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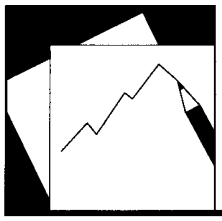

IMF Working Paper

Constraints on the Design and Implementation of Monetary Policy in Oil Economies: The Case of Venezuela

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Constraints on the Design and Implementation of Monetary Policy in Oil Economies: The Case of Venezuela

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Abstract

By definition, *fiscal dominance* impedes the effective implementation of any monetary strategy aimed at controlling inflation. Economies that exhibit *oil dominance*—a situation in which oil exports largely affect the main macroeconomic indicators—may also exhibit fiscal dominance. However, in this case, the standard indicators used to gauge the presence of fiscal dominance may fail to give the appropriate signals. The main purpose of this paper is twofold: i) to present a simple framework to analyze fiscal dominance in oil exporting countries and ii) to test the hypothesis of the presence of *oil dominance/fiscal dominance* (OD/FD) in the case of Venezuela. Using VAR and VEC models it is possible to conclude that there is relevant evidence supporting the validity of the OD/FD hypothesis.

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I. INTRODUCTION

By definition, *fiscal dominance* impedes the effective implementation monetary policy aimed at controlling inflation. When fiscal dominance is present, conflicting objectives between the monetary and the fiscal authorities often result in the central bank giving up its efforts to achieve price stability. Economies that exhibit *oil dominance*—a situation in which oil exports largely affect the main macroeconomic indicators—may also exhibit fiscal dominance. However, in this case, it is possible that the standard indicators used to gauge the presence of fiscal dominance (for example, overall fiscal balance and debt dynamics) fail to give the appropriate signals: fiscal dominance might be present even with fiscal surpluses and relatively low levels of public sector debt.[2] The main purpose of this paper is twofold: i) to present a simple framework to analyze fiscal dominance in oil exporting countries (OEC) and ii) to test the validity of the oil dominance/fiscal dominance (OD/FD) hypothesis based on that framework for the case of Venezuela. The paper also examines the potential macroeconomic effects of the oil dominance/fiscal dominance phenomenon, particularly with respect to the connection between the monetary base and prices. Vector Autoregression (VAR) models and Vector Error-Correction (VECM) models are used for the empirical analysis. The general conclusion drawn from the results is that there is relevant evidence, both in the short-run and the long-run that supports the validity of the oil dominance/fiscal dominance hypothesis during the period 1960–2005.

II. FISCAL DOMINANCE IN OIL ECONOMIES

Independence of the central bank from the fiscal authorities is a prerequisite for a successful implementation of any monetary regime. This independence has to be understood as *the ability of the central bank to freely use its instruments of monetary policy to achieve price stability, without being forced to softening the strength of its actions, or to constantly counteract the effects of fiscal policy, which ultimately leads to abandoning that objective*. In an economy characterized by *fiscal dominance* over *monetary dominance*, there is no such independence, and therefore, the implementation of any monetary policy regime is bound to fail.

In trying to determine empirically the degree of central bank independence, as explained above, some authors use a simple approach: based on the central bank accounts, analyze to what extent changes in the monetary base (and thus in the money supply) are dominated by changes in central bank net credit to the government.[3] A more comprehensive approach is to focus on the government's intertemporal budget constraint: *fiscal sustainability* analysis.

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[2] In some cases, mismanagement of oil resources, and asymmetric fiscal policy in response to changes in oil prices has led some countries to experience overall fiscal deficits and accumulate large public sector debt.

[3] Fratianni and Spinelli (2001) use this approach as a first approximation to determine the presence of fiscal dominance for the case of Italy.

According to this approach, a fiscal policy that results in high and continuous fiscal deficits, leads to an unsustainable deterioration of the government's financial position, usually identified by an accumulation of public sector debt. A weak financial position of the government limits the central bank's ability to increase interest rates to reduce inflationary pressures (for example, as indicated by a Taylor rule in an inflation targeting scheme) since it will deteriorate further the government's debt situation. Even if the central bank chooses to counteract the effects of fiscal policy, this attempt would be short lived. Sooner or later, the unsustainable fiscal policy would require a forced adjustment, either through debt default, domestic inflation, or both.

For OEC, the two approaches described above may not be sufficient. As discussed below, changes in the monetary base may occur as a result of fiscal policy without being reflected in net credit to the government in the central bank accounts. Also, fiscal dominance may not be clearly identified using the standard approach to fiscal sustainability based on the overall primary fiscal balance and the stock of debt. The next section tries to derive a practical approach to determine fiscal dominance taking into account the particular features of OEC associated with oil dominance.[4]

A. Oil Dominance and Fiscal Dominance: Analytical Framework

In general, the financing of government expenditures with resources obtained from oil exporting activities may have similar effects as monetizing the deficit, depending on the central bank's *de-facto* exchange rate policy.[5] Indeed, a common practice followed by central banks in OEC is to intervene in the foreign exchange market to avoid large fluctuations in the exchange rate associated with oil exports, independently of the officially announced foreign exchange system.[6] This has implications for the analysis of fiscal dominance using the two approaches described above.

Analysis of central bank accounts

The intervention of the central bank in the foreign exchange market, together with the government's financing of expenditures with oil-related receipts implies that the simple

[4] In addition to limit the role of monetary policy through fiscal dominance, oil dominance may also affect the effectiveness of monetary policy if the central bank limits the fluctuations in the nominal exchange rate in response to changes in oil prices. As discussed later in the paper, several OEC have chosen some kind of pegged exchange rate regime.

[5] In this case, the expansion in the monetary base is accompanied by an increase in net international reserves, instead of net credit to the government.

[6] As shown later in the paper, a significant group of major OEC maintains some form of currency peg. Other OEC countries with an officially announced flexible exchange rate system, also have "surrender requirements" for oil exports: all oil-related foreign currency must be sold to the central bank. The central bank then sells specific amounts of foreign exchange through an auction mechanism.

approach to determine fiscal dominance using central bank accounts would not work. The link between changes in the monetary base and fiscal policy is not clearly identified: all changes in the monetary base would be seen as originating from changes in the central bank's net international reserves. Moreover, it is possible to observe money creation of fiscal origin even in the presence of an overall fiscal surplus.

A simple example may illustrate the problem of using this approach in the case of OEC, using the basic monetary base identity, and the simplifying assumption that all oil exports are carried out by state-owned oil companies.

$$\Delta MB = \Delta NIR + \Delta NDA$$

where,
MB: Monetary base
NIR: Net international reserves
NDA: Central bank's net domestic assets

When an oil export occurs, there is a simultaneous increase in NIR (as the oil company sales the foreign exchange proceeds to the central bank) and in the deposits of the nonfinancial public sector at the central bank, that is, a decline in NDA for the same amount, so the monetary base does not change. As the nonfinancial public sector finances expenditures with those deposits, NDA increase and the monetary base expands. However, if those changes occur within the same period, the central bank accounts would show an expansion in the monetary base due to an increase in NIR. Moreover, if the public sector spends less than what it received from oil exports, NDA would reflect a decline, partially offsetting the impact of the increase in NIR. Without further analysis, one may reach to the conclusion that fiscal policy had a contractionary effect on the monetary base.

Fiscal sustainability approach

To use the fiscal sustainability framework as an instrument to determine fiscal dominance in OEC, it is necessary to change the focus from the stock of debt and the overall primary balance of the government to the net worth and its corresponding flow, the net operating primary balance. The reason for that is that the extraction of oil implies a depletion of a non-renewable resource, that is, a reduction of a government asset.[7] Financing government consumption or unproductive investments with oil-related fiscal receipts reduces the government's net worth without immediately affecting the stock of debt. Moreover, oil-related fiscal receipts present simply the change of one less liquid asset for another more liquid and should not be considered as fiscal revenue. The standard definition of primary fiscal balance overlooks this fact by treating oil-related receipts as any other revenue.

[7] If the government is the owner of the oil fields, the value of the asset is equivalent to the present value of all future sales, net of operating costs. If it is not, the oil-related asset is equivalent to the present value of expected future taxes and any other fees or contributions charged for the extraction of oil.

One way to properly assess the presence of fiscal dominance in OEC is to use a fiscal balance excluding oil-related net receipts and a more comprehensive indicator of the government's financial position—net worth (NW)—in addition to the stock of debt. The accounting framework explained below, based on the net worth approach to fiscal analysis, can be used to derive the appropriate indicators.[8] To visualize the separation between fiscal policy and monetary policy, the government and the central bank will first be considered individually and then consolidated.

The government's budget constraint and net worth

$$\underbrace{NOB_{g_t} - I^{no}_{NF_t} - I^{o}_{NF_t}}_{\substack{Government's \\ overall\ balance\ (OBg)}} = \Delta\left(A^{f}_{Fg_t} + DP^{cb}_{g_t} + A^{d}_{Fg_t}\right) - \Delta\left(L^{f}_{g_t} + L^{cb}_{g_t} + L^{d}_{g_t}\right) \quad (1)$$

$$NW_{g_t} = A^{no}_{NFg_t} + A^{o}_{NFg_t} + \left(A^{f}_{Fg_t} + DP^{cb}_{g_t} + A^{d}_{Fg_t}\right) - \left(L^{f}_{g_t} + L^{cb}_{g_t} + L^{d}_{g_t}\right) \quad (2)$$

$$\Delta NW_{g_t} = NOB_{g_t} \quad (3)$$

where,

$NOBg$: Net operating balance of the government, defined as revenue minus expense (transactions that increase net worth minus transactions that reduce net worth).

I^{no}_{NF}, I^{o}_{NF}: Net investment in non-oil and oil nonfinancial assets, respectively.

$A^{no}_{NFg}, A^{o}_{NFg}$: Non-oil nonfinancial assets of the government and oil wealth, respectively.

A^{f}_{Fg}, L^{f}_{g}: Government's foreign assets and liabilities.

A^{d}_{Fg}, L^{d}_{g}: Government's domestic financial assets and liabilities, respectively, excluding those with the central bank.

DP^{cb}_{g}, L^{cb}_{g}: Government's deposits at the central bank and liabilities to the central bank.

Equation (1) represents the government's budget constraint: the left hand side corresponds to the traditional definition of overall fiscal balance, while the right hand side represents the financing. Equation (2) defines the government's net worth as the sum of nonfinancial assets, non-oil and oil, financial assets, and debt. As indicated by equation (3), assuming no valuation adjustments, the change in net worth will be determined solely by the net operating balance, defined as revenue minus expense; since in the net worth framework any receipt related to the sale of assets is not considered revenue but a change of one asset for another, oil-related receipts are excluded. From equation (2) it is clear that even if the government's overall balance is zero (which may also imply no change in debt), its net worth position

[8] For a more comprehensive discussion of the net worth analytical framework, see Da Costa and Juan-Ramón, 2006, "Net Worth Approach to Fiscal Analysis: Dynamics and Rules," IMF WP 06/17.

might be deteriorating if oil wealth is being used to finance a negative *NOB* (for example, to finance government consumption).

The equations above can be used to analyze fiscal sustainability and thus, fiscal dominance in cases where the government is financing consumption or unproductive investments with assets instead of debt. An unsustainable fiscal situation could be identified with a path for the net operating balance that implies a continuous deterioration of the government's net worth.[9] This framework is suitable for oil exporting countries for which the stock of debt might not fully detect the extent of the problem, particularly during the oil extraction period. After all oil reserves have been depleted, the unsustainable path of the net operating balance would start affecting the stock of debt. The stronger the degree of oil dominance in the fiscal accounts, the more difficult it will be to introduce the fiscal adjustment required to compensate for the loss of oil financing. At that point, the problem becomes the standard case analyzed using the debt sustainability framework.

The central bank's budget constraint and net worth

$$NOB_{cb_t} - I^{no}_{NFcb_t} = \Delta(A^{f}_{Fcb_t} + A^{g}_{Fcb_t} + A^{d}_{Fcb_t}) - \Delta(L^{f}_{cb_t} + DP^{g}_{cb_t} + L^{d}_{cb_t}) - \Delta MB_t \qquad (1')$$

$$NW_{cb_t} = A^{no}_{NFcb_t} + (A^{f}_{Fcb_t} + A^{g}_{Fcb_t} + A^{d}_{Fcb_t}) - (L^{f}_{cb_t} + DP^{g}_{cb_t} + L^{d}_{cb_t}) - MB_t \qquad (2')$$

where,

NOB_{cb}:	Net operating balance of the central bank.
I^{no}_{NF}:	Net investment in non-oil nonfinancial assets.
A^{f}_{Fcb} , A^{d}_{Fcb}:	Financial assets of the central bank measured in local currency, foreign and domestic, respectively, excluding credit to the government.
A^{g}_{Fcb} :	Central bank credit to the government (equal to L^{cb}_{g} in equation (2)).
A^{no}_{NFcb}:	Non-oil nonfinancial assets of the central bank.
L^{f}_{cb} , L^{d}_{cb}:	Central bank's liabilities measured in local currency, foreign and domestic, respectively. Includes debt and non-debt foreign liabilities and any other liability not included in the concept of monetary base. Excludes deposits of the government at the central bank.
DP^{cb}_{g}:	Deposits of the government at the central bank.
MB:	Monetary base. By definition it includes: currency in circulation and deposits of banks and the nonfinancial private sector at the central bank.

[9] Formally, the sustainability analysis under the net worth framework would require a sustainable path for the net operating primary balance, consistent with a given net return on the government's net worth. It can be shown that if there is a positive return on the government's assets, the net operating primary balance required to avoid a decline in the government's net worth is lower than in the absence of such a return.

Equation (1') represents the central bank's budget constraint: the left hand side corresponds to the overall balance and the right hand side represents the financing. Equation (2') shows the central bank's net worth and its components: nonfinancial and financial assets and liabilities.

Rearranging the terms of equation (2'), and expressing the variables in terms of period changes, it is possible to obtain the accounting identity for the change in the monetary base:

$$\Delta MB_t = \underbrace{\Delta(A^f_{Fcb_t} - L^f_{cb_t}) + \Delta(A^g_{Fcb_t} - DP^g_{cb_t}) + \Delta(A^d_{Fcb_t} - L^{ng}_{cb_t}) + \Delta(A^{no}_{NFcb_t} - OL_{cb_t}) - \Delta NW_{cb_t}}_{Central\ bank's\ net\ domestic\ assets} \quad (2'')$$

where L^{ng}_{cb} includes central bank instruments of monetary control held by banks or the nonfinancial private sector, and OL_{cb}, other liabilities not included elsewhere. The first term of the right hand side of equation (2") corresponds to the change in net foreign assets of the central bank, which for simplification are assumed to be equivalent to the net international reserves; the second term represents the change in the net domestic credit of the central bank, defined as credit or holdings of government bonds by the central bank, net of government deposits, credit to banks and nonbank private sector, net of holdings of central bank instruments of monetary control, and central bank's net worth.

Equation (2") can be used to analyze the impact of oil-related fiscal receipts on the monetary base. Assuming a fixed exchange rate regime (or foreign exchange surrender requirements), if the government accumulates all oil-related receipts, the reduction in net domestic assets (due to the increase in government deposits) will compensate the increase in the central bank's foreign assets, without any monetary impact. The monetary base will expand only if the government uses the oil-related receipts to finance domestic expenditures: there will be a decline in government deposits (DP^g_{cb}) and a simultaneous increase in the monetary base (MB).

The consolidated public sector's budget constraint and net worth

Adding equations (1) and (1'), and (2) and (2"), and rearranging terms, it is possible to obtain the budget constraint and the net worth equations for the consolidated public sector shown below:

$$\underbrace{NOB_t - I^{no}_{NF_t} - I^{o}_{NF_t}}_{\substack{Consolidated \\ public\ sector's\ balance}} = \Delta(A^f_F - L^f)_t + \Delta(A^d_F - L^d)_t - \Delta OL_t - \Delta MB_t \quad (4)$$

$$NW_t = (A^o_{NF_t} + A^{no}_{NF_t} + A^f_{F_t} + A^d_{F_t}) - (L^f_t + L^d_t + OL_t) - MB_t \quad (5)$$

The left hand side of equation (4) represents the overall balance of the consolidated public sector, and the right hand side the financing. Assuming for simplification that all oil sales are external, when the government receives the proceeds from oil sales or from collecting oil

taxes, there is a reduction in oil wealth (a negative investment in oil, $I^{o}_{NF_t}$), compensated by an increase in foreign assets (A^{f}_{F}). As shown in equation (4), at that point there is no change in public sector wealth, and no monetary impact. However, if subsequently the government finances consumption with oil-related receipts—a negative NOB—there will be a reduction in net worth that can be compensated by an increase in the monetary base and/or a decline in foreign assets.

Equation (4) also highlights the fact that there is little that the central bank can do to avoid the reduction in foreign assets or the increase in the monetary base, say through open market operations. A continuous increase in the monetary base may cause inflationary pressures, while continuous placements of central bank bonds or government bonds generate central bank losses (since usually the return of international reserves is lower than the interest rate on central bank bonds or the forgone return of government bonds). Under those circumstances, the central bank looses the ability to effectively use monetary policy to achieve price stability: fiscal policy dictates monetary policy actions, which implies *fiscal dominance* as defined in this paper.

The framework presented above seems to be the appropriate one to determine fiscal sustainability in the case of oil exporting countries, which in turn helps to identify the presence of fiscal dominance: a declining net worth would indicate a possible situation of fiscal dominance. Using a fiscal sustainability framework based on net worth however, may be subject to some data problems and uncertainties associated not only to the valuation and volume of the stock of oil wealth, but also to the valuation of nonfinancial assets in general. In addition, while using oil wealth to finance investment might not affect the net worth position of the government in the short-run, it may still have a monetary impact.[10] An alternative and much simpler approach to directly address the problem of the monetary impact is discussed below.

