Resource Curse and Power Balance: Evidence from Iran

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Abstract

Empirical research shows that natural resources have a detrimental effect on economic growth, a phenomenon known as the “resource curse”. Competition between influence groups for access to the resource rents, that is, rent-seeking, is often blamed for this curse. In this paper we dig deeper into the link between political competition and the resource curse by studying the case of Iran from 1960-2007. We present a theoretical model demonstrating how the effect of rents on the economy depends on the balance of political power. The model shows that an increase in rents may lead to a sharp reduction in income when the distribution of power between influence groups is relatively balanced. The empirical evidence confirms the predictions of the model.

JEL classification: Q32; D72

Key words: natural resource curse; political power; economic growth; Iran

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1. Introduction

Countries rich in natural resources, especially oil, typically suffer from lower economic growth than countries without such resources, a phenomenon known as the “resource curse”.¹ Rent-seeking is often put forward as an explanation for the curse: Influence groups engage in a destructive competition to gain control over the resource rents, thereby diverting resources from more productive use.

In the present paper, we investigate the rent-seeking explanation for the resource curse by looking at the link between the political power struggle, resource rents and economic performance in Iran.² Since the Islamic Revolution of 1979, reformers, conservatives, and dozens of other factions have been involved in a struggle for political dominance in Iran. We focus on how the varying distribution of strength among these influence groups has shaped the economy, and in particular the impact of oil revenues on economic growth.

Our analysis starts out by presenting a simple theoretical model demonstrating why the effect of oil rents on economic growth should depend on the level of balance of political power. In particular, the model demonstrates that increased oil rents are more likely to cause a sharp reduction in income (that is, generating a resource curse) when power is equally distributed among influence groups than when one group dominates the political arena.

We then turn to the empirical analysis, where we use data from 1960 to 2004, the key variables being economic growth, oil revenues, and power balance, measured as the number of seats of different major factions in the Iranian parliament. In line with the theoretical

¹ See Frankel (2010) for an overview of this literature.
² In a companion paper, we use panel data for 30 oil rich countries to investigate the interaction between the distribution of power, resource rents, and economic outcomes, see Bjorvatn, Farzanegan and Schneider (2012). The present case study of Iran allows us to dig deeper into the mechanisms of rent-seeking and the resource curse in a particular institutional setting.
results, the empirical analysis shows that the more balanced the distribution of power among political factions, the less positive is the contribution of oil revenues on economic growth.

The paper is organized as follows. In section 2, we discuss the political power structure and factionalism in Iran. Section 3 presents the theoretical framework, which yields testable implications for the subsequent analysis. The main hypotheses, data and empirical model are presented in section 4. Section 5 presents the empirical results. Finally, section 6 concludes.

2. Background

Iranian history witnessed a significant political event in 1979 when the autocracy of Pahlavi changed into an Islamic Republic. While in the Pahlavi regime, the Shah was the most powerful person and the head of the political and economic system, the Islamic Republic does not carry the same degree of authority. The post-revolutionary period in Iran has been the ground of competition among different conservative and reformist factions (see Bjorvatn and Selvik, 2008 and Gheissari and Nasr, 2006).

Amuzegar (2009) highlights the high degree of political factionalism in the Islamic Republic: “There are more than 100 political parties officially registered and recognized, but none has a national base, sizable membership, party discipline or meaningful platform beyond some attention-getting slogans”. In other words, the factional politics has been a major characteristic of the Islamic Republic.

Gheissari and Nasr (2006) highlighted the main properties of political factionalism after the revolution in Iran: informality, absence of real organization, charter, rule or clear platform for defining their political and economic views and memberships, and lack of any

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3 “Within the modernization paradigm, factionalism precedes the formation of modern parties which develop as channels of mass participation and thus act as important agencies of eventual democratization” (Lewis, 1995, p. 105). Indeed, factionalism may refer to a primitive and immature form of democracy which is a property of political systems in transition to democracy.
party structure. These factions with changing boundaries and missions behaved like semi-parties within revolutionary powers. The battlegrounds for these factions have been the parliament, government agencies, media and different religious ceremonies such as the Friday prayer. Gheissari and Nasr believed that factionalism dominated Iranian politics in the 1980s.

The contemporary political economic history of Iran shows that the economy has performed better during strong autocracies. More specifically, the average real GDP per capita growth rate amounted to 8% per year from 1966-1976. The same figure for the post-revolution period (1980-2009) was about 1% (World Bank, 2010). Apart from the standard determinants of growth (see Barro and Sala-i-Martin, 2004), one of the main reasons behind this economic success before the Islamic Revolution is most likely the concentration of power in the hands of the Shah. This politically monopolized system implemented the constructive economic policies such as the Second Seven Year Plan (1956-1962), limiting the power of landlords (White Revolution), and rapid industrialization and investments in human resources.

Oil rents were present in all of these different polities and played an important role in the economic system (see Appendix A for the trend of share of oil revenue in total revenues in Iran). However, the system’s outcomes are different. Destructive competition, especially in the post-revolutionary factionalized system, has eroded the effectiveness of oil revenues in the economic growth process.

3. Theoretical framework

Recent theoretical explanations to the resource curse have focused on political economy mechanisms, and in particular rent-seeking. For example, Mehlum et al. (2006)

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4 Earlier explanations highlighted market mediated mechanisms, referred to as the Dutch disease. Higher oil prices lead to a higher real effective exchange rate and an appreciation of the domestic currency. This increases the price of non-oil exports and leads to de-industrialization of the economy; see Corden and Neary (1982), Corden (1984), and van Wijnbergen (1984).
introduced the concepts of “production friendly” and “grabber friendly” institutions in the natural resource-growth nexus. They conclude that the natural resource curse can only be observed in the countries with “grabber friendly” institutions. Torvik (2002) theoretically investigated the effect of natural resources on entrepreneurs’ activities. He suggests that increasing natural resource rents motivate the entrepreneurs’ activity in rent-seeking, diverting them from the productive part of the economy. Daniele (2011) examines the different effects of resource dependence and abundance on the quality of economic development in some African countries, emphasizing on the importance of specific national political and institutional characteristics. Andersen and Aslaksen (2008) highlight the role of constitutional arrangements when explaining the resource curse. Another group of researchers refers to the role of ethnical fractionalization as a possible explanation for the resource curse hypothesis. For instance, Hodler (2006) uses the ethnical fractionalization index as a proxy for potential destructive competition between rivalling groups. He concludes that natural resources are a blessing in homogenous countries and a curse in heterogenous ones. Montalvo and Reynal-Querol (2005) show that polarized societies with large rivalling groups have a greater potential for rent-seeking, corruption, and conflict. Poteete (2009) highlights the role of a broad and stable political coalition and lower levels of factionalism during the first decades of independence in Botswana as one of the main reasons behind adoption of pro-growth policies and institutions in this resource rich country.

