

THE POLITICAL ECONOMY OF RESOURCE RENT DISTRIBUTION

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Abstract: I model the link between political regime and level of diversification following a windfall of natural resource revenues. The explanatory variables I make use of are the political support functions embedded within each type of regime and the disparate levels of discretion, openness, transparency, and accountability of government. I show that a democratic government seeks to maximize the long-term consumption path of the representative consumer, in order to maximize its chances of re-election, while an authoritarian government, in the absence of any electoral mechanism of accountability, seeks to buy off and entrench a group of special interests loyal to the government and potent enough to ensure its short-term survival. Essentially the contrast in the approaches towards resource rent distribution comes down to a variation in political weights on aggregate welfare and rentierist special interests endogenized by distinct political support functions.

Key words: Political Resource Curse; Natural Resource Boom; Rent Distribution; Rentier State; Political Regime; Endogenous Growth Model

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1. Introduction

Uncannily enough issues of regime durability, socioeconomic instability, and democratic transition have been most prevalent in countries relatively rich in natural resources, essentially oil and minerals. Regime survival in the petro-states of the Middle East (including the North-African Maghreb states), authoritarianism, civil wars, and political turmoil in sub-Saharan Africa,¹ and democratic transition in the natural resource-rich ex-Soviet republics of the Caspian Basin region and Central Asia have of late come under the scrutiny of economists and political scientists alike. The acute boom-and-bust cycles of the 70s and 80s and the discovery of oil in the North Sea sparked a vast piece of economic literature that delved into the macroeconomic effects of exogenous natural resource windfalls, real exchange rate appreciation, and sectoral reallocation of resources.² Eventually the academic debate shifted from theoretical models to econometric analyses of the relationship between primary resource abundance and economic growth. Researchers in comparative politics, on the other hand, seemed more interested in specialized case studies of the aforementioned troubled regions, thus churning up a number of insightful explanations and narratives, which were tailored nonetheless to the specifics of the political environment at hand. Failure to propose generalizable, testable, and falsifiable hypotheses invited a bout of criticism from political scientists with a greater concern for methodological rigor (see Ross, 1999). That is where the all too recent literature on the ‘political resource curse’ comes in by reconciling the economic and political literature on natural resources and filling the methodological and empirical lacunae that have tainted the literature so far.

The overall macroeconomic effects of natural resource³ windfalls in the form of either exogenous terms-of-trade improvements for an exporting country of primary commodities or sudden discoveries of oil and minerals⁴ within one’s national territory have been well documented and theorized. The consensus among economists is that the concomitant increase in real income and the ensuing sectoral shift of factors of production may launch the economy on a long-term trajectory of sub-optimal growth because of loss of competitiveness and increasing returns to scale inherent in the declining tradeable sector.⁵ Arguably, however, these adverse effects of the natural resource curse all come down

1 For revenue-centered accounts of the causal links between civil war and natural resources see Fearon (2005), Humphreys (2005), and Snyder and Bhavnani (2005) in the 2005 special issue of the *Journal of Conflict Resolution*, volume 49, number 4.

2 Economic historians would argue, however, that this sudden interest in the macroeconomics of natural resources did not signify the documentation of novel phenomena. Forsyth and Nicholas (1983) for example examine the decline of the Spanish manufacturing sector in the 16th century following an influx of treasured metals, mainly gold and silver, from the Americas.

3 For a comprehensive survey of traditional accounts of the Dutch disease see Corden (1984). More recent contributions to the literature include Torvik (2001) and Matsen and Torvik (2005).

4 Even though part of the literature treats oil as a structural variable with intrinsic characteristics and properties, we will make no distinction among different types of publicly owned subsoil natural resources.

5 The resource boom may also undermine the competitive edge of the manufacturing sector indirectly by boosting real income and thus inflating the cost of non-traded intermediate goods used in the production of manufacturing goods.

to a contestable empirical tendency (see Sachs and Warner (2001) for some of the evidence), not an iron law of economics. Case study analyses paint a much more variegated and empirically complex picture. For instance, the papers by Sarraf and Jiwaji (2001) and Acemoglu, Johnson, and Robinson (2003) present the case of Botswana's development success in the wake of a mineral boom, in order to make the argument that the resource curse is down to bad economic management pure and simple.

A new promising research path towards explaining this widely documented variation in the developmental effects of resource booms and endowments highlights the critical role of institutions. For example, the political economics papers by Mehlum, Moene, and Torvik (2006) and Robinson, Torvik, and Verdier (2006) show both theoretically and empirically that the impact of resource booms on national income and growth levels depends above all else on the quality of institutions (meritocratic vs. clientelistic), along with other political variables. In other words, the so-called resource curse is essentially not an economic phenomenon but rather an outgrowth of the weaknesses and shortcomings of a political system. Therefore, one ought to provide an account of the political underpinnings of this phenomenon, in order to establish why some countries are more successful than others in confronting the pernicious long-term repercussions of a resource boom.

In the wake of the above literature on the 'political resource curse', this paper's initial insight is that the type of political regime already in place at the time of the boom is a crucial factor that affects both the soundness of economic management of windfall gains and how they are actually allocated to various social groups. What essentially distinguishes one regime from another is the kind of political environment it is embedded in, namely its political constraints and objectives. Implicit within the analysis to follow are fundamental office-seeking assumptions on the part of governments, namely reelection incentives when it comes to democracies and regime survival in autocracies. Even though the continuation of rule in one form or another may constitute the main facet of the political incentive structure I wish to model, it nonetheless does not become the dependent variable of the analysis. This is left to other more sophisticated dynamic models of electoral competition, democratic transition, or replacement of one authoritarian government by another.⁶

Bueno de Mesquita and Smith (2008) for example extend their 'selectorate' framework to offer an integrated theory of regime survival and endogenous institutional change in the face of non-tax revenue booms (natural resource rents and foreign aid). Whereas their emphasis is on the efforts of ruling elites to stay in power in light of existing institutions, revenue constraints, and popular pressures, I explicitly focus on the strategic choices of power-seeking incumbents to redistribute exogenous rents across differentiated sectoral interests and their overall economic ramifications.

⁶ For an electoral model of rentier economies see for example Wantchekon (1999); for a dynamic model of regime durability during crisis and development trajectories see Smith (2006).

What this paper seeks to accomplish is to theorize why different political regimes react in diverse ways to the exogenous shocks of resource booms and thus to explain the variation in economic policy and growth rates across such economies.

The first section of this paper puts forward an extension of Sachs and Warner's overlapping-generations endogenous growth model (1995) incorporating a rational government as the principal claimant and distributor of the exogenous windfall rents. I use this model to formalize many of the political economy arguments that have been postulated so far and to derive parsimonious and testable hypotheses on the relationship between regime type, windfall distribution, and economic management, as well as overall economic performance. In the respective subsections, I describe the economy, derive its general equilibrium, and perform some comparative statics and dynamic analysis. The penultimate section subsequently presents two particular case studies that illustrate the main results of the theoretical analysis. The final section discusses questions of empirical specification highlighting certain empirical puzzles in this area of research and proposes some extensions to the model.

2. The Model

I present an extended version of Sachs and Warner's (1995) dynamic Dutch disease endogenous growth model by incorporating the government as a pro-active objective-maximizing participant in the market. State intervention in the economy emerges as the common denominator of all political economy models of the 'resource curse'. In their initial formulation of the model the authors black-box the government as a neutral distributor of natural resource export rents to young consumers in the form of lump-sum transfers. Stripped of any own incentives or goals, the government's role in the extraction, management, and allocation of rents is essentially neutralized, thus rendering this original model purely economic and irrelevant for any sort of comparative political economy analysis of the 'resource curse'.

Yet the basic framework of this model is more than conducive for a rigorous analysis of such phenomena. For one it makes use of the standard Dutch disease sectoral trichotomy: it distinguishes between a Tradeable Booming Sector (producing primary natural resource commodities), a Tradeable Non-Booming Sector (producing manufacturing exportable goods), and a Non-Tradeable Sector (basically comprising services, welfare, and infrastructure).⁷ Although this kind of sectoral analysis has been mostly shunned by

⁷ It is unclear under which sector agriculture falls within this framework. On one hand, agriculture deals with raw commodities, but also makes ample use of capital equipment and mobile labor. On the other hand, it does not generally possess the 'learning-by-doing' properties of the manufacturing sector. For a better framework of a two-sector economy (manufacturing and agriculture) with external learning-by-doing properties see Matsuyama (1992).

political scientists, I intend to demonstrate its relevance and usefulness in capturing some of the main political explanations for the ‘resource curse’ within a parsimonious political economy framework and thus to help dwindle the gap between the well-established Dutch disease literature and the burgeoning literature on the effects of resource abundance (as a source of non-tax revenues) on democratic transition and regime durability.⁸ A second reason for extending this model to a political economy analysis is that it captures the basic rationale behind the economic repercussions of resource abundance by incorporating a learning-by-doing mechanism within the manufacturing sector (following the tradition of endogenous growth theory); in the absence of such an assumption the sectoral relocation caused by a resource boom via real exchange rate appreciation and real income growth would just reflect a shift in a country’s comparative advantage and hence would not imply any detrimental effects on its long-term growth rates. Technological externalities run to the core of the ‘resource curse’ literature. On a third note, the overlapping-generations framework is extremely useful for a dynamic analysis of the demand⁹ and supply sides of an economy not least because of its tractability and simplicity. It also helps distinguish between consumers’ finite life-long horizon and the government’s infinite horizon and illustrate how the interaction of these distinct decision structures affects the macropolitical and macroeconomic environment.

