Rent-Seeking and Resource Booms*

Jean-Marie Baland
CRED, University of Namur, 8 Rempart de la Vierge,
Namur, B-5000, Belgium

Patrick Francois
Department of Economics, Queen□s University, Canada,
CentER, Department of Economics, University of Tilburg, The Netherlands and
Department of Economics, University of Melbourne,
Victoria, Australia

This version, June 1999

Abstract

This paper develops a model of rent-seeking in which the opportunity cost of rent-seeking is foregone entrepreneurship. It provides conditions under which resource booms tend to lead to an increase in rent-seeking activity and those in which they induce entrepreneurship. We identify an important difference between the two activities which leads resource booms to bias gains in favour of rent-seeking over entrepreneurship. But we also show that this bias depends on the nature of the initial equilibrium.

*We have bene&ted from the comments of Ryan Davies, Ashok Kotwal, seminar participants at Cornell University and the comments of two anonymous referees. We thank SSHRC and CRED for funding, all remaining errors are our own.

1. Introduction

Informal accounts suggest that there are often large rents to be obtained in less developed economies. Precise estimates are difficult to obtain, but Krueger (1974) estimates rents generated by import licences alone to be in the range of 15% of GNP for Turkey in 1968, similarly large estimates are obtained by Gallagher (1991) for a sample of African countries from 1975 to 1987, ranging between 6% and 37% of GDP. Even allowing for overestimation, the magnitude of these rents suggests considerable returns to those able to capture them.

Not surprisingly, there is considerable evidence of rent-seeking activity in many developing economies. Yet despite the existence of large potential rents, rent-seeking is not observed everywhere. The apparent coexistence of extreme differences in rent-seeking across economies motivates a search for possibly self-reinforcing effects created by rent-seeking. Murphy, Shleifer and Vishny (1993) Robinson (1994), and Acemoglu (1995) have developed models which explore this possibility. In these models, rent-seekers, though competitive amongst themselves, prey on more productive agents (or entrepreneurs). An increase in the number of rent-seekers thus lowers returns to both rent-seeking and entrepreneurship, with possibly larger marginal effects on production. If this occurs, economies can exhibit multiple equilibria. The logic of these can be seen by considering the impact of an increase in rent-seeking from an initial steady state. Since this hurts entrepreneurs, it can crowd out entrepreneurship and induce more agents to switch into rent-seeking until the economy settles on another equilibrium with a higher level of rent-seeking. These authors argue that such multiplicity provides an account of divergent cross-country experiences.

The current paper also seeks to understand factors that incline some economies towards a prevalence of rent-seeking activities and others towards relatively little

rent-seeking, and similarly evokes Murphy, Shleifer and Vishny's (1991) argument that it is potentially the most talented people in a society who are attracted to the lure of rents. But in contrast to the authors above, here we explore a direction of causation that runs in the opposite direction. Here it is shown that increased entrepreneurship can also crowd out rent-seeking. We argue that entrepreneurial activity, by creating new and better goods or services, destroys rents accruing to those holding licences restricting trade in already existing goods or services. A natural example of such rents are quota licences.[1] A rent-seeker holding the exclusive right to import a particular good under quota, experiences a loss if domestic entrepreneurs compete to produce the same good. Entrepreneurship may thus also "crowd out" rent seeking.

The argument developed here relies on three critical assumptions: (i) entrepreneurial activity ultimately destroys the scope for rent-seeking in an economy, (ii) pro&ts to entrepreneurs increase with aggregate income, and (iii), as stated above, rent-seekers possess entrepreneurial skills and can transfer between these activities. Under these conditions, an increase in entrepreneurship reduces rent-seeking and encourages further entrepreneurship since it both destroys existing rents and increases income by releasing potential entrepreneurs from rent-seeking.