The present model builds on Torvik (2002) in describing a productive economy with increasing returns to scale, which competes for resources with an unproductive rent-seeking or “grabbing” activity. The key difference between Torvik (2002) and the present setup is that

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5 Di John (2007) presents a critical assessment on the effects of resource rents on civil war and conflict.
we introduce differences in rent-seeking technology between the groups, and study how the relative power structure affects resource allocation in the economy.

The economy in our model consists of a given number of workers $L$, which are involved in one of the two activities in the economy, production ($L_P$) and grabbing ($L_G$). We assume that there are increasing returns to scale in the productive sector, so that labor productivity, and hence the wage level, is a positive function of the number of workers in that sector. For simplicity, assume that there are two types of technologies, low-tech and high-tech. With low-tech, labor productivity, and hence the wage in the productive sector is $w_p^{\text{low}}$, whereas with high-tech production, labor productivity and wage is $w_p^{\text{high}}$. There are clustering effects in the productive sector, such that for productive labor input beyond a critical level $L_P^*$, productivity is high, and below this level productivity is low.

There are two groups in society, $a$ and $b$, defined by ethnicity and/or ideology. The two groups compete for power by various types of grabbing activities, ranging from lobbying to violent confrontation, with the winning group controlling the rent $R$. We assume that the probability of winning the power contest is determined by the groups' relative effort in rent-seeking (or “grabbing”) and their influence technology, which reflects the groups' relative political strength:

$$\rho_i = \frac{\alpha_i L_{Gi}}{\alpha_a L_{Ga} + \alpha_b L_{Gb}}, \quad (1)$$

where $L_{Gi}$ is the grabbing effort by group $i$, and where $\alpha_i$ is the influence technology. Assuming that the grabbers are paid their alternative wage in the productive activity, the expected profits from the grabbing activity is given by:

$$\pi_i = \frac{\alpha_i L_{Gi}}{\alpha_a L_{Ga} + \alpha_b L_{Gb}} R - w_p L_{Gi}, \quad (2)$$
where \( w_G \) is the compensation paid to grabbers. We envision a situation where each group has a leader who decides how many in his group will be employed in the power context. Each leader makes this decision, taking the employment decision of the rival leader as given. It can be shown that in the Nash-equilibrium, employment in the power contest is given by:

\[
L^*_G = L^*_a = \frac{\alpha_a \alpha_b R}{w_G}. \tag{3}
\]

Note that the more equal the power distribution between the two groups, the larger is the number of workers involved in grabbing. Moreover, the higher the rents and the lower the wage costs in grabbing, the more workers are involved in this unproductive activity.

The total number of grabbers in a rent-seeking equilibrium is thus given by

\[
L_G^* = L^*_a + L^*_b, \tag{4}
\]

which, using the fact that \( L_p = L - L_G \), can be expressed in terms of the grabber wage as:

\[
w_G = \frac{2 \alpha_a \alpha_b R}{L - L_p}. \tag{4}
\]

In an interior equilibrium, \( w_G = w_p \). Does a high-productive equilibrium exist? For the answer to this question to be in the affirmative, it must be the case that \( w_G(L_p^*) < w_p^{\text{high}} \).

For \( w_G(L_p^*) \geq w_p^{\text{high}} \), no productive equilibrium exists. What about the low-productive equilibrium? For the low-productive equilibrium to exist, it must be the case that \( w_G(L_p^*) > w_p^{\text{low}} \). If \( w_G(L_p^*) \leq w_p^{\text{low}} \), then only the high-productive equilibrium exists.

Note that the more balanced the power structure in society and the higher is the resource rent, i.e., the higher \( \alpha_a \alpha_b \) and \( R \), the higher is \( w_G \), and hence the larger is the chance that the low-productive equilibrium exists, either as the single equilibrium or together with the
productive equilibrium in a multiple equilibrium situation. Similarly, the more dominant one group is in society and the lower the rent, i.e., the lower $\alpha_a \alpha_b$ and $R$, the lower is $w_G$, and the larger is the chance that the high-productive equilibrium exists, either as the single equilibrium or together with the low-productive equilibrium under multiple equilibria.

Figure 1 illustrates the model, measuring $L_p$ on the horizontal axis from left to right, and $L_G$ from right to left, with the length of the horizontal axis given by the total labor supply $L$. The vertical axes measure the wage level.

Three $w_G$-curves are included in the Figure to illustrate the possible outcomes of the model. First, the $w_G^0$-curve shows the power contest equilibrium when the two groups are equally strong, i.e. $\alpha_a = \alpha_b$, and or rents are high. The only stable equilibrium here is point $a$, where grabbing necessarily implies a low-productive equilibrium, since $w_G > w_p^{\text{high}}$ at $L_p^*$. Secondly, the $w_G^1$-curve shows the power contest equilibrium when there is a moderate power asymmetry between the two groups, and or rents are moderately high. In this case, the model generates two stable equilibria, one low-productive in $b$ and one high-productive in $c$. Starting out to the left of the cut-off point $L_p^*$, the economy will move to the low-productive equilibrium, and to the right of $L_p^*$, to the high-productive equilibrium.

Thirdly, $w_G^2$-curve shows the power contest equilibrium when one group dominates the power contest, or when resource rents are low. In this case, only the high-productive equilibrium $d$ survives.