Oil dominance/fiscal dominance: an alternative indicator

The presence of oil dominance/fiscal dominance can be determined using a simple indicator that tries to capture the monetary impact of fiscal policy: the ratio of the *domestic fiscal balance* to oil-related net receipts.[11] The domestic fiscal balance (OB^{d}) is defined as the difference between revenues from domestic sources minus domestic expenditures.

[10] The only way to avoid the expansion of the monetary base is to completely substitute nonfinancial assets—investment—for oil wealth, without any accumulation of foreign financial assets. This can be seen in equation (4): a negative investment in oil nonfinancial assets would be compensated by a positive investment in oil or non-oil nonfinancial assets. The monetary base would increase, only if the central bank tries to keep the oil-related original increase in foreign assets (originated in oil exports).

[11] Formally, the overall fiscal balance can be divided into domestic and external. The external fiscal balance would include not only oil-related net receipts, but also any other revenue or expenditure related to external activities, for example, interest payments on external debt.

Equation (4) can be reformulated to capture the relationship between the domestic fiscal balance and the change in the monetary base as follows:

$$G_t - R_t^{no} = R_t^o + \Delta MB_t - \Delta(A_F^f - L^f)_t - \Delta(A_F^d - L^d)_t + \Delta OL_t \qquad (4')$$

Where *G* includes total expenditures (total expense and net investment in non-oil nonfinancial assets), R^{no} refers to non oil-related revenue, and R^o represents oil-related receipts (equivalent to $-I_{NF}^o$ as noted above, assuming that gross investment in oil assets is equal to zero). The left hand side of equation (4') represents the deficit related to domestic transactions: if it is zero (or negative), oil wealth is being transformed into a financial asset, for example, net foreign assets (international reserves); if it is positive, oil-related receipts are financing part or all of the domestic deficit, causing an increase in the monetary base, unless the central bank intervenes either by selling foreign assets, or domestic debt. Thus, it is possible to establish the following relation:

$$\gamma = \frac{G_t - R_t^{no}}{R_t^o} \qquad (6)$$

Where γ is equal to the ratio domestic deficit to oil-related receipts. Since R^o is always positive, a positive γ would indicate that a monetary expansion of oil origin initially took place. As noted above, that monetary expansion could have been offset by a fall in net international reserves or through central bank open market operations (to mop up the excess liquidity), an unsustainable monetary policy when continuously implemented for long periods of time. Therefore, γ could be used as an indicator of oil dominance /fiscal dominance: the larger γ, the higher the possibility of oil dominance/fiscal dominance. The approach followed in section IV to analyze oil dominance/fiscal dominance in the case of Venezuela is based on the same framework, but considers a more comprehensive definition of the domestic fiscal balance.

B. Transmission Mechanism

There are several channels through which changes in oil prices can affect internal and external equilibrium in OEC. From a policy perspective, the final effect might be different, depending on the exchange rate system, how the government administers oil resources and the central bank's reaction function. Below is a simplified description of what could be the transmission mechanism of an increase in oil prices, assuming that the government treats the shock as permanent and increases domestic spending (which implies a higher domestic deficit).

Under a fixed exchange rate regime, a positive shock in the price of oil initially causes a nominal expansion of the monetary base through government spending, creating a disequilibrium in the money market. Equilibrium is restored by the subsequent increase in the demand for tradable goods (reduction in nominal monetary base), and an increase in the price of nontradables, which translates into higher domestic inflation (reduction in the real monetary base). Under a completely flexible exchange rate system, the increase in oil prices

appreciates the nominal exchange rate. The shock to domestic inflation might be much smaller than in the previous two cases,[12] since there is no initial change in the nominal monetary base, but there may still be an impact on domestic prices due to the increased demand for nontradable goods associated to government spending.

The simplified theoretical analysis presented above serves to illustrate how the volatility of oil prices can be transmitted to key macroeconomic variables, including output, inflation and the current account, depending on the fiscal policy response to the shock. If fiscal policy is isolated from the fluctuations in oil prices, there may still be some impact (for example, through wealth effects), but probably much smaller. The empirical analysis presented here tries to determine if there is a relationship between changes in oil prices and domestic inflation in OEC, and to what extent fiscal policy is contributing to that, thus complicating any central bank strategy to control inflation.[13]

III. Oil Economies: Some Stylized Facts

The objective of this section is to find some common patterns in key economic indicators for OEC, focusing mainly on how oil dominance may affect monetary management. Although it is not a thorough empirical analysis, it serves to set the stage for the next section on the case of Venezuela. Three different criteria have been chosen to define oil dominance: i) oil exports to total exports (X^o/X)—oil dominance in the external accounts; ii) oil exports to GDP (X^o/GDP)—oil dominance in economic activity; and iii) oil-related fiscal receipts to total fiscal revenue (R^o/R^T)—oil dominance in the fiscal accounts.[14] The indicators considered in the analysis are: the ratios to GDP of government's total expenditure and net lending (G^{CC}/GDP), and the primary balance (pb^{GG}), the rate of growth of nominal monetary base (%MB) and nominal and real effective exchange rates (%NEER, %REER), the change in the CPI (inflation), and the ratio of the change in the monetary base to GDP ($\Delta MB/GDP$).[15] The set of OEC includes a total of 30 countries, but in many cases a smaller subset had to be selected due to problems with the availability of data. The overall sample includes annual data for the period 1979–2005, during which large positive and negative oil price shocks were observed. To facilitate the analysis, averages for the overall period were calculated, as well as for the sub-periods 1986–98 and 1999–2005. Tables A2–A4 in Appendix I present data with the selected indicators for the three periods.

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[12] The appreciation of the real exchange rate due to the favorable shock in the terms of trade takes place through the fall in the nominal exchange rate and not through domestic inflation.

[13] Note that the nature of the relationship is different from the one that could exist in oil importing countries. In that case the source of inflation is a supply shock.

[14] Table A.1 in Appendix I presents the ranking of OEC based on the ratio of X^o/GDP for different periods.

[15] Figures for the monetary base correspond to the concept of "reserve money" presented in the Fund's International Financial Statistics database.

The task of identifying some common patterns may be difficult for several reasons: i) the degree of oil dominance for many OEC has changed substantially through time; ii) some OEC maintain a form of an oil fund (stabilization or investment fund) which in principle, should reduce the impact of oil dominance on the selected indicators[16] and iii) there are difficulties in finding a homogeneous data base to calculate the appropriate indicators. However, some interesting conclusions may be drawn from the data, as discussed below.

Looking at some indicators of policy management, the OEC with the highest degree of oil dominance, measured by the ratios of X^o/X and X^o/GDP, have chosen to adopt the exchange rate as the nominal anchor, as indicated in table 1. Some of the other OEC have chosen to implement an inflation targeting strategy: Norway, Colombia and Mexico. Norway exhibits a high degree of oil dominance in the external sector, but not in the domestic economy. In addition, a combination of a fiscal rule and an oil fund is in place (see Da Costa and Juan-Ramón, 2007). Mexico has a mid-to high-degree of oil dominance in the fiscal sector, but has maintained some sort of mechanism to smooth out fluctuations in the oil-related receipts as well as fiscal deficit targets. Oil dominance in the Colombia's fiscal sector lies in the lower segment of the ranking.

Table 1. Exchange Rate and Nominal Anchor for Major OEC in 2005

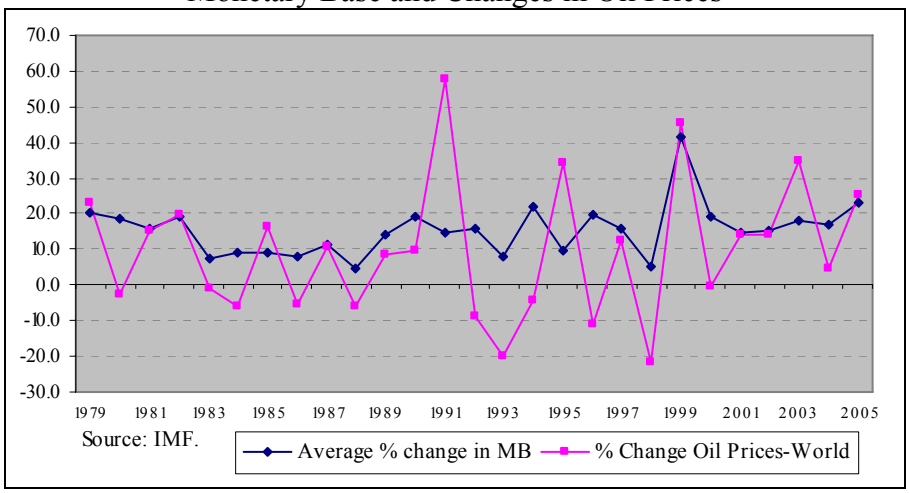
Range		Exchange Rate System (IMF *de facto*)	Nominal Anchor
X^o/X^T > 40%, X^o/GDP > 30%	Both > 40%	End-2004 - End-2005	End-2004 - End-2005
Algeria	Algeria	Managed Floating	No specific
Angola	Angola	Managed Floating	No specific
Bahrain, Kingdom of	Bahrain, Kingdom of	Conventional Peg (SC)	ER
Brunei Darussalam	Brunei Darussalam	Currency Board	ER
Congo, Republic of	Congo, Republic of	CAEMC	ER
Gabon	Gabon	CAEMC	ER
Kazakhstan		Managed Floating	No specific
Kuwait	Kuwait	Conventional Peg (SC)	ER
Libya	Libya	Conventional Peg (MC)	ER
Nigeria	Nigeria	Managed Floating	No specific
Oman	Oman	Conventional Peg (SC)	ER
Qatar		Conventional Peg (SC)	ER
Saudi Arabia	Saudi Arabia	Conventional Peg (SC)	ER
Trinidad and Tobago	Trinidad and Tobago	Conventional Peg (SC)	ER
United Arab Emirates		Conventional Peg (SC)	ER
Venezuela, Rep. Bol.		Conventional Peg (SC)	ER

Source: IMF.

[16] Although in general the empirical evidence is weak in supporting the hypothesis that oil funds reduce the volatility of fiscal performance, empirical research by Shabsigh and Ilahi (2007) finds some evidence that the existence of oil funds contributes to the reduction of the volatility in broad money and prices.

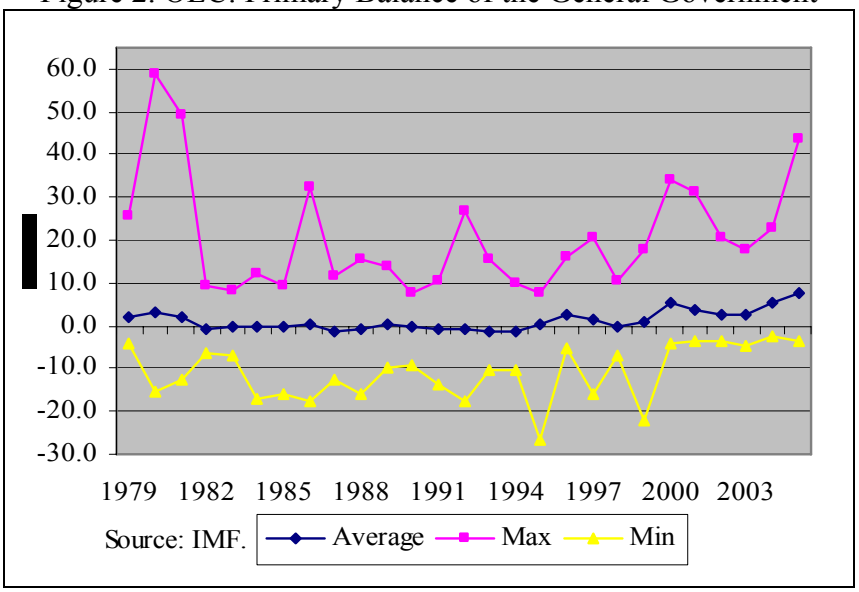
Looking at the monetary base, the averages for the overall period and for the sub-period 1999–05 do not show any clear pattern based on the degree of oil dominance. However, it is interesting to note that the rates of growth seem to be slightly higher in the final years of the period, in line with oil price increases; also the annual average for all OEC exhibits a close relation with the changes in oil prices, as shown in Figure 1.

Figure 1. OEC: Average Rate of Nominal Growth of Monetary Base and Changes in Oil Prices



With regard to fiscal policy, government expenditure in OEC tends to be closely correlated with the degree of oil dominance (measured in terms of X^o/GDP). This is observed for total expenditure and net lending as well as consumption. The latter implies a reduction in the government's net worth and thus, less resources for future generations. In general, as explained above, a close relation between the fluctuations in oil exports and government expenditures not only may have implications for the dynamics of the government's net worth, but also for monetary management. The wide dispersion observed in the data, indicates that this may be happening for some of the OEC, but not for all. In terms of the trend, there seems to be a gradual decline in government expenditure overall, which together with the increased oil-related receipts since 1999, translates into an improvement of the primary balance of the general government (Figure 2).

Figure 2. OEC: Primary Balance of the General Government



In relation to performance indicators, inflation in OEC appears to be somewhat correlated with changes in oil prices, although with considerable dispersion among countries (Figure 3). In particular, the OEC with the highest degree of oil dominance have experienced inflation lower than the rest, except for Angola, Nigeria and Venezuela, as seen in Figure 4; this pattern is also observed during the last period of increasing oil prices (1999–2005). Interestingly, these three countries maintained a managed floating exchange rate system (Angola and Nigeria) or exchange controls (Venezuela).

Figure 3. Change in the CPI-OEC and Oil Prices, 1979–2005

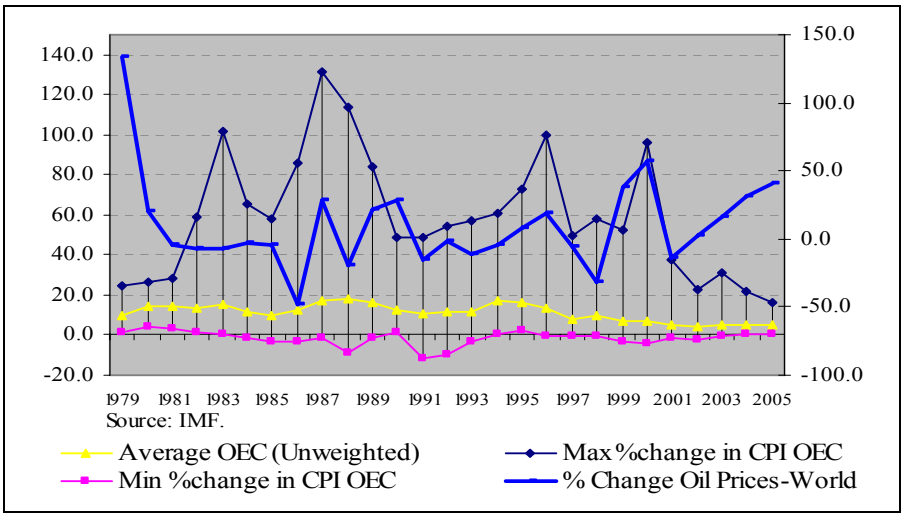
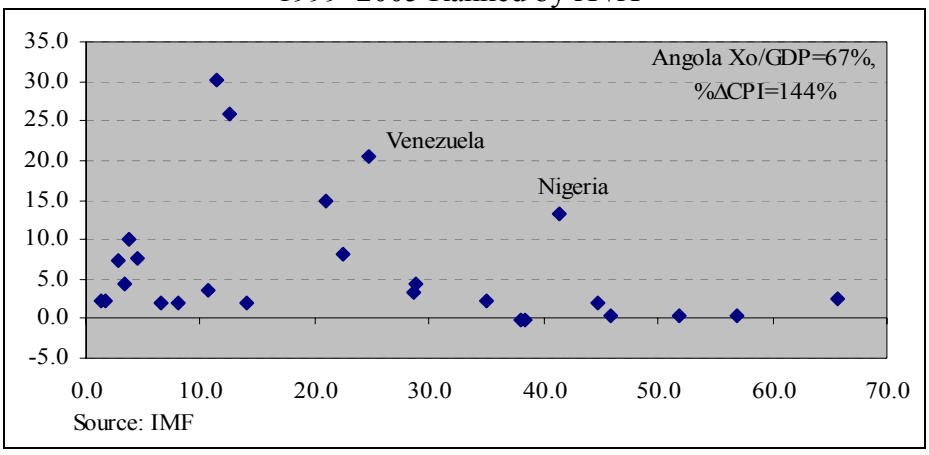


Figure 4. Selected OEC: Average Δ% Change in the CPI, 1999–2005 Ranked by X^o/X^T

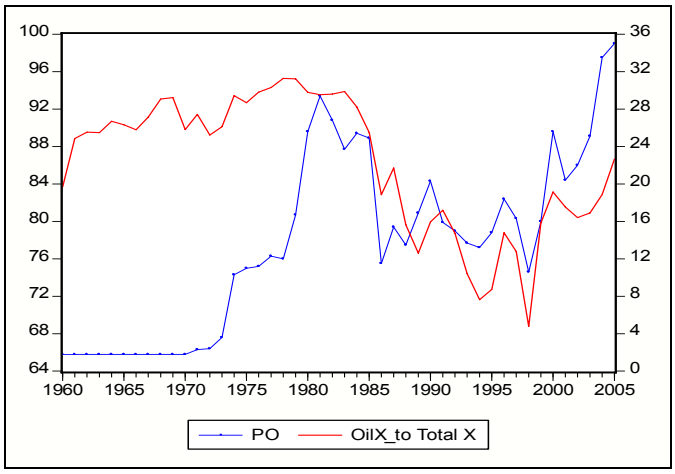


The few indicators analyzed in this section only give a general idea about what could be a relationship between oil dominance, fiscal dominance and monetary management. A comprehensive analysis is needed in order to draw more meaningful conclusions for the OEC as a group, but that task goes beyond the objectives of this paper.