Though perhaps of theoretical interest, the establishment of multiple equilibria in this framework is not the paper's main contribution. This has already been well established in the rent-seeking literature cited above. Instead we are concerned with understanding the conditions under which exogenous changes in the environment incline the agents in the economy towards a predominance of

[1] Or, as is equivalent, holding an import license in the presence of cross-country voluntary export restraints (VERs). These restraints have proliferated as a means of getting around the GATT, since it explicitly forbids quotas on non-agricultural goods.

rent-seeking or a predominance of entrepreneurial activity. The factor which we treat as exogenous here is the economy□s endowment of productive resources. We consider whether an exogenous increase in the value of these resources engenders rent-seeking over entrepreneurship. This is seen to depend critically on the nature of the equilibrium in which the economy started. When the initial proportion of agents engaged in entrepreneurship is large, we &nd that an increase in the economy□s resources, as would occur with a resource boom, increases domestic entrepreneurship, thus further raising income. However, when a large proportion of individuals are engaged in rent-seeking already, such an increase inclines the economy towards more rent-seeking and may actually lead to a decline in aggregate income. Our analysis thus suggests a cause for the differential effects of exogenous increases in economy wide income. In some regions, rent-seeking increases with income: Gallagher (1991) documents the more than proportionate rise in rents with increases in income over the African continent. Hilaire (1992) describes the decline in Trinidad and Tobago□s GDP immediately after a quadrupling in oil prices (which constituted 20% of the country□s GDP in 1972) from 1973 to 1974 and documents a rise in the premium on import licences for food. In South East Asia, however, the oil boom corresponded with increased investment, growth of the manufacturing sector and no readily discernible increases in rent-seeking.

Our results resemble those found in Lane and Tornell (1996) and (1999) who also show that booms can increase rent-seeking and lower growth rates. In contrast with our approach, Lane and Tornell (1999) treat the number of rent-seekers as &xed. The critical productive resource in their analysis is capital which can be allocated either to the formal sector (where rent-seekers can expropriate a portion) or the informal, where returns are lower but capital is safe from rent-seeking. The expropriation of capital by rent-seekers, through the political process, acts to

lower investment and thereby lower growth. In a boom, returns to capital investment in the formal sector rise, then rent-seekers can expropriate proportionately more while still preserving the incentive to invest there. However, this increased expropriation by all rent-seekers acting independently, lowers the amount of capital left for investment in the formal sector and as a consequence growth falls. The present paper instead emphasizes the change in the allocation of human capital with a boom and examines the loss of productive human capital (or talent) through the rent-seeking process (which is more in line with Murphy, Shleifer and Vishny (1991)). Furthermore, while their analysis is concerned with explaining countries that seemed to do poorly after resource booms, our model can also be used to understand the performance of the successful countries, and why countries faired differently.

The paper proceeds as follows. The next section speci&es the basic model. Section 3 speci&es the equilibrium allocation of skilled labour across activities. Section 4 then examines the effect of a resource boom and establishes the paper□s main results. Section 5 uses these results to help explain different cross country performances after the oil boom of the late 1970s. A brief conclusion is provided in Section 6.

2. The model

Consider a small open economy endowed with two productive inputs: an amount of basic input, denoted L, and an amount of skilled or entrepreneurial input, denoted S. Here we closely follow Murphy Shleifer and Vishny (1991) in focusing on S as the critical group of agents (the □talented□ in their formulation) who are able to choose between entrepreneurship and rent-seeking. We assume they are also able to substitute (perhaps imperfectly) for primary inputs in production as

well. Primary inputs, L, however cannot be used as a substitute for S in either entrepreneurial activities or rent-seeking. There are two classes of goods that can be produced: primary output, denoted A, and industrial or manufactured goods, x_i. Primary output (or food for simplicity) is assumed to be produced competitively using a constant returns to scale production technology, and without the need of the economy's skilled agents. For simplicity the formulation

$$A = l$$

is used, where l denotes the amount of inputs used in primary production. We will, for simplicity, assume that skilled and basic inputs are perfectly substitutable in primary production.[2]

Food is the numeraire so that, in equilibrium, the competitive payment to either factor working in primary production equals one. There is a continuum of industrial manufactured goods de&ned over the interval $[0, 1]$ which can be imported from abroad, at price p_i per unit of good i, with:

$$p_i = p_i^* + c,$$

where p_i^* is the world price and c denotes per unit transport costs.

