

# Economic Geography and African Development

Anthony J. Venables\*  
Department of Economics  
Oxford University

22/4/10.

## Abstract

Physical and economic geography both contribute to low levels of income in Africa. The small size of African countries and markets impedes growth through a number of mechanisms. The business environment is prone to monopoly and opportunistic behaviour. Cities are relatively small. Public goods (national and regional are undersupplied). The potential benefits of natural resources are not dispersed widely enough. Growth prospects require better use of natural resource revenues and the development of clusters of export oriented manufacturing in coastal economies.

**Keywords:** economic geography, Africa, agglomeration, urbanisation, natural resources.

**JEL classification:** R1, O1, O55, Q3

\* This paper is based on an address given at the European Regional Science Association meetings in Liverpool in August 2008. Work was supported by the Oxford Centre for the Analysis of Resource Rich Economies. Thanks to Philip McCann for useful comments and Paul Collier for numerous conversations. Parts of the paper draw on Collier and Venables (2008).

## Correspondence address:

Department of Economics,  
University of Oxford,  
Manor Road Building,  
Oxford OX1 3UQ,  
United Kingdom

[Tony.venables@economics.ox.ac.uk](mailto:Tony.venables@economics.ox.ac.uk)

## 1. Introduction

African per capita incomes have been falling behind those of the rest of the world for most of the last 40 years.<sup>1</sup> The period 1980-2000 was particularly grim, with an average rate of divergence of 5% per annum, although recent performance is much improved. Africa has grown faster than the world as a whole (although still slightly less per capita) since the early 2000s. There are numerous reasons for Africa's poor performance, many of them country specific, and this paper investigates the role of Africa's economic geography.

The background is one in which Africa is favoured neither by natural advantage nor by the political and economic overlay placed on it. Africa's endowment of high quality agricultural land is patchy, with many areas having low rainfall and high propensity to drought. Its natural resource endowment is unevenly distributed across countries and surprisingly low. The value of sub-soil assets remaining has been estimated at \$114,000 per square km in the OECD and just \$23,000 in Africa (Collier 2010), although this is partly due to lack of exploration and probably under-estimates future potential. There is high propensity to disease, both in humans and animals; Sachs and Malaney (2002) argue that malaria has a powerful negative impact on economic performance and estimate that its impact on growth just over the period 1980-95 adds up to as much as 10% of GDP. The rinderpest epidemic in the late 19<sup>th</sup> century killed 90% of cattle (and haulage animals) in many regions, and epidemics recurred to the late 20<sup>th</sup> century. Sub-Saharan Africa as a whole has virtually no navigable rivers and few natural harbours, so communication has always been difficult. This combined with Africa's distance from the world's main economic hubs combine to give poor access to markets both within and outside the continent.

The human and political geography superimposed on this is one of low population density, low income and fragmentation into small countries. African population density is one-quarter that of Asia, and only one African country (Rwanda) has a population density as high as India as a whole.<sup>2</sup> The total GNP of Africa is around that of the Netherlands or, converted to PPP, rises to slightly more than that of Spain. And Africa is divided into some 50 countries, with 40% of its population in landlocked countries. The average African state has a population of only 17 million,

---

<sup>1</sup> Throughout, Africa will be used to refer to Sub-Saharan Africa.

<sup>2</sup> Rwanda 341 people per square km, India 344, 2005 data, UN (2008).

and the median just half of that. The contrast with Asia is startling, where India and China each have larger population than the whole of Africa. Furthermore, Africa scores high on measures of ethnic, linguistic and religious fractionalisation. All of these features create heterogeneity amongst African countries. Collier and O'Connell (2008) have classified African countries as coastal, resource-rich, or landlocked (see table 2 below) and the economic problems and prospects for these groups are quite different.

With this as background, what insights can be derived from economic geography? Economic geography provides a global view of development and of inequalities in the world economy. Agglomeration forces mean that some regions are integrated into the world economy and others not, a core-periphery view of the world. Economic growth then takes place in sequence not in parallel, as countries and regions join the growth club, but the wait for membership may be long.<sup>3</sup> We will return to these issues in a final section on the prospects for African exports and integration in the world economy.

The main part of the paper takes a more micro view and looks at ways in which the economic geography of Africa shapes its productivity at country and city level. This paper focuses on four issues where an economic geography approach is particularly insightful. The first is to do with the economic prospects of the private sector and the quality of the business environment. The second is to do with the public sector and the provision of key public goods, and the third looks at African cities. In each of these cases we will argue that the economic geography of Africa has led to low productivity through economies of scale foregone. The fourth issue is to do with the distribution of natural endowments; uneven distribution spatial distribution of resources combined with diminishing returns to their use is a further force which reduces average productivity in the continent. In each of these cases the small size of African countries has been a damaging force. Clearly, small size is not an absolute barrier to prosperity, and small countries are represented at both ends of the income distribution (Luxembourg and Lichtenstein versus Burundi and Eritrea).<sup>4</sup> However, fragmentation into small countries with poor neighbours has been part of the problem underlying Africa's poor economic performance.

---

<sup>3</sup> Fujita et al (1999), Puga and Venables (1996).

<sup>4</sup> Cross country evidence provides some support for the view that small size reduces growth, see Alesina et al (2004) for a survey of literature.