IV. Oil Dominance in Venezuela

Throughout the period 1960–2005 oil has by large maintained its position of dominance in the current account as the main exporting good, as well as in the fiscal sector. The share of oil output to GDP has also been important but at a much lower level than the other two. On average, oil exports represent about 86 percent of total exports. After gradually increasing during 1960 to 1985, it has since displayed a significant volatility, partly in line with the volatility of oil prices, as shown in Figure 5.

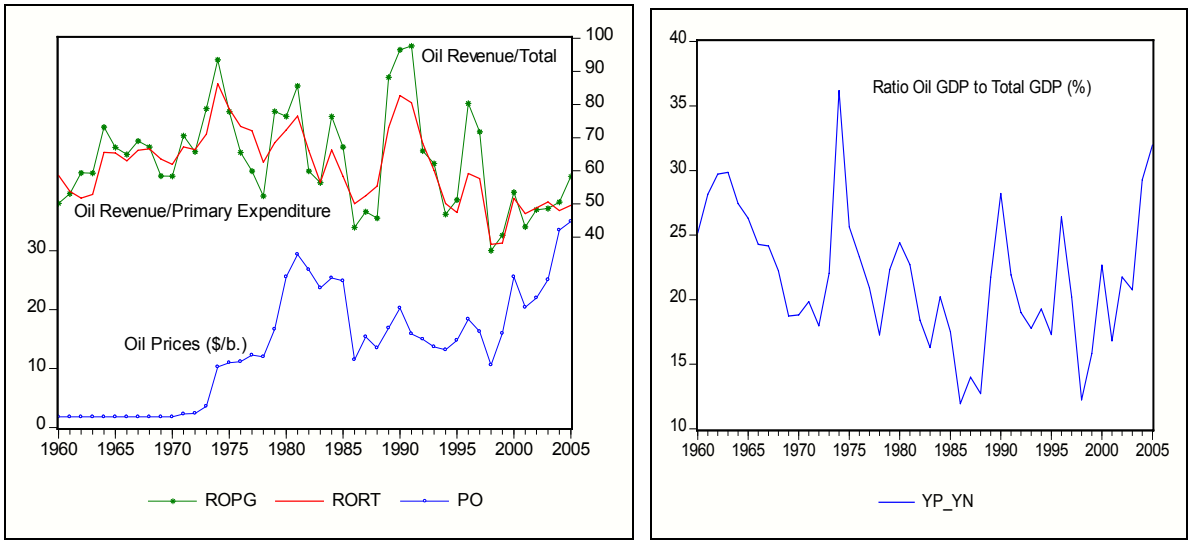
Figure 5. Oil Prices ($/B-Venezuelan Basket), And Ratio X^o/X^T, 960–2005



In the fiscal sector, oil is the main single source of revenue in the government budget, but its relative weight has been highly volatile, fluctuating between 86 percent (1974) and 38 percent (1998) of total fiscal revenue (Figure 6). The ratio of oil revenue to primary fiscal expenditures also shows high volatility (for example, 98 percent in 1991 and 36 percent in 1998). These two ratios have also been affected by changes in the legal tax framework and exchange rate adjustments.

On average, the share of oil GDP in total GDP during 1960–2005 stood at around 22 percent, but with significant fluctuations reflecting changes in oil prices (36 percent in 1974 and 12 percent in 1986).

Figure 6. Venezuela: Oil in the Economy



The high degree of oil dominance in the Venezuelan economy and the lack of fiscal mechanisms to effectively shield the domestic economy from oil price shocks may have contributed to explain the large volatility observed for key macroeconomic indicators, particularly during the last three decades, as shown in table 2.[17] Inflation and real GDP growth have experienced large fluctuations (figure 7); the same can be said for the changes in the nominal effective exchange rate and the monetary base.

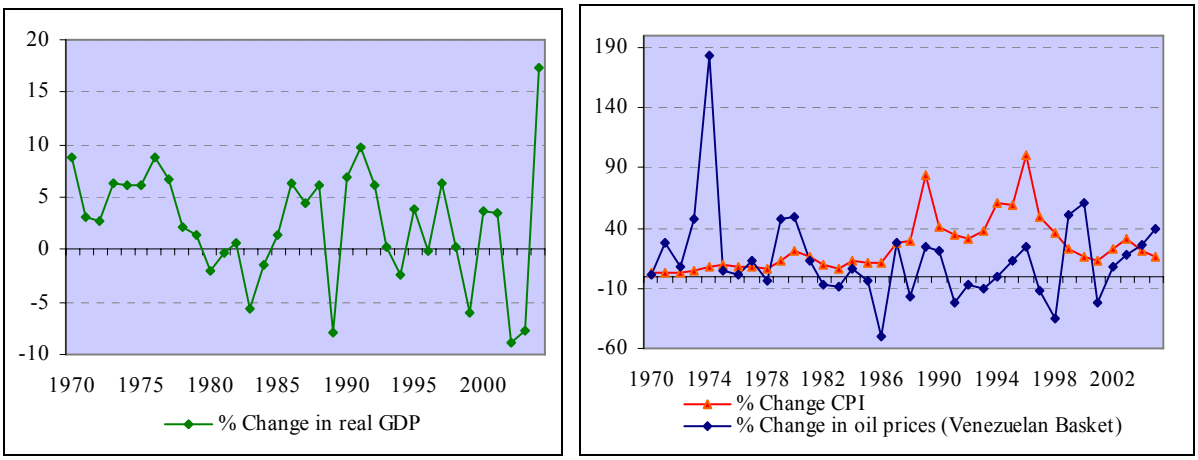
[17] Several attempts to set up oil stabilization or savings funds in the past ten years have been short-lived. In 1998, the government created the Investment Fund for Macroeconomic Stabilization (FIEM) to smooth out the impact of oil shocks on the fiscal accounts. At end-2001, FIEM's net worth was equivalent to 50 percent of central bank's foreign assets. In 2003, the FIEM was replaced by the Macroeconomic Stabilization Fund (FEM), but only 11 percent of the 2001 net worth was preserved. Since then, there has not been any accumulation of oil-related resources, notwithstanding the significant increase in oil prices. See Appendix II for a more detailed information regarding oil funds in Venezuela.

Table 2. Venezuela: Selected Indicators

	1970–1978		1979–1994		1995–2005		1979–2005	
	Average	Standard Deviation	Average	Standard Deviation	Average	Standard Deviation	Average	Standard Deviation
				(annual changes, in percent)				
Oil prices (Venezuela)	31.3	59.4	3.8	25.8	15.7	29.9	8.7	27.6
CPI	6.0	2.8	28.0	21.0	35.4	26.0	31.0	23.0
GDP (constant prices)	5.6	2.5	1.4	4.8	2.1	8.0	1.7	6.2
Monetary Base	21.9	13.0	27.6	32.2	39.5	26.7	32.5	30.1
NEER	0.7	4.2	29.3	173.9	-18.2	16.1	9.9	134.6
				(ratios, in percent)				
OilX to TotalX	92.2	2.2	85.2	8.0	79.3	5.0	82.8	7.4
OilX to GDP	20.9	8.0	20.7	4.5	22.9	6.5	21.6	5.4
Oil Rev/Total Rev.	NA	NA	65.5	13.8	46.8	7.1	52.7	12.8
G^{CG}/GDP	30.9	4.3	24.3	3.1	23.5	4.0	24.0	3.5
ΔRM/GDP	1.8	0.9	1.8	1.8	2.0	0.9	1.9	1.5

Source: IMF

Figure 7. Venezuela. Rates of Growth of Real GDP, CPI, and Oil Prices



The large fluctuations observed in the nominal exchange correspond to a period of frequent and significant modifications introduced in the exchange system that started in 1983. As described in table 3 below, after a period of relatively unchanged exchange rate, the authorities have applied different exchange systems, almost all within the context of a soft peg regime. Independently of the regime though, the central bank has maintained the control of all oil-related foreign exchange (surrender requirements), particularly since 1983.

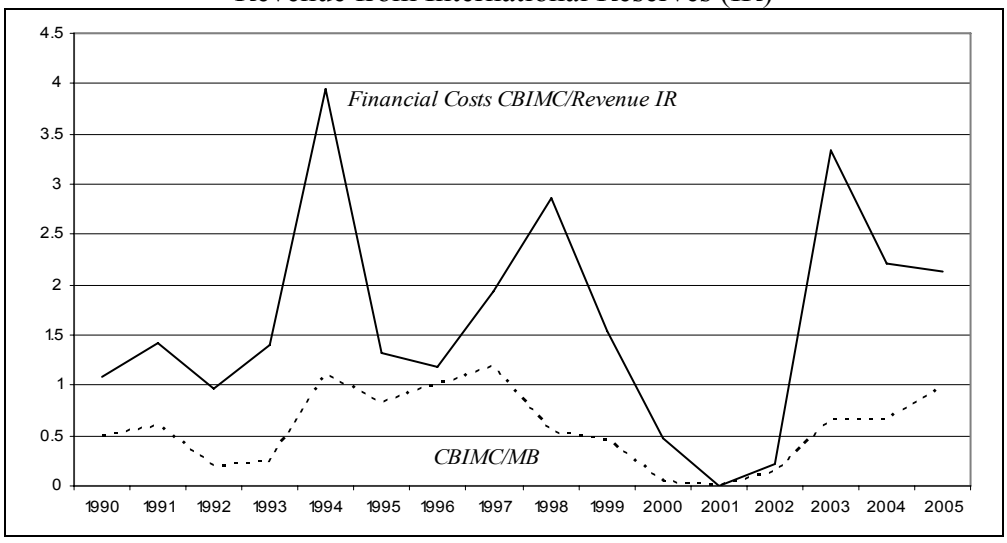
Table 3. Venezuela: Exchange Rate System, 1964–2007

Period	*Exchange System-Official*
1964–1983 (February)	Fixed Single Rate (Pegged to the US dollar)
1983–1989 (February)	Multiple Exchange Rates-Exchange Controls
1989–1992 (September)	Floating
1992–1994 (June)	Crawl
1994–1996 (July)	Multiple Exchange Rates-Exchange Controls
1996–2002 (February)	Bands
2002–2003 (February)	Floating
2003–	Fixed Single Rate-Exchange Controls

Source: International Monetary Fund.

Since 1990 the central bank has intervened in the money market trying to control liquidity by placing its own instruments (CBIMC). At times, the intervention has been very active, particularly during periods of large monetary base expansion from fiscal sources. However, in several occasions the attempts have been suspended due to increasing financial costs. Figure 8 shows significant fluctuations in the stock of AI during the period 1990–2005; in some cases, that stock has represented more than 100 percent of the monetary base. In general, the financial costs of placing the AIs have been larger than the return on central bank foreign assets. In the context of the analytical framework presented in section III of this paper, that situation is an indication of the presence of oil dominance/fiscal dominance: the monetary expansion created by a continuous increase in oil-financed government expenditures cannot be permanently offset by increases in central bank liabilities. Sooner or later, the central bank has to give up foreign assets or abandon the objective of price stability.

Figure 8. Venezuela: Ratios of Central Bank Instruments of Monetary Control (CBIMC) to Monetary Base, and CBIMC Financial Costs to Revenue from International Reserves (IR)



A. Oil Dominance/Fiscal Dominance: Simple Correlations

This section takes a first approximation to the role of oil in the Venezuelan economy and the relevance of the oil dominance/fiscal dominance hypothesis, by looking at simple contemporaneous correlations between oil-related variables, fiscal and monetary variables, and key macroeconomic indicators for the 1960–2005 period. The set of variables includes: oil prices (Venezuelan basket) and oil exports (measured in US dollars), fiscal revenue, total and oil-related (measured in local currency), primary fiscal expenditure, the monetary base, non-oil nominal and real GDP, and non-oil GDP deflator (as a proxy for domestic inflation). All variables are measured in logs.

The simple contemporaneous correlations between the rates of growth indicate: i) changes in nominal oil exports are mostly determined by movements in oil prices with very little effect of changes in volume; ii) changes in fiscal oil revenue are closely related to changes in oil exports. Moreover, variations in fiscal oil revenue present a high correlation coefficient with changes in total fiscal revenue and primary fiscal expenditure; iii) changes in the fiscal primary expenditure are highly correlated with changes in the nominal non-oil GDP, the inflation rate (measured by the non-oil GDP deflator) and changes in the nominal monetary base; and iv) the correlation between the rates of growth of the fiscal primary expenditure and the non-oil real GDP is very small and negative.[18]

In terms of volatility (measured by a the five-year moving variance of their rates of growth), the pair-wise correlation coefficients show that: i) the volatility of the rates of growth of oil prices and nominal oil exports are very similar, which again implies that volume changes do not seem to be relevant in explaining variations in oil exports; ii) the volatility of the rate of growth of fiscal oil revenue (one of the highest) seems to be highly correlated with the volatility of the rate of growth of nominal oil exports; iii) the volatility of the fiscal primary expenditure appears to be highly correlated with the volatility of the variables most directly related to the oil market (oil prices, oil exports and oil fiscal revenue), whose fluctuations appear remarkably higher than those of the rest of the variables under study. Indeed, the correlations between the variance of the rate of growth of oil prices and the variances of other variables not directly related to oil are relatively small. However, it is worth noting that the variances of the oil prices and the monetary base seem to move closer after 1985.

The importance of oil in determining developments in the fiscal sector is also supported by analysis of the role of non-oil activities (domestic activities) in explaining the overall fiscal deficit. In general, the domestic primary deficit has been substantially larger than the overall deficit. Moreover, the five-period dynamic correlation between the domestic fiscal deficit and the overall deficit, both in terms of GDP, is very low.

Overall, the simple correlation indicators discussed in this section do not seem to contradict the oil/fiscal dominance in the Venezuelan economy: fiscal variables show a strong

[18] Appendix III presents the matrices of pair-wise correlations for the rates of growth and the variances, as well as some illustrative charts.

correlation with oil prices. On the other hand, the monetary base and domestic prices show a strong correlation with fiscal primary expenditures. Interestingly, the simple correlation between non-oil real GDP and fiscal variables seems very weak.

B. Oil Dominance/Fiscal Dominance Hypothesis for Venezuela

This section presents the results of testing the validity of the oil dominance/fiscal dominance (OD/FD) hypothesis for the Venezuelan economy by means of assessing the existence of a close link between oil prices, the domestic primary fiscal deficit and the monetary base. The potential macroeconomic effects of the oil dominance/fiscal dominance phenomenon, particularly with respect to the connection between the monetary base and prices are also examined. Accordingly, the empirical analysis is divided in two parts: 1) testing the oil dominance/fiscal dominance hypothesis and 2) testing the hypothesis of a relationship between the monetary base and prices.

A wide variety of statistical approaches have been employed to test the fiscal dominance hypothesis and the link between fiscal deficits and money growth (See Olivo, 2001, for a literature review). Among those techniques, the VAR methodology represents a useful tool to test the two hypothesis described above, as it allows for a simultaneous and dynamic estimation where all relevant variables are treated as potentially endogenous. Thus, VAR models and Vector Error-Correction (VECM) models are estimated using annual data for the period 1960–2005 for the relevant variables.

In a previous work, Olivo (2001) applied a similar approach to test the fiscal dominance hypothesis, but using the overall fiscal deficit instead of the domestic primary deficit as the relevant fiscal variable. The monetary variables used in that study were the change in the net domestic credit to trend output ratio and the change in the monetary base to trend output ratio. In general, the VAR results seemed to provide a weak support for the fiscal dominance hypothesis. First, with annual data (1950–1998), the overall fiscal deficit does not Granger-cause changes in the net domestic credit or in the monetary base, both measured as ratios to trend output ratio. Second, in the model with quarterly data (1983.I–1998.IV), the overall fiscal deficit Granger-causes the net domestic credit to trend output ratio, but neither the overall fiscal deficit nor the net domestic credit to trend output ratio Granger-cause inflation.

1. Testing the oil dominance/fiscal dominance hypothesis.

The general VAR representation is as follows:

$$y_t = A_1 y_{t-1} + ... + A_p y_{t-p} + Bx_t + \varepsilon_t \qquad (7)$$

where y_t and x_t are the vectors of endogenous and exogenous variables, respectively, $A_1,....,A_p$ and B are the matrices of the coefficients to be estimated, and ε_t is the vector of innovations.

If all variables included in y_t result non-stationary I(1) variables, and a cointegration relationship among them is found, it is possible to rewrite equation (7) as:

$$\Delta y_t = \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + Bx_t + \alpha \hat{e}_{t-1} + \varepsilon_t \qquad (8)$$

Equation (8) represents the Vector Error Correction (VECM), where $\hat{e}_{t-1}$ embodies the deviation from long-run equilibrium in period (t-1)[19].

The general model

The vector of endogenous variables includes fiscal, monetary and external sector variables. The latter are included to control for the potential effect on the relationship between the fiscal and monetary variables of the different exchange rate regimes implemented in Venezuela during the period of analysis. Oil price represents the only exogenous variable in the model.

