. as a whole, while its revenues constitutes about 10 percent of revenues in the consolidated budget. In terms of expenditure responsibilities, the constitution lists all the

competencies of the federal government, and anything not listed is generally handled at the emirate level. Among other things, the federal government is responsible for foreign affairs, security and defense, nationality and immigration, public health, postal, telephone and other communications services, labor relations, banking, the delimitation of territorial waters, and the extradition of criminals. While the CBU conducts monetary policy—from a federal level—for all the emirates, the federal government has a limited mandate and no constitutional authority over fiscal policy at the emirate level.

### III. MEASURING THE FISCAL STANCE

**The cyclically adjusted non-hydrocarbon primary balance is the appropriate measure of the fiscal stance in a hydrocarbon-based economy.** The overall fiscal balance is a widely used indicator to assess the government's net financing need—or accumulation of net financial assets—and its fiscal vulnerability. When there is a high degree of correlation between oil prices and the headline fiscal balance, as it is the case in the U.A.E, the volatility of oil prices creates a misleading picture of the underlying fiscal position and possible structural imbalances (Figure 1). Therefore, the primary budget balance, factoring out interest payments and resource-based revenue including investment income of the sovereign wealth fund, provides a better indication of the U.A.E.'s underlying fiscal stance.<sup>2</sup> Furthermore, since the actual fiscal balance reflects cyclical—or temporary—effects on the government budget, as well as structural—or permanent—influences, it is important to refine the measurement of the fiscal position further by constructing a cyclically adjusted non-hydrocarbon primary balance as a percentage of non-hydrocarbon potential GDP, which reflects revenues and expenditures adjusted for the impact of the economic cycle.<sup>3</sup>

**Fiscal policy is expansionary (contractionary) when the change in the cyclically-adjusted non-hydrocarbon primary balance is negative (positive).** After separating the change in the non-hydrocarbon primary balance into the change in the cyclical non-hydrocarbon primary balance and the change in the cyclically adjusted non-hydrocarbon primary balance, we can define fiscal policy as expansionary (contractionary) when the change in cyclically adjusted non-hydrocarbon primary balance is negative (positive). To assess whether fiscal policy is countercyclical (procyclical), we have to examine the link between changes in the output gap and the change in the cyclically adjusted primary balance. Expansionary (contractionary) fiscal policy when the change in the output gap is positive (negative) is procyclical, exacerbating pressures in the economy, while expansionary

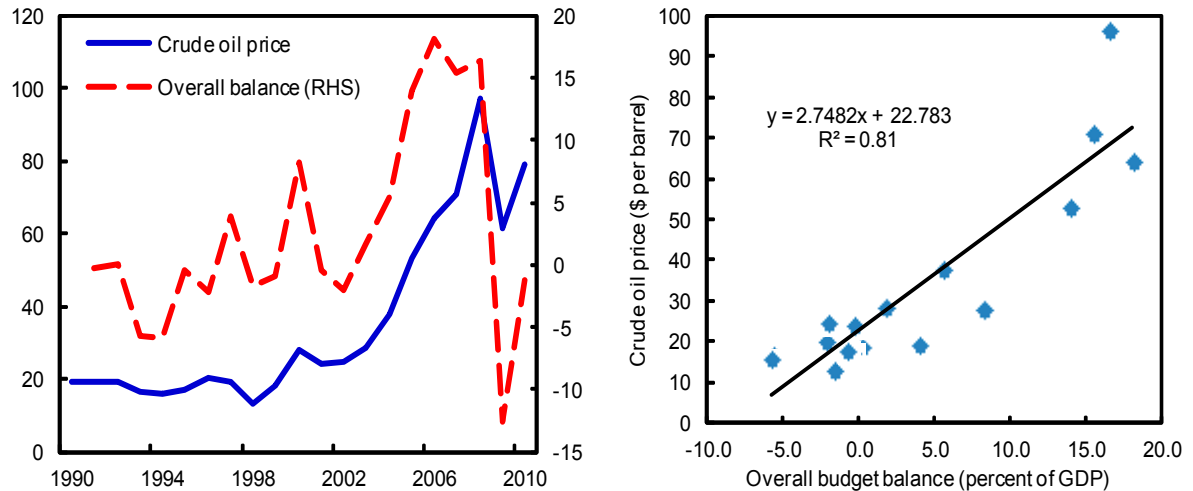
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<sup>2</sup> Investment income is usually reinvested abroad and therefore does not influence domestic aggregate demand.

<sup>3</sup> Automatic stabilizers—features of the tax code and some expenditure items such as unemployment benefits that adjust automatically to cyclical fluctuations in economic activity—do not have a prominent role in the U.A.E. and other GCC countries, for that matter (Espinoza and Senhadji, 2011).

(contractionary) policy when the change in the output gap is negative (positive) is countercyclical, dampening cyclical fluctuations in the economy.

**Figure 1. U.A.E.: Oil Price and Budget Balance, 1990–2010**



Source: Ministry of Finance; DataStream; author's calculations.

### A. Estimation Methodology

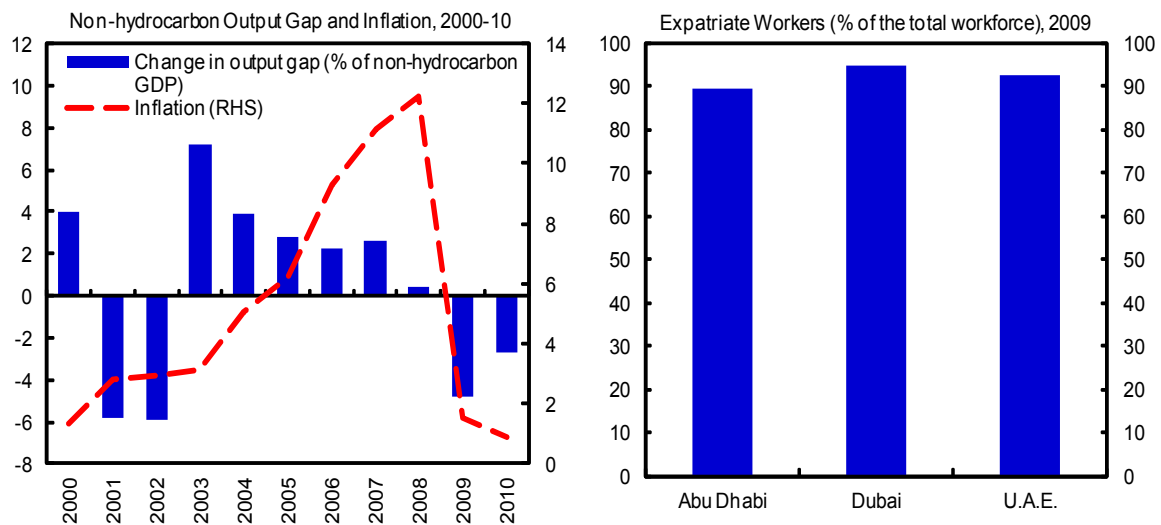
**Decomposing GDP into trend and cyclical components is the first step in estimating the cyclically adjusted budget balance.** There are various methods, none without shortcomings, to decompose GDP into its secular trend and cycle components. Since data limitations prevent the use of the production function approach to estimate potential GDP and the output gap, the Hodrick-Prescott filter developed by Hodrick and Prescott (1997) is used to extract trend and cyclical components. The Hodrick-Prescott filter is essentially an algorithm that removes low frequency variations—cycle—and smoothes the original GDP series to its stochastic trend. Simple as it sounds, the extraction of the trend component depends on the weight assigned to the linear time trend. If there is no noise, the original series is fully informative and the weight— $\lambda$ —should be equal to zero. Generally, high frequency data is noisier, requiring a higher value of  $\lambda$ —14,400 for monthly data, 1,600 for quarterly data, and 100 for annual data.<sup>4</sup> The Hodrick-Prescott filter is also susceptible to the end-point problem—the trend follows actual GDP more closely at the beginning and end of the estimation period than in the middle. In the case of the U.A.E., the end-point problem is

<sup>4</sup> While a  $\lambda$  of 100 is typically the choice for annual data in the empirical literature, Baxter and King (1999) argued that a value of around 10 is more reasonable, and Ravn and Uhlig (2002) recommended a  $\lambda$  of 6.5 for estimations using annual data. After experimenting with a range of smoothing parameters, this paper finds marginal computational differences in the empirical analysis and therefore adopts a  $\lambda$  of 100.

particularly pronounced prior to the crisis, as it experienced a growth surge between. The end-point issue is dealt with extending the series with our GDP projections through 2016.