I will proceed by describing the supply side, the government, and the private demand side. Following a simple parametric description of the economy, I will derive the dynamic equilibrium of the model.

2.1. Supply Side

The supply side of this economy is characterized by the sectoral trichotomy alluded to above. I will describe each sector separately, explain the ‘learning-by-doing’ property, and then derive the factor price equilibrium.

The **primary natural resource sector** consists of the extraction, refinement, and transportation of natural resources, such as oil and minerals. Let us assume that this sector yields a constant flow of natural resource production every period, which in turn increases real income. These primary commodities are exported to world markets at exogenously given prices p^r pumping a constant flow of rents R

⁸ While Ross (2001) and Ulfelder (2007) argue in favor of the propitious effects of natural resource wealth on the survival of autocracies, Smith (2004) and Morrison (2009) show that this stabilizing property of oil as a non-tax revenue applies to all political regimes across the board.

⁹ Unlike the representative agent model the overlapping-generations model encompasses intergenerational trade in equilibrium (the young trade with the old).

into the economy.¹⁰ The country is assumed to be a price-taker in world markets and a negligible consumer of domestically produced primary commodities.¹¹ The conversion of these subsoil commodities into goods and services normally consumed in the economy depends exclusively on trade, which in turn is the deeper cause of the ensuing structural change. In this model, the entirety of resource rents accrues to the government's coffers, which is a plausible assumption in light of the wave of nationalizations of oil and mineral firms across the developing world and elsewhere. Alternatively, government revenues may consist of export taxes and royalties on the resource rents extracted by private domestic or multinational firms. Overall, by convention R refers to the amount of resource rents accruing to the state.

Another critical assumption regarding the primary sector in this economy is that it functions as an 'enclave'. Resource extraction and refinement makes no use of any mobile factors of the economy, such as unskilled labor, but is highly capital- and skilled labor intensive. Capital equipment used in this sector is considered very immobile and specialized, while the human capital employed within the industry consists of scientists and experts whose skills have zero alternative value. Hence, the resource sector is isolated from any structural shifts in the economy brought about by exogenous factors.¹² This 'enclave' assumption is a direct corollary of the 'low linkages' hypothesis put forward by various economists as an explanation for the failure of resource booms to stimulate growth in the economy. Low 'forward' and 'backward' linkages¹³ of the booming sector with the rest of the economy signify that only the very few owners of factors of production employed in the sector may directly benefit from the resource boom. Such an enclave¹⁴ is particularly vulnerable to export revenue fluctuations given world price volatility and hence gives rise to fluctuating government revenues (Mikesell, 1997). The above generic description of the primary sector encompasses many types of resource commodities on the grounds that (1) resources tend to generate rents mostly captured by states and (2) resource extraction employs relatively little labor. Other primary commodities, however, such as agricultural goods, are assumed not to be covered by the definition.

¹⁰ R represents the total flow of resource rents per effective unit of labor, i.e., $R = \frac{R_{aggregate}}{H_t}$. As is going

to be explained below, H represents the stock of knowledge at any given time. The total labor force, which only consists of the younger generation at every period, is normalized to unity.

¹¹ An equivalent assumption is that these valuable new resources are of limited value as an intermediate good for domestic production.

¹² From an empirical standpoint, booming tradeable primary sectors are heavily capital intensive and rely on imported inputs and human expertise as well as a small workforce. When a boom occurs, local scarcities in highly specialized factors may be offset by drawing in foreign ones.

¹³ For a seminal exposition of this argument see Hirschman (1958) and Baldwin (1966).

¹⁴ The 'enclave' assumption may also be corroborated by the fact that in some cases domestically extracted rents are repatriated by foreign multinationals subject to low corporate taxation and highly favorable regulation by corrupted government officials.

The **tradeable manufacturing (m)** sector is a highly competitive one vying for scarce resources from the rest of the economy. Free entry entails a highly fragmented industry of numerous small firms producing one homogeneous manufacturing commodity traded in both domestic and international markets. The production technique is assumed to be capital-intensive. High levels of fragmentation and high costs of political collective action divest this sector of any industry-level political clout. Hence, the source of the curse in this case lies in the fact that the leading growth-enhancing sector in this economy is politically weak, even more so under authoritarian regimes. On the other hand, the **non-traded (n)** sector, which for reasons of simplicity is assumed to produce one homogeneous labor-intensive good, consists of state-fed or state-affiliated firms engaged in the production of politically sensitive goods, such as social welfare services (education, healthcare) and infrastructure. Despite economic fragmentation, the sector is assumed to be well-organized at the industry level and closely tied to the state mechanism (less so in democracies). Entrepreneurs in this sector are politically powerful and as such constitute a potential source of disruption for the government. The non-traded sector is to a certain extent pampered by significant levels of government consumption; construction projects and welfare services are of enormous political/ electoral value and hence form a big part of the government's in-kind distribution package.¹⁵ Yet, oversized state involvement, corruption, and large patronage networks, as well as insulation from international competition sap the competitiveness of the sector and its growth-enhancing potential. Despite the assumption of international capital mobility and zero profits, investment in the non-traded sector may be thought as less productive than in the manufacturing sector.

Both the manufacturing (m) and the non-traded (n) sectors are perfectly integrated with each other, meaning that they both employ the same mobile factors of production and hence factor price equalization occurs. It also means that in the face of binding resource constraints they can only expand at each other's expense. Their production functions are given by the following expressions:

$$X^m = J(L^m, K^m) = J(\theta H, K^m) \quad (1)$$

$$X^n = F(L^n, K^n) = F[(1-\theta)H, K^n] \quad (2)$$

Let H denote the stock of human knowledge, which applies uniformly to all sectors, and θ the share of labor employed in the manufacturing sector. After normalizing the total labor force to unity, then it turns out that $0 \leq \theta \leq 1$. Hence, the product of the labor share and the stock of knowledge in every period denotes the amount of effective labor employed in each sector.

¹⁵ This type of government consumption may also be construed as an attempt to buy off political support through under-the-counter distributional gifts. Essentially this is an application of electoral/political business cycle theory to both democracies and autocracies. The main difference is that democratic governments are vying for the support of the median voter, while authoritarian regimes stay in power by buying off the complicity of powerful opposition groups and cadres of the ruling elite.

Endogenous growth in this model stems from accumulation of knowledge generated by employment in the tradeable manufacturing sector. This external learning-by-doing property of the manufacturing sector propels economic growth through increased labor 'effectiveness' across all sectors by extending the frontier of knowledge. This crucial assumption is captured by the following equation:

$$\frac{H_t}{H_{t-1}} = 1 + \theta_{t-1} \quad (3)$$

Assuming homogeneity of degree one, the production functions may be written in their intensive form, i.e.,

$$x^m = j(k^m), \quad k^m = \frac{K^m}{\theta H} \quad (4)$$

$$x^n = f(k^n), \quad k^n = \frac{K^n}{(1-\theta)H} \quad (5)$$

Let the price of the exportable manufacturing commodity be the numeraire and p^n the relative price of the non-traded commodity. Assuming international capital mobility, the domestic capital market equilibrium equates the value marginal product of capital per effective labor to the world interest rate in both sectors, i.e.,

$$j'(k^m) = \bar{r} \quad (6)$$

$$p^n f'(k^n) = \bar{r} \quad (7)$$

Given free entry and competition, the wage rate and goods prices are determined by the following zero-profit conditions, where the b 's denote factor requirements for one unit of each good:

$$p^n = b_L^n(w, \bar{r})w + b_K^n(w, \bar{r})\bar{r} \quad (8)$$

$$1 = b_L^m(w, \bar{r})w + b_K^m(w, \bar{r})\bar{r}^{16} \quad (9)$$

The above two equations simultaneously determine the wage rate and relative price of the non-trade good in every period and for given values of the world interest rate. Equations (6) and (7) then determine the equilibrium capital-labor ratios in each sector.