## **2. The business environment.**

We have already noted Africa's poor market access. The measures of market potential computed by Redding and Venables (2004), Bosker and Garretsen (2008), and Mayer (2009) indicate that African countries are at the very bottom of the international ranking. Poor market access makes a country an unattractive place for investment and results in low wages, an effect that the studies referred to above suggest are quantitatively important. But in addition to market access effects, small scale creates other problems for investors. Many market failures become acute at small scale. Matching and risk sharing become more difficult and reciprocal externalities to do with learning and experimentation are not achieved.<sup>5</sup> The costs of monopoly power increase at an increasing rate as market size becomes very small.<sup>6</sup>

### ***Competition and the operation of markets***

Evidently, a small market is likely to be less competitive than a large one as – given firm level economies of scale – fewer firms will operate. Lack of competition restricts the supply of inputs such as finance, capital equipment and transport services that are critical to growth and development.

A common problem in African economies is difficulty in getting access to finance.<sup>7</sup> The typical African economy has a very highly concentrated banking sector; three or four banks dominate lending and this is a sufficiently small number to enable collusive oligopoly. The limited nature of the market also leads to a concentration of risks: banks are exposed to a high covariance of the risk of default. As a consequence there is often lack of innovation, high deposit-lending spreads, and an unwillingness to lend beyond the purchase of government debt.

Even if finance can be raised, it may not purchase large quantities of capital goods. The price of investment relative to the price of GDP as a whole determines how much capital equipment a given level of saving will buy, and it is well known that this price is high in developing economies (e.g. Caselli and Feyrer 2007). This is partly attributable to the high relative price of tradable goods in low income countries

---

<sup>5</sup> See the survey by Duranton and Puga (2004) for these issues.

<sup>6</sup> The move from duopoly to monopoly is likely to be much more damaging than the move from triopoly to duopoly.

<sup>7</sup> See World Bank (2010).

(the Balassa-Samuelson effect<sup>8</sup>). In some countries, it is also due to thin markets and monopoly power in supply of equipment and investment goods. Collier and Venables (2008) investigate this, finding that country size has a statistically significant although quantitatively modest effect on the price of capital equipment. Increasing the labour force by a factor of 20 reduces the relative price of investment by 13%, or somewhat more if the sample is restricted a labour force of less than 20 million. India's population is 66 times larger than the average African country, so the implications for differences in the price of capital become substantial.

Transport is another key sector that is often highly cartelized. There is evidence that trucking firms in Africa are able to charge exceptionally high prices; for example, average prices per ton kilometre are \$0.02 in Pakistan, \$0.05 in China, \$0.08 for the Mombasa-Kampala run and \$0.11 for Doula-N'Djamena.<sup>9</sup> Many African economies have restrictive regulatory regimes and transport cartels; de-regulation of the trucking industry in Rwanda has been estimated to have reduced transport prices by 75%. In some countries cartelization is supported by a treaty structure between countries designed to protect the national trucking industry from competition from neighbouring countries. Transport costs are also raised by lack of security and informal levies on traffic.

In addition to increasing the prices of key inputs, thin markets and monopoly power have further pernicious effects. Small and thin markets are unattractive places to invest because investors are vulnerable to 'hold-up' – opportunistic behaviour by the firms with which they have to transact. Hold-up refers to the possibility that, once an investment has been sunk, the investor faces a monopsonistic purchaser of the output of the investment. Even if the purchaser and investor entered an agreement before the investment is undertaken, *ex post* the purchaser may act opportunistically, breaking the agreement and only offering a lower price. The investor will anticipate this possibility so may not make the investment in the first place. How is the hold-up problem overcome? One way is by making the *ex ante* contract legally binding but, even in countries with strong legal systems, it is often impossible to write a contract with the degree of completeness that will rule out such opportunistic behaviour. The other is to make sure that there are many alternative uses for the output of the project. This is partly a matter of the specificity of the investment and partly a matter of the

---

<sup>8</sup> See eg Froot and Rogoff (1995)

<sup>9</sup> Teravaninthorn and Raballand (2008).

size of the market. Hold-up is more likely the fewer people are competing for the output.

This effect seems to be important in a number of African economies. In agriculture, returns to investment are reduced if there is a monopsonistic grain merchant. In manufacturing, fewness of potential purchasers of output deters investment. This gives rise to coordination failure – there is no incentive to enter on one side of the market until the other side has got more firms, and vice versa. And, in a small economy, even the return to the worst option, liquidating the investment, may be reduced by thin markets for second hand capital equipment. Distress sales are likely to be more coincident because smaller economies are less diversified, further depressing the expected price. The hold-up phenomenon applies not only to goods markets, but also to labour markets; the incentive to take training is reduced if the skill acquired can only be sold to one employer (Matouschek and Robert Nicoud 2005).

Why do these sources of inefficiency not get removed by entry of firms or by regulatory measures? Small scale inhibits entry, and this gets amplified by some cumulative causation processes. In an industry that is relatively competitive and has few rents to protect, the incentive to keep entrants out is relatively small. But in a small system where incumbents earn positive rents entry-deterrence yields relatively larger returns. The strategies of entry-deterrence may be the use of predatory pricing or the purchase of political influence. The reforms that might open sectors to competition are the outcome of a political economy process in which rent recipients (often the political as well as the business elite) are balanced against wider business and consumer interests. In a small system this elite is particularly concentrated and is likely to be effective at obstructing reform.

These arguments point to the fact that smallness does not just create static monopoly/ monopsony power. It restricts inputs that are essential for growth, and also creates a fundamentally more risky business environment. Entry of new producers will be deterred by predatory behaviour of incumbents, and by the scarcity of outside options and consequent vulnerability to predatory and opportunistic behaviour; reform will be retarded by the political influence of these incumbents.