**Estimates of potential non-hydrocarbon output are subject to uncertainty in an economy like the U.A.E. with a perfectly elastic labor supply.** The output gap is defined as the deviation of the actual real GDP from the potential output when the economy is operating at full capacity. According to the methodology outlined above, the U.A.E. moved from below potential growth during 1998-2004 to above potential growth in 2005-08. The boom period, starting in 2003, led to a swing of 19 percentage points in the non-hydrocarbon output gap from -11.8 percent of non-hydrocarbon GDP in 2002 to 7.3 percent in 2008 (Figure 2). Output gap estimates are subject to uncertainty, especially with a short time series and in an economy with a highly elastic labor supply. When expatriate workers account for about 90 percent of the workforce, the concept of the “natural rate of unemployment” is not informative as to whether the economy is operating below or above its potential. Furthermore, the estimated increase in potential non-hydrocarbon GDP during the boom years may have been partly a result of the easy availability of credit and the real estate bubble, and consequently not as sustainable as a productivity-driven improvement. Nevertheless, despite the empirical shortcomings, estimates of potential non-hydrocarbon GDP and output gap are consistent with inflation dynamics before, during and after the crisis, and therefore present a reasonable gauge of deviation from trend growth.<sup>5</sup>

**Figure 2. U.A.E.: Output Gap, Inflation and Expatriate Workers**



Sources: National Bureau of Statistics; Ministry of Labor; author's calculations.

<sup>5</sup> Average annual consumer price inflation increased from 2.9 percent in 2002 to 12.3 percent in 2008, before declining to 1.6 percent in 2009 and 0.9 percent in 2010 (Figure 2).



**Filtering out the impact of cyclicity reveals the structural primary balance net of cyclical effects on non-hydrocarbon revenues and expenditures.** In measuring the cyclicity of fiscal balances at the consolidated and emirate level in the U.A.E., the paper follows the methodology outlined by Horton, Kumar and Mauro (2009) and Abdih, Lopez-Murphy, Roitman and Sahay (2010), and uses the non-hydrocarbon primary budget balance, excluding interest spending and hydrocarbon revenues, investment income of the sovereign wealth fund, scaled by non-hydrocarbon GDP.<sup>6</sup> The cyclically adjusted primary balance is estimated by deducting cyclical components from the actual balance. It is important to correct for cyclical changes because the budget balance tends to vary endogenously according to the state of the economy—deteriorating during a bust and improving in a boom. Furthermore, since hydrocarbon revenues are dependent on the erratic behavior of hydrocarbon prices, the cyclically adjusted non-hydrocarbon primary balance is computed, using the elasticity of non-hydrocarbon revenues and primary expenditures relative to non-hydrocarbon GDP, to assess whether fiscal policy exacerbates economic fluctuations in the U.A.E. at the aggregate and emirate levels.<sup>7</sup>

## B. A Consolidated View

**The U.A.E.’s consolidated fiscal stance has been expansionary before and after the crisis, irrespective of measurement techniques.** The overall fiscal balance moved from a deficit of 2.1 percent of GDP in 2002 to a surplus of 11.8 percent, on average, between 2003 and 2008. That was a result of the unprecedented increase in hydrocarbon revenues, and the non-hydrocarbon primary balance, excluding investment income, deteriorated from a deficit of 16.5 percent of non-hydrocarbon GDP in 2005 to a deficit of 26.7 percent by 2008. The analysis based on the above-outlined methodology shows that the cyclically adjusted non-hydrocarbon primary deficit increased from 16.9 percent of non-hydrocarbon GDP in 2005 to 28.1 percent by 2008. That means the fiscal impulse—measured by the change in the cyclically-adjusted non-hydrocarbon primary balance as a share of non-hydrocarbon potential GDP—amounted to 11.3 percentage points over this period (Figure 3). Facing a steep economic downturn, the authorities responded with countercyclical measures, pushing the cyclically adjusted non-hydrocarbon primary deficit to 44.8 percent in 2009.

**Comparing the change in the cyclically adjusted non-hydrocarbon primary balance and the output gap shows the cyclicity of fiscal policy.** The combination of positive changes in the output gap with positive fiscal impulse implies a procyclical fiscal policy stance. Using

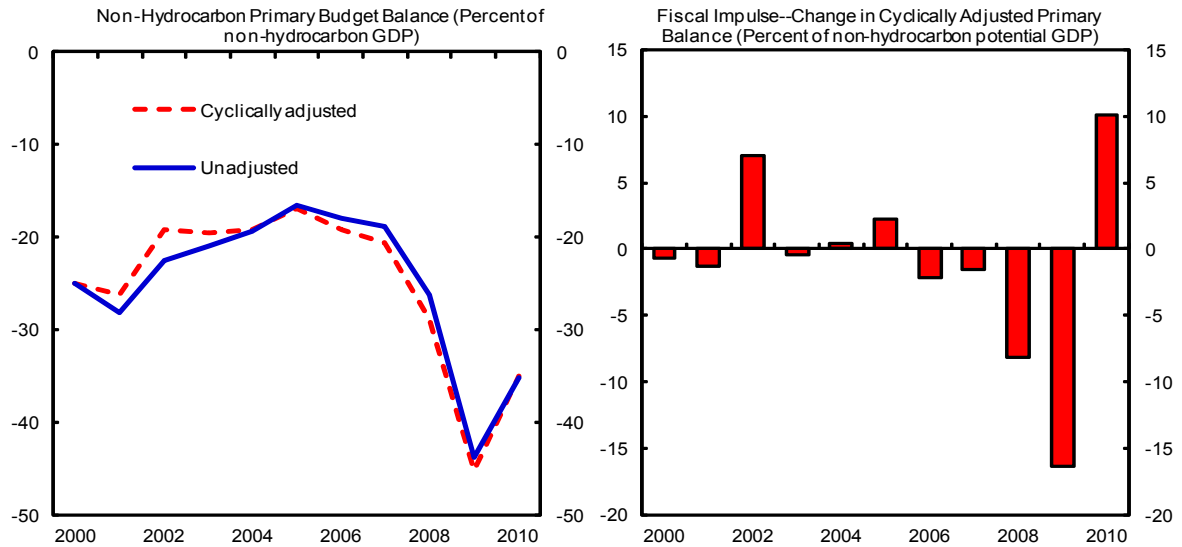
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<sup>6</sup> Gauging the fiscal stance at the public sector level would be better, since the bulk of what usually would be considered fiscal policy is conducted through GREs, but data limitations do not permit to include quasi-fiscal activities. As a result, we use standard measures of government finances in our calculations.