¹⁶ From the envelope theorem, unit factor requirements are equal to the partial derivative of the unit cost function with respect to factor prices, i.e.,

$$\frac{\partial c^i}{\partial w} = b_L^i(w, r) \quad \text{and} \quad \frac{\partial c^i}{\partial r} = b_K^i(w, r)$$

2.2. Government

This model takes a static view of the state by assuming away its institutional history or the possibility of regime change. The elected government or the authoritarian regime at hand acts as a unitary, objective-maximizing actor. Its function as a distributor of exogenous resource windfalls bestows upon it a significant role in the economy and enables it to either alleviate or exacerbate the economic phenomenon of the 'resource curse'. Its ultimate efficacy in managing the economy and promoting sustainable development strategies is essentially determined by the political objective function embedded within the type of regime. This type of function contains a large set of information about the institutional framework of a country's political economy, namely the strength of the rule of law, the level of democratic accountability and bureaucratic autonomy, the level of policy transparency and openness, and the degree of government centralization.

By setting up a government sector in this endogenous growth model, one can illustrate variegated views of the state proposed by political scientists as explanations for successful or unsuccessful cases of resource management and allocation. Despite the lack of descriptive complexity, this model may be enriched by numerous theories of regime durability: from Western-style liberal democracies - whose well-developed taxation system and institutionalized channels for interest representation have solidified a tight nexus between state and society -, to the fragile populist democracies of Latin America, to transitioning ex-Soviet democracies - whose archaic institutional infrastructure, entrenched bureaucratic elites, and limited extractive capacities threaten to derail the ongoing process of democratization -,¹⁷ all the way to sub-Saharan and Gulf state autocracies.

Let us assume away the state's extractive capabilities and suppose that its sole distributional resources consist of windfall revenues R collected each period from the country's primary sector. Economic management entails the decision of allocating R across three uses: either as direct lump-sum transfers to consumers (R_t^c), or as income for its own consumption of politically valuable goods (R_t^p), or as additional reserves to a country's national resource fund or endowment ($R_t^f - R_{t-1}^f \frac{1+r}{1+\theta_{t-1}}$). All these terms are denominated in units of effective labor.

The government allocates R_t^p from its windfall revenues every period in order to maximize its own temporal political objective function, which is a typical log-linear Cobb-Douglas function:

¹⁷ For the role of natural resource abundance in the democratic transition of the Central Asian Republics see Auty (1997a, 1997b).

$$\text{Max}_{g_t^m, g_t^n} G_t = \ln g_t^m + \gamma \ln g_t^n \quad (10)$$

$$\text{s.t. } g_t^m + p_t^n g_t^n \leq R_t^p \quad (11)$$

Setting up the Lagrangian of this optimization problem and solving for the first-order conditions yields the following:

$$\begin{aligned} L &= \ln g_t^m + \gamma \ln g_t^n + q(R_t^p - g_t^m - p_t^n g_t^n) \\ \text{F.O.C.: } \left. \begin{aligned} \frac{\partial L}{\partial g_t^m} &= \frac{1}{g_t^{m*}} - q = 0 \\ \frac{\partial L}{\partial g_t^n} &= \frac{\gamma}{g_t^{n*}} - p_t^n q = 0 \\ \frac{\partial L}{\partial q} &= R_t^p - g_t^{m*} - p_t^n g_t^{n*} = 0 \end{aligned} \right\} \Rightarrow \left. \begin{aligned} g_t^{m*} &= \frac{R_t^p}{1+\gamma} \\ g_t^{n*} &= \frac{\gamma}{1+\gamma} \frac{R_t^p}{p_t^n} \end{aligned} \right\} \\ \Rightarrow \tilde{G}_t(R_t^p) &= \ln\left(\frac{R_t^p}{1+\gamma}\right) + \gamma \ln\left(\frac{\gamma}{1+\gamma} \frac{R_t^p}{p_t^n}\right) \end{aligned} \quad (12)$$

Based on the above indirect political objective function, optimization of the political support function of the regime shown below will determine the government's allocational decision:

$$\text{Max}_{R_t^c, R_t^p} S = \sum_t (1+\rho)^{-t} \tilde{G}_t(R_t^p) + \alpha V(R_t^c), \quad \alpha > 0^{18} \quad (13)$$

$$\text{s.t. } R_t^F = R_{t-1}^F \frac{1+r}{1+\theta_{t-1}} + dR - R_t^c - R_t^p, \quad 0 \leq d \leq 1 \quad (14)$$

¹⁸ Equivalently, the government's support function could have been written as $\tilde{S} = a_1 \sum_t (1+\rho)^{-t} \tilde{G}_t(R_t^p) + a_2 [V(R_t^c) - \sum_t (1+\rho)^{-t} \tilde{G}_t(R_t^p)]$, where α_1 is the weight attached to indirect government utility from the consumption of non-traded goods for political purposes and α_2 is the weight attached to the net welfare of the representative young worker. According to a technique used by Grossman and Helpman (1994, p. 838), maximizing \tilde{G} is equivalent to maximizing G in (10) with $\alpha = \frac{\alpha_2}{\alpha_1 - \alpha_2}$. Assuming $\alpha_1 > \alpha_2$, which is plausible given that the government values a dollar of direct consumption more than a dollar of private consumption, then α can take any positive value

The government chooses the amount of lump-sum transfers (R_t^c) and the amount of revenue for direct political consumption (R_t^p) allocated from its discretionary pool of resource rents, in order to maximize the above linearly specified political support function. Equation (13) is a weighted sum of consumer's indirect utility and the government's intertemporal utility derived from a stream of present and future consumption levels. In other words, this function entails a mix of contemporaneous and intertemporal decisions for the government, whereby there is a trade-off between the instantaneous maximization of the current representative consumer's indirect utility and the intertemporal maximization of the government's own utility derived from a stream of current and future consumption. This uncanny blend of short-term and long-term horizons reflects the common maxim that people have finite lives while governments live forever. The crucial assumption behind this model is that an office-seeking incumbent government - whether elected or not - will seek to maximize its political support by whatever means possible in order to remain in power.

The actual form of the political support function (equation 13), i.e., the respective weights of its arguments, is determined by the institutional framework of the political environment. Let us examine each of the two arguments of the function separately. The first argument denotes the intertemporal government demand for non-resource goods, which is assumed to be inherently wasteful for consumer utility failing to generate any trickle-down effects. Such an assumption bodes down well with the standard 'political resource curse' argument that autocratic governments endowed with windfall gains tend to engage in unproductive investment booms (especially in the non-tradable sector), by channeling funds into extravagant infrastructure beyond the country's absorptive capacity or welfare projects with low rates of return and irrecoverable long-term costs (see Sarraf and Jiwanji, 2001).¹⁹ A corollary to that argument is the *irreversibility of government expenditures* once the boom subsides, which leads to soaring debts and fiscal collapse. This line of reasoning falls under what political scientists have dubbed the *Rentier State Hypothesis*, which has been widely applied to the resource-rich petro-states²⁰ of the Middle East, Sub-Saharan Africa, and Latin America. A rentier state is one whose lack of efficient extractive mechanisms, namely an efficient tax bureaucracy, is compensated for by an abundance of external rents (such as natural resource rents, royalties and export taxes, foreign aid, transit fees, and foreign remittances).²¹ It thus takes upon itself a primarily distributive rather than growth-enhancing role aiming at defusing any pressures for democratic accountability and representation. The standard conclusion to be derived is that "oil wealth makes states less democratic and causes governments to do a poorer job at promoting economic development." (Ross, 2001, p. 330)

¹⁹ A similar argument has been made with regard to the private sector in Southeast-Asian economies engaging in so-called *crony-capitalism*.

²⁰ For a societal, cognitive, and political analysis of the petro-state see Karl (1997).

²¹ Mahdavy, who is credited with introducing this term, refers to the rentier state as a state that receives substantial rents from "foreign individuals, concerns, or governments." (Mahdavy, 1970, p. 428) Beblawi refined this definition by noting that "only a few are engaged in the generation of this rent (wealth), the majority being only involved in the distribution or utilization of it." (Beblawi, 1987, p. 51)

The rationale for including the first argument to the political support function is also corroborated by rent-seeking theories of the ‘spending effect’ and the ‘feeding frenzy’. The concentration of wealth in the hands of a centralized state invites ardent rent-seeking behavior from powerful lobbies and opposition groups (Lane and Tornell, 1995). Lane and Tornell (1996) also show that a one-sector economy with competing powerful factions vying for access to the common aggregate capital stock may well be plagued by the so-called ‘voracity effect’ effect, defined “as a more than proportional increase in aggregate redistribution in response to an increase in the raw rate of return.”²² (Lane and Tornell, 1996, pp. 226-227) The inherently wasteful and unproductive public consumption of non-resource goods may hence be construed as the full dissipation of resource rents brought about by the government’s efforts to sustain a full-fledged patronage network, to co-opt political allies, to repress popular mobilization, or to tie the interests of powerful constituencies with the continuity of the regime (Smith, 2006). It is what Wantchekon calls “the politicization of revenue allocation.” (Wantchekon, 1999, p. 18)

The indirect utility function of consumers enters with a political weight α , which is contingent upon the degree of democratic accountability of the government. Electoral competition within a democratic framework entails pandering to the needs and wants of the median voter, which in this case is the representative young worker.²³ The closer the links of accountability between state and society and the higher the degree of transparency in the political system, the higher is the weight assigned by the incumbent upon popular political support in order to remain in power.²⁴ The electoral system is also an institutional parameter that affects the political weight α by dint of the incentives it generates for candidates to create inequalities among otherwise homogeneous voters (see for example Myerson, 1993). On the other hand, autocracies are normally associated with fiscal reliance on non-tax revenues, weaker state institutions, looser societal links, and a porous rule of law, thus obviating the need for widespread public support. It is hence assumed that the backing of powerful social groups, a powerful and penetrating repression mechanism, and an undeveloped civil society are enough to guarantee regime survival.²⁵ Overall, democracies will tend to have higher α ’s, while authoritarian regimes will tend to have lower α ’s.