### **3. Public goods provision:**

A core function of government is to supply public goods which, by definition, are subject to scale economies. Consumption is non-rival, since one person's consumption does not reduce that of another, and many public goods also have more conventional scale economies: their production technology has high fixed costs which can be spread over more consumers as scale is expanded. Fragmentation into small economies has two effects, both of which are likely to lead to sub-optimal public goods' supply. One follows directly from increasing returns to scale; small economies face higher unit cost of provision. The other is that a high proportion of public goods have cross-boundary effects, so supply has to be met regionally rather than nationally with the attendant problems of international cooperation that this brings.

#### ***Good economic policies and governance***

The formulation and implementation of public policy – economic and otherwise – is a fundamental public good. There are fixed costs to running a finance ministry and formulating an economic policy, and the quality of the civil service can be higher in a larger society simply because it can be more selective. It is around 50 times more competitive to become Permanent Secretary to the Ministry of Finance in India than in Africa and so the quality will on average be higher.

Scale effects also operate through other routes. A larger society can be better informed about economic issues than a small society because there are scale economies in the commercial media: radio, television, newspapers and magazines. The serious discussion within a society of economic issues is highly dependent upon the existence of specialist media, and a large market will permit more of these to exist than a small market. India has such media whereas in Africa only South Africa comes anywhere close to providing a market in which specialist journals are viable. Without a specialist media discussion in the society is likely to be less sophisticated and so the pace at which social learning takes place will be slower. In effect, the society needs a critical mass of educated citizens before social learning can be rapid.

A further reason why larger states may have better policy making is the switch from discretion to rules in decision taking. At its best an intimate organization can function by tailoring each decision to the needs of the individual and the

circumstance: decisions can be personalized. As the organization becomes larger this style of decision-taking breaks down because micro-management becomes overburdened, and is replaced by rule-based procedures. Rule-based decisions can seldom be as good as first-best discretionary decisions, but they are far better than either patronage-driven or idiosyncratic decisions. They also enable the government to have a credible commitment technology which may make it less vulnerable to policy reversals. Hence, we might expect that public decisions in large societies lie within a narrower range than those in small societies. This is closely analogous to the difference between autocracy and democracy. Autocrats have the discretion either to be very good or very bad, whereas democracies are rule-bound. Besley and Kamatsu (2006) have recently compared the economic outcomes for these two types of government and indeed find that democracy truncates the distribution at both extremes. Furthermore, while rule-based procedures replace discretion, large societies are nevertheless able to undertake and learn from policy experiments, as has China, more effectively than can a very small society.

While the above effects of scale are plausible, is there any evidence that they actually matter? Chauvet and Collier (2008) analyze the preconditions for policy turnaround in countries which initially have very poor economic policies and governance. They define a turnaround as the passage between levels of a measure of policy quality (The World Bank's Country Policy and Institutional Assessment) and use data for all low-income countries over the period 1977-2005. They find that larger the population has a significant positive effect on the probability that a country that is initially below the threshold will achieve a sustained turnaround. This effect is quantitatively large. Calculations based on these findings suggest that while it may take a hypothetical large country ('India') six years to bounce out of bad policies, it might take a representative small economy ('Zambia') sixty years.

### ***Infrastructure***

Transport infrastructure has obvious international dimensions, particularly for landlocked economies. As shown by Limao and Venables (2001), the transport costs faced by landlocked countries are strongly affected by the infrastructure spending of their coastal neighbours. Evidently, these benefits to the landlocked are externalities from the perspective of the coastal countries: they are not internalized into the decision calculus and so spending is sub-optimal. Fragmentation affects not only road

and rail transport but even air travel, with journeys between African countries often involving transit via Europe or the middle-east. Other forms of infrastructure also have an international dimension. The generation of electric power is subject to scale economies and there are gains from pooling non-coincident peaks in demand. Political fragmentation can prevent these benefits from being achieved and is one of the factors behind Africa's power crisis.

Cross-border investments do not just create an externality, but also a potential for hold-up. Suppose that a mineral resource is in a land-locked country and there is only one route for the resource to reach the coast for export. Africa has many such examples (oil in Uganda, Chad or South Sudan, copper in Zambia). This is a situation of bilateral monopoly in which countries have an incentive to cooperate before investments are made, but an incentive to try and capture the entire surplus once investments are sunk. Unless they can enter binding agreements (impossible for sovereign parties) or have a high level of trust, the investments will not be made. The hold-up problem between states is radically more severe than that within countries because the whole domain of international law is fragile: essentially, the concept of national sovereignty constitutes a barrier to the enforcement of any contract entered into by states.

### *Security*

Security is the clearest case of a public good that is subject to scale economies far beyond the size of the typical small African state. Over a wide range defence is non-rival: the same army that defends one community from rebellion can defend a proximate community. Over a very wide range it benefits from scale economies: big armies usually defeat little ones.

The international prisoner's dilemma that this creates is more acute the more countries there are. The incidence of war may be increased and, even if not, arms races take place, increasing military spending while at peace. Collier and Hoeffler (2007) establish that neighbourhood arms races have been common around the developing world. Applying their results to Africa suggests that fragmentation leads to military spending about 30% higher than might be expected in a United Africa.