Each consumer has the following Cobb-Douglas utility function:

$$U = A^{1-\alpha} e^{\int_0^1 \ln x_i^\alpha di}, \tag{2.1}$$

for the consumption of quantity x_i of each variant of industrial good, i. This utility function implies that, with aggregate income Y, expenditure on the agricultural good is $(1-\alpha)Y$ and total expenditure on industrial goods equals αY,

[2] This is a sufficient assumption made for simplicity only, the critical assumption is that skilled inputs are relatively more productive in rent-seeking/entrepreneurship than primary production in comparison with basic inputs.

independently of the distribution of Y across agents. The unit density of industrial goods also implies that αY is the aggregate amount spent on each industrial good.

We pause brie! y to explain our choice of this utility function. The Cobb-Douglas speci&cation is useful &rstly because the zero cross price elasticity between the classes of goods shuts down a possible avenue of complementarity between industrial goods producers that could itself lead to multiplicity of equilibria (see Baland and Francois (1999)). For instance, as surveyed in Matsuyama (1995), a speci&cation such as this can lead to self-reinforcing effects arising from an increase in the measure of industrial good producers and multiplicity. Here, in contrast, the measure of goods is &xed but production can vary between domestic and foreign sources. Secondly the positive linear homogeneity of the formulation in income and equiproportionate increases in demand for both classes of goods implies that changes in demand composition play no role. This is also an issue that has been widely analyzed (see Baland and Ray (1991) and Bourguignon (1993) for example). Furthermore, the constant expenditure share property of this speci&cation makes equilibria easy to compute.

Rent-seeking is treated using a variant of Krueger's (1974) analysis. Aggregate rents are created by an exogenously imposed quota on the import of industrial goods in each sector i, $\overline{M}_i$. We can equivalently think of the quota as arising either from direct government mandate, or, as is more common today, as part of a system of voluntary export restraints between trading countries. All domestic quota holders are assumed to act non-collusively and thus import upto their quota limit, so that aggregate imports are constrained at $\overline{M}_i$. The price implied from consumer demands in equation (2.1) is given by:

$$p_i^m = \frac{\alpha Y}{\overline{M}_i}.$$

We assume throughout that p_i^m exceeds the cost of imports, $p_i^* + c$, so that quota holders obtain a positive rent.

We deliberately abstract from the mechanism giving rise to political in! uence but assume a simple competitive process. Rent-seeking involves the allocation of one unit of skilled labour in order to obtain a proportionate share of aggregate rents created by quotas. There is free entry into rent-seeking activities so that rents available to the marginal rent-seeker should re! ect opportunity costs in any equilibrium. With the total amount of rent-seekers denoted R, each rent-seeker receives $\frac{1}{R}$ of total rents available.

Industrial goods can also be produced domestically by local entrepreneurs.[3] Entrepreneurship also involves a &xed cost of one unit of skilled labour per sector in organizing production and we shall allow for the possibility of all sectors having entrepreneurs by assuming $S \geq 1$.[4] Once organized, production is undertaken using the following constant returns to scale technology:

$$x_i = \frac{1}{\gamma} l_i,$$

where x_i is the amount of industrial good produced and l_i is primary input used in sector i, and γ is a production parameter. Transport costs are large in the sense that local production for sale domestically is pro&table, in gross terms, even though exporting and incurring c, is not; that is $p_i^* + c > \gamma > p_i^* - c$.

Given the unit elastic demand for industrial goods, see (2.1), a domestic entrepreneur, when producing in sector i, maximizes pro&t by limit pricing at the

[3] Skills can be equivalently thought of as access to capital, education, connections, information, ability, or literally as skills. Only a sub-set of the total population can become entrepreneurs.