<sup>7</sup> This paper performs cyclical adjustment on total revenue and expenditures by using the aggregate elasticities of non-hydrocarbon revenues and primary spending with respect to the output gap, which are assumed to be one and zero, respectively.

this methodology, we find that fiscal policy was procyclical prior to the crisis when the U.A.E. economy experienced an unprecedented above-potential boom and sustained inflationary pressures. After the crisis, facing a negative output gap, the authorities adopted an expansionary countercyclical stance and raised the cyclically adjusted non-hydrocarbon primary budget deficit to 44.8 percent of non-hydrocarbon GDP in 2009. However, in 2010, the fiscal policy turned contractionary, with the cyclically adjusted non-hydrocarbon primary deficit narrowing to 35.1 percent of non-hydrocarbon GDP.

**Figure 3. U.A.E.: Fiscal Policy Stance, 2000-10**



Source: Author's calculations.

### C. Abu Dhabi

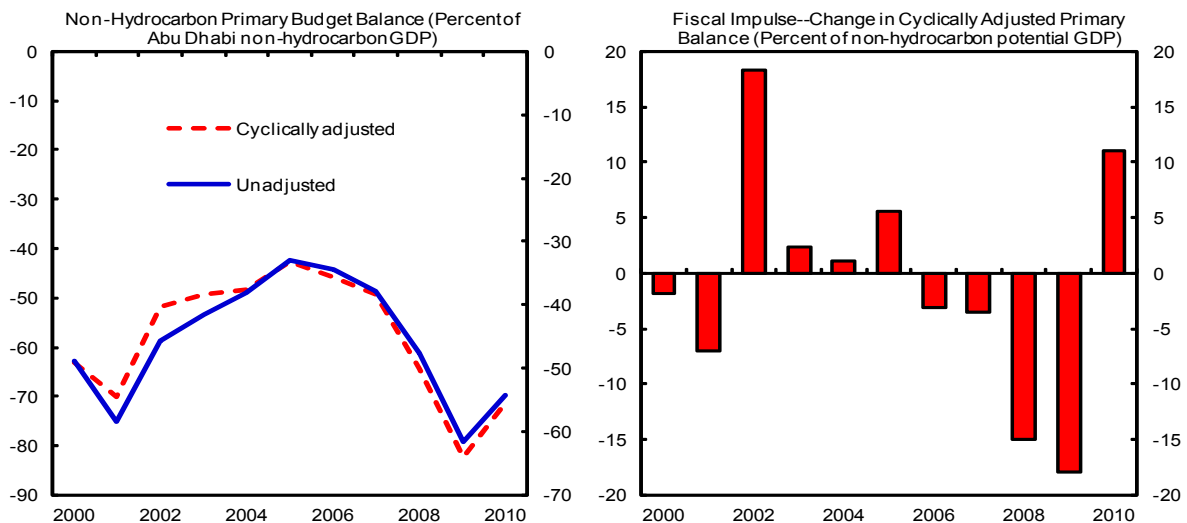
**The Emirate of Abu Dhabi, accounting for almost 70 percent of government revenues, dominates the U.A.E.'s consolidated fiscal position.** Abu Dhabi is the largest and most wealthy emirate, controlling more than 95 percent of the country's hydrocarbon reserves, and therefore enjoys abundant fiscal space relative to other emirates. Thanks to the rise in hydrocarbon earnings, Abu Dhabi's overall fiscal balance improved from a deficit of 11.2 percent of Abu Dhabi GDP in 2002 to a surplus of 12.7 percent, on average, between 2004 and 2008, while the non-hydrocarbon primary balance, excluding investment income, widened from a deficit of 42.2 percent of Abu Dhabi non-hydrocarbon GDP in 2005 to a deficit of 61.4 percent in 2008. In the wake of the global shock, the government of Abu Dhabi boosted primary spending by 39.4 percent in 2009, pushing the non-hydrocarbon primary budget deficit to 79.3 percent of non-hydrocarbon GDP.<sup>8</sup>

<sup>8</sup> Government expenditures included Abu Dhabi's loan to the Emirate of Dubai, accounting for 6.8 percent of total spending or 3.1 percent of Abu Dhabi non-hydrocarbon GDP in 2009.

**Abu Dhabi’s cyclically adjusted non-hydrocarbon primary budget balance deteriorated before and after the crisis.** The cyclically adjusted non-hydrocarbon primary budget deficit, excluding investment income, widened from 42.7 percent of Abu Dhabi non-hydrocarbon GDP in 2005 to 63.8 percent by 2008. That implies a fiscal impulse of 21 percentage points of non-hydrocarbon potential GDP on a cumulative basis prior to the crisis (Figure 4). After the crisis, the authorities introduced an additional fiscal impulse of 17.8 percentage points, which consequently led the cyclically-adjusted non-hydrocarbon primary deficit to an estimated 81.6 percent of Abu Dhabi non-hydrocarbon GDP in 2009. Moreover, these figures may not reflect the true extent of expansionary fiscal operations, given the significant role of GREs in the economy. The high share of GREs in Abu Dhabi’s total public sector debt—about 90 percent—implies that the fiscal impulse would be even greater if non-commercial GRE spending were accounted for.

**The fiscal policy stance in Abu Dhabi turned forcefully procyclical after 2006 and then countercyclical in 2009.** By comparing the changes in the cyclically adjusted non-hydrocarbon primary balance and the output gap, the paper finds that Abu Dhabi’s fiscal policy stance became strongly procyclical in 2006, exacerbating the upswing in economic activity driven by higher hydrocarbon prices and a broad-based boom in aggregate domestic demand. After the crisis, however, facing a negative output gap, Abu Dhabi’s fiscal policy stance turned countercyclical in an attempt to support the domestic economy. In 2010, on the other hand, fiscal policy turned contractionary, with the cyclically-adjusted non-hydrocarbon primary deficit narrowing by 10.7 percentage points to 70.9 percent of Abu Dhabi non-hydrocarbon GDP.

**Figure 4. Abu Dhabi: Fiscal Policy Stance, 2000-10**



Source: Author's calculations.

#### D. Dubai

**The Emirate of Dubai has a diversified economy, but insufficient fiscal space to address macro-financial shocks.** Dubai has a diversified economy with non-hydrocarbon sectors representing over 95 percent of GDP. There are, however, three important caveats. First, although Dubai is not directly dependent on the hydrocarbon sector, it appears to have a significant dependency on real estate-related sectors. Second, economic diversification should be differentiated from fiscal diversification, as non-hydrocarbon revenues may be disproportionately concentrated on a particular economic sector. Third, its revenue mobilization capabilities have not developed rapidly when compared to other diversified emerging market economies. Consequently, the overall fiscal balance deteriorated from a small surplus of 0.1 percent of Dubai and northern emirates GDP in 2001 to a deficit of 1.8 percent in 2008 and 13.9 percent in 2009, while the non-hydrocarbon primary balance worsened from a deficit of 1.2 percent of Dubai and northern emirates non-hydrocarbon GDP in 2005 to a deficit of 4 percent in 2008 and 18.5 percent in 2009.<sup>9</sup>

**Dubai's cyclically adjusted non-hydrocarbon primary budget deficit widened before and after the crisis.** On a cyclically-adjusted basis, Dubai's non-hydrocarbon primary budget deficit widened from 1.3 percent of Dubai and northern emirates non-hydrocarbon GDP in 2005 to 5.1 percent in 2008. The fiscal impulse amounted to 3.8 percentage points of Dubai and northern emirates non-hydrocarbon GDP on a cumulative basis. However, these figures may significantly underestimate the extent of expansionary fiscal operations, especially in the case of Dubai where the bulk of what usually would be considered fiscal policy is conducted through GRE investments. While limitations in data availability do not permit to include quasi-fiscal activities in Dubai, the share of GRE debt in total public sector debt—more than 70 percent—suggests that off-budget spending through GREs was substantial and may have been even more than spending at the government level.