[Figure 1 about here]

Consider a given increase in rent under three different distributions of power balance. Starting out in a situation with a dominant group, such that the $w_G^2$-curve describes the
expected income from grabbing, the increase in rents will shift the $w_G$-curve upwards; for instance to $w_G^1$. Some workers now move out of manufacturing and into grabbing, which crowds out part of the increase in rent, but since the economy started out to the right of $L_p^*$ it is reasonable that the new equilibrium is given by $c$. With productivity still being high, and only partial rent dissipation due to rent-seeking, the increase in rents has thus led to an increase in income in the economy.

Consider next a similar rise in rents given that the distribution of power was more equal, such that the $w_G$-curve shifts from $w_G^1$ to $w_G^0$ and the economy from $c$ to $a$. This has led to a radical downward shift in labor productivity as grabbing has now brought productive employment down below the critical level $L_p^*$. In this case, then, the increase in resources may lead to a reduction in income for the economy; the increase in rents has led to a radical increase in grabbing and a sharp decline in the wage level.

In sum, therefore, the model shows that the impact of an increase in rents is contingent on the power balance in society. While an increase in rents given a dominant group is likely to lead to higher income, a similar increase in rent with a more balanced distribution of power may well have large negative effects on the economy. Based on our theoretical model, we formulate the following hypothesis to be tested:

**Hypothesis:** The growth effect of oil revenues depends on the degree of power balance. Higher balance of power reduces the growth effect of oil revenues.

4. **Data and empirical model**

4.1. **Data and econometric specification**

To estimate whether the relationship between natural resources and GDP per capita growth varies systematically with the balance of political power, we use the following model:
\[ G_t = \alpha_1 G_{t-1} + \alpha_2 X_t + \beta_n r_t + \beta_f \text{fac}_t + \beta_n (nr_t \times \text{fac}_t) + \epsilon_t \]  

where \( G \) is the real per capita GDP growth rate. The main proxy for oil dependency (\( nr \)) in this study is the share of oil revenues in total revenues of the government (\textit{oil revenues})\(^6\). The \textit{fac} variable refers to the degree of power balance among political groups. \( nr_i \times \text{fac}_i \) is an interaction term of the oil dependence variable with an index of power balance and \( \epsilon \) is the error term which is assumed to be independent from other regressors. \( X \) is a vector of control variables including investment as a ratio of the real GDP (\textit{Inv\_gdp}), changes in oil prices (\textit{Oil\_g}; as a proxy for changes in terms of trade), inflation rate (\textit{Inf}; as a measure of macroeconomic instability), real government consumption as a ratio of real GDP (\textit{Govex\_gdp}; a proxy for the size of government distortions in the economy), real per capita GDP growth rate of OECD countries (\textit{OECD\_GDPPCG}; a proxy for external demand from Iran’s major trading partners), a dummy variable for Iran-Iraq war (\textit{Wardummy}; for the period of 1980-1988), and the lag of the dependent variable (\( G_{t-1} \); to control for the dynamic path of economic growth). Our initial estimation method is the dynamic OLS method.

The marginal impact of a unit increase in the oil rent variable on economic growth is \( \beta_1 + \beta_3 \text{fac} \). Based on our theoretical model, the sign of \( \beta_3 \) should be negative. This means that increasing factional politics (increasing \textit{fac}) and oil rents lead to lower economic growth. Thus, the final effect of oil rents on growth is conditional on the level of the relative strength of the interest groups or the degree of power dominance among factions.

The expected effects of the control variables are straightforward. The share of real investment in real GDP in the neoclassical growth model is an indicator of saving rates. A

\(^6\) Oil dependency captures materialized rents in the government budget. Political factions are more interested in these more tangible rents rather than oil reserves or production. In other words, what matters for economic growth and rent-seekers is ultimately the value of produced oil barrels and not necessarily the number of barrels (see Hodler, 2006 for similar view). However, we have also carried out the estimations using the per capita daily oil production. The results (not shown) remain robust by using the oil abundance indicator as well.
higher level of this ratio, therefore, has a positive effect on growth. An increase in
government consumption in the economy is expected to result in crowding-out of private
investment and increases of the regulatory burden. This argument is more significant
considering the role of the state in the Iranian economy. Thus, it should have a negative effect
on growth. Improving terms of trade (export prices/import prices), which are proxied by the
growth rate of oil prices, are expected to have positive effects on growth. Since the major
export products of Iran are oil and refinery products, this variable is a valid indicator in the
fluctuations of the terms of trade. We also expect that a higher growth in the major trading
partners of Iran (OECD region) will positively influence the economic growth of Iran.

In our analysis, it is also possible that power distribution and natural resource related
variables are affected by economic growth. Thus, the independent variables may be
contemporaneously correlated with the error term, i.e. the endogeneity problem. The reasons
behind the problem of endogeneity in our specification may be due to the omitted variable or
simultaneity. Following Block (2001), we use the Ramsey’s RESET (Regression
Specification Error Test) test (Ramsey, 1969) to investigate the possibility of omitted variable
bias in our OLS models. The null hypothesis under the RESET test is that the estimated OLS
model has no omitted variable (Baum, 2006, p.123; Block, 2001 and QMS, 2010). As we will
present in our result section, the OLS estimations do not show a specific problem due to
omitted variable or other forms of misspecification bias. Thus, the second issue, i.e.
simultaneity, might play a role and deserves addressing.

Of course, oil revenues are largely exogenous in our model and the possibility of
reverse feedback is low. Iran as a member of the OPEC must follow the determined level of
the crude oil production quota by this organization (Farzanegan, 2011). In addition,
Farzanegan and Markwardt (2009) argue that “demand for the Iranian oil largely depends on
global economic growth, energy intensities within industrial countries, speculator operation in the global oil markets, expectations of other key oil producers about current and future developments of the market, international oil companies' decisions on liquidation of their stocks and finally, the policy of key oil consumers on strategic petroleum reserves.”