22 The authors note that the necessary conditions for this result is that (1) there exist multiple powerful

groups that act non-cooperatively and (2) $\sigma > \frac{n}{n-1}$, where σ is the elasticity of substitution and n is the number of powerful groups.

23 The intertemporal nature of this optimization problem implies that the government has already garnered maximum political support from the old generation of retired worker by offering them an optimal amount of R_{t-1}^c .

24 Take the example of the Alaska Permanent Fund, where a large part of the fund income is spent on the payment of direct dividends to qualified Alaskans. This is one of the rare real-life cases of direct lump-sum transfers of resource revenues implying a high degree of democratic accountability. In fact, some feel that α is too high and that fiscal policy should include the use of a portion of Fund income to support state services and programs (see Alaskan Permanent Fund website www.apfc.org).

25 This model does not account for regime failure or social revolution. It must be noted though that the first two conditions outlined in the text were not enough to save the Persian Shah’s absolutist rentier state from collapse.

One must also note that this model does not account for any sort of electoral competition. The incumbent government seeks to maximize its political support in the knowledge that it is enough to keep it in office. In this ‘resource curse’ model, an ‘iron’ version of the incumbency advantage is embedded within the political system.²⁶

Equation (14) represents the government’s temporal budget constraint expressed in units of effective young workers. Since human capital accumulation implies that the number of effective young workers is increasing over time, variables expressed in units of effective old workers are subject to some sort of depreciation and must, therefore, be converted into effective units of young workers. Hence the amount of rents available in last period’s resource fund, i.e., R_{t-1}^F , is converted to $\frac{H_{t-1}}{H_t} R_{t-1}^F = \frac{R_{t-1}^F}{1+\theta_{t-1}}$.

The budget constraint is obviously binding at the optimum. Parameter d denotes the fraction of discretionary rents available to the government every period. The level of discretion is generally determined by the parameters of the political system, namely the degree of government centralization, the rule of law, and the level of transparency in economic management. For reasons of simplicity, it may be assumed that the remaining amount $(1-d)R$ accrues to other institutional actors, such as regional governments or multinational corporations²⁷ active in the primary resource sector. Such rents remain in the economy as private rents generated by the primary sector. A corollary argument can be made that parameter d is strongly correlated with regime type: a democratic regime will tend to uphold the rule of law and property rights in light of its institutional constraints. On the other hand, an authoritarian regime will seek to maximize discretion over resource rents and exploit its informational advantage with respect to their scale and scarcity in order to buy off political support and guarantee its survival and stability. In other words, high values of d will be associated with lower values of α .

2.3. Private Demand Side

In this overlapping-generations model, consumers work when they are young and they retire when they are old. They earn a wage at time t and may save part of it at the world interest rate (r) in order to smooth out life-long consumption. Let R_t^c be the optimal value of lump-sum rent transfers from the government to consumers.

²⁶ Such a strong version of incumbency advantage in resource dependent countries is presented in Wantchekon’s (1999) model of Myerson-style electoral competition in a resource rich country. In his model, the incumbent party has discretionary power over rent distribution and an informational advantage over rent availability, thus allowing it to invest in pre-electoral consumption expenditures and win the election with certainty.

²⁷ As noted before the strength of the rule of law and the protection of property rights affects the amount of non-discretionary rents that accrue to the private sector.

Assuming a constant world interest rate, let us examine the consumers' intertemporal consumption decision:

$$\text{Max } U = [\ln(c_t^m) + \beta \ln(c_t^n)] + \delta [\ln(c_{t+1}^m) + \beta \ln(c_{t+1}^n)] \quad (15)$$

$$\text{s.t. } c_t^m + p_t^n c_t^n + \frac{1}{1+r} (c_{t+1}^m + p_{t+1}^n c_{t+1}^n) = w_t + R_t^c \quad (16)$$

This simple constraint maximization problem produces the following demand functions for each generation, where δ represents the consumers' subjective discount rate:

$$\frac{C_t^m}{H_t} = c_t^m = \frac{1}{(1+\beta)(1+\delta)} (w_t + R_t^c) \quad (17)$$

$$\frac{C_t^n}{H_t} = c_t^n = \frac{1}{p_t^n} \frac{\beta}{(1+\beta)(1+\delta)} (w_t + R_t^c) \quad (18)$$

$$\frac{C_{t+1}^m}{H_t} = c_{t+1}^m = \frac{\delta(1+r)}{(1+\beta)(1+\delta)} (w_t + R_t^c) \quad (19)$$

$$\frac{C_{t+1}^n}{H_t} = c_{t+1}^n = \frac{1}{p_{t+1}^n} \frac{\beta\delta(1+r)}{(1+\beta)(1+\delta)} (w_t + R_t^c) \quad (20)$$

The indirect utility function can be derived by substituting the optimal demand functions back to the utility function:

$$\begin{aligned} V(p_t^n, p_{t+1}^n, R_t^c) = & \left\{ \ln \left[\frac{1}{(1+\beta)(1+\delta)} (w_t + R_t^c) \right] + \beta \ln \left[\frac{1}{p_t^n} \frac{\beta}{(1+\beta)(1+\delta)} (w_t + R_t^c) \right] \right\} \\ & + \delta \left\{ \ln \left[\frac{\delta(1+r)}{(1+\beta)(1+\delta)} (w_t + R_t^c) \right] + \beta \left[\frac{1}{p_{t+1}^n} \frac{\beta\delta(1+r)}{(1+\beta)(1+\delta)} (w_t + R_t^c) \right] \right\} \quad (21) \end{aligned}$$

Then summing total demand for the non-traded good across old and young workers at period t and expressing it in effective units of young workers yields the following equation:

$$\begin{aligned} c_t^n &= c_{t,young}^n + \frac{H_{t-1}}{H_t} c_{t,old}^n = c_{t,young}^n + \frac{c_{t,old}^n}{1+\theta_{t-1}} = \\ &= \frac{1}{p_t^n} \frac{\beta}{(1+\beta)(1+\delta)} (w_t + R_t^c) + \frac{1}{p_t^n} \frac{\delta\beta(1+r)}{(1+\beta)(1+\delta)} \left(\frac{w_{t-1} + R_{t-1}^c}{1+\theta_{t-1}} \right) = \\ &= \frac{1}{p_t^n} \frac{\beta}{(1+\beta)(1+\delta)} \left[w_t + R_t^c + \frac{\delta(1+r)}{1+\theta_{t-1}} (w_{t-1} + R_{t-1}^c) \right] \quad (22) \end{aligned}$$

2.4. Equilibrium

To find the equilibrium of this model, one needs to solve for the government's optimization problem. First, derive the government's intertemporal budget constraint from equation (14). Given that concavity and well-behaved functions guarantee binding constraints, calculate the present discounted value of all temporal constraints and express them in terms of the initial young population (at time 0). Add them up to yield:

$$\sum_{t=0}^T \frac{(1+\theta_0)\dots(1+\theta_{t-1})}{(1+r)^t} (R_t^c + R_t^p) = R_{-1}^F \frac{1+r}{1+\theta_{-1}} + dR \sum_{t=0}^T \frac{(1+\theta_0)\dots(1+\theta_{t-1})}{(1+r)^t} - \frac{(1+\theta_0)\dots(1+\theta_{T-1})}{(1+r)^T} R_T^F \quad (23)$$

Let us assume that $\theta_{-1} = 0$, that the economy makes the resource discovery at time $t = 0$, i.e., $R_{-1}^F = 0$, and that the government finds it optimal to run down its fund's principal in the long run, i.e., $\frac{(1+\theta_0)\dots(1+\theta_{T-1})R_T^F}{(1+r)^T} \xrightarrow{T \rightarrow \infty} 0$.²⁸

Then the government's intertemporal budget constraint (23) becomes:

$$\sum_{t=0}^T \frac{(1+\theta_0)\dots(1+\theta_{t-1})}{(1+r)^t} (R_t^c + R_t^p) = dR \sum_{t=0}^T \frac{(1+\theta_0)\dots(1+\theta_{t-1})}{(1+r)^t} \quad (24)$$