[4] If $S < 1$, the equilibria examined below will be slightly altered so that, there will always exist positive rents in equilibrium, however this does not alter any of the model's implications. Assuming that &xed costs of entrepreneurship and rent-seeking are identical is not critical. Varying these costs will affect equilibrium proportions of the two types but not the qualitative nature of the equilibria.

marginal import cost, p_i. Returns to entrepreneurship are thus given by:

$$\begin{aligned} \pi_i &= (p_i - \gamma)\, x_i \\ &= (p_i - \gamma)\, \frac{\alpha Y}{p_i}. \end{aligned} \tag{2.2}$$

where the second equality follows from (2.1) . Once entry has occurred in a sector, no other entrepreneur wishes to enter due to the threat of Bertrand competition.[5] This implies that there will be, at most, one entrepreneur in each industrial sector.

The magnitude of aggregate rents, however, depends on the level of domestic entrepreneurship. Since entrepreneurs set prices at the domestic cost of the imported good, the value of a quota licence on a good produced domestically falls to zero. This lowers aggregate rents, so that the amount obtained by a single rent seeker is given by:

$$r(q) = \frac{1}{R(q)} \int_0^{1-q} (p_i^m - p_i)\, \overline{M}_i di, \tag{2.3}$$

where q denotes the measure of sectors in which production is undertaken by a domestic entrepreneur and $R(q)$ is the total number of rent-seekers.

Finally note that since the value of imports on world markets equals $\int_0^{1-q} p_i \overline{M}_i di$, this also corresponds to the amount of A, and hence l, exported. Consumers' budget constraints thus ensure that trade is always balanced. For simplicity, from hereon we consider only the symmetric case in which $p_i = p$ and $\overline{M}_i = \overline{M}\ \forall\ i$.

Before considering the equilibrium outcomes we recap on the essential features of the model. A critical role is played by the source of industrial production. This production can either be imported from the world market or produced domestically by entrepreneurs. The right to import industrial goods confers a rent which

[5] Alternatively, this could be modelled by assuming that there is a unique agent with the right to be an entrepreneur in each sector (as in Murphy, Shleifer and Vishny (1989)) or by explicitly considering the timing of entry decisions and ruling out the low probability event of more than one entry in the same instant.

accrues to domestic rent-seekers. However, the economy is also endowed with enough resources to produce these goods domestically (and more cheaply due to transport costs) provided sufficient entrepreneurship is forthcoming. Existing models focus on a negative externality from rent-seeking to entrepreneurship, here however, equation (2.3) captures an opposite direction of causation. The right to import a good from abroad becomes worthless when that good is being more cheaply produced domestically. Thus, economy wide rents fall with entrepreneurship, ceteris paribus.

Recalling that resources in agriculture are paid one unit of food per unit of input, aggregate income, Y, can be decomposed into factor payments as follows:

$$Y = L + S - R(q) - q + q\theta\alpha Y, \tag{2.4}$$

where θ denotes the mark-up rate $\left(\frac{p-\gamma}{p}\right)$, L is returns to primary factors, $S - R(q) - q$, are payments to skilled labour working in either industrial or food production, and the last term denotes net pro&ts in domestic production from equation (2.2). This equation is an aggregate accounting identity which simply states that total income, Y, comprises payments to both factors, L and S, resources dissipated on rent seeking, $R(q)$, that paid as a set up cost to entrepreneurship, q, and that accruing as a rent to successful entrepreneurs, $q\theta\alpha Y$. Re-arranging equation (2.4) allows expression of Y as a function of q:

$$Y(q) = \frac{L + S - R(q) - q}{1 - q\alpha\theta}. \tag{2.5}$$

Then substitution into equations (2.3) and (2.2) respectively, implies:

$$r(q) = \frac{1-q}{R(q)}\left(\alpha\frac{L + S - R(q) - q}{1 - q\alpha\theta} - p\overline{M}\right) \tag{2.6}$$

and

$$\pi(q) = \theta\alpha\frac{L + S - R(q) - q}{1 - q\alpha\theta}. \tag{2.7}$$

These equations thus specify returns to rent-seeking and entrepreneurship respectively as functions of a unique endogenous variable; the number of entrepreneurs. The equilibrium will thus depend critically on the relationship between $r(q)$ and $\pi(q)$, which we now consider.