Therefore, oil prices are an exogenous factor for the Iranian economy. In addition, Alexeev and Conrad (2010) also argue that natural resource endowments and the output of a country are largely exogenous. However, to reduce the possible simultaneity concern, we should find one or more variables as instruments that meet two conditions: first, they should be correlated with the suspected explanatory variables such as oil revenues and factionalism and secondly, they should be uncorrelated with the error term.

We use 1 to 4 years’ lags of independent variables as instruments. On one side, the lagged explanatory variables are correlated with the current values of independent variables and on the other side there is no significant correlation between lagged variables and the disturbance term (see Barro, 1996 and Barro and Sala-i-Martin, 2004 for the similar approach). The second condition can be examined by using the over-identifying restriction test such as the Sargan (1958) test. Murray (2006) mentions that “Sargan’s test asks whether any of the instruments are invalid, but assumes, as in the intuitive two-stage least squares over-identification test, that at least enough are valid to identify the equation exactly”. The null hypothesis under the Sargan test is that the instruments are uncorrelated with the error term (Gundlach and Paldam, 2009).

4.2. Measuring power balance in a factionalized democracy

To test our theoretical predications, we need indicators of power distribution in a political system. The most relevant proxies that define and measure the degree of power

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7 In 2SLS and GMM estimations, we treat all explanatory variables as endogenous except for the OECD growth rate and different dummy variables.
balance and its distribution are introduced by Vanhanen (2000). He initially used these indicators as “measures of power distribution”. These are explained as follows:

**Power balance (Van_comp):** This variable portrays the electoral success of smaller parties, i.e. the percentage of votes gained by the smaller parties in parliamentary and/or presidential elections. The variable is calculated by subtracting from 100 the percentage of votes won by the largest party (the party which wins most votes) in parliamentary elections or by the party of the successful candidate in presidential elections.

If both parliamentary and presidential elections are taken into account, the arithmetic mean of the two percentages is used to represent the smaller parties' share of the vote cast. In parliamentary elections, the largest party is the party which receives the largest share of the total votes or of the seats in parliament. In presidential elections, the concept of the largest party refers to the party of the winner candidate in the election (Vanhanen, 2000).

The power balance index is linearly decreasing in the vote share of the largest party. That is, it is high, if the largest party's vote share is low. Since there is no well-defined and established party in Iran, the Vanhanen measure of competition uses the number of seats of different major factions in parliament. In the post-revolutionary period these factions are: Islamic Republican party (disbanded in June 1987), Supporters of Khomeini (Line of Imam Faction), radical Islamists (including Islamic leftists), pro-Rafsanjani candidates, Society of Combatant Clergy, reformists fronts and factions (including May 23 Front), and neo-conservative groups and supporters of Ahmadinejad (i.e. Alliance of Builders of Islamic Iran).

During the government of Shah (1960-1979 in this study), we can only consider the pro-Shah strong parties of the Iran Novin (New Iran) and the National Resurgence Party. The latter was the outcome of the Shah decision for a one party State in March 1975. The new National Resurgence Party replaced the previous two parties: pre-eminently the governing
Iran Novin party and the moderate opposition party of People. The candidates of the National Resurgence Party won 100% of the Iranian parliament in 1975. Executive power was in the hand of the Shah until the Islamic Revolution in 1979.

The competition index of Vanhanen for the period of 1975-1978 is zero for Iran, indicating the highest level of political dominance of one group in the system. In this period, the largest party received 100% of votes, leaving no place for other smaller factions and groups. The Vanhanen indicator of power balance (competition in his terminology) reached its actual maximum (28) during the 5th parliament and the first presidency term of Khatami (1996-1999). In the 5th parliament election, the Society of Combatant Clergy as the main reformist group and supporter of Khatami in 1997 election won only 44% of seats. This was the lowest figure in post-revolution elections for the parliament. This figure indicated the higher power balance between different political factions and the lack of dominance of one political group in the system.

This variable theoretically ranges from 0 (only one party received 100% of votes) to 100 (each voter casts a vote for a distinct party). Thus, the lower value of this indicator shows a higher degree of dominance of one political group or faction (i.e. lower degree of power balance among factions). By contrast, the higher level of this variable refers to larger degree of power balance or symmetry (i.e. a lack of dominance of a single political group). The actual range of this variable from 1960-2004 was from 0 to 28.

**Power distribution (Van_index):** The *Van_index* is the principal index of power distribution (Vanhanen, 2000). This index combines two basic dimensions of power balance – competition and participation – measured as the percentage of votes cast for parties other than the largest (competition) times the percentage of the population which actually voted in the election (participation). This product is divided by 100 to form an index that in principle
could vary from 0 (full dominance of one political faction) to 100 (lack of any dominant political faction).

Higher levels of this index reflect more competition of factions within political power and the participation of their supporters. Vanhanen argues that both dimensions of power balance (competition and participation) are critical to build a principal index of power distribution.

Increasing the percentage of votes cast for parties other than the largest means higher competition of smaller parties or factions in a country showing more characteristics of a factionalized democracy than an established one. The actual range of this variable from 1960-2004 was from 0 to 6.1. The lowest values of this index recorded during the full power of the Shah and dominance of his party (National Resurgence) from 1975-1978. The highest value of this index realized in the first year of the Islamic Revolution (1979) which accompanied the largest balance of power among different revolutionary factions. During the years after the revolution, the balance of power diminished and the index reached to 2 in the end of the Rafsanjani government (1995). The Reformist movement during the 5th parliament and the election of Khatami boosted the role of smaller factions in the politics of Iran. The power distribution index of Vanhanen increased during this period to 5.7, indicating a reduction of dominance of the ruling group.

In summary, the post-revolution governments in Iran never experienced a full dominance in their political life. Both presidential and parliamentary elections have been competitive within the pre-defined limits of ruling clergy (Vanhanen, 1997, p. 121). Bayart (1994, pp. 295-298) agreed with this issue. He explains that “Iranian political society is now too diversified and complex for anyone to be able to impose as clear a hegemony as that of the Shah in the 1970s, although it is not yet ‘democratic’.
The two variables of Van_comp and Van_index give a good approximation of the degree of power dominance in Iran. Figure 2 shows the co-movement of the power distribution and the power balance indicators in Iran. More details on variables and sources are presented in Appendix A. Table 1 presents the summary statistics of the main variables in the empirical analysis.