While larger political units reduce the potential for international conflict, almost all of Africa's wars have been internal and so the key issue is how larger political units would have affected this risk. Statistical analysis of the risk of civil war

finds that while population significantly increases the risk, the effect is substantially less than proportionate: a territory under a single country has a lower risk than the combined risk from two polities were it split in half (Collier, Hoeffler and Rohner, 2009). However, the case for scale is complicated by the trade-off with ethnic diversity. In general, in order to make a country larger it is necessary to take in additional social groups so diversity increases, and this increases the risk of civil war. Were Africa to have been split into fewer countries this adverse effect might have more than offset the benefit from greater scale. The issue has recently been analyzed by Wigstrom (2008) who investigated how mergers between neighbouring African countries would affect ethnic diversity. It transpires that in some cases Africa's borders are so arbitrary that ethnic diversity would actually be *reduced* by merger.

### **3. Cities:**

Productivity tends to be higher in large (and/or dense) clusters of economic activity. Firms and workers locate to gain the benefits of this productivity advantage, despite the congestion costs and other diseconomies associated with large cities. A number of mechanisms drive this productivity effect. Some are narrowly technical, for example the fact that dense activity economises on transport costs, improves communications, and might increase learning externalities between firms and workers. Others are to do with the impact of size on market structure and the intensity of competition, as discussed in section 1. Still others are to do with political economy; a city with a large business sector is likely to have a strong business lobby, this producing a business-friendly investment climate. The quantitative evidence of the productivity effect of city size comes largely from studies of cities in developed countries. Rosenthal and Strange (2004) report a consensus view that doubling city size is associated with a productivity increase of some 3 – 8%. This is a large effect – moving from a city of 100,000 workers to one of 3 million is predicted to increase productivity by more than 30%. Au and Henderson (2006) find even larger results for Chinese cities, where they estimate that moving from a city of 100,000 workers to one of 1.3 million workers raises productivity by 80%, although beyond this scale weak diminishing returns cut in.

What is the impact of Africa’s fragmentation on its city size? The obvious fact is that small countries generally have smaller cities, so some of these productivity benefits are foregone. The quantitative importance of this can be found by including country size in a regression equation for city size. The dependent variable is the population of the  $j$ th ranked city in country  $i$ , using the top five ranked cities in each country and giving – with some missing values for very small countries – 521 observations. The explanatory variables are country population, country area, country per capita income, and the rank of the city in the country, i.e.,

$$\begin{aligned} \ln(\text{population}_{ij}) = & a + b_1 \ln(\text{population}_i) + b_2 \ln(\text{area}_i) + b_3 \ln(\text{income pc}_i) \\ & + b_4 \ln(\text{rank}_j) \dots \end{aligned}$$

**Table 1: City population:** (all variables in logs)

	City population	City population	City population
Country population	0.639 (23.3)	0.70 (18.9)	0.731 (13.7)
Country area	0.169 (7.1)	0.107 (3.9)	0.085 (2.1)
GDP pc	0.27 (7.6)	0.27 (7.6)	0.102 (1.8)
City rank	-1.08 (-25.0)	-1.1 (-28.0)	-1.21 (-25.0)
Region fixed effects	No	Yes	No
N	521	521	Income per capita < \$10k. N = 325.
R <sup>2</sup>	0.80	0.83	0.83

Data: Source: <http://www.citypopulation.de/World.html> and World Development Indicators.

Results are given in table 1 for specifications with and without regional fixed effects, for the world as a whole and for countries with per capita income of less than \$10,000. As is well known, national per capita income has a positive effect on city population. The city’s within country rank has a negative effect, as it must by construction. The estimated parameter in our central specification is -1.08, close to

Zipf's law.<sup>10</sup> Of most interest for our purposes is that fact that both country population and country area are highly significant determinants of city size. The sum of the coefficients on these two variables is 0.8, indicating that a merger of two similar size countries – i.e. a doubling of population and area – would lead to a 75% increase in the size of the largest city. To see the quantitative implications of this, suppose that initially there are 10 separate countries, in each of which the largest city has a population of 3 million people. Combining these countries and letting city sizes adjust in line with the regularities given in table 3, produces a largest city of 19 million, and a size distribution of city populations given (for the first 10 cities) by; 19mn, 9.5mn, 6.3mn, 4.7mn, 3.8mn, 3.1mn, 2.7mn, 2.4mn, 2.1mn, 1.9mn...).

It is interesting comparing these calculations with the actual city size distributions of Africa as compared to India (table 2). Both the calculations and the actual data for India suggest that, compared to Africa, a large integrated country has much larger cities at the top of the rank; slightly fewer upper middle ranking (compare the ranks of the Indian and African cities with population around 3 million as given in table 2); and many more mid to large cities (e.g. number of cities with population between 1 and 2 million).

This analysis suggests that the smaller size of African cities is due, in large part, to the fragmentation of countries. Our preceding analysis and the evidence from developed country studies (as summarised by Rosenthal and Strange 2004, cited above) suggests that this may have had an adverse effect on the productivity of African manufacturing. Africa's fragmentation and consequent urban structure may have impeded the development of major international manufacturing centres of the type that contribute to the performance of high growth economies.

---

<sup>10</sup> The rank size rule, stating that within countries the size of each city is inversely proportional to its rank in the city size distribution, see Gabaix and Ioannides 2004.