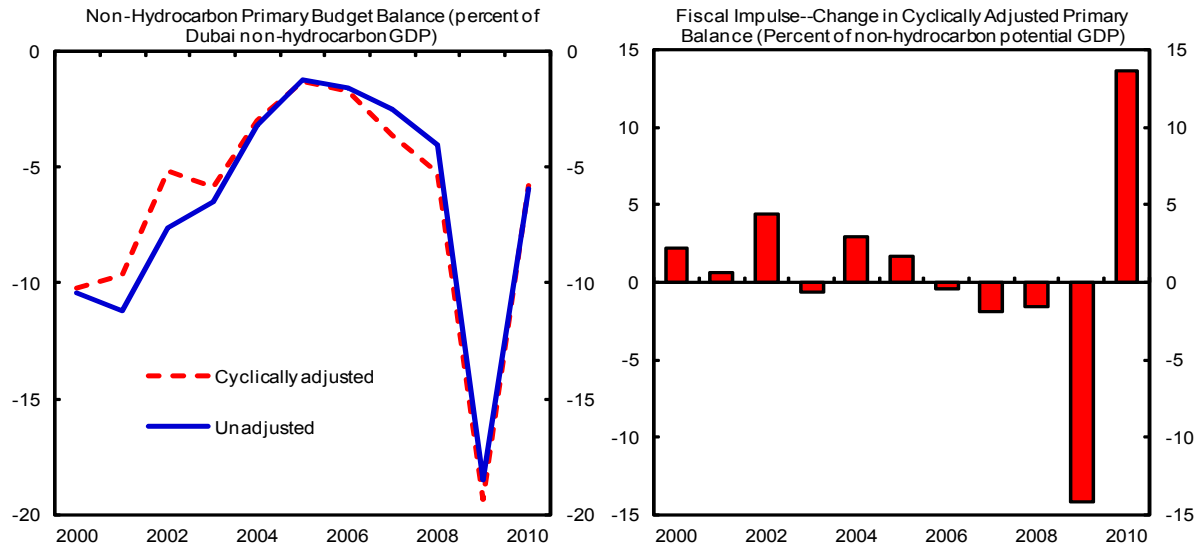
**Dubai's expansionary and procyclical fiscal policy stance prior to the crisis exacerbated the economic cycle.** The comparison of the changes in the cyclically-adjusted non-hydrocarbon primary balance and the output gap show that the authorities typically maintained a procyclical fiscal policy stance before the crisis, which exacerbated the non-hydrocarbon business cycle, especially through real estate investments (Figure 5). After the crisis, the cyclically adjusted non-hydrocarbon primary deficit widened to 19.2 percent of Dubai and northern emirates non-hydrocarbon GDP in 2009. Although Dubai's fiscal stance turned countercyclical after the crisis, the shift was made possible by the financial support from Abu Dhabi and the CBU, which accounted for 45 percent of total government spending—and 9.6 percent of Dubai non-hydrocarbon GDP—in 2009. Consequently,

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<sup>9</sup> There is no consistent time series GDP data for Dubai alone, and therefore we use Dubai and northern emirates GDP as a proxy. Though reasonable, this may result in an underestimation of various ratios calculated in the paper, as Dubai is estimated to account for about 65-70 percent of U.A.E. GDP excluding Abu Dhabi.

Dubai's fiscal policy stance became contractionary in 2010, with the cyclically adjusted non-hydrocarbon primary deficit narrowing by 13.4 percentage points to 5.8 percent of non-hydrocarbon GDP.

**Figure 5. Dubai: Fiscal Policy Stance, 2000-10**



Source: Author's calculations.

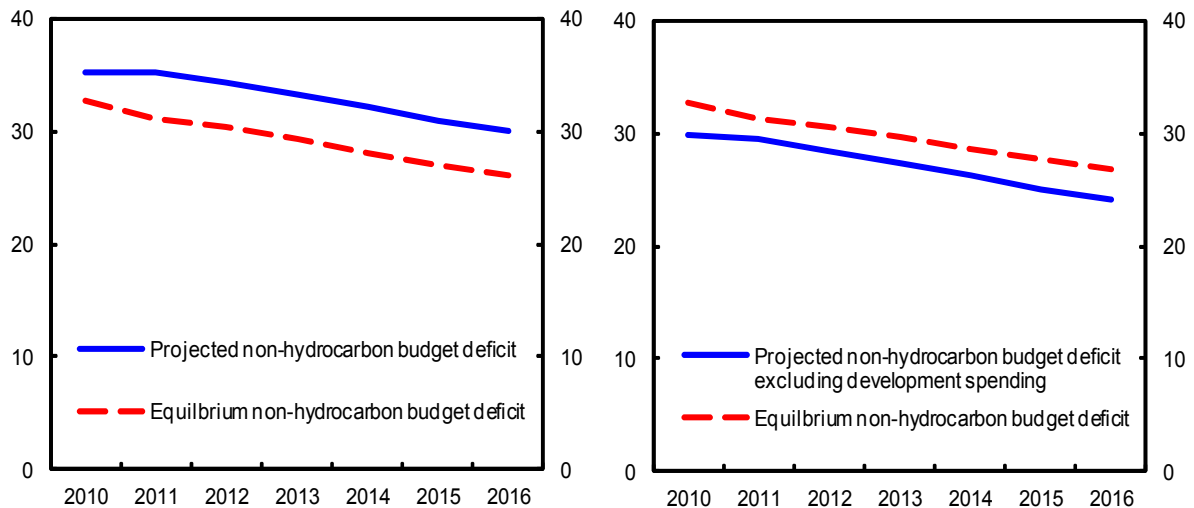
#### IV. ASSESSING FISCAL SUSTAINABILITY

**Fiscal sustainability is also important in light of the debt crisis and the contamination of the sovereign balance sheet by contingent liabilities.** The main focus of this paper is on the cyclicity of fiscal policy and the estimation of structural balances, but the issue of fiscal sustainability has also moved to center stage in light of the post-crisis contamination of the sovereign balance sheet by contingent liabilities. Gross government debt, excluding domestic bank loans to the government, increased from 3.6 percent of GDP in 2007 to 6.6 percent in 2008 and 15.8 percent in 2010. Though the sustainability of public debt is not an immediate issue for the U.A.E. as a whole, there are considerable differences at the sub-national level. For example, Abu Dhabi, with its substantial hydrocarbon reserves and accumulated financial wealth, does not have a sustainability problem over the medium term, whereas the built-up of contingent liabilities during the boom years has made Dubai more vulnerable, as shown by GRE debt restructurings and financial support from Abu Dhabi and the CBU.

**The U.A.E. as a whole is estimated to have a non-hydrocarbon primary budget deficit more than the equilibrium level.** According to the permanent income hypothesis, governments should smooth consumption out of hydrocarbon income over time in line with

the annuity present value of expected hydrocarbon wealth.<sup>10</sup> Assuming constant real per capita government expenditure that delivers a constant real per capita annuity after the depletion of hydrocarbon resources, the non-hydrocarbon primary deficit is estimated to be 4 percentage points of GDP higher than its equilibrium value in 2011, with the gap staying virtually unchanged at 3.9 percentage points by end-2016 (Figure 6).<sup>11</sup> Alternatively, excluding development spending that may yield a return on investment equal to the discount rate used in the annuity calculations, the non-hydrocarbon primary deficit is estimated to be 2.9 percentage points of GDP below its equilibrium value in 2011 and remaining at 2.8 percentage points below the estimated equilibrium threshold by 2016. A limitation of this analysis is the use of proven hydrocarbon reserves to derive the estimates of fiscal sustainability. This does not account for the possibility that the resource base could be extended and broadened through technological developments and the exploitation of probable reserves. Accordingly, a wider resource base would extend the production horizon and raise the sustainable non-hydrocarbon primary deficit. Nevertheless, albeit sensitive to the parameter assumptions, these results indicate a need for fiscal consolidation to ensure long-term sustainability and to improve intergenerational distribution of hydrocarbon wealth.