[Figure 2 about here]

[Table 1 about here]

5. Empirical results

The first step before running regressions is checking the time-series properties of the variables in the model. Since the time period of our study covers different political regimes before and after the Islamic Revolution of 1979, a structural break is a possibility within our variables. In such a case, the most common unit-root tests, namely Augmented Dickey-Fuller (ADF) and Phipps-Perron (PP) tests may not be efficient. We should control for the possibility of structural breaks. Thus, we apply the ZA unit root test introduced by Zivot and Andrews (1992). Through the ZA test we have examined for a single structural break in the intercept and/or in the trend of the time series. The optimal lag length was selected by a t-test. There are some minor contradictions between the ZA unit-root results with those not controlling for a structural break. Thus, we relied on the outcome of the ZA unit-root tests for further analysis of our hypotheses. The unit root tests of variables without controlling for the structural break (ADF and PP tests) and with controlling for the break (ZA test) are presented in Tables B1 and B2 (Appendix B), respectively.8

8 Furthermore, there can be another concern about the effect of the “oil-rent” specific variables on power distribution indicators which in turn influence economic growth. In this case, we still have a correct model but it may not be an efficient specification. We can show that this issue is a not a source of concern for our case. The correlation of the “oil-rent” dependency variable with the power distribution variables is not statistically different from zero.
Table 2 shows the direct and indirect effects of oil dependency on real economic growth. As is evident in Table 2, the oil rent itself is not a curse for the economy, but a blessing. More recent studies also show the overall positive income effects of resource wealth in cross country analysis (see Alexeev and Conrad, 2009). Nevertheless, the final effect of oil dependency depends on the level of distribution of power among political factions.

The negative and significant sign of interaction terms ($\beta_3$) in all specifications shows that increasing oil rents in a situation with a relative balance of power between interest groups reduces economic growth. Destructive competition of factions aiming to capture a part of oil revenues increases inefficiency and consequently wastes scarce resources within the economy. These findings are robust controlling for the possible endogeneity of the determinants of growth. The Sargan test confirms the validity of instruments in the 2SLS and GMM models. In other words, the lagged explanatory variables as instruments are appropriately uncorrelated with the disturbance process. To check the relevancy of the instruments, we have regressed each of the endogenous regressors on a full set of instruments. The first stage R-squares show a high explanatory power of employed instruments for the endogenous variables. We have also shown the standardized coefficients (beta) of the explanatory variables in Table 2. Through beta coefficients, we can see the relative importance of the independent variables which are statistically significant, while still keeping the dependent variable in its original and more meaningful metric. Among all explanatory variables, the oil revenue has the largest effect on economic growth. The interaction term between power balance (distribution) and oil revenues is in the top three influential variables in growth regressions.

Furthermore, it is interesting to know whether the interaction term between power distribution (or power balance) and oil rent remains significant if observations from before the
regime change in 1979 are excluded. The power balance was lowest during the Shah regime. The Islamic Revolution changed the structure of political power and social order. Thus, it is important that the results remain robust when restricting the sample on the period after the Islamic Revolution of 1979.

If the interaction term loses its significance, then the results would simply suggest that the Shah regime was better (or more pro-growth) in managing the oil revenues than the subsequent religious regime. In this case, one may argue that the degree of power balance within the post-revolution period may not matter for growth. In other words, the negative interaction term from the main specifications and the full sample might be due to changes of power of balance in pre- and post-revolution regimes. Thus, it could be any of the other changes that explain the difference in the growth effects of oil revenues in pre- and post-revolution. Of course, we have controlled in our full sample estimations for the effects of other key variables which may affect growth beyond the degree of balance of power among factions.

For robustness of our main results, we carried out the same estimation for the post-revolution period (1979-2004 & 1980-2004). The results are shown in Table 3. The negative effect of interaction of the index of power distribution ($\text{van\_index}$) or power balance ($\text{van\_comp}$) and oil revenues remains robust during the post-revolution period. These results show that power balance is not only an important moderator in the growth-oil nexus during the whole period of the pre- and post-revolution, but this role is still important within the period of the Islamic Republic. The positive direct and statistically significant effect (at 1% level) of oil revenues on growth is reduced by a higher degree of power balance or distribution of power in the Islamic Republic.
In addition, in the parliamentary election of 1984 members of the parliament were elected but political parties were not allowed to take part in the election. Also in the parliamentary election of 1988, no organized parties took part in the election.\(^9\) In such cases, Vanhanen assumes that one party has taken all the votes or seats in the parliament.\(^10\) Thus, he assumed the share of the votes for the largest party (as a % of total votes or seats) for the parliamentary elections of 1984 and 1988 in Iran (8 years of our sample period: 1984-1991) is 80%. We define a dummy variable to deal with this uncertainty regarding these two elections in the Vanhanen calculations of the power balance index, examining robustness of our main results. We notice that controlling for the uncertainty regarding the share of the largest party in the mentioned elections, our main results remain robust.\(^11\)

The effects of other control variables are consistent with our expectations and economic theory. The share of investment in GDP has a positive, significant and stable effect on growth in most specifications. An increase in government consumptions in GDP has a negative and significant effect on growth in most specifications. Inflation as an indicator of macroeconomic instability has negative effects on growth. It seems that the growth rate of OECD economies has no significant effect on the Iranian economy when we control for other variables. The growth effect of a war dummy is significantly negative in most specifications.

The Ramsey test indicates that we do not have a serious problem with an omitted variable bias in any of the specifications. Also based on the LM test, we can accept that in all specifications our main findings are immune to the possible autocorrelation of residuals.