Maximizing the political support function (13) subject to the intertemporal budget constraint (24) yields the following Lagrangian:

$$\mathcal{L} = \sum_{t=0}^T (1+\rho)^{-t} \tilde{G}_t(R_t^p) + \alpha V(R_t^c) + \lambda \left\{ dR \sum_{t=0}^T \frac{(1+\theta_0)\dots(1+\theta_{t-1})}{(1+r)^t} - \sum_{t=0}^T \frac{(1+\theta_0)\dots(1+\theta_{t-1})}{(1+r)^t} (R_t^c + R_t^p) \right\} \quad (25)$$

First-order conditions:

$$\frac{\partial \mathcal{L}}{\partial R_t^c} = \alpha V'(R_t^c) - \lambda \frac{(1+\theta_0)\dots(1+\theta_{t-1})}{(1+r)^t} = \alpha \frac{(\beta+1)(\delta+1)}{w_t + R_t^c} - \lambda \frac{(1+\theta_0)\dots(1+\theta_{t-1})}{(1+r)^t} = 0 \quad (26)$$

²⁸ This condition has been termed the No-Ponzi-Game condition from the famous letter fraud. It also implies that the government cannot go upon a divergent debt path because the international financial markets will cotton on and force the government to comply. This is exactly what happened with Mexico in the early 90s: sudden resource windfalls generated excessive and irrational government optimism over the level of future rents and thus caused excessive government spending that could not be cut back. The Mexican government optimized as if the NPG condition did not apply. Eventually, financial markets realized that Mexico could not service its debt, thus instigating a debt crisis and a significant devaluation of the Mexican peso.

$$\frac{\partial L}{\partial R_t^p} = \frac{\tilde{G}'(R_t^p)}{(1+\rho)^t} - \lambda \frac{(1+\theta_0)\dots(1+\theta_{t-1})}{(1+r)^t} = \frac{1+\gamma}{R_t^p(1+\rho)^t} - \lambda \frac{(1+\theta_0)\dots(1+\theta_{t-1})}{(1+r)^t} = 0 \quad (27)$$

From (26) and (27):

$$R_t^p = \frac{\gamma+1}{\alpha(1+\beta)(1+\delta)(1+\rho)^t} (w_t + R_t^c) \quad (28)$$

Hence, government demand of the non-traded good is:

$$g_t^n = \frac{\gamma}{1+\gamma} \frac{R_t^p}{p_t^n} = \frac{1}{p_t^n} \frac{\gamma}{\alpha(1+\beta)(1+\delta)(1+\rho)^t} (w_t + R_t^c)^{30} \quad (29)$$

Finally, to solve for the general equilibrium of this model, supply expressed in terms of total effective young workers in the population must equal total demand in the non-traded sector:

$$\begin{aligned} c_t^n + g_t^n &= f(k^n)(1-\theta_t) \\ \Leftrightarrow \frac{1}{p_t^n} \frac{\beta}{(1+\beta)(1+\delta)} [w_t + R_t^c + \frac{\delta(1+r)}{1+\theta_{t-1}} (w_{t-1} + R_{t-1}^c)] + \frac{1}{p_t^n} \frac{\gamma}{\alpha(1+\beta)(1+\delta)(1+\rho)^t} (w_t + R_t^c) &= f(k^n)(1-\theta_t) \\ \Leftrightarrow \frac{1}{p_t^n} \frac{\beta}{(1+\beta)(1+\delta)} [(\frac{\gamma}{\alpha\beta(1+\rho)^t} + 1)(w_t + R_t^c) + \frac{\delta(1+r)}{1+\theta_{t-1}} (w_{t-1} + R_{t-1}^c)] - f(k^n) + \theta_t f(k^n) &= 0 \end{aligned} \quad (30)$$

For reasons of parsimony, the latter expression³¹ can be implicitly written as

$$\phi(R_t^c, R_{t-1}^c, \theta_t, \theta_{t-1}) = 0 \quad (31)$$

The implicit function ϕ describes the dynamic growth path of a resource-rich

²⁹ One can derive the Euler equation for R_t^p by dividing $\frac{\partial L}{\partial R_t^p} = 0$ and $\frac{\partial L}{\partial R_{t+1}^p} = 0$ by parts: $\frac{R_{t+1}^p}{R_t^p} = \frac{(1+\theta_t)(1+r)}{1+\rho}$. This is a first-order linear equation that describes the evolution of R_t^p ex-

pressed in effective units of young labor in period 0 over time for given values of R_0^p and θ_t .

³⁰ A significant observation is that the higher α is, i.e., the more democratic a regime is, the lower is government consumption of the non-traded good at every point in time.

³¹ Notice that the latter expression is the same as the one presented in Sachs and Warner (1995) when $\alpha \rightarrow \infty$. In that case, a regime is considered perfectly democratic and thus allocates the entire amount of discretionary windfalls every period to consumers.

³² Notice that, since $0 \leq \theta \leq 1$, the ϕ function is bounded from above and below.

economy. From this first-order non-linear equation we can implicitly define the steady state value of θ when $R_t^c = R_{t-1}^c = 0$, i.e., $\phi(0, 0, \theta_{ss}, \theta_{ss}) = 0$, and check from the implicit-function rule whether it is locally stable, i.e., whether $0 < \frac{d\theta_t}{d\theta_{t-1}} < 1$

$$\frac{d\theta_t}{d\theta_{t-1}} = \frac{\frac{1}{p_t^n} \frac{\beta\delta(1+r)}{(1+\beta)(1+\delta)} \frac{1}{(1+\theta_{ss})^2} (w_t)}{f(k^n)} \quad (32)$$

Hence the contemporaneous labor share in the manufacturing sector will converge to its stable steady state in a step-like fashion. Similarly according to equation (3), the steady state stock of knowledge H will also grow at the same rate, i.e., $\frac{\dot{H}_{ss}}{H_{ss}} = \theta_{ss}$.

Moreover, since the production functions are homogeneous of degree one, then the stock of capital will also grow continuously at the same steady state growth rate. Hence, since both the manufacturing sector and the non-traded sector will grow at the same rate, the steady-state economy-wide growth rate will be the following:

$$\left(\frac{\dot{GDP}}{GDP} \right)_{ss} = \underbrace{\frac{R}{GDP}}_{\substack{\text{Primary} \\ \text{Income} \\ \text{Share}}} \times \underbrace{\frac{\dot{R}}{R}}_{=0} + \left(\frac{\underbrace{wH\theta_{ss} + rK^m}_{\substack{\text{Manufacturing} \\ \text{Income} \\ \text{Share}}} + \underbrace{wH(1-\theta_{ss}) + rK^n}_{\substack{\text{Non-traded} \\ \text{Income} \\ \text{Share}}}}{GDP} \right) \times \theta_{ss} = s\theta_{ss} \quad (33)$$

The above expression shows the economy-wide growth rate as a sum of the respective sectoral growth rates weighted by sectoral income shares. The end result is that the economy grows at a rate θ_{ss} times the total income share of the non-resource sectors. This conclusion highlights the significance of the learning-by-doing property of this model, since the growth rate of this economy is essentially driven by the labor share employed in the manufacturing sector.

³³ To prove local stability, Sachs and Warner (1995) suggest multiplying both the numerator and denominator by $H(1-\theta)$. Then from equation (5) the denominator denotes total non-traded production, while the numerator becomes total consumption by old workers times $(1-\theta)/(1+\theta)$, which is clearly less than one. Hence, the whole derivative is more than 0 and less than 1 because total non-traded consumption by the old must be less than total non-traded production.