Based on the main arguments presented in Sections II and III, the following order is given to the variables in the VAR: 1) fiscal; 2) monetary; and 3) external sector variables.

The lags of the VAR models have been chosen using the Akaike and Schwarz criteria, and taking into account the stability of the VAR system.

Overall, if the oil dominance/fiscal dominance hypothesis holds, the empirical tests should be able to detect a connection between oil prices, the primary domestic fiscal deficit and the monetary base.

If the OD/FD hypothesis holds then the following results should be observed: i) I-R functions and VD consistent with a positive response of the monetary base to shocks to the domestic primary deficit and no response of the domestic primary deficit to shocks to the monetary base; ii) one way Granger-causality running from the domestic primary deficit to the monetary base; and iii) a cointegrating vector with a positive relationship between the domestic primary deficit and the monetary base[20].

To test this hypothesis nominal variables have been used, both log-levels (model 1) and as deviations from trend (model 2), as well as real variables and ratios to GDP (model 3). Also, estimations have been obtained from the overall sample period, 1960–2005 and from two sub-periods, 1960–1982, and 1983–2005. The reason for the two sub-periods is the fact that they correspond to two well differentiated exchange rate system. For the purpose of this paper, the first sub-period, 1960–1982 is labeled the soft-peg period: the nominal exchange

[19] When considering more than two variables, it is possible to find more than one cointegrating vector: In this case there will be more than one VECM representation of the VAR.

[20] In the interest of shortening the paper, the results have not been presented here, but are available upon demand.

rate was kept fixed with very few modifications. The second sub-period is called the variable-peg period, and is characterized by the implementation of several variations of fixed and quasi-fixed exchange rate schemes, frequently combined with exchange rate controls, as noted above.

2. Testing the hypothesis of a relationship between the monetary base and prices.

If the transmission mechanism described above holds, in addition to finding a relationship between oil, fiscal and monetary variables, a close relationship between prices and money also should be found, both in the long-run and short-run. Again the VAR-VECM methodology is used to test for this relationship.

The details of the two sets of empirical analysis are described below.

B.1 Testing the oil dominance—fiscal dominance hypothesis

Model 1: variables in nominal terms

To test for the link between the domestic primary deficit and the monetary base, a first model using the variables in nominal terms is estimated. All variables are measured in log-levels and are identified as follow:

LPON: Nominal oil prices (average of the Venezuela's oil basket)- exogenous;
LDDPN: Nominal domestic primary deficit;
LNEXEP: Nominal exchange rate (official rate Bs./US$; end of period);
LR: Stock of nominal net international reserves (in U.S. dollars);
LMB: Nominal monetary base.

From a long-run perspective, the finding of a cointegrating relationship between the monetary base (LMB) and the domestic primary deficit (LDDPN) is supportive of the OD/FD hypothesis.

Since all nominal variables in levels contain a unit root (as indicated by the augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) tests) the Johansen approach to test for cointegration was applied. The most satisfactory result obtained was from the application of the Johansen test to LMB and LDDPN which indicates the presence of a cointegrating vector (normalized) in which the coefficient of LDDPN exhibits a statistically significant and negative sign as expected, and with a value close to one:[21]

COINT1A= LMB-1.075578*LDDPN

[21] The Johansen test shows the presence of one cointegrating equation between LMB, LDDPN, LNEXEP and LR, but in this cointegrating vector (normalized) the coefficient of LDDPN has a positive sign which is opposite to what is expected.

As in the case of cointegration for the long-run, I-R functions, variance decompositions and Granger-causality tests lend support to the OD/FD hypothesis in the short-run.

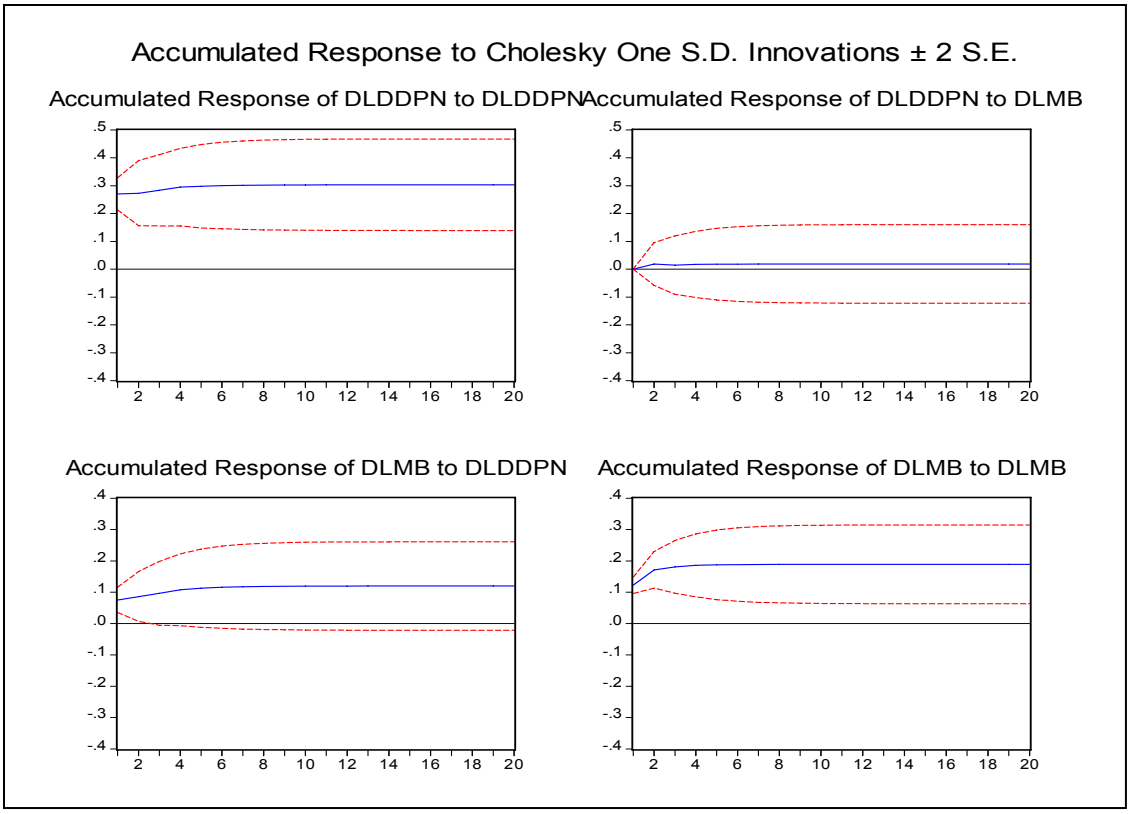
With the previous result, a VECM with one lag is estimated including as endogenous variables the first difference of the nominal variables (DLDDPN, DLMB, DLR, DLNEXEP) and as exogenous variables the residuals from the cointegrating vector lagged one period [COINT1A(-1)], and the first difference of the logarithm of the nominal oil price lagged one period [DLPON(-1)]. The validity of the OD/FD hypothesis in the short-run is evaluated by first studying the accumulated I-R functions and VD derived from the VECM model, using the following order for the Cholesky decomposition: DLDDPN, DLMB, DLR, and DLNEXEP. For the complete sample period (1960–2005) the I-R functions and VD indicate the following:

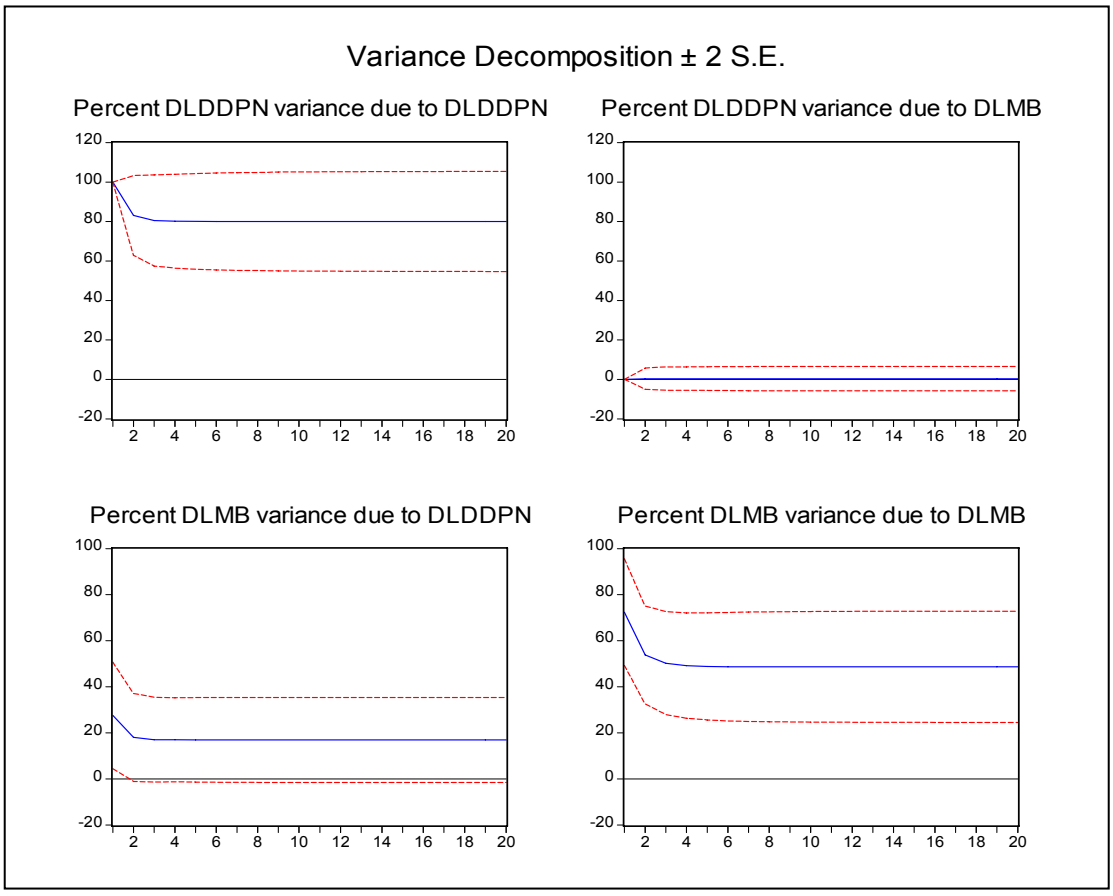
- A one standard deviation shock to DLDDPN has a positive effect on DLMB that explains around 17 percent of its forecast error variance in a twenty-period horizon.

- The response of DLDDPN to shocks to DLMB is positive, but very close to zero according to the variance decomposition analysis.

The block Granger-causality test indicates one way Granger-causality running from the nominal domestic primary deficit to the monetary base. Although within the VECM there is not causality in either way between DLDDPN and DLMB, the coefficient of the lagged value of the residuals of the cointegrating vector [COINT1A(-1)] is significantly different from zero and has the expected (negative) sign in the DLMB equation, while it has the expected (positive) sign, but it is not statistically significant (at a 10 percent level of significance) in the DLDDPN equation.

Another interesting result from the VECM that reinforces the validity of the OD/FD hypothesis, is that there seems to be a connection between oil prices, the primary domestic fiscal deficit and the monetary base. In fact, the coefficient of DLPON (-1) is positive and statistically different from zero in the DLDDPN equation (at a 1 percent level of significance) and in the DLR equation (at a 10 percent level of significance).


Accumulated Response to Cholesky One S.D. Innovations ± 2 S.E.
Accumulated Response of DLDDPN to DLDDPN
Accumulated Response of DLDDPN to DLMB
Accumulated Response of DLMB to DLDDPN
Accumulated Response of DLMB to DLMB


Variance Decomposition ± 2 S.E.
Percent DLDDPN variance due to DLDDPN
Percent DLDDPN variance due to DLMB
Percent DLMB variance due to DLDDPN
Percent DLMB variance due to DLMB

Analysis for two sub periods

Although the results from the divided sample should be interpreted with care due to the reduction in the degrees of freedom available for estimation, the separation produces I-R functions and VD that suggest that the OD/FD hypothesis is valid in the two periods.

A comparison of the I-R functions and VD for the two sub-periods gives the following main results:

- In both periods shocks to DLDDPN have a positive effect on DLMB, but the response is substantially different. In the soft-peg period shocks to DLDDPN explain approximately 60 percent of the forecast error variance of DLMB, while in the variable period they explain around 20 percent.

- In the soft-peg period DLDDPN responds positively but mildly to shocks to DLMB: shocks to DLMB explain close to 5 percent of DLDDPN forecast error variance. In the variable-peg period the response of DLDDPN to shocks to DLMB is negative, but close to zero according to the variance decomposition analysis.

The examination of other results from the VECM, however, shows some puzzling results for the soft-peg period: there seems to be Granger-causality running from the monetary base to the domestic primary deficit, but not from the domestic primary deficit to the monetary base. In fact, the coefficient of COINT1A(-1) is positive (as expected) and statistically different from zero in the DLDDPN equation. However, in the DLMB equation this coefficient is not statistically significant. Another result for this period is that the coefficient of DLPON(-1) is not longer statistically significant in the DLDDPN and DLR equations.

In contrast, the results of the variable-peg period are more in line with those for the complete sample (although shocks to DLDDPN have a smaller impact on DLMB in this period compare to the soft-peg): there seems to be Granger-causality from the domestic primary deficit to the monetary base and not the opposite. In the variable-peg period the coefficient of COINT1A (-1) is negative and significantly different from zero in the DLMB equation. This coefficient is positive, but not statistically significant in the DLDDPN equation. Additionally, the coefficient of DLPON (-1) continues to be positive and statistically different from zero in the DLDDPN equation, but no in the DLR equation.

In both periods the block Granger-causality test does not allow to reject the null hypothesis of no causality in either direction between DLDDPN and DLMB (at standards levels of significance).

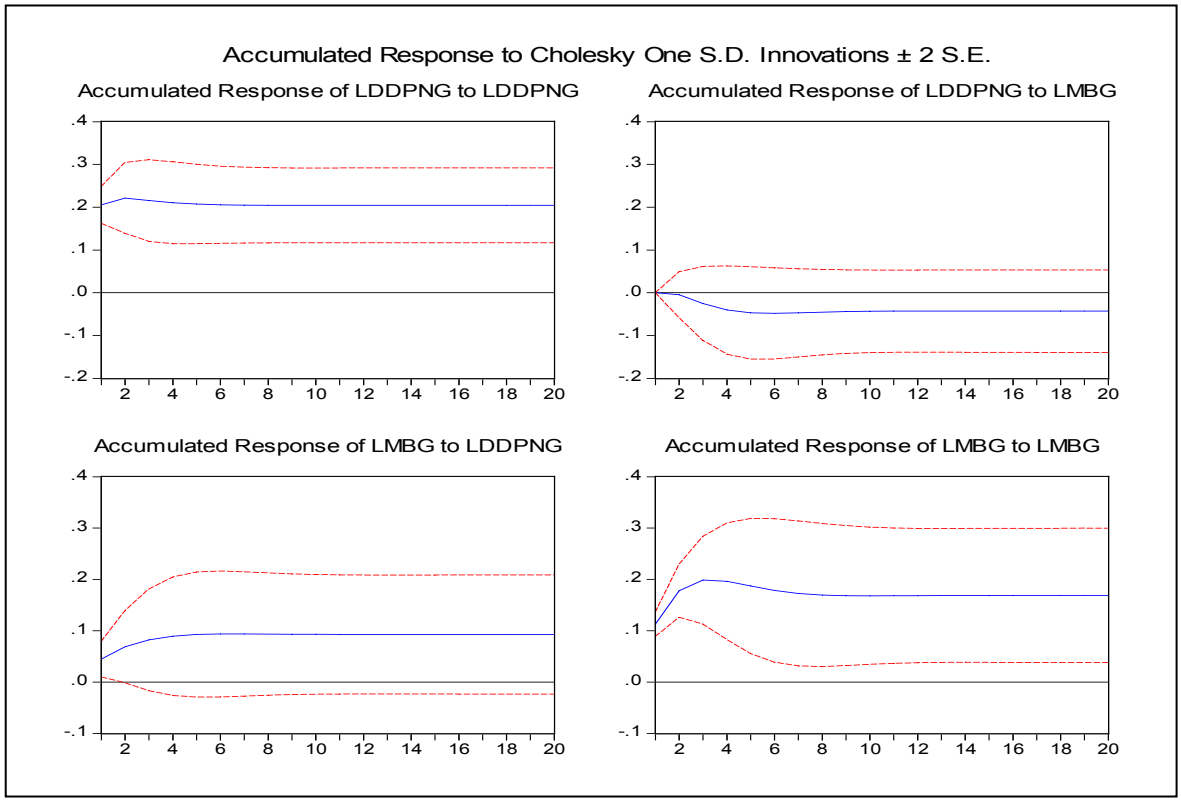
Model 2: variables measured as deviations from their trend values