**Figure 6. U.A.E.: Fiscal Sustainability Analysis, 2010-16**  
(Percent of non-hydrocarbon GDP)



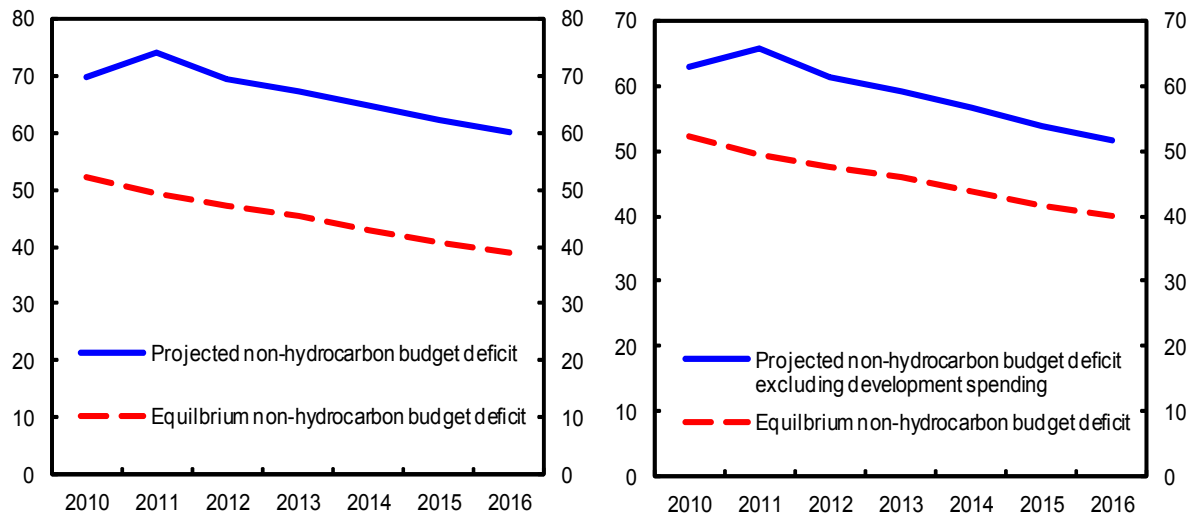
Source: Author's calculations

<sup>10</sup> If population growth is different from zero, the optimal consumption path would require the use of a per national permanent income rule. Other rules are constant real wealth or constant real wealth per national. The choice of wealth accumulation rule involves trade-offs between the economy's domestic absorption capacity, society's intertemporal preferences, and the accountability of current to future generations.

<sup>11</sup> The calculations assume the real rate of return on assets, inflation, and population growth of U.A.E. nationals of 4 percent, 2 percent, and 1.5 percent, respectively. Hydrocarbon reserves are assumed to be depleted by 2082, and the price of oil is projected to be \$96.8 per barrel in 2016 and remain constant in real terms thereafter.

**Given the extent of fiscal decentralization, a disaggregated approach to the fiscal sustainability analysis seems more appropriate.** Since the U.A.E. has a loose federal structure and emirates have no legal obligation to provide fiscal support to another, assessing fiscal sustainability at a consolidated level may yield misleading results. Taking into consideration the asymmetric distribution of resource wealth, it would be more appropriate to look at fiscal sustainability at emirate level. According to the fiscal sustainability analysis based on the permanent income hypothesis, assuming constant real per capita government expenditure that delivers a constant real per capita annuity after the depletion of hydrocarbon resources, Abu Dhabi's non-hydrocarbon primary deficit is estimated to be 24.6 percentage points of GDP higher than its equilibrium value in 2011, with the gap narrowing to 21 percentage points by end-2016 (Figure 7). Even excluding development spending that may yield a return on investment equal to the discount rate used in the annuity calculations, the non-hydrocarbon primary deficit is estimated to be 16.4 percentage points of GDP above its equilibrium value in 2011 and remaining at around 12 percentage points above the estimated equilibrium threshold by the end of 2016. These findings indicate that while Abu Dhabi has abundant fiscal space over the medium term, it should nevertheless moderate government spending to maintain long-term sustainability and intergenerational equity.

**Figure 7. Abu Dhabi: Fiscal Sustainability Analysis, 2010–16**  
(Percent of non-hydrocarbon GDP)



Source: Author's calculations.

**Contingent liabilities stemming from non-performing GREs have raised Dubai's public sector debt ratio.** While the U.A.E. as a whole and Abu Dhabi on its own do not appear to have a sustainability problem over the medium term, the built-up of contingent liabilities has made Dubai's fiscal performance more vulnerable. Gross government debt, including government guarantees but excluding domestic bank loans, increased from 1.6 percent of

Dubai and northern emirates GDP in 2007 to 10.3 percent in 2008 and 34 percent as of end-2010.<sup>12</sup> This was mainly due to the bailout of GREs, which was financed through sovereign borrowing. Government debt figures, however, still underestimate Dubai's total public sector debt by omitting quasi-sovereign contingent liabilities stemming from underperforming GREs. Dubai's publicly-held debt stands at US\$113 billion (or 102.5 percent of Dubai and northern emirates GDP), with only US\$36 billion of this debt belonging to the government (Guzzo and Ribeiro da Silva, 2011). While variable financial conditions suggest that not all GREs should pose a fiscal risk, most entities operating in the real estate sector appear to fall in this category. Accordingly, we assume that the debt issued by real estate GREs or their subsidiaries, together with that of those entities currently reporting losses, represent a contingent liability to the sovereign balance sheet. On this basis, at least US\$11 billion of contingent risk can be foreseen for Dubai by end-2016, with more than 70 percent of these liabilities coming due in 2011-12.<sup>13</sup> This would raise the total debt-to-GDP ratio to 47.4 percent in 2012, compared to 34.6 percent for the government alone (Figure 8). Furthermore, by accounting for all maturing GRE debt as a contingent liability, Dubai's total public sector debt would grow to 62.5 percent of Dubai and northern emirates GDP as of end-2012.

**The debt sustainability analysis indicates that Dubai's debt may become unsustainable in the absence of policy change.** Despite gradual fiscal consolidation projected in the baseline scenario, Dubai's government debt is estimated to increase to 41 percent of GDP by the end of 2016. In the absence of fiscal consolidation (i.e., without policy change compared to 2005-09), however, it is projected to reach 53 percent by 2016. Furthermore, including the contingent liabilities as estimated above and with the baseline profile for fiscal adjustment, the total debt-to-GDP ratio would increase to 54.3 percent of GDP—and 62.5 percent without fiscal consolidation—by the end of 2016. As an extension, including all maturing quasi-sovereign debt would raise Dubai's total public sector debt to 88.6 percent of GDP by 2016. Even if we assume minimal GRE spending going forward compare with the 2003-08 period, these estimates already imply large fiscal costs in case the government needs to support underperforming GREs and make fiscal sustainability a serious challenge for Dubai over the medium term (for detailed projections, see Appendix I).

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<sup>12</sup> The breakdown of domestic bank lending to the government by emirate is not available.