2.5. Comparative Statics

Now let us return to our original question, namely how the type of regime affects the allocation of rents and hence the long-run growth rate of the non-resource economy. This is an exercise in comparative statics examining the cross-country effect of the institutional variable α on θ_{ss} . Notice that the assumption of regime continuity makes this a comparison across countries. Using the Implicit Function Theorem, the derivative of the implicitly defined θ_{ss} with respect to d is the following:

$$\frac{d\theta_{ss}}{d\alpha} = -\frac{\frac{\partial\phi}{\partial\alpha}}{\frac{\partial\phi}{\partial\theta_{ss}}} = \frac{\frac{1}{p_t^n} \frac{(w_t + R_t^c)\gamma}{(1+\beta)(1+\delta)(1+\rho)^t} \frac{1}{\alpha^2}}{f(k^n) - \frac{1}{p_t^n} \frac{\beta\delta(1+r)(w_{t-1} + R_{t-1}^c)}{(1+\beta)(1+\delta)} \frac{1}{(1+\theta_{ss})^2}} > 0 \quad (34)$$

The numerator of this fraction is clearly positive. Therefore, to prove that the derivative is positive it would suffice to show that the denominator is also positive. In a similar fashion, it turns out that

$$\frac{\frac{1}{p_t^n} \frac{\beta\delta(1+r)(w_{t-1} + R_{t-1}^c)}{(1+\beta)(1+\delta)} \frac{1}{(1+\theta_{ss})^2}}{f(k^n)} < 1 \Leftrightarrow f(k^n) - \frac{1}{p_t^n} \frac{\beta\delta(1+r)(w_{t-1} + R_{t-1}^c)}{(1+\beta)(1+\delta)} \frac{1}{(1+\theta_{ss})^2} > 0$$

In a (θ_t, θ_{t-1}) phase diagram the steady state equilibrium occurs at the intersection point between the ϕ function and the 45° degree line. We have proven local stability by showing that the non-linear difference equation crosses the 45° degree line from above. Moreover, as the previous comparative static analysis has demonstrated, an exogenous increase in the institutional parameter α will shift the ϕ line upwards and hence lead to a higher steady-state value of θ_{ss} . Hence, we have shown that democratic regimes (higher α 's) will tend to manage their resource endowment more effectively by achieving higher levels of economic diversification (i.e., by not 'crowding out' the manufacturing sector) and higher non-resource growth rates. Notice that if we assume that the government's subjective discount rate depends on its institutional underpinnings, i.e., $\rho = \rho(\alpha)$, the above growth effect of democracy may be further accentuated by a positive factor $^{-t} \frac{d\rho}{d\alpha} > 0$. This indirect effect on the non-resource growth

rate is strongly corroborated by a large piece of cognitive literature on the effects of resource abundance on policymaking mentality. Essentially resource wealth may cause myopic sloth among policymakers or even generate a "get-rich-quick" mentality (Ross, 1999, p.309). Arguably these cognitive effects are more pronounced among authoritarian regimes, which fall prey to a kind of 'boom-and-bust' psychology, whereby they feel they have to do 'too much too soon' and indulge in fiscal laxity in order to guarantee their short-term political survival. On the other hand, solid institutional constraints within democracies mitigate the effects and variations of such fiscal cycles and uphold the political significance of intergenerational considerations.

One can also postulate a negative relationship between α , the regime parameter, and γ , which is the non-traded preference coefficient in the government's Cobb-Douglas political objective function.³⁴ A higher γ means that government consumption is tilted more in favor of non-traded goods, such as welfare, infrastructure, or even coercive mechanisms. Based on the hypotheses proposed by political scientists, authoritarian regimes will engage in fiscal laxity and channel government expenditures towards rentierist and repressive objectives. On the other hand, democratic regimes will allocate fewer funds towards politicized expenditures and will channel a larger share of these funds towards the tradeable non-booming sector by dint of subsidies and other protectionist measures.³⁵ An implicit claim is that the manufacturing sector is politically more influential in democracies than in autocracies. This claim could be further elaborated by Shafer's (1994) argument that the characteristics of the leading sector will determine its clout vis-à-vis the state and influence its institutional capacity and political preferences (i.e., γ). Based on the above assertions, the type of regime may also affect the growth path of the economy in the following indirect manner:

$$\text{Chain rule: } \frac{d\theta_{ss}}{d\alpha} = \frac{d\theta_{ss}}{d\gamma} \times \underbrace{\gamma'(\alpha)}_{<0} > 0^{36} \quad (35)$$

2.6. Dynamic Analysis

So far the focus has been on growth rates rather than income levels. The Dutch disease literature has produced various models of the mechanisms through which resource abundance may lower an economy's growth rate, regardless of political economy considerations. This model has made explicit why resource-rich countries fail to diversify their economies and thus to achieve higher growth rates by introducing a rational, objective-maximizing government as a fiscal participant in the economy. Yet it has been assumed throughout that the primary sector yields a steady flow of rents to the state. An implication of this assumption is that undiversified economies may still enjoy relatively high per

³⁴ Note that $\frac{\gamma}{1+\gamma}$ denotes the non-traded share of resource rents R^P allocated for political purposes.

³⁵ However, support for such import-substituting policies may in turn undermine the competitiveness of the manufacturing sector. Admittedly it is hard to classify protectionist measures as government consumption of manufacturing goods for political purposes within the framework of this model. For the purposes of the analysis, however, it is enough to argue that a low γ means less state involvement in the non-traded sector.

³⁶ Note that $\frac{d\theta_{ss}}{d\gamma} < 0$ is also an implication of the Implicit Function Theorem, i.e., $\frac{d\theta_{ss}}{d\gamma} = -\frac{\frac{\partial \phi}{\partial \gamma}}{\frac{\partial \phi}{\partial \theta_{ss}}}$.

capita GDP levels despite economic stagnation in the non-resource sectors, which may help explain the persistence of authoritarianism in such countries. Such is the case of Saudi Arabia, an oil-based economy with strong government controls over major economic activities and a remarkable record of political stability.³⁷

In order to isolate the political economy effects suggested by our model, it would be more appropriate to examine the dynamic effects of a temporary resource boom on a resource-poor economy. Let us assume that at time 0 the primary sector in a country is non-existent, thus leaving little scope for fiscal and distributional government activity. A significant amount of oil is then discovered in period 1 and is immediately extracted by the state-owned oil company filling the government's coffers with oil revenue dR_1 .³⁸ Given rational expectations, the boom is considered temporary throughout the economy. Subsequently windfall gains fall back to zero. How does the type of regime affect how this temporary windfall revenue is managed?

Initially the resource-poor model economy is in a steady state. In period 1, θ_1 will be determined by $\phi(R_1^c, 0, \theta_1, \theta_{ss})$, in period 2, θ_2 will be determined by $\phi(0, R_1^c, \theta_2, \theta_1)$, and so on. Since the windfall rents of period 1 boost demand for the non-traded good, the non-traded sector attracts resources from the manufacturing sector and, therefore, lowers the non-resource growth rate. The positive direct and indirect effects on both private and government demand of the non-traded good work to depress θ below its steady state value, until the temporary rents are exhausted and total demand converges back to its original non-resource level. So θ falls abruptly below its steady state value and then converges back to its former steady state in a step-like manner.³⁹

Let us examine what happens to GDP levels. Take the gross level of resource rents, substitute for K^m and K^n , and rearrange the following GDP factor income composition expression. Then take the derivative of GDP at the time of the resource boom with respect to the level of rents extracted:

$$GDP = R + wH + r(K^m + K^n) = R + H \{w + r[k^n + \theta(k^m - k^n)]\} \quad (36)$$

$$\frac{\partial GDP}{\partial R_1} = 1 + H_1 r \underbrace{\frac{\partial \theta_1}{\partial R_1}}_{<0} \underbrace{(k^m - k^n)}_{>0} \quad (37)$$

³⁷ Of course alternative explanations have been put forward to account for that phenomenon. The durability of the Saudi regime may well be attributed to what Bellin terms the "robustness of authoritarianism", i.e., the ability and will of rulers to repress. She also makes the argument that superpowers have supported authoritarian regimes in Muslim-majority countries out of fear that oil reserves may fall into the hands of Islamist opposition groups. (Bellin, 2004)

³⁸ Note here that I disregard any Hotelling-type considerations about the optimal rate of extraction.

³⁹ The actual shape of the convergence path will be determined by the consumers' discount rate δ and the government's subjective discount rate γ .

⁴⁰ GDP per effective unit of young labor becomes $\frac{GDP_t}{H_t} = R_t + w_t + r[k^n + \theta_t(k^m - k^n)]$, where R is in effective units of young labor.

Since we have assumed that the boom initially depresses θ and that the manufacturing sector is capital intensive with respect to the non-traded sector, then the second half of the RHS of equation (37) will be negative. The final effect on GDP in period 1 is ambiguous, since the actual level of capital intensities in the two sectors will determine whether the partial derivative in equation (37) is positive or negative. Overall, a resource-boom in a resource-poor country may initially boost GDP levels but subsequently launch the economy on a lower growth path, so that eventually GDP may be less than what it would be without the resource boom.⁴¹

Now let us turn to the government's managerial and distributional decisions in the face of a sudden influx of rents into its budget (which is assumed to be devoid of any revenues in period 0). Its budget constraint now is binding insofar as the present discounted value of current and future rent allocations expressed in effective units of the young population at the time of discovery is equal to the discretionary amount of rents available to the government, i.e.,

$$\sum_{t=1}^T \frac{(1+\theta_1)\dots(1+\theta_{t-1})}{(1+r)^{t-1}} (R_t^c + R_t^p) = dR_1 \quad (38)$$

T is the discrete period when fund reserves are fully depleted. Here it is further assumed that $\theta_0 = 0$. Solving for the equilibrium in this case yields the same Euler equations and ϕ function as before.⁴² The main difference with Sachs and Warner's model is that temporary windfall gains accrue to a government with an infinite time horizon, while in the original model money accrues entirely to consumers with a two-period time span. Hence, the whole amount of the resource rent is spent within those two periods and then the economy converges back to its steady state. Here the effects of a resource windfall are prolonged because of the pro-active participation of a regime eager to maximize its political support in every period until the reserves are depleted and government economic activity becomes once again irrelevant.