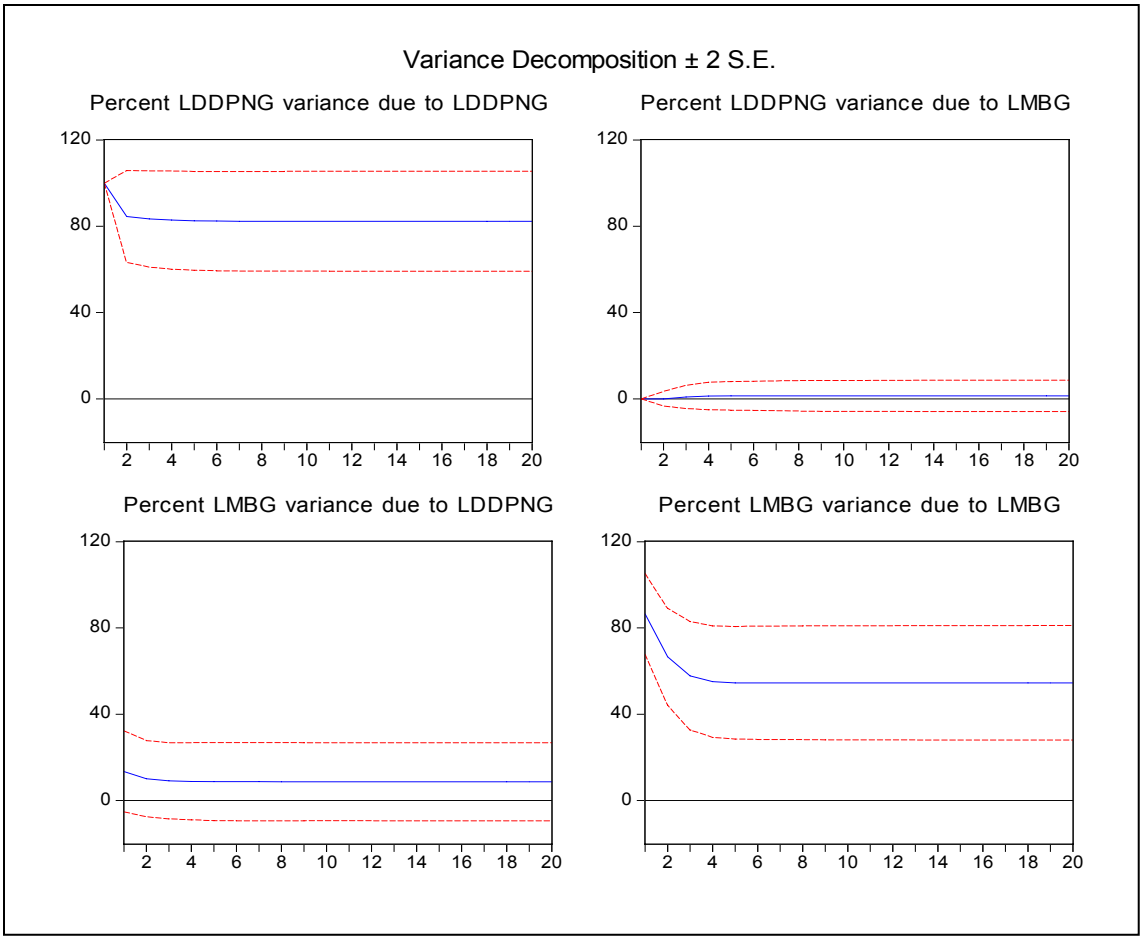
In this VAR model nominal variables are measured as deviations from their Hodrick-Prescott (H-P) trend values. Both the augmented Dickey-Fuller and Phillips-Perron unit-root tests suggest that all variables are I(0). The variables are defined as follows:

LPONG: nominal oil prices gap - exogenous;
LDDPNG: nominal domestic primary deficit gap;
LNEXEPG: nominal exchange rate gap;
LRG: nominal net international reserves gap;
LMBG: nominal monetary base gap.

The results based on the I-R functions and VD analysis with the ordering LDDPNG, LMG, LRG LNEXPG give a rather weak support to the OD/FD hypothesis, both for the whole sample as well as for the two sub-periods, particularly when compared to model 1:

- A shock to LMBG has a negative impact on LDDPNG.
- The VD analysis indicates that the percentage of the forecast error variance of LDDPNG explained by LMBG is close to zero (approximately 1.4 percent in a 20-period horizon).
- LMBG varies positively to shocks to LDDPNG.
- The VD analysis indicates that the percentage of the forecast error variance of LMBG explained by LDDPNG is very low (approximately 8.7 percent in a 20-period horizon).
- There is no Granger causality in either direction between LDDPNG and LMBG.
- Similar to the VECM with nominal variables, we observe that the coefficient of LPONG in the equations for LDDPNG, LRG and LMBG is positive and statistical significant.





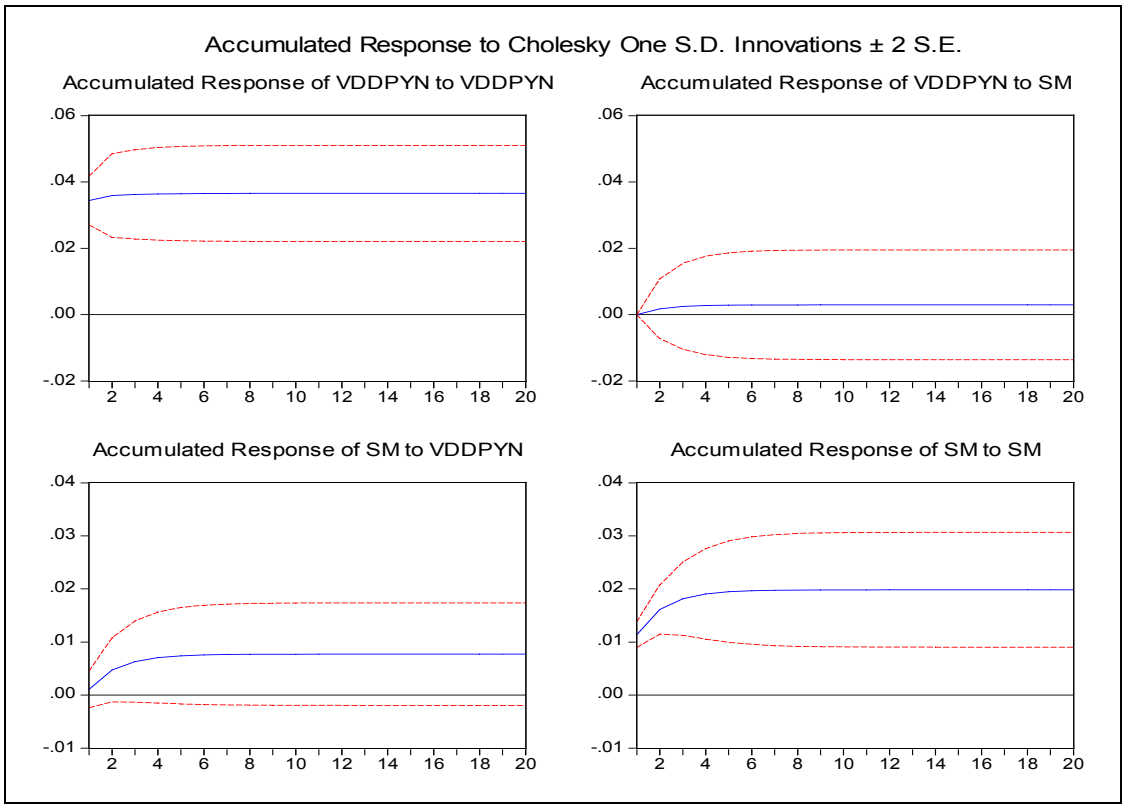
Model 3: variables measured as percentage of GDP or in real terms

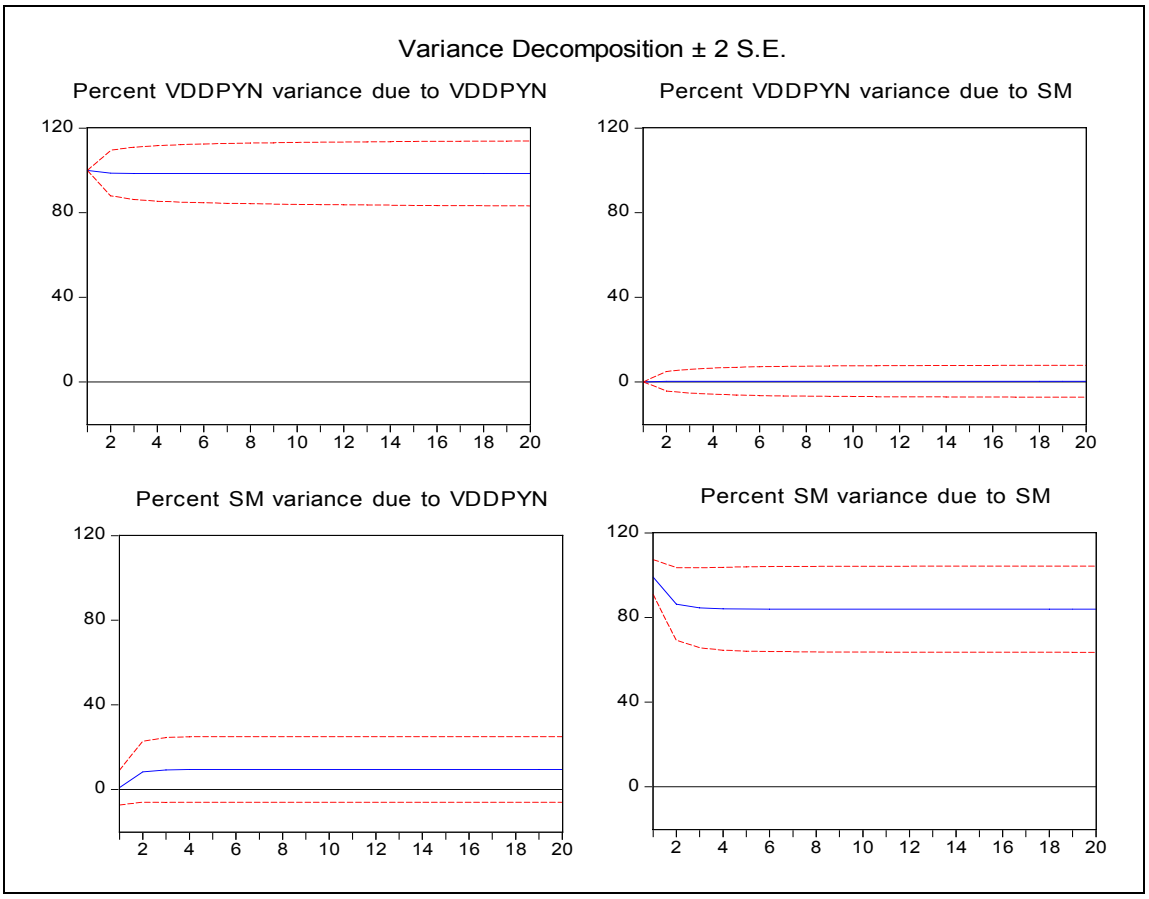
In this case, the VAR model is constructed with all variables measured as percentage of GDP or in real terms. The augmented Dickey-Fuller and Phillips-Perron unit-root tests suggest that all variables are I(0). The variables are defined as follow:

DLPOR: first difference of the logarithm of real oil price—exogenous;
VDDPYN: change in the nominal domestic primary deficit as a percentage of GDP;
DLREXEP: first difference of the logarithm of the real exchange rate;
DLRREAL: first difference of the logarithm of the real net international reserves
SM: seigniorage measured as the change in the nominal monetary base as a percentage of GDP.

This model also produces a relatively weak support of the OD/FD hypothesis compared to model 1, but the results are more robust than in model 2. The results for the two subperiods are similar to those for the whole sample. Based on the impulse-response functions and Variance Decomposition analysis with the ordering VDDPYN, SM, DLRREAL, DLREXEP, it is possible to observe the following:

- VDDPYN response to shocks to SM is positive but very small.
- The VD analysis indicates that the percentage of the forecast error variance of VDDPYN explained by SM is close to zero.
- SM exhibits a positive reaction to shocks to VDDPYN.
- The VD analysis indicates that the percentage of the forecast error variance of SM explained by VDDPYN is very low (approximately 9.4 percent in a 20-period horizon).
- The block Granger-causality test indicates that SM does non Granger cause VDDPYN, but the latter Granger cause SM (P-value = 0.072).
- As in the case of the VECM with nominal variables and the VAR model with the nominal variables measured as deviations from the trend, a positive and statistical significant coefficient of DLPOR was found in the equations for VDDPYN, DLRREAL and SM.





B.2. Testing the hypothesis of a relationship between the monetary base and prices

The general conclusion that can be drawn from the results is that there seems to be a close relationship between prices and money, both in the long-run and short-run, for the 1960–2005 period. Overall, the results are in line with those reported in Olivo and Miller (2000) and Olivo (2002).

Given that the logarithm of the monetary base and the price level (measured by the CPI) are I(1) according to the ADF and PP tests, the test for cointegration between them is performed. The Johansen test indicates the existence of one cointegrating equation, but a visual inspection of the residuals from this equation suggests that they are not stationary. To capture the effects of a possible regime shift, the Gregory and Hansen (G&H, 1996) cointegration tests are applied, following Olivo and Miller (2000) and Olivo (2002).

The three tests proposed by G&H allow to reject the null hypothesis of no cointegration at the 1 percent level of significance with a structural brake in 1968. However, the level shift model (model C in G&H notation) seems to produce the most robust results. This model generates the following cointegrating equation (t-statistics in parenthesis):

LCP=-1.199748 + 0.972699*LMB - 1.058871*DU68
(-10.72852) (47.26916) (-7.12508)

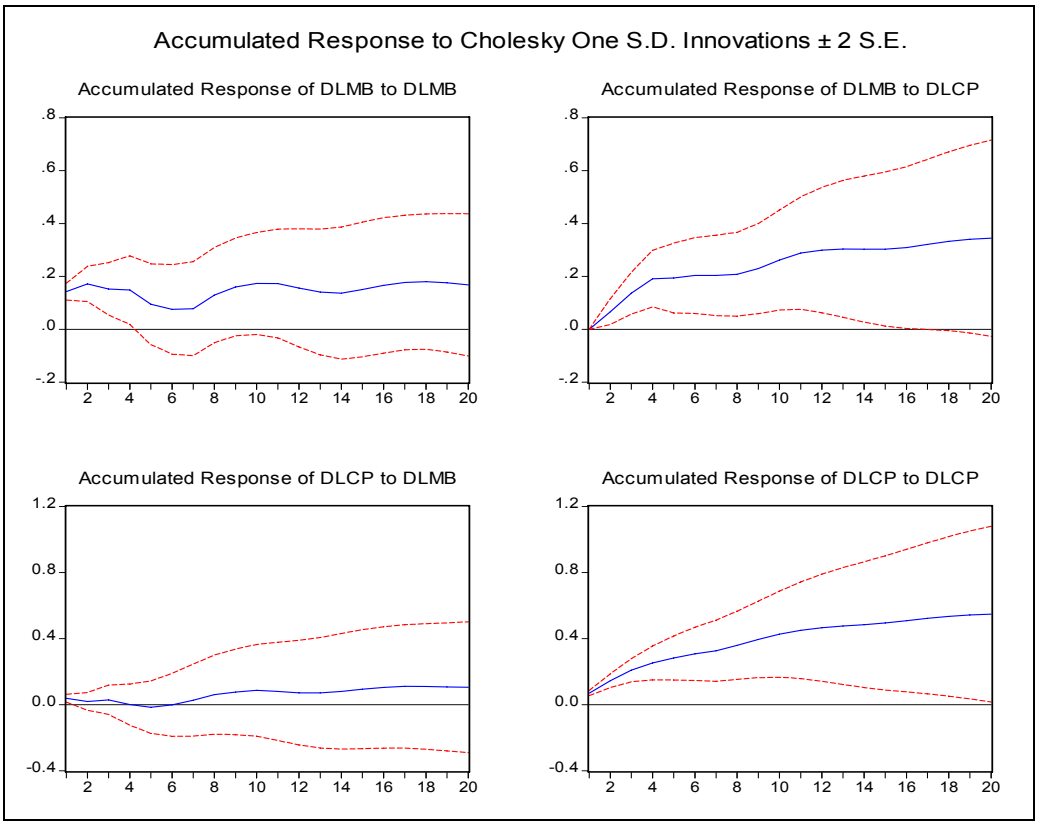
In the above equation DU68 is the dummy variable that captures the level shift in the cointegrating vector, taking values equal to one from 1969 on. Notice that in the cointegrating equation the coefficient of LMB is close to one. Therefore, taking into account the possibility of a structural break in 1968, there is evidence of a long-run equilibrium relationship between the monetary base and the price level.