<sup>13</sup> This amount should be regarded as a minimum level of contingent risk. First, the performance of profitable companies operating outside the real estate sector may also be subject to deterioration over the coming years, ultimately triggering sovereign support. Second, other companies, primarily non-listed entities that do not disclose financial statements, may also be registering losses. Third, for several GREs, the liabilities requiring sovereign support may exceed significantly the level of publicly-held debt. Finally, sovereign support may well go beyond guaranteeing the stock of liabilities and require capital injection. While all these factors should be taken into account when assessing the perimeter of contingent risk, on a more positive note, the net impact of these companies on the sovereign balance sheet might be somewhat lower when assets are accounted for.



**Dubai has a narrow revenue base and a limited scope for revenue mobilization to deal with the fiscal burden of underperforming GREs.** The sustainability of the debt-to-GDP ratio depends on the difference between the debt service ratio—measured by interest payments as a share of GDP—and the primary budget balance. In the case of Dubai, the debt service ratio already increased from 0.6 percent of GDP in 2008 to 2.1 percent in 2010, and it is estimated to reach approximately 3 percent by 2016.<sup>14</sup> This is significantly higher than the primary budget balance, which was in a deficit of 2.9 percent of GDP in 2010 and it is projected, according to the baseline assumptions, to remain in a deficit of 1.6 percent by 2016, putting Dubai in a precarious fiscal position. On the other hand, including the estimated contingent liabilities, the total debt service ratio would rise to 3.7 percent of GDP by the end of 2016.<sup>15</sup> The need for fiscal consolidation would increase according to the size of the contingent liability shock. Though containing expenditures is essential in the near term, there is also need for broadening the revenue base. Tax revenues—consisting of custom duties and income tax on foreign banks—remain low as a share of GDP compared to other emerging market economies. Furthermore, custom duties account for more than 82 percent of total tax revenues, making the revenue base vulnerable to shocks. Therefore, lacking the scope for revenue mobilization, Dubai’s fiscal consolidation to achieve a comfortable debt level over the medium term need to take place on the expenditure side, putting further strain on economic activity. While there is room for broadening the revenue base, for example, through the introduction of value-added tax, it requires a national initiative.

**Abu Dhabi and, to a lesser extent, other emirates of the U.A.E. also face similar fiscal risks stemming from underperforming GREs.** Although the size of Abu Dhabi’s publicly-held government debt is about 6 percent of Abu Dhabi GDP, compared to Dubai’s 34 percent of Dubai and northern emirates GDP, including the outstanding GRE debt raises it 54.8 percent of Abu Dhabi GDP. That would still be just above half of Dubai’s total debt including quasi-sovereign entities. Nevertheless, similar to Dubai’s experience with contingent liabilities arising from underperforming GREs, Abu Dhabi is also facing the risk of contingent liabilities stemming from over US\$92.4 billion in GRE debt. In view of that, if we assume that all debt issued by the GREs operating in the real estate sector, along with that of GREs currently reporting losses, imply a contingent liability to the government, at least US\$9 billion of contingent risk can be foreseen for Abu Dhabi by end-2016, with more than half of that debt coming due in 2011-12.<sup>16</sup> Furthermore, despite the market-based debt

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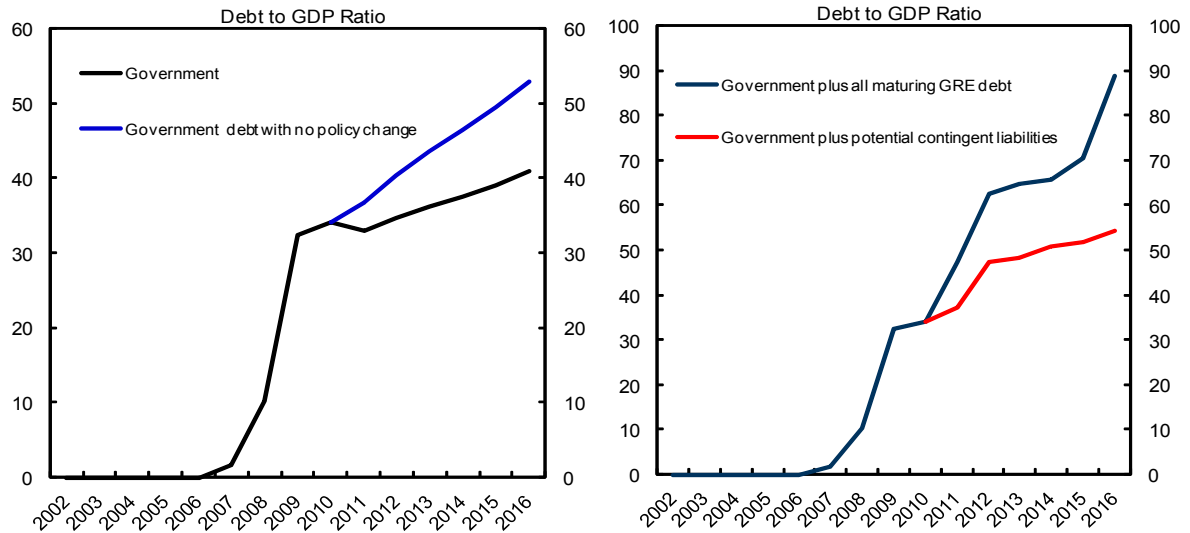
<sup>14</sup> Estimates of the debt service ratio are based on conservative assumptions and do not incorporate any income flow from problematic GREs over the forecast horizon.

<sup>15</sup> The possible monetary tightening cycle in the U.S. over the 2012-16 period would have implications for Dubai’s debt profile, given the exchange rate peg and the likely increase in the cost of debt service.

<sup>16</sup> Similar to the case of Dubai, this amount should be regarded as a minimum level of contingent risk, since the performance of profitable companies operating outside the real estate sector may also be subject to deterioration over the coming years and other companies, primarily non-listed entities, not disclosing financial statements may also be registering losses.

restructurings, the recent GRE bailouts—namely, financial support provided to Dubai by Abu Dhabi and the CBU and to Abu Dhabi GREs by the government of Abu Dhabi—have bolstered the implicit bailout expectation.

**Figure 8. Dubai: Public Sector Debt Sustainability Analysis, 2002–16**



Source: Author's calculations.

## V. CONCLUSION

**The expansionary and procyclical fiscal stance, at the consolidated and sub-national levels, aggravated the severity of the crisis.** As the pegged exchange rate regime limits the scope for using monetary policy, fiscal policy is the only potent tool to manage the macroeconomic cycle. The empirical findings of this paper indicate that fiscal policy was procyclical at the consolidated and sub-national levels prior to the crisis—and turned countercyclical after the crisis in 2009. During the boom years, the procyclical fiscal position reinforced the “financial accelerator” effect—exacerbating the economic cycle—and thereby contributed to the above-trend increase in aggregate demand. After the crisis, facing a negative output gap, the authorities adopted an expansionary countercyclical stance and raised the cyclically adjusted non-hydrocarbon primary budget deficit in 2009, albeit at varying degrees according to the available fiscal space of individual emirates. However, in 2010, the fiscal policy turned contractionary, with the cyclically adjusted non-hydrocarbon primary deficit narrowing significantly as a share of non-hydrocarbon GDP. Looking forward, although the sustainability of public debt is not an immediate issue for the U.A.E. as a whole, the analysis shows that there are considerable differences at the sub-national level, especially with the build-up of contingent liabilities during the boom years.