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\(^9\) http://www.fsd.uta.fi/aineistot/taustatietoa/FSD1289/Iran.pdf


\(^11\) Moreover, there were two periods with a high power index. The four years after the Revolution, and the period 1996-1999. In these periods the vote shares of the largest group were 53 and 44 percent, respectively. We also controlled for these two periods of time in some of our regressions to see whether they drive our main findings. However, we do not find the evidence for sensitivity of our main results to developments under these two distinct periods.
Normality assumption is required in order to conduct single or joint hypothesis tests about the model parameters. The Jarque-Bera tests in all specifications cannot reject the null hypothesis of residual normality, increasing the confidence in the inferences that we make about the coefficient estimates. The R-squared criteria show that a significant portion of changes in the real economic growth of Iran can be explained by included explanatory variables in specifications.

[Table 2. about here]

[Table 3 about here]

To get a better picture of the size and interpretation of the effects, we calculate the marginal economic growth effects of one percentage point increase in oil rents at different levels of political power distribution (or balance) indices. For illustration, we use coefficients in Table 2 for power distribution (van_index) and power balance (van_comp) variables (S1 (OLS), and S2 (OLS))\(^{12}\). Using Eq. 6, we calculate these marginal effects.

\[
\frac{\partial G_t}{\partial nr_t}=\beta_1 + \beta_3 . fac_t \tag{6}
\]

Where \( G \) is the real per capita GDP growth rate, \( fac \) is the level of Vanhanen power distribution (van_index) or power balance (van_comp) index, and \( nr \) is the share of oil revenues in total revenues of the government growth rate.

At the minimum levels of power distribution and power balance, a one percentage point increase in the share of oil revenues raises income per capita growth by 0.40 and 0.46 percentage points, respectively. When we have the maximum degree of power distribution, a one percentage point increase of oil revenues leads to a reduction of growth by 0.02 and in the case of highest power balance the growth will be limited to 0.18 percentage points.

\(^{12}\) Using 2SLS or GMM estimations does not change the marginal impacts qualitatively.
Are these marginal effects statistically significant? To answer this question, we illustrate the marginal effect with the corresponding 90% confidence intervals (Figure 3). The estimated marginal effects are statistically significant if the zero line does not fall between standard error bands.

[Figure 3 about here]

This result supports our initial hypothesis, asserting that factionalized political power and the reduction of dominance of one political group reduce the positive growth effects of oil revenues. The mechanism suggested by our theoretical model is that the more balanced the political power, the more intense is rent seeking, and the more labor is diverted from the dynamic manufacturing sector. Oil revenues are more likely to have a positive impact on growth when one group is in control.

6. Conclusion

The literature on the resource curse shows that there is a negative association between natural resource wealth and economic growth. The mechanism underlying this negative association is likely to vary between countries, in some cases involving a Dutch disease, in others civil war. In the present paper, we focus on resource rents and economic growth in Iran, a country that has been plagued by factional politics since the Islamic Revolution. The ambition of our study is to investigate whether the intensity of the power struggle affects the growth effect of oil rents.

For this purpose, we build a simple theoretical model highlighting the way in which the distribution of influence between the power groups in society may determine the growth effect of resource rents. More specifically, the model shows that an increase in rents is likely
to have a positive effect on income when one group is firmly in power, while an increase in
rents in a situation with a power balance may lead to a reduction in income.

To test these theoretical predictions, we estimate dynamic OLS, 2SLS and GMM
models for the Iranian economy from 1960-2007. We show that the direct growth effect of oil
rents is positive. However, a higher degree of political factionalism dampens the positive
growth effects of oil rents. While our study is based on the Iranian experience, we have
elsewhere, in Bjorvatn, Farzanegan and Schneider (2012), shown that the same pattern holds
for oil exporting countries as a group. Hence, we believe that the case study of Iran may carry
important lessons also for the other oil rich countries in the region. In particular, given the
current events, where authoritarian regimes are being challenged, there is a clear danger of
increased factionalism in the years ahead. The countries themselves, and the international
community, should be aware of the potential economic costs of factional politics in a situation
with high resource rents, and contribute to building solid institutions that reduce the room for
destructive competition for power. Moreover, as shown in Bjorvatn and Farzanegan (2011),
the challenges are amplified by the fact that the MENA countries are undergoing a dramatic
demographic transition. A political power struggle that diverts resources from job creation to
grabbing, may potentially destabilize the region for years to come.
References


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World Bank, 2010. World Development Indicators. Online Database.

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<tr>
<th>Variable</th>
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<th>Maximum</th>
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<td>3.26</td>
<td>7.05</td>
<td>-18.02</td>
<td>13.87</td>
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Table 2.
OLS, 2SLS & GMM results for oil revenues/total revenues, full sample period

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<th>S1(OLS, beta)</th>
<th>S1(2SLS)</th>
<th>S1(GMM)</th>
<th>S2(OLS)</th>
<th>S2(OLS, beta)</th>
<th>S2(2SLS)</th>
<th>S2(GMM)</th>
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<td>oil revenue</td>
<td>0.40 (3.40)**</td>
<td>0.49</td>
<td>0.52 (3.08)**</td>
<td>0.50 (6.19)**</td>
<td>0.46 (3.55)**</td>
<td>0.55</td>
<td>0.61 (3.38)**</td>
<td>0.65 (4.50)**</td>
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<td>-0.79 (-2.10)</td>
<td>-0.19</td>
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<td>-1.07 (-3.27)**</td>
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<td>-0.11</td>
<td>0.02 (0.12)</td>
<td>0.07 (0.41)</td>
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<td>-0.25</td>
<td>-0.11 (-2.30)**</td>
<td>-0.11 (-4.11)**</td>
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<td>-0.02 (-1.88)*</td>
<td>-0.02 (-2.25)**</td>
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<td>(power distribution)*(oil revenues)</td>
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<td>0.26</td>
<td>0.38 (2.17)**</td>
<td>0.37 (3.67)**</td>
<td>0.45 (2.44)**</td>
<td>0.26</td>
<td>0.51 (3.00)**</td>
<td>0.47 (3.35)**</td>
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<td>(power balance)*(oil revenues)</td>
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<td>-0.43</td>
<td>-2.08 (-2.85)**</td>
<td>-2.19 (-5.79)**</td>
<td>-1.61 (-3.25)**</td>
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<td>-0.24 (-1.44)</td>
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<td>-0.31 (-3.10)**</td>
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<td>0.12</td>
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<td>0.06 (0.53)</td>
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<td>0.18</td>
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<td>0.13 (0.91)</td>
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<td>0.01 (1.30)</td>
<td>0.01 (0.61)</td>
<td>0.07</td>
<td>0.00 (0.03)</td>
<td>-0.00 (-0.41)</td>
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<td>0.16</td>
<td>0.91 (1.00)</td>
<td>0.89 (2.08)**</td>
<td>0.92 (1.20)</td>
<td>0.19</td>
<td>1.21 (1.11)</td>
<td>1.84 (2.30)**</td>
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<td>-6.37 (-3.87)**</td>
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<td>-5.74 (-3.84)**</td>
<td>-0.32</td>
<td>-6.44 (-2.44)**</td>
<td>-7.53 (-3.84)**</td>
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<td>0.70</td>
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<td>0.61</td>
<td>0.59</td>
<td>0.32</td>
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<td>0.23</td>
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<td>0.38</td>
<td>0.50</td>
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<td>41</td>
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</table>