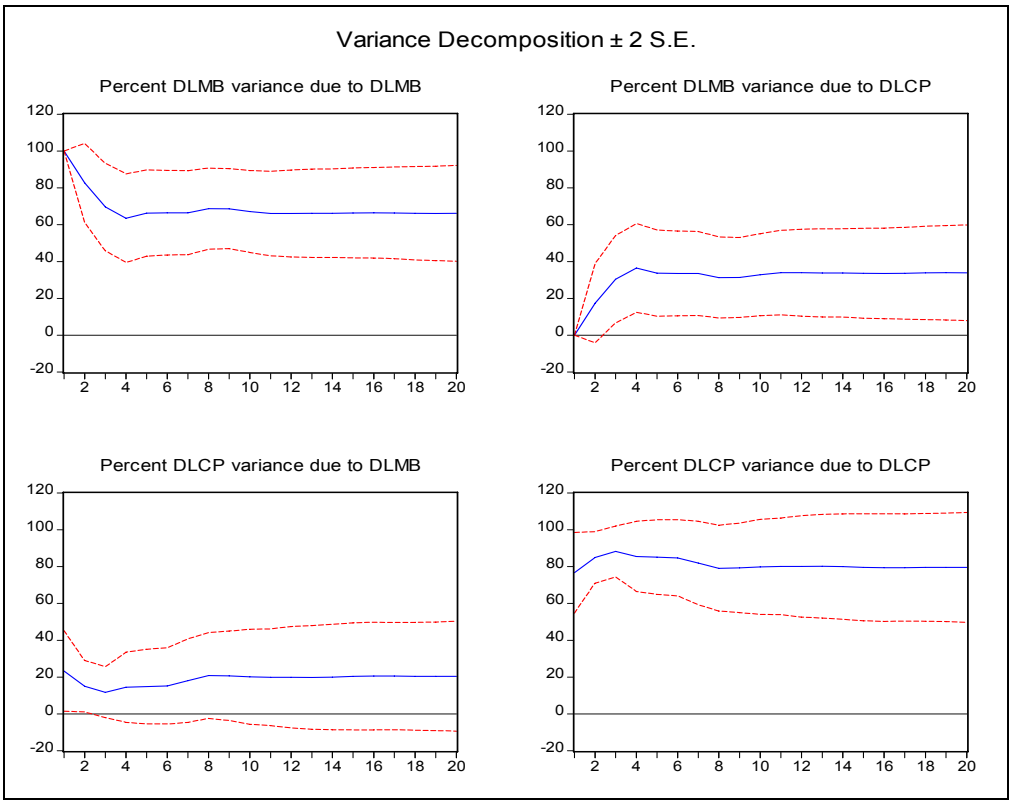
Given the presence of cointegration between LCP and LMB, a five lag VECM is estimated, with DLMB and DLCP as endogenous variables and the residuals from the G&H cointegrating vector lagged one period [COINN2(-1)] as an exogenous variable.

The I-R functions and VD derived from that model for the period 1960–2005, show the following results:

- A one standard deviation shock to DLMB produces a positive response in DLCP, explaining approximately 20 percent of its forecast error variance.

- A one standard deviation shock to DLCP affects positively DLMB, explaining around 33 percent of its forecast error variance.





Consistent with these results, the block Granger-causality test indicates a two-way causality between DLCP and DLMB.

The coefficient of COINN2(-1) has the expected sign in both equations of the VECM, but is only statistically significant in the DLMB equation, implying Granger-causality from DLCP to DLMB.

These results are interpreted as evidence of an accommodative monetary policy, which in turn may be the consequence of the OD/FD problem that affects the implementation of an independent monetary policy in Venezuela.

Dividing the sample between the soft-peg and variable-peg periods generates the following results for the I-R functions and VD:

- In both periods shocks to DLCP produce a positive response of DLMB, but this response is stronger in the variable-peg period when the forecast error variance of DLMB explained by shocks to DLCP rises to 40 percent and then declines to 31 percent in a ten-period horizon. In the soft-peg period the comparable number increases gradually up to 21 percent.

- In both periods shocks to DLMB have a positive impact on DLCP, but the effect is stronger in the variable-peg period. The VD show that a shock to DLMB explains up to 15 percent of the forecast error variance of DLCP in the soft-peg period and up to 29 percent in the variable-peg period.

- Turning to the block Granger-causality tests, they indicate the absence of causality in either direction for the soft-peg period and bidirectional causality in the variable-peg period. However, for the soft-peg period the coefficient of COINN2(-1) has the expected positive sign and is statistically different from zero (at a 10 percent level of significance) in the DLMB equation, which implies Granger-causality from DLCP to DLMB. In the DLCP equation the coefficient of COINN2(-1) has the expected negative sign, but is not statistically different from zero, indicating no Granger-causality from DLMB to DLCP. In the variable-peg period it was not possible to estimate a stable VECM model including COINN2(-1), thus a simple 5-lag VAR was estimated for this period.

V. CONCLUSIONS

This paper presents a simple framework to analyze fiscal dominance in countries where the economy is highly dominated by the oil sector, trying to overcome the difficulties that arise when using the standard framework based on primary overall balance and debt. The framework is based on the transmission mechanism that takes places from changes in oil exports (oil price shocks) to fiscal and monetary variables, ultimately affecting domestic prices. This simple framework is used to analyze VAR, cointegrating and VECM models to test the oil dominance/fiscal dominance hypothesis in the case of Venezuela.

The general conclusion from the results described in the previous section is that there is relevant evidence, both in the short-run and the long-run, which supports the validity of the oil dominance/fiscal dominance hypothesis in Venezuela during the period 1960–2005. The model specified with nominal variables (in logs) seems to provide the best results: it gives a stronger support to the OD/FD hypothesis and allows the estimation of a VECM that distinguishes between short-run and long-run effects. The existence of a close long-run relationship between the level of the nominal domestic primary deficit and the nominal monetary base is an important finding of this paper. That evidence, however, seems to reflect more the results of the variable-peg period (1983–2005), as mixed signals were obtained in the soft-peg period (1960–1982).

A close connection between the monetary base and prices was found in the short-run as well as in the long-run. In the shor-trun the link between these variables is bidirectional. We interpret this last result as evidence of an accommodative monetary policy, which in turn may be related to the OD/FD problem that affects the implementation of an independent monetary policy in Venezuela.

As in the case of the OD/FD hypothesis, the relationship between money and prices also appears more robust in the variable-peg period. This result seems to be in line with the behavior of simple macroeconomic indicators presented in the paper for individual oil exporting countries. Indeed, as noted in that section, most of the OEC with the highest oil dominance and a single currency peg tend to exhibit low inflation rates overall, including during periods of positive oil shocks.

Another important result of the analysis is that oil prices (treated as exogenous) are statistically important in explaining the behavior of the fiscal domestic primary deficit in all models, which reinforces the OD/FD hypothesis.

APPENDIX I. OIL EXPORTING COUNTRIES-SELECTED INDICATORS

Table A.I.1. Classification and Evolution of Oil Exporting Countries, based on the Ratio of Oil Exports to GDP

	Range				
Year	0-10	11-20	21-30	31-40	> 40
1965					
	Algeria	Bahrain, Kingdom of	Saudi Arabia	Kuwait	Indonesia
	Canada	Iran, I.R. of	Trinidad and Tobago	Libya	Qatar
	Colombia	Venezuela, Rep. Bol.			
	Egypt				
	Malaysia				
	Mexico				
	Nigeria				
	Norway				
	Russia				
	Syrian Arab Republic				
	United Kingdom				
	Vietnam				
1980					
	Cameroon	Ecuador	Angola	Algeria	Gabon
	Canada	Egypt	Congo, Republic of	Bahrain, Kingdom of	Kuwait
	Colombia	Indonesia	Venezuela, Rep. Bol.	Nigeria	Libya
	Kazakhstan	Iran, I.R. of		Trinidad and Tobago	Oman
	Mexico	Malaysia			Qatar
	Norway	Syrian Arab Republic			Saudi Arabia
	Russia				United Arab Emirates
	United Kingdom				
	Vietnam				
1995					
	Cameroon	Iran, I.R. of	Algeria	Oman	Angola
	Canada	Norway	Libya	Saudi Arabia	Bahrain, Kingdom of
	Colombia	Syrian Arab Republic	Qatar		Brunei Darussalam
	Ecuador	Trinidad and Tobago	United Arab Emirates		Congo, Republic of
	Egypt	Venezuela, Rep. Bol.	Nigeria		Gabon
	Indonesia				Kuwait
	Kazakhstan				
	Malaysia				
	Mexico				
	Russia				
	United Kingdom				
	Vietnam				
2005					
	Cameroon	Ecuador	Iran, I.R. of	Kazakhstan	Algeria
	Canada[IT]	Norway[IT]		Qatar	Angola
	Colombia[IT]	Russia		United Arab Emirates	Bahrain, Kingdom of
	Egypt	Syrian Arab Republic		Venezuela, Rep. Bol.	Brunei Darussalam
	Indonesia	Vietnam			Congo, Republic of
	Malaysia				Gabon
	Mexico[IT]				Kuwait
	United Kingdom[IT]				Libya
					Nigeria
					Oman
					Saudi Arabia
					Trinidad and Tobago

Source: IMF.

Tables A.I.2–A.I.4: Definition of Variables Included in the tables:

Xo/XT: Ratio of oil exports to total exports of goods (both in U.S. dollars).

Xo/GDP: Ratio of oil exports to GDP (both in US dollars).

Ro/RT: Ratio of oil-related revenue to total revenue of the public sector.

Δ%RM: Growth rate of nominal reserve money.

Inflation: Defined as the percentage change in the consumer price index.

ΔRM/GDP: Ratio of change in reserve money to GDP.

Δ%NEER: Percentage change in the nominal effective exchange rate, defined as foreign currency per unit of local currency (- depreciation).

Δ%REER: Percentage change in the real effective exchange rate, defined as foreign currency per unit of local currency (- depreciation).

GCG/GDP: Ratio of central government total expenditure and net lending to GDP.

pb^{GG}: Ratio of general government primary balance to GDP.

Table A.I.2. Oil Exporting Countries: Selected Indicators
(All figures in %)

	Average 1999-2005											Standard deviation 1999-2005										
	X^o/X^T	X^o/GDP	R^o/R^T	Δ% MB	Inflation	$\frac{\Delta MB}{GDP}$	Δ% NEER	Δ% REER	GCG/GDP	pb^{GG} (%GDP)	Real GDP growth	X^o/X^T	X^o/GDP	R^o/R^T	Δ% MB	Inflation	$\frac{\Delta MB}{GDP}$	Δ% NEER	Δ% REER	GCG/GDP	pb^{GG} (%GDP)	Real GDP growth
Angola	89.6	67.0	n.a.	190.9	143.6	4.3	n.a.	n.a.	51.7	-2.5	8.4	3.0	5.3	n.a.	212.7	110.3	2.7	n.a.	n.a.	15.7	9.9	7.1
Bahrain, Kingdom of	73.5	51.9	n.a.	19.7	0.4	1.8	-1.0	-2.5	28.4	n.a.	5.7	3.5	4.9	n.a.	16.5	1.7	1.3	4.5	3.8	2.3	n.a.	1.3
Brunei Darussalam	89.1	56.9	n.a.	n.a.	0.2	n.a.	n.a.	n.a.	54.5	n.a.	2.3	3.4	5.0	n.a.	n.a.	1.3	n.a.	n.a.	n.a.	5.9	n.a.	1.3
Cameroon	43.3	8.0	n.a.	13.7	1.9	n.a.	0.4	-0.1	n.a.	n.a.	3.8	6.5	2.0	n.a.	16.3	1.4	n.a.	3.2	4.4	n.a.	n.a.	0.8
Canada	4.8	1.7	n.a.	5.2	2.3	0.2	2.6	0.5	16.2	3.6	3.4	1.3	0.4	n.a.	10.5	0.4	0.4	4.7	3.7	0.6	1.7	1.5
Colombia	27.3	4.4	9.9	18.4	7.5	1.1	-3.3	-1.5	19.9	1.4	2.3	3.5	0.5	1.5	10.3	2.0	0.5	10.0	9.5	1.3	2.0	3.2
Congo, Republic of	88.4	65.8	n.a.	28.8	2.4	1.6	n.a.	n.a.	29.5	8.2	3.6	4.5	4.8	n.a.	44.4	2.5	2.9	n.a.	n.a.	3.9	6.5	3.6
Ecuador	44.9	11.4	26.2	-0.5	30.2	n.a.	-14.1	1.6	n.a.	n.a.	3.2	8.3	3.3	3.6	28.3	34.7	n.a.	25.5	20.6	n.a.	n.a.	4.5
Gabon	80.6	45.9	n.a.	13.8	0.5	n.a.	0.3	-1.1	n.a.	n.a.	-0.3	2.9	4.8	n.a.	18.2	1.4	n.a.	2.9	3.5	n.a.	n.a.	4.2
Kazakhstan	50.2	22.5	n.a.	36.8	8.1	1.8	n.a.	n.a.	13.5	2.3	9.2	8.1	5.6	n.a.	27.6	2.4	1.4	n.a.	n.a.	1.0	3.3	3.2
Malaysia	6.2	6.5	n.a.	6.0	1.9	0.6	-0.4	-0.3	26.4	-1.9	5.4	1.4	1.6	n.a.	11.2	0.7	1.4	3.4	3.5	2.6	1.0	2.7
Mexico	10.5	2.8	33.6	15.0	7.2	0.6	n.a.	n.a.	17.5	0.8	2.8	2.6	0.8	2.9	10.3	4.5	0.4	n.a.	n.a.	0.6	0.7	2.3
Norway	42.8	14.1	n.a.	n.a.	2.0	n.a.	1.0	4.2	34.7	9.5	2.3	3.6	2.3	n.a.	n.a.	1.0	n.a.	4.5	5.1	2.4	3.8	1.0
Oman	70.3	38.3	n.a.	12.4	-0.2	0.6	-0.8	n.a.	n.a.	9.2	4.1	4.0	3.7	n.a.	17.7	0.9	0.9	3.7	n.a.	n.a.	4.6	2.7
Russia	37.4	12.6	19.5	41.9	25.9	4.6	-8.7	3.1	15.1	5.3	6.7	7.1	1.8	7.6	19.7	26.7	1.7	23.4	16.3	1.1	2.5	1.7
Syrian Arab Republic	64.7	16.9	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.8	11.7	2.5	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.4
Trinidad and Tobago	60.4	28.7	n.a.	10.4	4.4	0.8	0.4	1.7	26.3	5.7	8.3	6.1	6.9	n.a.	19.7	1.3	1.3	2.0	2.5	1.7	1.9	2.9
United Kingdom	7.8	1.4	n.a.	6.8	2.4	0.2	0.0	0.4	37.1	0.3	2.7	1.2	0.2	n.a.	7.2	0.7	0.2	3.1	3.5	1.6	2.5	0.7
Vietnam	21.0	10.7	n.a.	24.5	3.6	3.4	n.a.	n.a.	25.9	-3.0	7.0	2.4	2.5	n.a.	12.7	3.7	1.0	n.a.	n.a.	2.0	1.0	1.1
Algeria	97.5	35.0	n.a.	23.2	2.3	n.a.	-2.9	-4.2	n.a.	n.a.	4.3	0.7	6.3	n.a.	14.8	1.3	n.a.	4.2	4.6	n.a.	n.a.	1.7
Egypt	34.4	3.3	3.7	17.0	4.5	4.1	n.a.	n.a.	28.9	-0.3	4.3	5.5	1.6	1.3	20.9	3.1	5.6	n.a.	n.a.	2.5	3.8	1.1
Indonesia	11.4	3.7	30.5	17.6	10.1	1.5	n.a.	n.a.	19.4	2.1	4.3	0.6	0.7	6.6	14.7	5.5	1.2	n.a.	n.a.	1.7	0.7	1.7
Iran, I.R. of	81.8	20.9	n.a.	16.9	15.0	n.a.	-7.2	2.6	n.a.	n.a.	5.0	1.6	3.7	n.a.	6.4	2.7	n.a.	11.1	10.6	n.a.	n.a.	1.9
Kuwait	91.3	44.8	n.a.	9.3	2.0	0.4	n.a.	n.a.	38.0	26.9	6.2	1.4	7.2	n.a.	13.0	1.2	0.6	n.a.	n.a.	5.7	9.8	6.5
Libya	90.0	49.8	n.a.	15.6	n.a.	3.0	n.a.	n.a.	40.7	13.0	4.1	9.6	17.5	n.a.	21.4	n.a.	4.3	n.a.	n.a.	6.2	10.6	2.2
Nigeria	90.9	41.4	63.5	20.7	13.2	2.0	-12.9	-3.6	24.9	6.7	5.1	2.4	6.5	8.0	22.7	5.2	2.3	17.7	21.4	4.9	5.2	3.3
Qatar	46.7	28.6	n.a.	18.6	3.3	n.a.	-1.2	n.a.	n.a.	n.a.	7.8	6.6	4.9	n.a.	11.2	3.2	n.a.	4.6	n.a.	n.a.	n.a.	6.1
Saudi Arabia	88.8	38.0	n.a.	7.4	-0.2	0.6	-1.0	-3.2	33.2	n.a.	3.5	1.3	8.1	n.a.	9.6	0.9	0.9	4.5	3.8	2.6	n.a.	3.4
United Arab Emirates	36.0	27.2	n.a.	18.9	n.a.	2.5	-0.2	n.a.	n.a.	n.a.	7.1	4.1	3.9	n.a.	14.1	n.a.	1.8	4.4	n.a.	n.a.	n.a.	4.5
Venezuela, Rep. Bol.	82.1	24.8	46.3	30.3	20.5	1.8	-15.4	-2.1	25.4	3.1	1.9	2.3	6.6	4.5	14.8	6.2	0.8	13.0	12.1	3.6	3.8	10.1

Source: The data is obtained from the IMF data base. The selection of OEC is based on the list of countries presented by OPEC as oil exporting countries, since it provides a wide range for degree of oil dominance.