**Diverging sub-national fiscal performance calls for closer policy coordination and institutional rethinking of fiscal federalism.** The theory of fiscal federalism—developed by

Tiebout (1956), Musgrave (1959) and Oates (1972) among others—argues that sub-national governments should have the ability to provide services that match the preferences and circumstances of its constituents. The key assumption is that the sub-national provision of services would improve efficiency and welfare above that generated by a centralized allocation of resources. Although the conventional theoretical literature tends to highlight a positive link between fiscal decentralization—the transfer of revenue sources and expenditure functions to sub-national tiers of government—and economic efficiency, a plethora studies have found no concrete evidence for significant “economic dividend” derived from fiscal decentralization (Davoodi and Zou, 1998; Woller and Phillips, 1998; Rodriguez-Pose and Bwire, 2004; Baskaran and Feld, 2009). Furthermore, in the case of the U.A.E., the problem seems to be a high degree of decentralization with insufficient policy coordination between sub-national governments that weakens the effectiveness of macroeconomic management at the aggregated level. Although the U.A.E. constitution gives primary responsibility to the emirate level for imposing taxes and fees, thus conveying revenue autonomy to the emirates, there is need for closer policy coordination—and possibly institutional optimization of fiscal federalism—to strengthen fiscal performance and safeguard macro-financial stability in individual emirates and the U.A.E. as a whole, especially in view of wide disparities in the distribution of natural resource wealth.

**Fiscal rules have become a popular tool to avoid procyclicality and enhance policy credibility, especially in emerging economies.**<sup>17</sup> Ongoing initiatives in the U.A.E. to enhance fiscal transparency should be supported by the adoption of legally-anchored fiscal rules, which place constraints on discretionary policies through procedural and numerical limits on fiscal aggregates such as the structural budget balance, spending or indebtedness (Fisc and Scartascini, 2007; Ter-Minassian, 2006). The optimal design of a rule-based medium-term fiscal framework varies from one country to another, depending on fiscal policy objectives and institutional capabilities. In the case of the U.A.E., the authorities can choose from a range of fiscal rules, implemented at the consolidated and/or sub-national levels, to facilitate the coordination of fiscal policies, moderate procyclicality, and ensure fiscal sustainability and intergenerational equity.

- *An overall budget balance rule is easy to implement and monitor.* A ceiling on the overall fiscal deficit is effective in many countries, but the volatility of oil prices could make it procyclical in a hydrocarbon-based economy. For example, it could trigger a consolidation in the event of a negative terms-of-trade shock or exacerbate the economic upswing in the case of a positive shock. Thus, a ceiling on the non-hydrocarbon deficit offers a better alternative and eliminates the problem of procyclicality.

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<sup>17</sup> The number of countries adopting fiscal rules increased from seven in 1990 to 80 by 2009.

- *An expenditure rule is operationally simple and provides clear guidance.* A ceiling on nominal or real expenditure growth would be operationally simple and provide clear guidance on how to adjust the fiscal stance over time. This approach, however, requires a reliable medium-term framework to avoid the built-up of large deficits and deterioration in the net asset position due to persistently lower revenue generation.
- *A structural balance rule is the preeminent option, but operationally challenging.* The cyclically-adjusted non-hydrocarbon fiscal deficit rule would avoid procyclical policies and ensure sustainability. Under this rule, government spending is budgeted ex-ante in line with the structural level of revenues that would be achieved if the economy were operating at full potential. Although it would support fiscal discipline, the implementation of a structural balance rule is operationally more challenging in a hydrocarbon-based economy, as it requires reliable estimates of the output gap.
- *A debt brake mechanism, constraining the debt-to-GDP ratio, could safeguard fiscal solvency.* The main objective of the debt brake would be to slow an unsustainable deterioration in the public sector net asset position because of sustained fiscal deficits. The debt brake mechanism at emirate level, including quasi-sovereign debt, would prevent the transfer of liabilities off the sovereign balance sheet and trigger an automatic—and timely—fiscal adjustment when the cumulative deviation of the overall fiscal deficit or GRE borrowing exceeds a target threshold, while retaining desirable countercyclical properties.

**The U.A.E. would benefit from a rule-based medium-term fiscal framework related to non-hydrocarbon revenues and debt sustainability.** Better fiscal policy formulation (e.g. identification of the cycle) and enhanced policy coordination among various governments with or without a rule-based regime form a cornerstone of sound macroeconomic governance. Nevertheless, the U.A.E. faces distinct policy challenges that may warrant customized fiscal anchors, as the sustainability of non-hydrocarbon fiscal deficits varies among the emirates with differences in hydrocarbon reserves and initial net asset positions.<sup>18</sup> Since what works in a hydrocarbon-rich emirate may not be appropriate for a more diversified emirate, sub-national fiscal rules—accommodating emirate-level structures and capabilities—and a clear and credible fiscal transfer mechanism (or a credible “no bailout” clause) would help avoid the dangers of moral hazard in the U.A.E.<sup>19</sup> Furthermore, decentralized fiscal authorities may not internalize the impact of unsustainable fiscal policies at sub-national level when fiscal rules are imposed at the consolidated level. Therefore,

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<sup>18</sup> For example, imposing a uniform ceiling on the non-hydrocarbon fiscal balance, non-hydrocarbon primary budget balance or permanent income-based hydrocarbon balances could be problematic because of the difficulty in finding an anchor for the non-hydrocarbon primary balance.

<sup>19</sup> Since the cost of fiscal indiscipline by one or more sub-national governments is likely to spill over to the others, as it has been the case in the Eurozone debt crisis, fiscal rules are crucial to address strong heterogeneity of sub-national governments and avoid the problem of moral hazard created by the expectation of bailouts.

emirate-specific fiscal rules—based on the sustainable medium-term fiscal framework of each emirate—with a debt brake mechanism would impose a high cost on non-compliance and de-politicize enforcement procedures so that corrective actions become automatic.<sup>20</sup>

**The establishment of fiscal rules at the emirate level would signal commitment to put the budgetary situation on a sustainable footing.** The fiscal rule should constrain policy in the steady state—rather than being the tool to implement the de rigueur fiscal adjustment—and therefore requires the institutional infrastructure and an adequate system of public financial management as pre-conditions. Nevertheless, the establishment of fiscal rules at the emirate level would signal the authorities’ commitment to undertake the requisite measures to put the fiscal situation on a sustainable footing.<sup>21</sup> Furthermore, given that GRE borrowing generated debt sustainability problems, a debt brake mechanism constraining the debt-to-GDP ratio, at the federal and emirate government levels, including GREs could help safeguard fiscal solvency. The main objective of the debt brake, along with a multi-year fiscal framework, would be to slow an unsustainable deterioration in the public sector net asset position. The debt brake mechanism would trigger an automatic and timely fiscal consolidation when the cumulative deviation of the overall fiscal deficit or GRE borrowing exceeds a target threshold, while retaining desirable countercyclical properties.

**Broader coverage of the fiscal sector is important to contain the fiscal risks of quasi-sovereign entities.** The recent GRE bailouts underscore that entities outside the general government sector can undermine the credibility of the fiscal anchor if they entail large contingent liabilities for the sovereign balance sheet. Therefore, in view of that some GREs perform non-commercial functions on behalf of the government, the coverage of fiscal accounts should extend to the broader public sector, along with timely fiscal reporting based on a harmonized classification system. To this end, the debt management offices should have dedicated units collecting frequent data on the outstanding GRE liabilities, their maturity profile, income and cash-flow statements, and assessing potential contingent liabilities to the sovereign balance sheet. The authorities should also consider including a statement of fiscal risks as part of the annual budget documents including discussion of past experiences with the materialization of risks, a presentation of policies to mitigate and manage risks, and forward-looking risk estimates, which, in the case of the U.A.E., could focus on fiscal risks posed by GREs.<sup>22</sup>

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<sup>20</sup> Although some countries exclude capital expenditures from the fiscal rule on the grounds that such spending contributes to growth over the long run, such exclusions could lead to the risk of “creative” accounting that reclassifies expenditure items and lessen transparency.