**Table 2: Cities with population greater than 1 million: India and Africa.**

Mumbai	21,600,000	Lagos	Nigeria	10,100,000
Delhi	21,500,000	Kinshasa	Congo DR	8,200,000
Kolkata	15,700,000	Johannesburg	South Africa	7,800,000
Chennai	7,850,000	Al-Kharṭūm	Sudan	5,450,000
Bangalore	7,350,000	Abidjan	Côte d'Ivoire	4,225,000
Hyderābād	7,150,000	Durban	South Africa	3,600,000
Ahmadābād	5,650,000	Kano	Nigeria	3,600,000
Pune	4,625,000	Cape Town	South Africa	3,400,000
Sūrat	3,875,000	Accra	Ghana	3,350,000
Kānpur	3,475,000	Ibadan	Nigeria	3,200,000
Jaipur	3,050,000	Nairobi	Kenya	3,175,000
Lucknow	2,800,000	Adis Abeba	Ethiopia	3,100,000
Nāgpur	2,700,000	Dar es Salaam	Tanzania	3,000,000
Patna	2,350,000	Luanda	Angola	2,875,000
Indore	1,870,000	Dakar	Senegal	2,550,000
Vadodara	1,870,000	Pretoria	South Africa	2,450,000
Coimbatore	1,820,000	Harare	Zimbabwe	2,200,000
Bhopāl	1,810,000	Douala	Cameroon	2,000,000
Ludhiāna	1,730,000	Maputo	Mozambique	1,820,000
Āgra	1,700,000	Antananarivo	Madagascar	1,760,000
Kochi	1,660,000	Bamako	Mali	1,730,000
Visākhapatnam	1,610,000	Lusaka	Zambia	1,720,000
Meerut	1,600,000	Yaoundé	Cameroon	1,610,000
Asansol	1,580,000	Conakry	Guinea	1,600,000
Bhubaneswar	1,560,000	Kaduna	Nigeria	1,590,000
Nāshik	1,550,000	Kumasi	Ghana	1,520,000
Chandīgarh	1,520,000	Kampala	Uganda	1,490,000
Vārānasi	1,470,000	Lubumbashi	Congo (DR)	1,450,000
Kolhāpur	1,460,000	Muqdisho	Somalia	1,410,000
Jamshedpur	1,350,000	Brazzaville	Congo (Rep.)	1,330,000
Madurai	1,350,000	Lomé	Togo	1,320,000
Rājkot	1,320,000	Ouagadougou	Burkina Faso	1,260,000
Jabalpur	1,300,000	Benin City	Nigeria	1,180,000
Dhanbād	1,290,000	Port Harcourt	Nigeria	1,170,000
Amritsar	1,270,000	Port Elizabeth	South Africa	1,150,000
Allahābād	1,230,000	Freetown	Sierra Leone	1,110,000
Vijayawāda	1,220,000	Cotonou	Benin	1,090,000
Srīnagar	1,180,000	Maiduguri	Nigeria	1,040,000
Shambajinagar	1,170,000			
Solāpur	1,100,000			
Thiruvananthapuram	1,100,000			
Rānchi	1,090,000			
Jodhpur	1,040,000			
Guwāhātī	1,030,000			
Tiruchirāppalli	1,010,000			
Gwalior	1,000,000			

Source: <http://www.citypopulation.de/World.html>

#### 4. Uneven endowments and diminishing returns

Economic geography models often generate spatial inequalities by combining increasing returns to scale with mobile factors of production. Spatial inequalities also arise from the combination of diminishing returns with an uneven distribution of immobile natural advantages. Fragmentation of a continent into countries means that geographically concentrated natural endowments – such as mineral resources, coasts or rivers – are likely to be unevenly distributed between countries, and so it turns out in Africa. Table 3 gives export earnings (as % GDP and per capita) from natural resources together with Collier's (2008) classification of countries according to whether they are resource rich, landlocked, or coastal. Resource export revenues per African citizen average range from several thousand dollars per head and more than half of GDP, to zero in resource scarce – and also landlocked – countries such as Malawi, Rwanda, Burundi or Uganda.<sup>11</sup>

This unequal distribution matters for two reasons. The first is that it maps into an unequal distribution of resource rents per capita. Within a country resource rents are likely to be spent throughout the nation. The spending may not be spatially uniform; producing regions may be favoured, as in Nigeria, where 2005 Federal transfers from oil revenue amounted to \$210 per capita in oil producing states, and \$70 per capita in the North West of the country. But this is a far wider distribution of rents across intra-country boundaries than occurs across international boundaries (i.e. zero).

---

<sup>11</sup> Uganda has made recent but as yet undeveloped discoveries of oil.

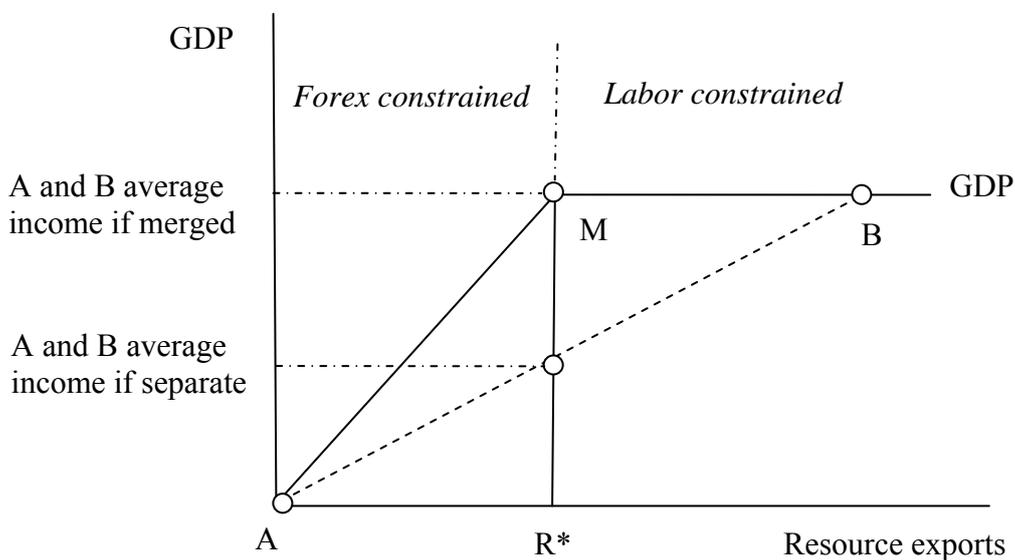
**Table 3: African first nature geography**