Table A.I.3. Oil Exporting Countries: Selected Indicators
(All figures in %)

	Average 1986-98											Standard deviation 1986-98										
	X^o/X^T	X^o/GDP	R^o/R^T	Δ% MB	Inflation	$\frac{\Delta MB}{GDP}$	Δ% NEER	Δ% REER	GCG/GDP	pb^{GG} (%GDP)	Real GDP growth	X^o/X^T	X^o/GDP	R^o/R^T	Δ% MB	Inflation	$\frac{\Delta MB}{GDP}$	Δ% NEER	Δ% REER	GCG/GDP	pb^{GG} (%GDP)	Real GDP growth
Angola	91.5	45.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.7	3.8	18.6	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	10.4
Bahrain, Kingdom of	55.4	39.8	n.a.	4.3	0.5	0.2	-1.6	-3.8	33.2	n.a.	4.1	19.1	15.7	n.a.	22.1	1.6	2.1	6.3	7.2	5.5	n.a.	3.7
Brunei Darussalam	94.7	55.9	n.a.	n.a.	2.0	n.a.	n.a.	n.a.	51.8	n.a.	0.6	3.1	9.5	n.a.	n.a.	1.6	n.a.	n.a.	n.a.	7.3	n.a.	4.1
Cameroon	43.5	6.6	n.a.	5.3	5.8	0.1	3.0	-0.9	20.4	-1.1	-0.4	6.4	1.0	n.a.	21.2	9.9	0.9	15.6	11.6	4.6	4.7	4.8
Canada	3.3	0.9	n.a.	4.4	2.9	0.2	-1.2	0.0	21.5	-0.2	2.5	0.4	0.2	n.a.	2.6	1.8	0.1	4.6	5.6	2.0	2.8	2.0
Colombia	20.5	2.6	6.8	24.5	23.7	1.7	-7.6	-0.7	14.1	n.a.	4.0	4.6	0.7	1.1	19.6	4.1	1.3	11.1	10.2	2.1	n.a.	1.6
Congo, Republic of	84.0	43.3	n.a.	5.4	n.a.	0.3	n.a.	n.a.	32.4	-0.4	4.5	6.9	11.1	n.a.	17.4	n.a.	1.3	n.a.	n.a.	7.9	4.2	8.0
Ecuador	40.5	8.6	27.0	3.1	40.3	0.1	-17.9	-1.8	n.a.	0.4	2.8	8.7	2.3	5.8	18.7	16.3	1.1	12.7	13.5	n.a.	2.7	3.6
Gabon	75.3	33.3	n.a.	11.6	3.2	0.3	1.1	-3.7	32.0	n.a.	2.7	6.2	9.7	n.a.	38.8	12.0	1.2	15.3	11.8	10.0	n.a.	7.0
Kazakhstan	10.5	4.8	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	10.8	5.7	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Malaysia	10.1	6.4	n.a.	16.6	3.1	1.7	-3.0	-3.9	25.9	n.a.	7.1	5.5	2.6	n.a.	35.6	1.4	7.2	8.1	7.5	4.7	n.a.	5.0
Mexico	18.0	3.2	34.5	29.4	41.5	2.0	n.a.	n.a.	19.4	4.4	2.6	7.6	1.2	3.7	17.9	41.4	2.3	n.a.	n.a.	5.6	4.3	3.6
Norway	33.4	9.3	n.a.	5.5	3.8	0.2	-1.1	1.2	38.8	0.7	3.1	6.7	2.6	n.a.	15.8	2.4	0.7	2.3	2.6	2.6	3.6	1.7
Oman	81.3	35.2	n.a.	3.1	n.a.	0.2	-2.6	n.a.	n.a.	n.a.	4.3	8.2	4.3	n.a.	8.4	n.a.	0.6	8.9	n.a.	n.a.	n.a.	3.2
Russia	26.3	5.1	8.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	4.4	4.1	3.5	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Syrian Arab Republic	55.5	11.3	n.a.	10.4	17.4	3.3	n.a.	n.a.	29.8	n.a.	4.9	9.1	5.2	n.a.	8.9	16.7	2.8	n.a.	n.a.	3.4	n.a.	6.2
Trinidad and Tobago	49.3	17.0	n.a.	7.2	7.4	0.5	-4.0	-3.7	29.7	n.a.	1.5	14.4	4.9	n.a.	19.9	3.0	1.8	11.4	9.8	3.5	n.a.	4.4
United Kingdom	7.4	1.4	n.a.	6.5	4.3	0.2	-0.1	2.1	38.5	-1.0	2.6	2.0	0.4	n.a.	10.1	2.2	0.3	6.2	6.6	2.8	3.0	1.8
Vietnam	17.2	4.3	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	6.8	9.7	2.7	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.3
Algeria	89.3	19.9	n.a.	13.7	16.8	2.5	-16.4	-7.4	30.6	n.a.	1.1	12.3	6.7	n.a.	8.0	9.9	1.4	16.4	15.0	2.7	n.a.	2.6
Egypt	49.9	3.0	n.a.	12.6	14.2	3.1	n.a.	n.a.	34.2	-2.5	3.9	11.1	1.3	n.a.	7.2	6.5	1.5	n.a.	n.a.	6.9	8.8	1.8
Indonesia	22.0	4.5	25.9	23.5	11.9	1.2	n.a.	n.a.	17.0	1.6	5.1	10.9	1.6	1.9	20.9	14.0	1.1	n.a.	n.a.	1.5	1.2	5.6
Iran, I.R. of	85.1	15.0	n.a.	n.a.	24.2	n.a.	-20.2	-5.3	24.5	-5.0	2.4	5.8	4.1	n.a.	n.a.	10.1	n.a.	18.6	30.7	4.9	2.8	8.6
Kuwait	92.2	36.3	n.a.	n.a.	2.7	n.a.	n.a.	n.a.	68.7	-8.2	5.1	3.6	9.8	n.a.	n.a.	3.3	n.a.	n.a.	n.a.	44.0	46.7	23.7
Libya	137.7	25.9	n.a.	8.4	n.a.	2.8	n.a.	n.a.	36.4	n.a.	-0.6	168.8	4.6	n.a.	14.1	n.a.	4.4	n.a.	n.a.	7.1	n.a.	7.7
Nigeria	94.4	35.4	64.8	32.7	32.4	3.6	-19.4	-2.5	15.7	n.a.	3.0	2.1	6.8	11.1	30.5	24.3	3.4	27.4	36.3	3.4	n.a.	5.2
Qatar	70.7	30.0	n.a.	5.7	2.9	0.4	0.1	n.a.	49.4	n.a.	4.8	8.1	4.1	n.a.	9.7	2.0	0.7	7.9	n.a.	6.4	n.a.	10.3
Saudi Arabia	88.3	28.5	n.a.	2.7	0.9	0.3	-1.7	-3.7	40.6	n.a.	3.2	3.0	5.0	n.a.	8.1	2.2	0.8	7.8	8.2	6.8	n.a.	3.9
United Arab Emirates	51.7	32.8	n.a.	9.0	n.a.	0.8	-1.4	n.a.	11.4	-5.9	3.9	13.5	6.5	n.a.	17.3	n.a.	1.8	7.7	n.a.	0.8	7.1	8.7
Venezuela, Rep. Bol.	77.5	19.5	57.6	42.6	46.5	2.0	-22.6	1.2	22.1	n.a.	2.9	4.7	5.0	15.2	39.3	24.4	1.9	15.9	17.8	2.2	n.a.	4.9

Source: The data is obtained from the IMF data base. The selection of OEC is based on the list of countries presented by OPEC as oil exporting countries, since it provides a wide range for degree of oil dominance.

Table A.I.4. Oil Exporting Countries: Selected Indicators
(All figures in %)

	Average 1979-2005											Standard deviation 1979-2005											
	X^o/X^T	X^o/GDP	R^o/RT	Δ% MB	Inflation	$\frac{\Delta MB}{GDP}$	Δ% NEER	Δ% REER	GCG/GDP	pb^{GG} (%GDP)	Real GDP growth	X^o/X^T	X^o/GDP	R^o/RT	Δ% MB	Inflation	$\frac{\Delta MB}{GDP}$	Δ% NEER	Δ% REER	GCG/GDP	pb^{GG} (%GDP)	Real GDP growth
Angola	86.9	46.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3.5	8.8	19.5	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	8.6
Bahrain, Kingdom of	54.4	40.8	n.a.	9.6	1.4	0.8	-0.3	n.a.	32.8	0.0	4.5	19.8	13.6	n.a.	19.1	3.1	1.7	6.5	n.a.	5.8	n.a.	3.2
Brunei Darussalam	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cameroon	n.a.	n.a.	n.a.	10.4	6.1	n.a.	2.4	n.a.	n.a.	n.a.	3.1	n.a.	n.a.	n.a.	18.1	7.7	n.a.	12.5	n.a.	n.a.	n.a.	5.5
Canada	3.8	1.1	n.a.	4.7	4.1	0.2	-0.2	0.2	20.1	-0.1	2.8	1.0	0.4	n.a.	5.6	3.2	0.2	4.4	4.6	2.9	3.4	2.1
Colombia	19.3	2.6	8.4	22.5	19.4	1.6	-3.2	n.a.	15.4	n.a.	3.3	7.9	1.5	2.0	14.7	8.0	1.0	18.6	n.a.	3.4	n.a.	2.1
Congo, Republic of	79.3	43.8	n.a.	14.7	n.a.	0.8	n.a.	n.a.	26.9	n.a.	4.5	13.0	17.9	n.a.	27.2	n.a.	1.8	n.a.	n.a.	10.1	n.a.	6.2
Ecuador	48.7	10.2	26.5	1.6	33.3	n.a.	30.8	n.a.	n.a.	n.a.	3.0	14.0	2.8	4.2	20.9	22.3	n.a.	236.9	n.a.	n.a.	n.a.	3.5
Gabon	77.5	40.6	n.a.	11.4	4.3	n.a.	3.6	n.a.	n.a.	n.a.	1.7	6.7	10.2	n.a.	28.2	9.1	n.a.	19.2	n.a.	n.a.	n.a.	5.6
Kazakhstan	18.1	8.2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	21.5	10.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Malaysia	14.1	8.4	n.a.	12.4	3.2	1.3	-0.2	-1.0	30.9	n.a.	6.4	10.3	3.9	n.a.	25.3	2.1	4.9	7.6	7.3	10.1	n.a.	4.0
Mexico	25.5	4.0	33.9	30.7	35.1	3.3	n.a.	n.a.	19.8	n.a.	3.1	20.1	2.4	2.9	21.7	35.9	4.2	n.a.	n.a.	4.7	n.a.	3.7
Norway	34.8	10.4	n.a.	n.a.	4.6	n.a.	-0.4	1.7	36.8	4.5	3.1	7.3	3.1	n.a.	n.a.	3.5	n.a.	2.9	3.7	3.1	5.1	1.7
Oman	81.6	39.9	n.a.	9.7	n.a.	0.5	-0.7	n.a.	n.a.	n.a.	6.2	10.3	7.8	n.a.	16.9	n.a.	1.1	7.7	n.a.	n.a.	n.a.	4.9
Russia	37.9	7.1	16.9	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	15.3	4.4	8.4	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Syrian Arab Republic	62.3	12.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3.8	11.4	5.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	5.3
Trinidad and Tobago	60.0	22.5	n.a.	12.2	8.2	0.9	-1.4	0.9	32.1	n.a.	3.1	16.3	7.7	n.a.	23.8	4.3	1.9	8.9	8.9	7.1	n.a.	5.9
United Kingdom	10.3	2.0	n.a.	5.4	5.2	0.2	0.1	2.0	38.3	-0.6	2.3	5.3	1.2	n.a.	8.6	4.0	0.3	5.3	6.9	2.4	2.5	1.8
Vietnam	13.7	4.8	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	6.5	10.8	4.5	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.7
Algeria	90.1	24.8	n.a.	16.6	11.1	n.a.	10.8	n.a.	n.a.	n.a.	2.2	10.7	8.8	n.a.	10.3	9.2	n.a.	95.5	n.a.	n.a.	n.a.	3.4
Egypt	52.2	4.8	3.7	18.2	11.7	4.8	n.a.	n.a.	36.7	n.a.	4.5	17.3	3.4	1.3	15.5	6.7	4.0	n.a.	n.a.	10.8	n.a.	2.1
Indonesia	31.6	6.8	28.4	n.a.	11.4	n.a.	n.a.	n.a.	18.9	1.6	5.1	25.2	4.7	5.4	n.a.	10.1	n.a.	n.a.	n.a.	2.5	1.6	4.2
Iran, I.R. of	87.4	16.5	n.a.	n.a.	19.7	n.a.	22.8	5.0	n.a.	n.a.	2.7	7.4	5.1	n.a.	n.a.	9.0	n.a.	184.6	37.7	n.a.	n.a.	8.6
Kuwait	91.1	43.0	n.a.	n.a.	3.2	n.a.	n.a.	n.a.	55.0	9.3	2.8	3.4	11.6	n.a.	n.a.	3.0	n.a.	n.a.	n.a.	33.7	37.8	18.0
Libya	114.2	37.1	n.a.	10.4	n.a.	2.5	n.a.	n.a.	42.6	n.a.	0.3	117.1	14.9	n.a.	17.5	n.a.	4.2	n.a.	n.a.	10.6	n.a.	6.7
Nigeria	94.0	35.9	64.2	24.9	22.7	2.6	12.2	n.a.	19.7	n.a.	3.0	2.8	7.1	9.6	27.4	19.5	3.0	129.5	n.a.	5.8	n.a.	5.2
Qatar	66.9	34.6	n.a.	9.7	n.a.	n.a.	0.2	n.a.	n.a.	n.a.	3.9	14.3	10.2	n.a.	11.4	n.a.	n.a.	8.9	n.a.	n.a.	n.a.	9.5
Saudi Arabia	90.9	35.1	n.a.	3.2	0.5	0.3	-0.7	n.a.	40.7	n.a.	2.2	4.8	11.1	n.a.	9.1	2.0	0.9	7.1	n.a.	7.5	n.a.	5.2
United Arab Emirates	56.2	36.6	n.a.	11.7	n.a.	1.2	0.0	n.a.	n.a.	n.a.	3.8	22.3	13.3	n.a.	16.0	n.a.	1.7	7.8	n.a.	n.a.	n.a.	7.4
Venezuela, Rep. Bol.	82.8	21.6	52.7	32.5	31.0	1.9	9.9	n.a.	24.0	n.a.	1.7	7.4	5.4	12.8	30.1	23.0	1.5	134.6	n.a.	3.5	n.a.	6.2

Source: The data is obtained from the IMF data base. The selection of OEC is based on the list of countries presented by OPEC as oil exporting countries, since it provides a wide range for degree of oil dominance.

APPENDIX II. MANAGEMENT OF OIL RESOURCES: OIL FUNDS AND INTERNATIONAL RESERVES

The Investment Fund for Macroeconomic Stabilization (FIEM) was created in 1998, with an initial contribution in December 1999, as shown in Table A.II.1. below. The main objective of the FIEM was to avoid the impact that fluctuations in oil-related receipts could have had on the equilibrium in the fiscal sector as well as in the foreign exchange and money markets. The threshold for accumulation and withdrawal of funds was the 5-year moving average of oil-related receipts. This formula was later replaced by a rule stating the transfer of 6 percent of oil-related receipts, that was supposed to be implemented starting in 2003 through 2007. The resources of the FIEM were made available to cover budgetary needs in 2002 and 2003, independently of the size of oil-related receipts. Accordingly and in spite of increasing oil prices, about 76 percent of the FIEM's net worth was transferred to the public sector in 2003.

The FIEM's remaining net worth was transferred to a new fund, the Macroeconomic Stabilization Fund (FEM), created in December 2003. According to the rules of this new fund, the threshold for the accumulation and withdrawal of funds was the three-year moving average of oil-related receipts, however, no contribution to the FEM was made after 2003.

Table A.II.1. Venezuela: Macroeconomic Stabilization Fund (FEM) and Investment Fund for Macroeconomic Stabilization (FIEM)
(In billions of US dollars)

	1999[1]	2000	2001	2002	2003[2]	2004[3]	2005	2006	Total
Flows									
Contributions	215	4,246	2,300	419					7,180
Return on financial investments		131	235	79	14	10	22	36	527
Withrawls			894	3,870	2,169				6,933
Expenses		2	2	1	1				6
Net worth	215	4,590	6,229	2,856	700	710	732	768	768

[1]Initial contribution on December 29, 1999.

[2]As of December 23, 2003, when it stop operations.

[3]The FIEM became FEM in December 2003.

A development fund was created in July 2005 (FONDEN) with resources transferred from the Central Bank's international reserves. Table A.II.2. below shows the cumulative value of those transfers recorded in the Central Bank's balance sheet as a domestic asset.

Table A.II.2. Central Bank of Venezuela-Balance Sheet
(In billions of Bolivars)

	30-Sep-05	31-Oct-05	30-Nov-05	31-Dec-05	31-Mar-06	31-Dec-06	31-Aug-05
ASSETS	80,972	85,338	85,424	86,990	90,955	105,352	77,278
Foreign Assets	72,678	72,408	70,368	71,856	75,726	91,566	95,945
Domestic Assets	8,295	12,930	15,056	15,134	15,229	13,786	1,333
Financial Assistance to Financial Institutions	0	0	0	0	0	0	0
Other Domestic Assets	8,295	12,930	15,056	15,134	15,229	13,786	1,333
of which:							
Public Sector Bonds	1,108	1,526	1,536	1,526	1,526	133	237
Transfers to Fonden	6,079	10,309	12,453	12,453	12,453	12,453	0
LIABILITIES AND NET WORTH	80,972	85,338	85,424	86,990	90,955	105,352	77,278
LIABILITIES	67,267	71,345	71,102	72,269	78,693	97,180	62,963
Foreign Liabilities	9,858	10,026	9,687	10,598	14,948	9,796	10,424
Domestic Liabilities	57,409	61,319	61,415	61,671	63,745	87,384	52,539
Monetary base	19,522	19,391	25,121	23,087	25,641	44795	18,783
Other domestic liabilities [1]	37,887	41,928	36,294	38,584	38,104	42,589	33,756
of which:							
Securities	22,753	27483	27,196	30,314	33,337	34,748	18,708
Public Sector Deposits	12,800	12,128	6,997	6,171	3,747	6,729	13,289
NET WORTH	13,706	13,993	14,321	14,721	12,263	8,171	14,315
of which:							
Net worth accounts adequate level of international reserves [2]	0	0	0	0	-4,075	-9,168	0
Adjusted Net Worth [3]	7,627	3,684	1,868	2,267	-191	-4,282	14,315

Source: Central Bank of Venezuela.