3. Equilibrium allocations of skilled labour

An equilibrium is an allocation of S between rent-seeking and entrepreneurship such that, given this allocation, a skilled individual does not wish to shift between activities. The economy can possibly sustain corner equilibria. One in which no entrepreneurs exist, and rents exceed pro&ts, and another in which there is no rent-seeking and pro&ts exceed rents. There also arises the possibility of interior equilibria where returns between rent-seeking and entrepreneurship are equal and skilled workers are involved in each activity.

3.1. Corner equilibria

Consider an equilibrium in which all sectors have entrepreneurial production. For such an equilibrium, it is necessary that the pro&t rate is greater than or equal to 1 (the opportunity cost of entrepreneurship) when all sectors are industrialized. Rearranging equation (2.7), it can be seen that this holds if and only if $\alpha\theta\left(\frac{L+S-1}{1-\alpha\theta}\right) \geq 1$ which, upon re-arrangement, yields:

$$L + S > \frac{1}{\alpha\theta}. \tag{3.1}$$

We henceforth assume that inequality (3.1) is always satis&ed. It then follows that a full entrepreneurship equilibrium, $q = 1$, exists since, from (2.6), $r(1) = 0$.

Consider now the possibility of an equilibrium where there are only rent-seekers. This occurs when returns to rent-seeking exceed entrepreneurial returns at $q = 0$. A necessary condition for this is that $r(q) \geq \max[\pi(q), 1]$. Or, in terms

of the model's primitives, substituting for $\pi(q)$ and $r(q)$ from conditions (2.7) and (2.6) respectively yields:

Proposition 1. *If* $S \leq \alpha L - p\overline{M}$, $q = 0$ *is an equilibrium when* $S < \frac{\alpha L - p\overline{M}}{\alpha\theta L}$. *If* $S > \alpha L - p\overline{M}$, $q = 0$ *is an equilibrium when* $S < \frac{1+\alpha}{\alpha\theta} - L - p\overline{M}$.

Combined with condition (3.1),we have sufficient conditions for the existence of both a full rent-seeking and a full entrepreneurship equilibrium. Multiplicity here arises for similar reasons to other analyses of rent-seeking (e.g. Robinson (1994) and Acemoglu (1995)). However the direction of causation here is opposite. While there rent-seekers directly prey on entrepreneurs, here an increase in entrepreneurship lowers returns to rent-seeking by reducing the scope for rent-seeking activities.

3.2. Interior equilibria

Since both corner equilibria can exist under the same conditions, and the relationships $\pi(q)$ and $r(q)$ are continuous in [0,1), it is clear that there will also exist at least one interior equilibrium. We characterize these equilibria by further examining the functions $\pi(q)$ and $r(q)$.

Lemma 1. *Pro&t is increasing in entrepreneurship.*

All proofs are in appendix.

Pro&ts rise with q because an increase in productive entrepreneurship raises aggregate income and thus returns to more entrepreneurship. However, an increase in q may also increase returns to rent-seeking, since, aggregate income, and thus rents, rise. In fact, when all individuals are working as either rent-seekers or entrepreneurs, $r(q)$ can rise above 1. For example, if $r(0) \geq \pi(0) > 1$,

then it can be shown that $\frac{dr(q)}{dq} > 0$ at $q = 0$. Hence, when there initially exists no entrepreneurship, a small rise in entrepreneurship increases returns to rent-seekers. However, for sufficiently high values of q, the part of the economy in which rents are available becomes small so that returns to rent-seeking fall towards 1. In summary, $r(q)$ is non-monotonic in q.

It proves impossible to obtain further meaningful restrictions on $r(q)$, so that we provide in Figure 1 an example of some possible con&gurations and the corresponding equilibria.

INSERT FIGURE 1

Consider Figure 1A, where there is a unique interior equilibrium. Such an equilibrium is unstable as a small change in q from its equilibrium value drives the economy to one of the two corner equilibria. In what follows we will ignore such equilibria. There may also exist stable interior equilibria, these require that the $\pi(q)$ function crosses the $r(q)$ function from above, for example, equilibria B and D in Figure 1B.