	<b>Fuels, Ores &amp; Metals: Export Value % GDP</b>	<b>Fuels, Ores &amp; Metals: Export Value per capita (\$)</b>	<b>Collier classification:</b>	<b>Year</b>
Equatorial Guinea	93.92	14591	Resource rich	2005
Angola	72.16	1471	Resource rich	2005
Congo, Rep.	71.46	1182	Resource rich	2005
Gabon	55.90	4071	Resource rich	2006
Chad	44.47	258	Landlocked	2005
Nigeria	40.94	214	Resource rich	2004
Botswana	34.74	1977	Resource rich	2005
Guinea	24.4	88	Resource rich	2006
Congo, Dem. Rep.	24.34	34	Resource rich	2006
Mauritania	19.79	123	Newly resource rich	2005
Mozambique	18.71	62	Newly resource rich	2005
Zambia	18.32	116	Resource rich	2005
Sudan	13.50	102	Newly resource rich	2005
Cote d'Ivoire	12.52	108	Coastal	2005
Mali	10.65	46	Landlocked	2004
Cameroon	9.4	89	Coastal (Ex-res-rich)	2005
Sierra Leone	9.4	20	Coastal	2005
South Africa	6.81	351	Coastal	2005
Zimbabwe	5.75	15	Landlocked	2005
Niger	4.55	12	Landlocked	2005
Kenya	4.52	21	Coastal	2004
Senegal	4.3	30	Coastal	2005
Togo	3.9	13	Coastal	2004
Namibia	3.11	97	Coastal	2006
Ghana	2.50	12	Coastal	2005
Madagascar	1.70	5	Coastal	2006
Central African Rep	1.62	5	Landlocked	2005
Tanzania	1.58	5	Coastal	2005
Cape Verde	0.87	19	Coastal	2006
Swaziland	0.81	9	Landlocked	2002
Uganda	0.66	2	Landlocked	2005
Ethiopia	0.54	0.7	Landlocked	2004
Burundi	0.34	0.3	Landlocked	2005
Rwanda	0.33	0.8	Landlocked	2005
Burkina Faso	0.31	1.2	Landlocked	2004
Mauritius	0.17	9	Coastal	2005
Benin	0.11	0.6	Coastal	2005
Malawi	0.05	0.1	Landlocked	2005
Liberia			Coastal	
Guinea-Bissau	0.44	0.9	Coastal	1995
Gambia, The	0.05	0.1	Coastal	2003
Comoros	0.03	0.1	Coastal	1997
Djibouti	0.01	0.1	Coastal	1990

**Notes.** Diamond exports included in calculation for Angola, Botswana, DRC, Guinea and Zimbabwe, and gold exports included for DRC, Guinea and Ethiopia. For Mali, Fuels, Ores & Metals export consists solely of gold. For Sierra Leone, Fuels, Ores & Metals export consists solely of diamonds.

It is not only equity that is damaged by unequal distribution of resource revenues. Since the economic impact of resource revenues is likely to be subject to diminishing returns their unequal distribution also leads to an efficiency loss. A simple economic model makes the point. Suppose that every country consumes and produces a single good that is non-tradable. Production of the good uses foreign exchange (imported inputs and equipment) and domestic labour in fixed proportions. The only source of foreign exchange is resource revenues, and labour is in fixed supply. Real income in such an economy is illustrated in figure 1, in which resource revenue is measured on the horizontal axis. If resource exports are less than  $R^*$ , then production is foreign exchange constrained and real income is given by the upwards sloping section of the line (with slope equal to the foreign exchange content per unit GDP). If natural resource earnings are greater than  $R^*$ , then the economy is labour constrained, this fixing income; further resource earnings beyond this point are simply accumulated as foreign assets.

**Figure 1: Income loss from uneven distribution of resources**



As a simplest case, suppose that one economy has no resource revenue (so is at point A) and another has resource revenue and is at point B. In this case income in country A is zero; it has no foreign exchange so cannot import the inputs necessary

for any production to take place. In contrast, country B's labour is fully employed with productivity determined by its technology. It has more foreign exchange than is needed to finance domestic needs so the excess is accumulated in foreign assets. Average non-resource income – of the two separate countries – is the midpoint between A and B. Merger of the two economies would exactly double income, as both countries would operate at point M.

This is a very clear cut example – what insights does it provide to reality? There are two key elements to the argument. The first is that shortage of foreign exchange constrains production in economies without resource earnings. Many of the resource scarce and landlocked African economies have extremely low shares of exports in GDP – less than 15% of GDP for 8 such countries. Accessing world markets is difficult for these countries, and they are heavily aid dependent. If they were located within a single country, then such areas would earn the resources to finance 'imports' by intra-country trade. The argument must therefore turn on the fact that barriers to trade created by international borders are an order of magnitude greater than within-country trade barriers, and there is plenty of evidence that this is the case. The classic studies of the barriers created by international borders, compared to within country trade costs, are based on trade between Canada and the US. McCallum (2005) and Helliwell (1997) show that exports of Canadian provinces to other Canadian provinces are some twenty times larger than their exports to US states at the same distance. African borders are generally very much more difficult to navigate than is the border between the US and Canada. Limao and Venables (2001) find that poor infrastructure is particularly important in choking off trade between African countries. The implication is that resource scarce land-locked regions face more acute problems financing imports as separate nations than they would as regions of a larger country.