⁴¹ This result may partially help explain why the resource-poor 'Asian tiger' economies managed to achieve higher levels of prosperity through export-oriented policies than similar countries in Latin America and the Middle East that experienced temporary resource booms. A diverse set of scholars put Latin American reluctance to discard import-substituting industrialization down to its greater resource wealth with regard to South Korea or Taiwan for example.

⁴² In this case, it would be useful to solve for λ in order to find the shadow price of relaxing the constraint, i.e., the proportional increase in political support of the regime in response to an exogenous increase in the one-off windfall in period 1.

In this kind of dynamic analysis, it turns out that the economy always converges back to its non-resource steady state. Going back to the initial assumptions, however, where an economy experiences a permanent resource boom of constant windfall rents R every period, it is conceivable that the structural shock to the economy is so devastating that it falls into a no-growth resource trap, i.e., $\theta_{ss} = 0$. This would occur in an excessively authoritarian state, where the government would crowd out the manufacturing sector through excessive demand of the non-traded good. The non-traded sector would grow at the expense of the tradeable sector until it has attracted the entire factor endowments of the economy. Once the manufacturing sector disappears from the economic landscape, it will not start producing again save for state-led industrialization policies. Yet, even if the non-resource economy fails to grow, the constant flow of resource revenues may compensate for that by helping to keep the regime in power through extensive distribution packages and patronage networks. This may well be a cogent account of the political economy of Saudi Arabia.

There are three distinct types of decisions that policymakers need to make: (1) a Ramsey-type savings intertemporal decision, which will essentially depend on the government's subjective discount rate and the world interest rate, (2) a contemporaneous allocational decision between private and government consumption with regard to discretionary resource rents not earmarked for the fund in every period, which will be essentially determined by the democratic credentials of the regime, i.e., α , and (3) an objective optimization decision on how to spend the amount of revenues earmarked for political purposes in every period, i.e., R_t^p , which will depend on γ .

Let us examine the following two polar economies and theorize how in each stylized case the political economy affects the actual growth path and adjustment period to the steady state, assuming that R_1 is the same across both economies. (a) High α , low ρ , low γ , low d : The government of this highly democratic country is very prudent, patient, and more attentive to the interests of the manufacturing sector. The state will manage the windfall rents in such a manner as to smooth out the adjustment process as much as possible and 'sterilize' this sudden rent inflow, in order to avert significant real exchange rate appreciation and thus to preserve the country's industrial base (essentially by having the temporary shock cause just a small jump from θ_{ss}).⁴³ The government will seek to initiate a transparent, 'rule-oriented' process of rent distribution. Institutionalization of a resource fund may arguably come about in order to mitigate any time-inconsistency or other electoral incentives. In light of increased democratic accountability, strong state-society relations, and supposedly a long tradition of a free-market economy, public pressure for immediate expenditures will be mild. Every period a small part of the fund will mainly finance lump-sum

⁴³ One of the most popular 'immunization' policies against the Dutch disease has been to accumulate international currency reserves in order to prevent the real exchange rate from appreciating and thus to encourage economic diversification.

income transfers to consumers.⁴⁴ A much smaller part of that money will finance ‘politicized expenditures’ heavily weighted towards protectionist measures in favor of the manufacturing sector. Hence, total demand for the non-traded good every period will be just slightly higher than initially, thus alleviating the adverse consequences of a sectoral shift. As an end result, the adjustment process of the economy will be much smoother. (b) Low α , high ρ , high γ , high d : an authoritarian government stakes its political survival on its heavy involvement in the economy through rentier-type expenditures. Once endowed with windfall resource rents, it will seek to immediately capitalize on them by investing in rentierist expenditures, such as welfare and infrastructure, as well as a more effective coercive apparatus, so as to quell social pressures for state-led development. Alternatively the government will fall prey to a so-called ‘feeding frenzy’ by rent-seeking social groups whose support will bolster the regime’s stronghold on power. Total demand for non-traded goods will skyrocket, the real exchange rate will appreciate strongly, and the manufacturing sector will shrink. The adjustment process will be painful but probably shorter than in the previous case, since resource fund reserves will be depleted at a very fast pace. The economy will experience a number of periods of very low growth before converging back to its former steady state. Moreover, the adverse effects of the resource boom will be much more pronounced than in the previous case because of the larger amount of discretionary rents available to the government.

The main difference between these two stylized polar cases is that intergenerational considerations are paramount in the first case. Since the adjustment process will surely last more than two periods, a democratic government with an embedded sense of continuity will seek to minimize the adverse growth effects during that process, thus allowing very small decreases in the future growth rates of effective wages.⁴⁵ One may also consider the possibility that future generations could be compensated for this injustice through income support policies financed by a resource fund. On the other hand, fragile state institutions and a weak rule of law will accentuate the need for immediate politicized expenditures in the latter case. In that respect, an authoritarian regime is more short-sighted, susceptible to rent-seeking behavior, and imprudent in the economic management of windfall resource gains even in the absence of democratic-type electoral cycles.

⁴⁴ Arguably this model could be extended to account for boom-and-bust cycles in the economy, thus rendering these income transfers part of a general fiscal stabilization and income support program.

⁴⁵ Notice that nominal wages per unit of physical labor do not change over time. However, the ever-expanding stock of knowledge enhances the amount of effective labor increasing at the same time the level of effective wages wH_t .

3. Mini Case Studies

3.1. Norway

The Norwegian case constitutes a paragon of sound economic management of resource wealth. It demonstrates how a country with a long history of stable, democratic institutions and a strong diversified economy is better poised to deal with the adverse Dutch disease effects of sudden resource discoveries. The discovery of large amounts of oil in the North Sea threatened to sap the economy's competitiveness and growth potential. Yet, in large part due to remarkable political stability and high democratic accountability, the Norwegian government set into motion a robust process of sound economic management, as the model would predict for a country with high α , low ρ , and low d . The Government Petroleum Fund was established in 1990 in an attempt to institutionalize the government's intertemporal savings decision, to enhance intergenerational equity, and to achieve greater transparency in the spending of petroleum revenues.⁴⁶ The Fund now serves as a bulwark against short-term and long-term volatility of oil prices and oil reserves. In the official words of the Norwegian government, the Fund has a twofold objective: "First, it shall act as a buffer to smooth short-term variations in the oil revenues. This will make the Norwegian economy more robust and allow greater room for manoeuvre in economic policy. Second, it will serve as a tool for coping with the financial challenges connected to an ageing population and the eventual decline in oil revenues, by transferring wealth to future generations. The process of exchanging physical petroleum reserves with financial assets in the Petroleum Fund will reduce future dependence of the oil revenues." (from the Norwegian Government Petroleum Fund official website)

Indeed, the Norwegian case highlights the separability of government savings and allocational decisions that form part of a political economy response to exogenous oil windfalls. At every period t , discretionary net oil revenues and returns on investments $(R_{t-1}^F \frac{1+r}{1+\theta_{t-1}} + dR)$ flow into the Fund (R_t^F) , while transfers to finance

the non-oil budget deficit $(R_t^c + R_t^p)$ flow out of it. Thus a part of discretionary oil revenues helps finance the government's fiscal policy in a transparent and comprehensible manner. As an integrated part of government finances oil rents are channelled towards fiscal stabilization policies, thus supplementing the government's tax revenues. The Norwegian government does not fall prey to the 'boom-and-bust' psychology alluded to above, but instead uses its external revenues to smooth out government expenditures, to mitigate potential Dutch disease symptoms, and to sustain high levels of growth, as polar case (a) in section 6 would predict.

⁴⁶ It should be noted that the establishment of the Government Petroleum Fund was not an entirely controversy-free issue in Norwegian electoral politics. The prioritization of future over current production is a deeply political question and as such has been the subject of ample political debate ever since. I thank an anonymous reviewer for pointing this out.