At this point our model delivers qualitative outcomes comparable to both Murphy, Shleifer and Vishny (1993), Robinson (1994) and Acemoglu (1995), though for different reasons. At $q = 0$ returns to rent-seeking exceed returns to entrepreneurship, the drain of heavy rent-seeking makes entrepreneurship unattractive so that all skilled individuals are rent-seekers. At $q = 1$, however, the predominance of entrepreneurs destroys rents, increasing income and returns to entrepreneurship, thereby inciting skilled individuals to become entrepreneurs.

4. A resource boom

Here we examine the effects of an increase in the economy s resources or endowment, starting at one of the equilibria examined above. We model such a resource

increase as an exogenous rise in the primary input L. The model is general enough to allow a number of interpretations of this, such as a commodity boom, or an increase in world price of a major export or any other change which would increase the value of the economy's productive endowment. (The distribution of such an increase across individuals is unimportant due to the homotheticity of preferences.) Consider first the effect of a boom on an economy initially at equilibrium with entrepreneurs in all sectors.

Proposition 2. *In a full entrepreneurship equilibrium , a resource boom raises returns to entrepreneurship relative to rent-seeking.*

In a full entrepreneurship equilibrium, $q = 1$, and all rent-seeking opportunities are already destroyed, so that an increase in income, by raising demand, and therefore profits, raises relative returns to entrepreneurship. An economy with an extensive domestic industrial base can only benefit from a boom which increases the size of the domestic market.[6] Now consider the effect of a boom when the economy is not in a situation where entrepreneurship dominates rent-seeking:

Proposition 3. *At any stable equilibrium other than the full entrepreneurship equilibrium, a resource boom lowers returns to entrepreneurship relative to rent-seeking, hence entrepreneurship falls.*

The reasons for this, though arising in an admittedly specific context are robust to more general formulations. The important difference between rent-seekers and entrepreneurs is that entrepreneurs have a positive marginal cost. Both activities benefit from an increase in the size of the economy but rent-seekers by relatively more. This is because an increase in the economy's endowment

[6] This is assuming no industrial exports. If there were industrial exports a Dutch Disease could ensue, but, in any case the net effect would still be an increase in aggregate income.

increases demand and in turn the value of holding a quota license. Rents arise from holding the right to sell the imported commodity but since the amount sold is unchanged, the only change is an increase in price, the full bene&t of which accrues to the rent-seeker. In contrast, entrepreneurs price compete with their next best competitors; the imports. Since their price is &xed by limit pricing on the competition, they bene&t from higher demand by selling more units at a positive mark up on cost. But consumers also bene&t since production has increased. This contrasts with sectors where the good is sold by rent-seekers; consumers simply pay a higher price for these goods. Thus when the size of income increases, since all of the bene&ts of an increase accrue to rent-seekers and only part of the bene&t accrues to entrepreneurs the bene&ts of rent-seeking relative to entrepreneurship necessarily rise.

5. Effects of the late 1970s oil boom

In this section we examine the differential impact of the late 1970s oil boom on a selection of oil exporting countries in light of the theory developed above. We cannot test the theory by such a cross-country comparison, if only because the multiplicity of equilibria makes it impossible to pin down a unique set of implications. Instead, we use the model□s various implications to try and explain the marked differences in performance of these oil exporting countries after the boom. We do not employ a literal interpretation of corner equilibria which would imply either no entrepreneurs ($q = 0$, equilibria) or no rent-seekers ($q = 1,$ equilibria). A more realistic interpretation of these is that, for example in the $q = 1$ equilibria, all individuals with an □economic□ choice between becoming an entrepreneur and a rent-seeker choose the former. In reality, there are still individuals with strongly biased skills which constrain them to one particular type of activity.

In 1990 the countries analyzed had the following share of total world exports of crude oil: 13.27 % for Saudi Arabia, 8.46 % for Nigeria, 8.04 % for Norway, 5.99 % for Mexico, 5.85 % for Venezuela, 5.85 % for the United Arab Emirates, 4.19 % for Indonesia, 2.74 % for Kuwait, 2.65 % for Malaysia, 2.33 % for Algeria, and 0.5 % for Trinidad (International Trade Statistics, Yearbook 1990, Vol II, Trade by Commodity). Table 1 below lists some relevant information for these countries.