Note: Dependent variable: real per capita GDP growth rate. Period: 1959-2007 (effective sample: 1968-2004); t value within () brackets; Newey-West HAC standard errors & covariance, LM is Breusch-Godfrey Serial Correlation LM Test (F form, p-value for OLS & Obs*R², p-value for TSLS) which shows the probability of null hypothesis (no auto-correlation in residuals) acceptance (p-values larger than 0.05 means acceptance of null hypothesis); Jarque-Bera P-value shows the acceptance probability of null hypothesis of residual normality; RESET is Ramsey test (using powers of the independent variables for omitted variables. The p-value of RESET tests the H0: model has no omitted variables (p-values larger than 0.05 means acceptance of null hypothesis (model has no omitted variables). Instruments consist of 1-4 years lagged values of "oil abundance", different factionalism proxies, government expenditures /GDP, investment/GDP, interactions terms, inflation, as well as 2 to 4 lagged value of "lagged dependent variable". Sargan p-value test show the probability of acceptance of over identification restriction (instruments are uncorrelated with the error term and thus validity of instruments). Constant term is included but not reported. beta estimations refer to standardized coefficients. ***: Significant at 1%, **: Significant at 5%, *: Significant at 10%.
### Table 3.

**OLS, 2SLS, & GMM results for oil revenues, post-revolution period**

<table>
<thead>
<tr>
<th>Variable</th>
<th>S1-OLS</th>
<th>S2-OLS</th>
<th>S3-OLS</th>
<th>S4-OLS</th>
<th>S5-GMM</th>
<th>S6-OLS</th>
<th>S7-GMM</th>
<th>S8-2SLS</th>
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<tr>
<td>oil revenues</td>
<td>0.65 (3.04)***</td>
<td>0.62 (3.22)***</td>
<td>0.77 (3.02)***</td>
<td>0.73 (3.19)***</td>
<td>1.00 (5.75)***</td>
<td>0.72 (3.71)***</td>
<td>1.01 (6.14)***</td>
<td>0.99 (3.62)***</td>
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<td>-0.20 (-0.56)</td>
<td>-0.39 (-2.93)***</td>
<td>-0.41 (-1.52)</td>
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<td>-0.12 (-2.20)**</td>
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<td>(power distribution)*(oil revenues)</td>
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<td>-0.12 (-2.17)**</td>
<td>-0.02 (-2.47)**</td>
<td>-0.02 (-2.43)**</td>
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<td>-0.02 (-2.43)**</td>
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<td>$G_{t-1}$</td>
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<td>0.76</td>
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</tbody>
</table>

Note: Dependent variable: real per capita GDP growth rate. *t value* within () brackets; Newey-West HAC standard errors & covariance; LM is Breusch-Godfrey Serial Correlation LM test (F form, p-value for OLS & Obs*R², p-value for TSLS) which shows the probability of null hypothesis (no auto-correlation in residuals) acceptance (p-values larger than 0.05 means acceptance of null hypothesis); Jarque-Bera P-value shows the acceptance probability of null hypothesis of residual normality; RESET is Ramsey test (using powers of the independent variables) for omitted variables. The p-value of RESET tests the H0: model has no omitted variables (p-values larger than 0.05 means acceptance of null hypothesis) (model has no omitted variables). Instruments consist of 1-4 years lagged values of “oil abundance”, different factionalism proxies, government expenditures/GDP, investment/GDP, interactions terms, inflation, as well as lagged value of “lagged dependent variable”. Sargan p-value test show the probability of acceptance of over identification restriction (instruments are uncorrelated with the error term and thus validity of instruments). Constant term is included but not reported. ***: Significant at 1%, **: Significant at 5%, *: Significant at 10%.
Figure 1. Rent-seeking, power balance, and economic performance
Figure 2. Co-movement among different indicators of political power balance in Iran
Figure 3. Marginal effects of oil revenues on growth at different levels of power distribution

*Note:* the middle solid line shows the estimated marginal impacts and the dashed lines are 90% confidence interval bands. The marginal effects are statistically significant when the error bands do not include the zero line.
### Appendix A

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>$G$</td>
<td>Real per capita GDP growth rate</td>
<td>CBI (2009)</td>
</tr>
<tr>
<td>oil revenues</td>
<td>Changes in the share of oil revenues in total revenues of government (oil dependency)</td>
<td>CBI (2009)</td>
</tr>
<tr>
<td>power distribution</td>
<td><em>Van_index:</em> Index of distribution of power calculated as the products of <em>Van_comp</em> and <em>Van_part</em> divided by 100.</td>
<td>Vanhanen (2000)</td>
</tr>
<tr>
<td>power balance</td>
<td><em>Van_comp:</em> Index of balance of power among political factions, groups and parties</td>
<td>Vanhanen (2000)</td>
</tr>
<tr>
<td>Inv_gdp</td>
<td>Changes in the share of real investment in real GDP</td>
<td>CBI (2009)</td>
</tr>
<tr>
<td>Govex_gdp</td>
<td>Changes in the share of real government expenditures in real GDP</td>
<td>CBI (2009)</td>
</tr>
<tr>
<td>Inf</td>
<td>CPI inflation</td>
<td>CBI (2009)</td>
</tr>
<tr>
<td>Oil_g</td>
<td>Growth rate of global average oil prices</td>
<td>IFS (2009)</td>
</tr>
<tr>
<td>OECD_gdppcg</td>
<td>Real growth rate of OECD per capita GDP</td>
<td>World Bank (2010)</td>
</tr>
</tbody>
</table>
Figure A1. Trend of oil revenues share in total revenues in Iran (%)  
Source: CBI (2009)
## Appendix B