The second part of the argument contained in figure 1 is that, at some point, there are diminishing returns to resource earnings. In the example of the figure this was the economy hitting full employment, so no more labour is available to produce further income, but the argument is more general. There are often bottlenecks in the supply of non-tradable services, such as construction services or particular labour skills, so a resource boom bids up the price of these inputs but does not buy additional real services. More generally, spending from resource revenues will be met by a combination of increased output and price increases which crowd out other

expenditures. The ‘Dutch disease’ is the case when exports are crowded out, perhaps with long run implications for productivity growth.

The key point for the present argument is that the smaller are resource revenues relative to the economy as a whole the more favourable will be the balance between increasing income vs. crowding out other expenditures. If two countries are merged, the supply curve of merged country is the horizontal sum of the supply curves of each separately, so a given size increase in demand will lead to a larger quantity increase and smaller price increase in the merged economy than in a separate one. While this argument focuses on income and expenditure, other aspects of the ‘resource curse’ (e.g. political economy issues) may also exhibit increasing marginal cost, possibly meaning that benefits of resource revenue do not just flatten out with more revenues, but turn negative at the margin. In this case the citizens of *both* countries would gain from merger and a sharing of the economic impact of revenues.

It is not just natural resources that are unequally divided between countries, but also access to other natural assets, such as rivers, harbours, and the coast. Coastal economies in developing countries are much better placed to engage in producing manufactures for world markets than are landlocked countries, and such activities are important drivers of growth (Jones and Olken 2007, Spence 2008). Coastal regions that achieve rapid export growth experience rising labour demand met by a combination of rising wages and in-migration. Some Asian economies have witnessed massive migration to those regions (usually although not necessarily coastal) that have been successful in building up sectors supplying world markets. The best example is west to east migration in China

If migration is not possible, then growth is choked off by rising wages and diminishing returns. Africa has not yet developed such magnets of employment, but the analysis points to the fact that if it were to do so, fragmentation would prevent it from fully realising the benefits. International movement of labour is generally restricted, and where large flows have occurred they have sometimes played into the politics of xenophobia. The clearest instance of this depressing sequence arose from the sharp difference in natural advantage between Cote d’Ivoire and Burkina Faso. With its radically better economic opportunities due to its coast and its rainfall, Cote d’Ivoire attracted massive immigration from Burkina Faso. Indeed, at one stage around 40% of the labour force in Cote d’Ivoire was Burkinabe. During the 1990s this was exploited by populist politicians and was instrumental in triggering the political

meltdown into coups and civil war during which much of the migration was reversed.<sup>12</sup> Nigeria during the 1970s provides a second instance of the same sequence. The oil discovery in Nigeria created a sharp distinction in natural advantage vis-à-vis Ghana. This generated mass migration from Ghana: at one stage around a fifth of the Ghanaian population had emigrated. This in turn induced xenophobia in Nigeria and once economic conditions deteriorated the Ghanaians were formally expelled. South Africa witnessed its own backlash against immigration in 2008.

### ***Time-Variant differences in natural advantage: export volatility***

The economic advantages of a country at a point in time are shaped partly by geography, and partly by the impact of transient shocks. The arguments developed above apply to these transient effects as well as to the permanent ones. Shocks create unevenness between areas, and the ability to spread their impact (i.e. to pool risk) – with both distributional and efficiency implications – is impeded by fragmentation into national units.

Many authors have argued that high degrees of export concentration in primary commodities have exposed African economies to a high degree of volatility. For example, Collier and Goderis (2008, 2008a, 2008b) investigate the consequences of commodity export shocks for GDP. They find that the effects of shocks on growth are asymmetrical: adverse shocks significantly and substantially reduce output, whereas positive shocks do not have significant effects. The effect of adverse shocks is substantial. For example, for a typical African country whose commodity exports are initially around 35% of GDP, the consequence of a 30% fall in export prices would be to reduce growth in the following year by 3.6 percentage points, on top of the direct impact of the price fall. Larger countries would be better able to pool risk, although the extent to which this can occur in Africa is reduced by the correlation between countries' export structures.

## **5. Growth prospects**

We have argued that, on top of its physical geography and remoteness, Africa has been held back by the fragmentation of its political and economic geography.

---

<sup>12</sup> See Collier (2009) for a detailed account of this sequence.

Economic size is necessarily small in a low income region but the fragmentation of Africa compounds this, meaning that agglomeration economies are foregone, coordination failures are acute, and natural endowments are not used effectively. What are the prospects for future growth?

Collier's classification of countries (table 1) is helpful. A few countries – notably Botswana, Angola, Gabon, Nigeria and the DRC – have sufficient resource wealth that their future will be dominated by income from these assets. The challenge in these countries is to manage the assets and the income from them successfully. Botswana's record is outstanding (it has increased real per capita income by a factor of ten over the last 40 years). Problems of governance and economic management have drawn the others into the 'resource curse'. Overcoming this means getting all stages of resource management (fiscal regimes, revenue transparency, management of volatility, adequate savings rates, and effective public spending) substantially correct (Collier et al 2010). Improvements are being made (e.g. through the Extractive Industries Transparency Initiative<sup>13</sup> and the creation of Stabilization funds to manage resource income) but vested interests are hard to dislodge.