Insert Table 1

What is surprising, is that a totally different type of pattern seems to have been followed by different groups of countries. Three types of countries can be distinguished in the table: (1) the failures: Nigeria, Saudi Arabia, Kuwait, Trinidad, United Arab Emirates, (2) the small failures: Venezuela, Mexico, Algeria and (3) the successes: Indonesia, Malaysia, and Norway. First, while most of these countries enjoyed comparable growth rates in the 1965-80 period, as a result of the two oil booms, their performances during the 1980-93 period are quite different, particularly in terms of growth of GDP per capita. In the failures, the share of public consumption in GDP (the share of private consumption, and the share of services follow a similar pattern) have increased, the opposite is true in the successes. Also, the share of manufacturing in GDP in 1977 is usually lower for the failures, and remains low, while that of the successes is much higher, and increased dramatically in some countries, particularly Indonesia and Malaysia. The average annual growth rates of industry, and of gross domestic investment in the 1980-90 period were negative for the failures and positive for the successes. Other indicators such as GDP share of services, GDP share of investment, or growth of the manufacturing sector yield essentially the same picture.

While we do not pretend to carry out a test of any sort here, the table above is suggestive. Oil booms give rise to two opposite patterns of evolution for the oil exporting countries. On the one hand, there are countries with a small initial industrial base, and low entrepreneurship corresponding to the ones analyzed in Proposition 3. These countries seem to use most of the gains to &nance increased consumption and, according to the argument presented in this paper, rent seeking. This seems to be the case for Trinidad, Nigeria, Kuwait, the United Arab Emirates and Saudi Arabia, and, to a lesser extent , for Venezuela, Mexico and Algeria. On the other hand, there are countries which use the gains from the oil booms to constitute a sound industrial base by investing in the industrial sector, instead of increasing public and private consumption, or the share of services in the economy. Compared to the failures, those countries tend also to be characterized by more active entrepreneurship, as evidence by the higher initial industrial base, so that their reactions to the boom are consistent with Proposition 2.

6. Conclusion

We have focused on a situation in which, following Krueger (1974), rents are created by restrictions on trade and competition. Here, in contrast to more recent approaches, such as Murphy, Shleifer and Vishny (1993) and Acemoglu (1995), rent-seekers are not modeled as preying on productive activities, but instead as licence holders. Domestic entrepreneurship, instead of raising the income on which rent-seekers prey, reduces the scope for rents by producing direct substitutes to the goods under license.

This framework is shown to exhibit multiple equilibria in the allocation of skilled labour between entrepreneurship and rent-seeking, so that otherwise identical economies can exhibit markedly different outcomes. An increase in the

value of the economy's resources, such as during a resource boom, increases rent-seeking activities when the proportion of entrepreneurs in the economy is initially low. However, when a large proportion of individuals are already engaged in entrepreneurship, a resource boom reinforces entrepreneurial activities. This model can be used to explain divergent patterns of economic growth following resource booms.

References

[1] Acemoglu, D. (1995) Reward Structures and the Allocation of Talent, *European Economic Review*, 39, 17-33.

[2] Baland, J.-M. and D. Ray (1991) Why does asset inequality affect unemployment? A study of the demand composition problem, *Journal of Development Economics*, 35, 69-92.

[3] Baland, J.-M. and P. Francois (1999) Investment Coordination and Demand Complementarities, *Economic Theory*, 13, 495-505.

[4] Bourguignon, F. (1993) Growth and Inequality in the Dual Model of Development: The Role of Demand Factors, *Review of Economic Studies*, 57(2), April 1990, pages 215-28.

[5] Gallagher, M. (1991) *Rent-Seeking and Economic Growth in Africa*, Westview Press, Boulder.

[6] Hilaire, A. (1992) The Effects of Trinidad and Tobago's Oil Boom on Relative Prices, Wages and Labour Flows, *Social and Economic Studies* 41:2, 45-82.

[7] Krueger, A. O. (1974) The Political Economy of the Rent-Seeking society, *American Economic Review*, June, 291-303.