3.2. Nigeria

The Nigerian case, on the other hand, is more readily captured by polar case (b). A legacy of civil war, ethnic and tribal rivalries, authoritarian rule, and acute political instability was already in place at the time of the oil boom of the 1970s and early 1980s. Balancing the power struggle between rival social groups, placating the deep ethnic tensions between the Christian South and the Islamic North, and forestalling secessionist threats by ethno-tribal groups were the prerequisites for regime survival at the time. The above circumstances highlighted the need for heavy politicized expenditures pandering to the rent-seeking appetites of rival ethnic groups (low α). This so-called 'spending effect' primarily took the form of inefficient grand projects (e.g., the construction of a new capital in Abuja) evenly allocated across ethno-tribal cleavages (high γ). The government's fiscal policy at the time aimed at garnering public support and bringing about ethnic reconciliation through symbolic but highly inefficient public-investment projects and a pervasive cross-cutting patronage network (Lane and Tornell, 1996). Yet high levels of corruption and inefficiency led one scholar to describe the system as one of "mutual looting - the political economy of state robbery" (Madunagu, 1983). Moreover, deep ethnic divisions and threats of secession resulted in a redrawing of internal political boundaries and effectively increased government centralization. Despite pressures for increased allocation of revenues across local levels of government, the federal government sought to enhance its control over oil revenues (high d) either directly or indirectly by intervening in local fiscal policy. The end result was that Nigeria experienced many years of low or even negative GDP per capita growth rates. Imprudent economic management exacerbated the country's adjustment process to the new realities of an unstable petro-state.

4. Discussion and Extensions

This paper proposes a political economy model suggesting that the effectiveness of economic management in the face of adverse resource curse effects is highly dependent upon the institutional characteristics of the regime. It is found that democratic accountability, high transparency, and low discretion over windfall revenues sustain high levels of economic diversification and growth, while on the other hand authoritarian regimes respond to resource booms by exacerbating Dutch disease symptoms and launching the economy upon dynamic paths of low economic growth and diversification in their paradoxical quest for political survival. It should be made clear though that nothing in this model can account for questions of regime durability. Extending the theoretical analysis to encompass such dynamic political phenomena would stumble across such seemingly paradoxical cases as Saudi Arabia, where relatively low levels of economic diversification and growth have been coupled by

harsh and robust authoritarian rule.⁴⁷ All these outlier cases aside, one should not fail to ignore the most commonly encountered intermediate cases of resource-abundant political economies, which definitely fall within the scope of this model. The growing literature on this topic may yield more testable hypotheses and valuable insights on such interesting real-life examples as the ones that abound in Central Asia. Models of resource rent allocation may help shed some light on the fluid, transitioning political economy of countries like Azerbaijan and Kazakhstan, where seemingly stable autocratic governments try to do a better job of managing their countries' wealth by providing support to the nascent private sector, attracting foreign direct investment, and setting up institutionalized oil and gas funds in order to dispel allegations of corruption and rentierism in the management of resource rents. It has been the modest purpose of this paper to explain how an exogenous windfall filtered through the political economy of a country leads to a wide range of economic outcomes and to maximize the domain of resource-abundant countries where this model can be applied.

Even though our political economy model of resource rent allocation yields a set of clear-cut hypotheses about the effect of regime-specific institutional characteristics on economic management of windfall resources, it is not straightforward to operationalize some of its variables into econometric parameters. The most obvious candidate for a dependent variable in a cross-country panel regression analysis would be the level of economic diversification in a resource-abundant country. The share of labor employed in the manufacturing sector or the manufacturing sector's income share of total GDP could serve as proxies. The type of regime would serve as the principal explanatory variable. To that effect one could either use the Freedom House (Gastil) measure of democracy that rates countries on a subjective scale from 1 to 7 mainly according to political rights records or the authoritarian and democratic measures derived from the Polity IV data set initially conceptualized by T. R. Gurr and currently under the direction of M. G. Marshall and K. Jaggers. Subsequently one should control for independent variables, such as oil and mineral abundance (see Sachs and Warner, 1995, for appropriate measures and the debate on the ambiguity of such measures), regional characteristics (regional dummies), state extractive capacity (by measuring tax revenue as a proportion of total government revenue), the size of γ (by measuring the share of public investment in total non-tax revenue funded expenditures), the size of d (by measuring the publicly-controlled share of the primary sector), trade policy (through widely used measures of protectionism), and finally population effects⁴⁸ (by measuring the size of state-controlled per capita resource rev-

⁴⁷ Besides allowing for an efficient repressive apparatus, one could account for this apparent paradox by using Smith's argument that overall economic performance is much more important in exporting states that have moved towards industrial transformation than in undiversified economies (Smith, 2006).

⁴⁸ In the model, total labor force is normalized to unity, thus failing to account for the indirect effect of the per capita size of resource rents. Regimes in densely populated countries will surely be under more pressure to spend windfall revenues immediately in visible public expenditures and income transfers (increase in ρ). Maybe this would help explain why resource funds tend to fail (or are not created in the first place) in densely populated countries.

enues). The model would predict a statistically significant negative regime type coefficient. As for testing for the convergence path of the economy following a resource boom, one may also consider including a lagged variable for economic diversification as well as a squared lagged variable in order to control for potential non-linearities.

In terms of making the model richer, a natural extension would consist of tampering with the assumption that resource rents are the only source of government revenue. By all means, this assumption is utilized for simplification purposes. The ability of a government to tax the income of its constituents is a crucial determinant of the type of regime that is in place. In the above model the extractive capacity of the state has been endogenized through the institutional parameters α and d : highly democratic regimes tend to have robust tax bureaucracies that help develop tight societal linkages of information and accountability between the state and the electorate. High levels of taxation imply associated public expenditures geared towards enhancing the welfare of the people rather than towards the regime's political ends. Moreover, democracies tends to be associated with free market economies; the electoral ailments of time-inconsistency and political business cycles justify a democratic tendency for lower discretion over non-tax revenues and higher institutionalization of public expenditure procedures. By contrast, resource-rich autocracies follow lower-cost paths of placating social groups by using external windfall revenues rather than tax-and-concede policies. At the kernel of rentier state theory lies the argument that patronage networks can compensate for the weakness of institutions and the lack of economic diversification (Smith, 2006). Authoritarian rentier states are distributive rather than extractive, relying mainly upon patronage in order to alleviate popular pressures for democratic accountability and buy off political consensus. The maintenance of pervasive patronage networks and the weakness of the state-society nexus imply that authoritarian regimes seek to maximize discretion over rents - thus 'crowding out' the private sector - but fail in their attempts to initiate successful developmental policies. Economic management becomes myopic, risk-averse, and inefficient.

In essence, the extractive capacity of a resource-abundant country is the implicit variable within this model that links all institutional parameters together, namely α , ρ , γ , and d . One useful extension of our model would be to make taxation explicit and thus to endogenize the institutional characteristics of a regime. In such an extended model, tax revenue as a function of the regime's extractive capacity would enter its budget constraint. This technique could prove to be very useful in examining the effects of regime type on fiscal policy and on overall state involvement in the economy as well as in studying the persistence of authoritarianism and the failure of democratic transition in resource-rich political economies.

One could further introduce uncertainty over resource availability into this model. It has been assumed heretofore that the primary sector either yields a constant flow of rents R or just a one-off amount of windfall revenues. Suggesting that the discovery of natural resources every period follows a stochastic process could yield some very interesting results. Alternatively uncertainty could be introduced under the guise of terms-of-trade volatility, since the model so far effectively makes no dis-

inction between rents produced by a natural resource discovery or a terms-of-trade improvement in a resource-exporting country. Such an extended version would establish an interesting dynamic relationship between regime type and private ($E[R_t^c]$) and government expectations of future rents ($E[R_t]$), whereby authoritarian governments - as opposed to democratic ones - become overtly optimistic over the size of future revenues and propagate their optimism in order to inflate consumers' expectations. The type of regime would certainly affect the rules and preferences of such a dynamic game of expectations and speculation. Uncertainty over resource availability could also alter the results of the original political economy model by allowing for a negative relationship between rent volatility and political stability. *Prima facie* a democratic government is better poised to buffer against the adverse political effects of volatility through stabilizing counter-cyclical fiscal policies. However, once terms-of-trade (or more generally rent) volatility enters the political support function S of an authoritarian government, then the regime's economic management of resource rents will arguably resemble that of a democratic one and yield smoother adjustment processes. The government will put more weight on the goal of diversification (higher θ_{ss}) in order to make the economy more flexible and robust in light of external and internal shocks. The threat of political instability as a result of rent volatility may even have long-term institutional repercussions by making the government more responsive to consumer welfare needs, thus instigating a process of democratic transition (α, \uparrow). Notice that α in this case would become endogenous.

Last but not least, the analysis so far has ignored any optimality considerations over the dynamically efficient extraction path of natural resources. A theoretical model that could be incorporated is Hotelling's rule on the dynamically efficient level of extraction of a non-renewable natural resource (Hotelling, 1931). Given constant marginal extraction costs, the price of the resource will be a function of the discount rate (often the interest rate). Specifically, the price will be equal to the marginal extraction rate plus the marginal user cost, which measures the scarcity value of the resource left in the ground. With constant marginal extraction costs, the marginal user cost will rise at the discount rate reflecting the increasing opportunity cost of extracting the resource today versus tomorrow; the rate of extraction will fall as the resource becomes worth more in the ground. While the efficient rate of extraction will vary according to projections of changing demand (if demand increases, it will be more efficient to extract more at a later time relative to the case of constant demand), the scarcity value will still increase at the discount value.

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