### Table B1.

*Unit root tests without controlling structural break (ADF and PP)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Included in test equation</th>
<th>ADF</th>
<th>PP</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Level</td>
<td>First Diff.</td>
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<tr>
<td>oil revenues</td>
<td>Intercept</td>
<td>-2.24</td>
<td>-6.42*</td>
</tr>
<tr>
<td></td>
<td>Intercept and trend</td>
<td>-2.33</td>
<td>-6.42*</td>
</tr>
<tr>
<td></td>
<td>none</td>
<td>-0.62</td>
<td>-6.48*</td>
</tr>
<tr>
<td></td>
<td>Interception and trend</td>
<td>-2.05</td>
<td>-5.72*</td>
</tr>
<tr>
<td></td>
<td>none</td>
<td>-0.05</td>
<td>-5.76*</td>
</tr>
<tr>
<td>Inv_gdp</td>
<td>Intercept</td>
<td>-2.53</td>
<td>-5.69*</td>
</tr>
<tr>
<td></td>
<td>Intercept and trend</td>
<td>-0.96</td>
<td>-5.18*</td>
</tr>
<tr>
<td></td>
<td>none</td>
<td>-0.14</td>
<td>-5.02*</td>
</tr>
<tr>
<td>Govex_gdp</td>
<td>Intercept</td>
<td>-1.28</td>
<td>-4.97*</td>
</tr>
<tr>
<td></td>
<td>Intercept and trend</td>
<td>-0.96</td>
<td>-5.18*</td>
</tr>
<tr>
<td></td>
<td>none</td>
<td>-0.14</td>
<td>-5.02*</td>
</tr>
<tr>
<td>Inf</td>
<td>Intercept</td>
<td>-2.61***</td>
<td>-2.46</td>
</tr>
<tr>
<td></td>
<td>Intercept and trend</td>
<td>-3.22***</td>
<td>-3.23***</td>
</tr>
<tr>
<td></td>
<td>none</td>
<td>-1.41</td>
<td>-7.27*</td>
</tr>
<tr>
<td>Pcpgdp_g</td>
<td>Intercept</td>
<td>-3.59*</td>
<td>-3.59*</td>
</tr>
<tr>
<td></td>
<td>Intercept and trend</td>
<td>-3.61**</td>
<td>-3.61**</td>
</tr>
<tr>
<td></td>
<td>none</td>
<td>-3.38*</td>
<td>-3.38*</td>
</tr>
<tr>
<td>G_t-1</td>
<td>Intercept</td>
<td>-3.59*</td>
<td>-3.59*</td>
</tr>
<tr>
<td></td>
<td>Intercept and trend</td>
<td>-3.61**</td>
<td>-3.61**</td>
</tr>
<tr>
<td></td>
<td>none</td>
<td>-3.38*</td>
<td>-3.38*</td>
</tr>
<tr>
<td>Oil_g</td>
<td>Intercept</td>
<td>-6.28*</td>
<td>-6.28*</td>
</tr>
<tr>
<td></td>
<td>Intercept and trend</td>
<td>-6.21*</td>
<td>-6.21*</td>
</tr>
<tr>
<td></td>
<td>none</td>
<td>-5.84*</td>
<td>-5.84*</td>
</tr>
<tr>
<td>Oecd_gdppcg</td>
<td>Intercept</td>
<td>-3.96*</td>
<td>-3.86*</td>
</tr>
<tr>
<td></td>
<td>Intercept and trend</td>
<td>-4.90*</td>
<td>-4.58*</td>
</tr>
<tr>
<td></td>
<td>none</td>
<td>-1.93***</td>
<td>-1.73***</td>
</tr>
</tbody>
</table>

*Note:* Null hypothesis: respected variable has a unit-root. *: rejection of null hypothesis at 1% level, **: rejection of null hypothesis at 5% level and ***: rejection at 10% level.

### Table B2.

*Zivot and Andrews unit-root tests with structural break in intercept and trend*

<table>
<thead>
<tr>
<th>Variable</th>
<th>t-statistics</th>
<th>Break year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil_revenues</td>
<td>-2.84</td>
<td>1974</td>
</tr>
<tr>
<td>Inv_gdp</td>
<td>-3.62</td>
<td>1985</td>
</tr>
<tr>
<td>Govex_gdp</td>
<td>-3.97**</td>
<td>1976</td>
</tr>
<tr>
<td>Inf</td>
<td>-5.14</td>
<td>1993</td>
</tr>
<tr>
<td>Pcpgdp_g</td>
<td>-5.77</td>
<td>1975</td>
</tr>
<tr>
<td>Pcpgdp_g(-1)</td>
<td>-5.77</td>
<td>1975</td>
</tr>
<tr>
<td>Oil_g</td>
<td>-7.36</td>
<td>1979</td>
</tr>
<tr>
<td>Oecd_gdppcg</td>
<td>-6.20</td>
<td>1972</td>
</tr>
</tbody>
</table>

*Note:* Critical values: 1%: -5.57 5%: -5.08. If the test statistic (e.g. -7.36 for oil_g variable) is smaller than the critical values (e.g. for breaks in trend and intercept -5.5 and -5.0), then we have an I (0) series with a trend and a break. If the test reports otherwise, we have an I (1) series.*: break in intercept, (Critical values: 1%: -5.43 5%: -4.80) **: break in trend (Critical values: 1%: -4.93 5%: -4.42).