[8] Lane, P.R, and A. Tornell (1996) Power, Growth, and the Voracity Effect, *Journal of Economic Growth*, (1), 213-241.

[9] Lane, P.R, and A. Tornell (1999) The Voracity Effect, *American Economic Review*, 89(1), 22-46.

[10] Matsuyama, K. (1995) Complementarities and Cumulative Processes in Models of Monopolistic Competition, *Journal of Economic Literature*, June, 701-729.

[11] Murphy, K.M., A. Shleifer and R. Vishny (1989) Industrialization and the Big Push, *Journal of Political Economy*, 97, 5, 1003-1026.

[12] Murphy, K.M., A. Shleifer and R. Vishny (1991) The Allocation of Talent: Implications for Growth, *Quarterly Journal of Economics,* 503-530.

[13] Murphy, K.M., A. Shleifer and R. Vishny (1993) Why is Rent-Seeking so Costly to Growth? *American Economic Review,* Papers and Proceedings, May, 409-414.

[14] Robinson, J. A. (1994) Investment and Political Instability, *mimeo*, University of Melbourne.

7. Appendix

7.1. Proof of Lemma 1

We &rst demonstrate that Y rises with q. Differentiation of equation (2.5) yields:

$$\frac{dY(q)}{dq} = \frac{1}{1-q\alpha\theta}\left[\alpha\theta Y(q) - 1 - \frac{dR(q)}{dq}\right] \tag{7.1}$$

When $S = R(q)+q$, then $\frac{dR(q)}{dq} = -1$, so that (**??**) is positive. When $S > R(q)+q$, then, since $r(q) = 1$, substituting for $Y(q)$ in equation (2.6) implies:

$$R(q) = (1-q)\left(\alpha Y(q) - p\bar{M}\right).$$

Differentiating in q and substituting into equation (2.5) yields:

$$\frac{dY(q)}{dq} = \left[\frac{1}{1-\alpha+(1-\theta)q\alpha}\right]\left[\alpha Y(q) - p\bar{M} + \alpha\theta\frac{L+S-R(q)-q}{1-q\alpha\theta} - 1\right].$$

Condition (3.1) ensures, after some re-arrangement:

$$\frac{\theta\alpha(L+S-q)}{1-q\alpha\theta} > 1. \tag{7.2}$$

As a result, a sufficient condition for $\frac{dY(q)}{dq} > 0$ is $\alpha Y(q) - p\bar{M} - \frac{\alpha\theta R(q)}{1-q\alpha\theta} > 0$. But, from (2.6), $\alpha Y(q) - p\bar{M} = \frac{R(q)}{(1-q)}r(q)$, so that the required condition is:

$$\frac{R(q)}{(1-q)}r(q) > \frac{\alpha\theta R(q)}{1-q\alpha\theta}.$$

However, since $R(q) > \alpha\theta R(q)$, $(1-q) < 1-q\alpha\theta$, and $r(q) \geq 1$ this condition is always satis&ed. In equation (2.7) $\pi(q)$ is linear in income, and since $Y(q)$ increases with q, the proof is complete. □

7.2. Proof of Proposition 2

When $q = 1$, $r(1) = 0$. However, $\pi(1) = \alpha\theta Y(1)$, so that $\frac{d\pi(1)}{dL} = \frac{\alpha\theta}{1-\alpha\theta} > 0$. □

7.3. Proof of Proposition 3

>From equations (2.6) and (2.7):

$$\frac{d\pi(q)}{dL} - \frac{dr(q)}{dL} = \left(\alpha\theta - \frac{1-q}{R(q)}\alpha\right)\frac{dY}{dL}.$$

However, since $r(q) \geq \pi(q)$, equations (2.6) and (2.7) again imply:

$$\alpha\theta Y(q) < \frac{1-q}{R(q)}\left[\alpha Y(q) - p\bar{M}\right]$$

$$\Rightarrow \left(\alpha\theta - \frac{1-q}{R(q)}\alpha\right) \leq -\frac{1-q}{R(q)}\frac{p\bar{M}}{Y(q)} < 0.\square$$