<sup>21</sup> The speed of fiscal adjustment during the consolidation period, for example, in the case of Dubai, may be different from that needed during the steady state.

<sup>22</sup> For an overview of best practices in the disclosure of fiscal risks in the budget documents, see Everaert, Fouad, Martin, and Velloso (2009).

## Appendix I. Dubai: Public Sector Debt Sustainability Framework, 2007-2016

(Percent of Dubai GDP, unless otherwise indicated)

	Actual			Projections						
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
<b>Baseline: Public sector debt 1/</b>	1.6	10.3	32.4	<b>34.0</b>	<b>32.9</b>	<b>34.6</b>	<b>36.1</b>	<b>37.4</b>	<b>39.0</b>	<b>41.0</b>
o/w foreign-currency denominated	1.6	10.3	32.4	34.0	32.9	34.6	36.1	37.4	39.0	41.0
Change in public sector debt	1.6	8.6	22.2	1.6	-1.2	1.7	1.5	1.3	1.6	2.0
Identified debt-creating flows (4+7+12)	0.2	1.0	15.3	2.4	-4.4	2.0	2.3	1.9	2.0	2.3
Primary deficit	0.2	1.2	12.9	2.9	-0.9	1.2	1.4	1.4	1.5	1.6
Revenue and grants	6.6	7.5	10.6	10.8	10.7	8.2	7.8	7.5	7.1	6.8
Primary (noninterest) expenditure	6.8	8.7	23.5	13.7	9.8	9.4	9.2	8.9	8.7	8.4
Automatic debt dynamics 2/	0.0	-0.2	2.4	-0.5	-3.5	0.8	0.9	0.5	0.5	0.6
Contribution from interest rate/growth differential 3/	0.0	-0.2	2.4	-0.5	-3.5	0.8	0.9	0.5	0.5	0.6
Of which contribution from real interest rate	0.0	-0.2	2.1	-0.4	-2.7	1.9	2.3	1.9	2.0	2.2
Of which contribution from real GDP growth	0.0	0.0	0.3	-0.2	-0.8	-1.1	-1.3	-1.4	-1.5	-1.6
Contribution from exchange rate depreciation 4/	0.0	0.0	0.0	...	...	...	...	...	...	...
Other identified debt-creating flows	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Residual, including asset changes (2-3) 5/	1.4	7.6	6.8	-0.7	3.2	-0.3	-0.8	-0.6	-0.4	-0.3
Public sector debt-to-revenue ratio 1/	24.9	137.1	306.6	315.5	307.7	421.0	462.7	500.4	547.6	601.1
<b>Gross financing need 6/</b>	0.5	2.6	20.2	21.2	18.2	19.1	20.8	25.5	21.7	23.1
in billions of U.S. dollars	0.6	3.1	21.1	22.4	20.9	23.3	27.2	35.8	32.8	37.5
<b>Key Macroeconomic and Fiscal Assumptions Underlying Baseline</b>										
Real GDP growth (in percent)	18.1	3.2	-2.4	0.5	2.8	3.4	4.1	4.2	4.4	4.4
Average nominal interest rate on public debt (in percent) 8/	6.4	4.3	6.5	6.9	7.7	7.9	7.7	7.1	7.7	8.3
Average real interest rate (nominal rate minus change in GDP deflator, in percent)	-2.7	-11.5	17.8	-1.3	-9.0	6.1	7.0	5.7	5.7	6.2
Nominal appreciation (increase in US dollar value of local currency, in percent)	0.0	0.0	0.0	...	...	...	...	...	...	...
Inflation rate (GDP deflator, in percent)	9.1	15.8	-11.3	8.2	16.7	1.8	0.7	1.4	2.0	2.1
Growth of real primary spending (deflated by GDP deflator, in percent)	40.2	23.8	167.8	-45.4	-33.6	0.3	3.7	3.2	2.3	2.6
Primary deficit	0.2	1.2	12.9	2.9	-0.9	1.2	1.4	1.4	1.5	1.6
<b>A. Alternative Scenarios</b>										
A1. No policy change (constant primary balance) in 2005-09				<b>34.0</b>	<b>36.7</b>	<b>40.3</b>	<b>43.5</b>	<b>46.4</b>	<b>49.5</b>	<b>52.9</b>
A2. Government plus potential contingent liabilities				<b>34.0</b>	<b>37.0</b>	<b>47.4</b>	<b>48.2</b>	<b>50.7</b>	<b>51.7</b>	<b>54.3</b>
A3. Government plus 100 percent of maturing GRE debt				<b>34.0</b>	<b>47.4</b>	<b>62.5</b>	<b>64.6</b>	<b>65.7</b>	<b>70.4</b>	<b>88.6</b>
<b>B. Bound Tests</b>										
B1. Real interest rate is at historical average plus one standard deviation				<b>34.0</b>	<b>34.2</b>	<b>37.5</b>	<b>40.8</b>	<b>44.0</b>	<b>47.6</b>	<b>51.8</b>
B2. Real GDP growth is at historical average minus one standard deviation				<b>34.0</b>	<b>33.3</b>	<b>36.2</b>	<b>39.6</b>	<b>43.3</b>	<b>48.0</b>	<b>53.6</b>
B3. Primary balance is at historical average minus one standard deviation				<b>34.0</b>	<b>35.0</b>	<b>38.9</b>	<b>42.7</b>	<b>46.2</b>	<b>50.0</b>	<b>54.3</b>
B4. Combination of B1-B3 using 1/2 standard deviation shocks				<b>34.0</b>	<b>34.9</b>	<b>39.3</b>	<b>43.7</b>	<b>47.9</b>	<b>52.7</b>	<b>58.1</b>
B5. One time 30 percent real depreciation in 2006 10/				<b>34.0</b>	<b>59.6</b>	<b>62.0</b>	<b>64.3</b>	<b>66.0</b>	<b>67.9</b>	<b>70.4</b>
B6. 10 percent of GDP increase in other debt-creating flows in 2006				<b>34.0</b>	<b>42.9</b>	<b>44.8</b>	<b>46.7</b>	<b>48.1</b>	<b>49.8</b>	<b>52.0</b>

1/ Indicate coverage of public sector, e.g., general government or nonfinancial public sector. Also whether net or gross debt is used.

2/ Derived as  $[(r - \pi(1+g) - g + \alpha\varepsilon(1+r)] / (1+g+\pi+g\pi)$  times previous period debt ratio, with  $r$  = interest rate;  $\pi$  = growth rate of GDP deflator;  $g$  = real GDP growth rate;  $\alpha$  = share of foreign denominated debt; and  $\varepsilon$  = nominal exchange rate depreciation (measured by increase in local currency value of U.S. dollar).

3/ The real interest rate contribution is derived from the denominator in footnote 2/ as  $r - \pi(1+g)$  and the real growth contribution as  $-g$ .

4/ The exchange rate contribution is derived from the numerator in footnote 2/ as  $\alpha\varepsilon(1+r)$ .

5/ For projections, this line includes exchange rate changes.

6/ Defined as public sector deficit, plus amortization of medium and long-term public sector debt, plus short-term debt at end of previous period.

7/ The key variables include real GDP growth; real interest rate; and primary balance in percent of GDP.

8/ Derived as nominal interest expenditure divided by previous period debt stock.

9/ Assumes that key variables (real GDP growth, real interest rate, and other identified debt-creating flows) remain at the level of the last projection year.

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