[1] Includes cummulative balance in operations.

[2] According to the Partial Reform of the Central Bank Charter of July 20, 2005, the Central Bank should transfer to a public fund the e---- international reserves over what has been determined as the "adequate level."

[3] Defined as net worth minus transfers to Fonden, which are recorded as an asset.

APPENDIX III. DESCRIPTIVE STATISTICS AND PAIR-WISE CORRELATIONS FOR SELECTED ECONOMIC INDICATORS

Selected Economic Indicators: Descriptive Statistics

	RXPXT	RIFPIFT	RIFPGFP	YP_YN
Mean	86.99	61.31	63.47	21.78
Median	91.11	62.23	61.05	21.75
Maximum	95.49	86.25	97.65	36.19
Minimum	68.78	37.78	35.93	11.95
Std. Dev.	7.72	11.27	15.10	5.30
Skewness	-0.65	0.08	0.44	0.38
Kurtosis	2.12	2.53	2.60	2.98
Jarque-Bera	4.67	0.48	1.81	1.09
Probability	0.10	0.79	0.40	0.58
Sum	4,001.55	2,820.27	2,919.76	1,001.88
Sum Sq. Dev.	2,678.81	5,713.75	10,256.16	1,265.85
Observations	46	46	46	46

Pair-wise correlation of rates of change

	DLPON	DLXP	DLIFP	DLIFT	DLGFP	DLYNPR	DLYNP	DLDYNP	DLMB
DLPON	1	0.94	0.70	0.63	0.44	0.00	0.07	0.06	0.35
DLXP	0.94	1	0.78	0.72	0.50	0.06	0.18	0.13	0.41
DLIFP	0.70	0.78	1	0.96	0.77	-0.14	0.51	0.50	0.62
DLIFT	0.63	0.72	0.96	1	0.86	-0.17	0.64	0.62	0.69
DLGFP	0.44	0.50	0.77	0.86	1	-0.03	0.65	0.57	0.63
DLYNPR	0.00	0.06	-0.14	-0.17	-0.03	1	-0.19	-0.53	-0.23
DLYNP	0.07	0.18	0.51	0.64	0.65	-0.19	1	0.93	0.71
DLDYNP	0.06	0.13	0.50	0.62	0.57	-0.53	0.93	1	0.70
DLMB	0.35	0.41	0.62	0.69	0.63	-0.23	0.71	0.70	1

Pair-wise correlation of five-year moving variances of rates of growth

	VDLPON	VDLXP	VDLIFP	VDLIFT	VDLGFP	VDLYNPR	VDLYNP	VDLDYNP	VDLMB
VDLPON	1	0.97	0.72	0.75	0.69	-0.01	0.31	0.25	0.16
VDLXP	0.97	1	0.71	0.75	0.73	0.06	0.25	0.19	0.11
VDLIFP	0.72	0.71	1.00	0.93	0.74	0.68	0.56	0.32	-0.09
VDLIFT	0.75	0.75	0.93	1.00	0.90	0.51	0.38	0.21	-0.16
VDLGFP	0.69	0.73	0.74	0.90	1	-0.27	0.20	0.03	-0.05
VDLYNPR	-0.01	0.06	-0.09	-0.16	-0.27	1	0.07	0.35	0.39
VDLYNP	0.31	0.25	0.68	0.51	0.20	0.07	1	0.87	0.44
VDLDYNP	0.25	0.19	0.56	0.38	0.03	0.35	0.87	1	0.73
VDLMB	0.16	0.11	0.32	0.21	-0.05	0.39	0.44	0.73	1

Figure A.III.1. Venezuela: Changes in Oil Prices, Oil Exports, Fiscal Revenue, and Primary Expenditures, 1960–2005.

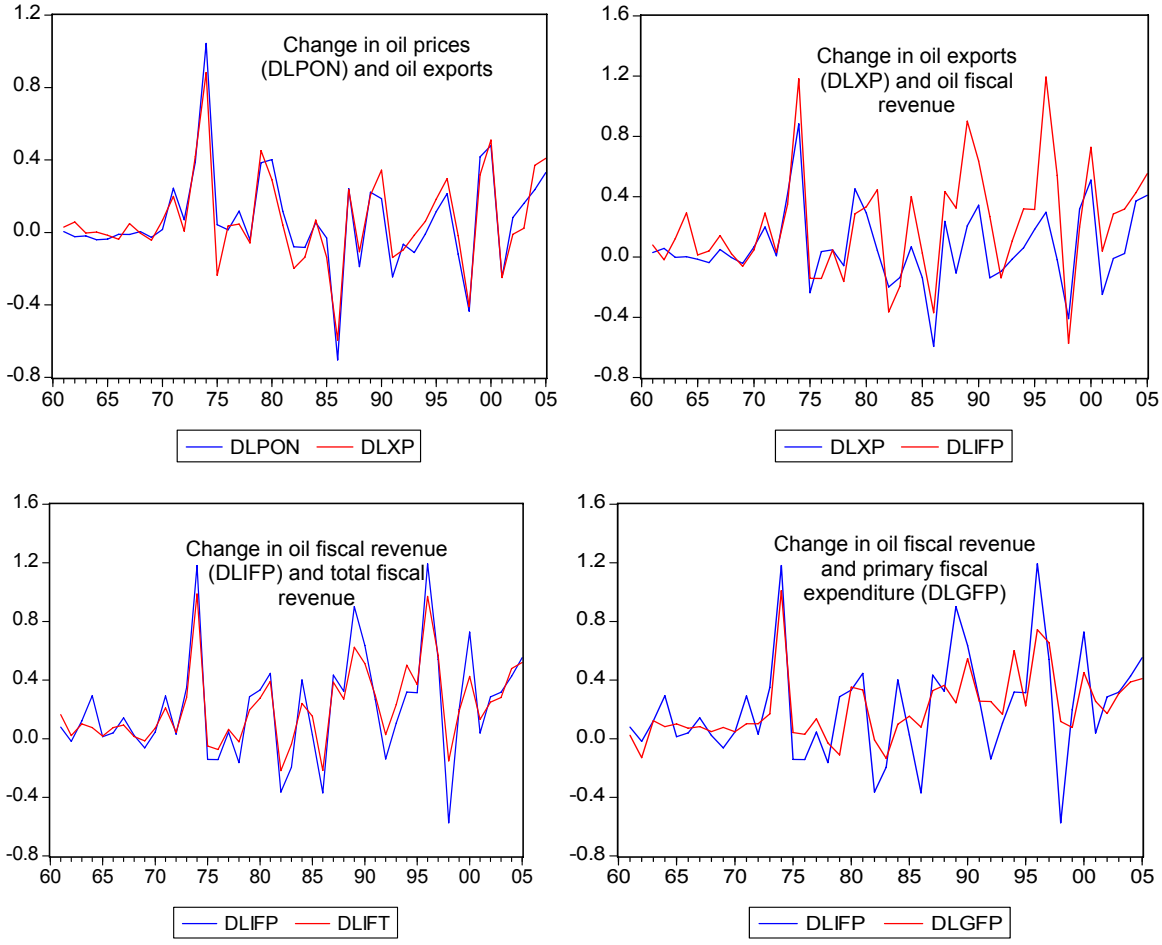


Figure A.III.2. Venezuela: Change in Primary Fiscal Expenditure, Non-Oil GDP Inflation and Monetary Base, 1960–2005

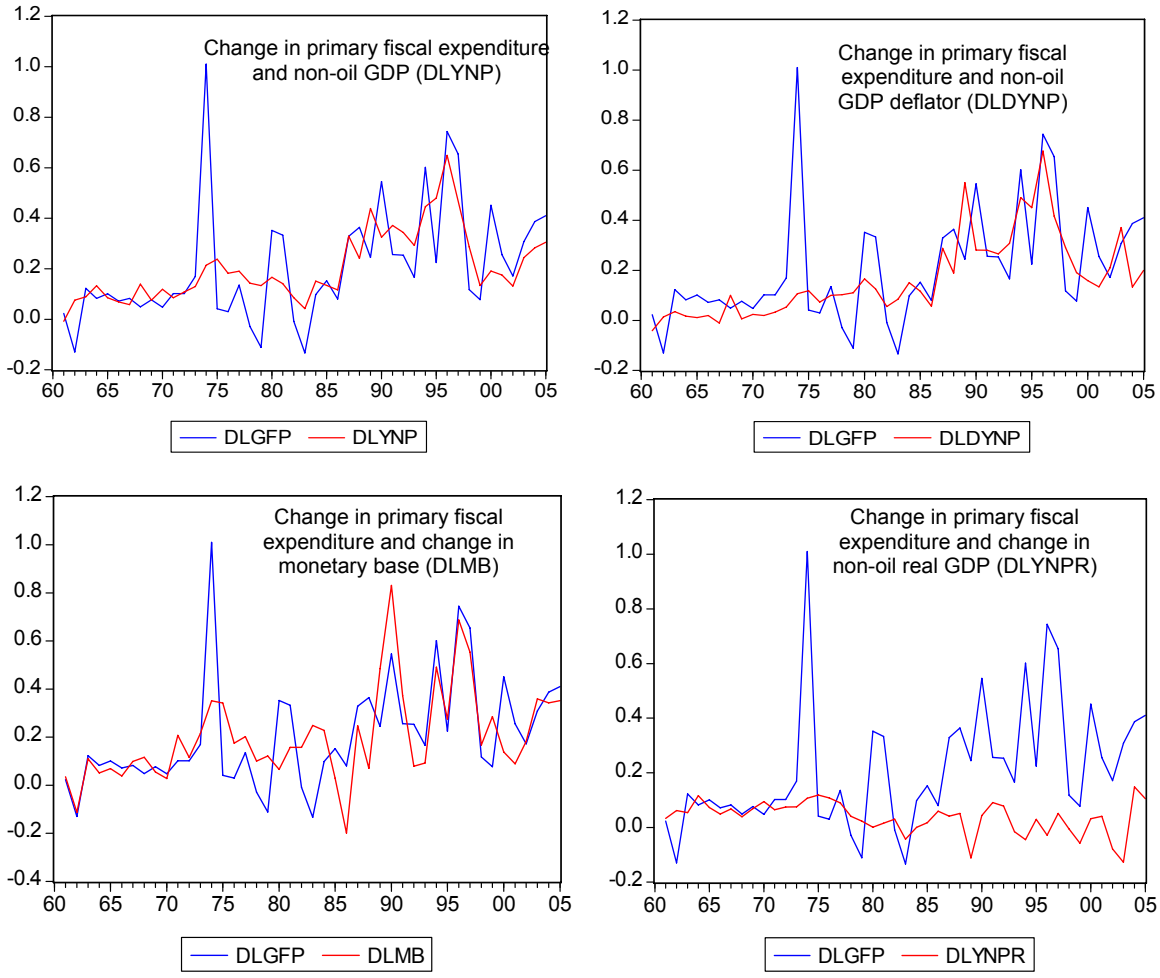


Figure A.III.3. Venezuela: Five-Year Moving Variances of Rates of Growth of Selected Indicators, 1965–2005

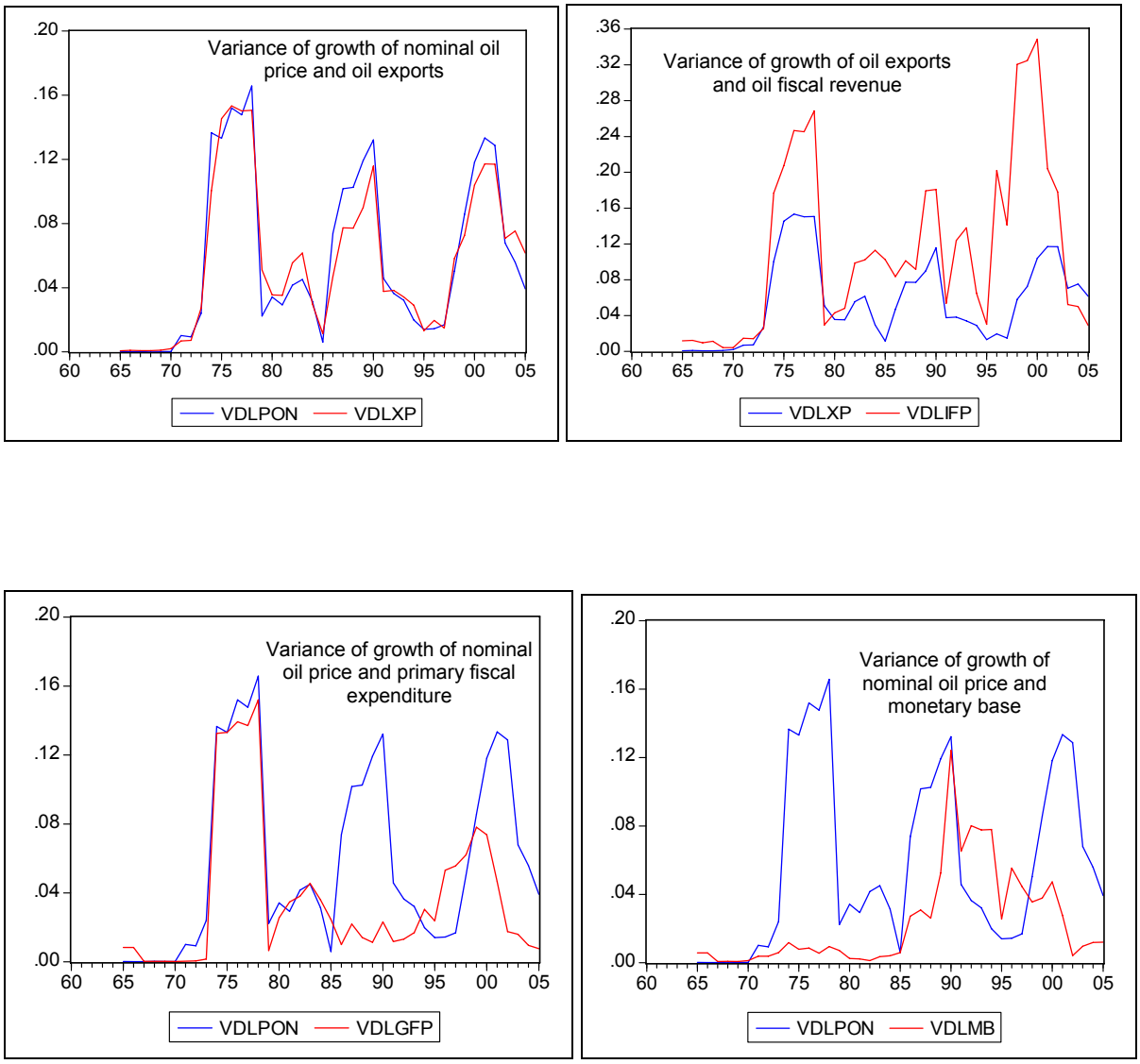
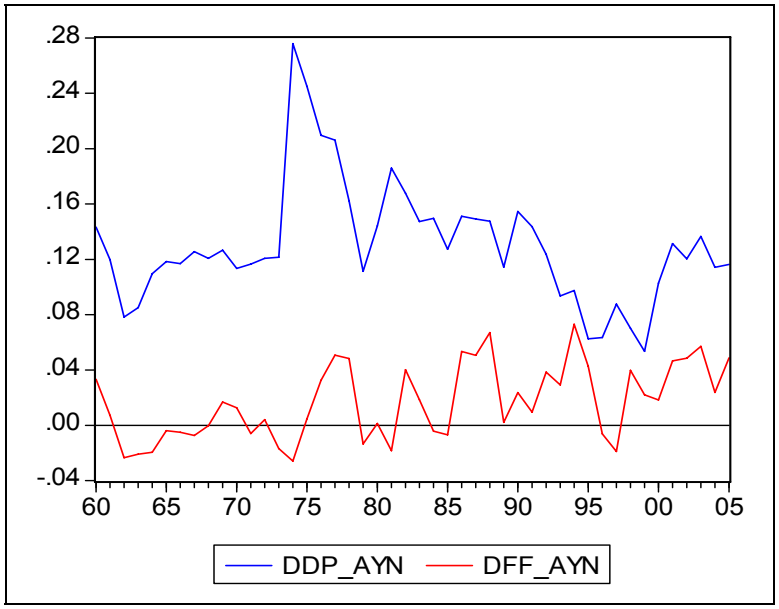


Figure A.III.4. Venezuela: Overall Fiscal Balance and Domestic Primary Deficit (Percentage of GDP)



Sample: 1960–2005
Included observations: 46
Correlations are asymptotically consistent approximations

DDP_AYN,DFF_AYN(-i)	DDP_AYN,DFF_AYN(+i)	i	lag	lead
. | . |	. | . |	0	0.0320	0.0320
***| . |	. |**. |	1	-0.2478	0.1958
.**| . |	. |**. |	2	-0.2273	0.1858
.**| . |	. | . |	3	-0.2433	0.0489
.**| . |	. |* . |	4	-0.1490	0.0625
.**| . |	. | . |	5	-0.1523	-0.0353

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