There is a second group of resource rich countries where resource revenues can make an important contribution to the availability of both foreign exchange and government funds, yet where absolute magnitudes are small – a few hundred dollars per capita per annum. The challenge for these countries is to use revenues in a way which fosters growth of other sectors of the economy, rather than damages it. This means improving the quantity of domestic capital (infrastructure and human capital) so that potential adverse effects of the Dutch disease are offset by public investments that raise the return to private capital.

Coastal economies have the greatest potential for developing clusters of manufacturing export activity. Africa was left out of the globalisation waves of the 1980s and 90s because of conflict, poor governance, and inappropriate economic policies. Most African countries are now much improved in all these dimensions, but face the problem that Asia has developed effective clusters in labour intensive manufacturing with the consequent high levels of productivity. As wages rise in Asia there will come a point at which it becomes profitable for firms to relocate. Economic geography models teach us that this can be quite a sharp and discontinuous process:

---

<sup>13</sup> <http://eitransparency.org/>

as new clusters start to reap the productivity benefits of agglomeration they will grow fast. Critically, quite small initial differences between locations will determine where the new clusters develop.<sup>14</sup> Will Africa attract some of these new clusters of activity? Changes in international trade rules can facilitate this, most notably liberalization of restrictive rules of origin (such as those of the EU) which restrict the extent to which Africa can use imported inputs and specialise in labour-intensive stages of the value chain (such as garment production using textiles imported from Asia). Most importantly, if clusters are to develop they require hard and soft capital (infrastructure and business environment) to be of high quality. This can be spatially concentrated, perhaps just in special economic zones, which must offer conditions good enough to attract the inwards investment that can trigger growth and agglomeration.

The final group of countries in the classification are those that are land-locked, resource poor and – in some cases – facing adverse consequences of climate change. Political fragmentation is most damaging for these, and it is hard to see a solution without a much more effective process of economic and political integration within Africa.

---

<sup>14</sup> An analytical framework for thinking about the relocation of these clusters comes from Puga and Venables (1996) and Fujita et al (1999).

## References:

- Alesina, A., E. Spolaore and R. Wacziarg (2004) 'Trade, growth and the size of countries' in P. Aghion and S. Durlauf (eds) *Handbook of Economic Growth*, North Holland, Amsterdam.
- Au, C-C and J.V. Henderson (2006) 'Are Chinese Cities Too Small?' *Review of Economic Studies*, 73, 549-576.
- Besley, T. and M. Kudamatsu, (2007), 'Making Autocracy Work', CEPR discussion paper no. 6371.
- Bosker, M. and H. Garretsen, (2008), '*Economic Geography and Economic Development in Sub-Saharan Africa*' Cesifo working paper no. 2490
- Caselli, F. and J. Feyrer, (2007) 'The Marginal Product of Capital' *Quarterly Journal of Economics*.
- Chauvet, L. and P. Collier, (2008), What are the Preconditions for Turnarounds in Failing States? *Journal of Conflict Management and Peace Science*, 25,332-348.
- Collier, P. (2010) '*The plundered planet*', Allen Lane, London.
- Collier, P. and S. O'Connell, (2008) Opportunities and Choices, in B. Ndulu, S. O'Connell, R. Bates, P. Collier and C. Soludo (eds) *The Political Economy of Economic Growth in Africa, 1960-2000*, Cambridge University Press.
- Collier, P. and B. Goderis, forthcoming, 'Does Aid Mitigate External Shocks?' *Review of Development Economics* (forthcoming).
- \_\_\_\_\_, (2008a), 'Structural Policies for Shock-Prone Commodity Exporters', mimeo, CSAE, Oxford.
- \_\_\_\_\_, (2008b), Commodity Prices, Growth, and the Natural Resource Curse, mimeo, CSAE, Oxford.
- Collier P. and A.J. Venables (2008) 'Trade and economic performance: does Africa's fragmentation matter', processed, Oxford.
- Collier P., R. van der Ploeg, M. A. Spence and A.J. Venables (2010) 'Managing resource revenues in developing economies', *IMF Staff papers*, 57, 84-118.
- Duranton, G. and D. Puga, (2004) 'Microfoundations of urban agglomeration economies' in J. V. Henderson and J. F. Thisse (eds.) *Handbook of International Economics*, Vol. 3, Amsterdam: North Holland

- Froot, K. and K. Rogoff, (1995) ‘Perspectives on PPP and long run real exchange rates’ in G. Grossman and K. Rogoff (eds.) *Handbook of Regional and Urban Economics*, Vol. 4, Amsterdam: North Holland
- Gabaix, X. and Ioannides, Y. (2004), ‘The evolution of city size distributions’, in J. V. Henderson and J. F. Thisse (eds.) *Handbook of Regional and Urban Economics*, Vol. 4, Amsterdam: North Holland,
- Limao, N. and A.J. Venables (2001) “Infrastructure, geographical disadvantage, transport costs and trade”, *World Bank Economic Review*, 15, 451-479.
- Matouschek, N., and F. Robert-Nicoud. 2005. “The Role of Human Capital Investments in the Location Decisions of Firms.” *Regional Science and Urban Economics* 35 (5): 570–83
- Mayer, T. (2009) ‘Market potential and development’ CEPII working paper 2009-24.
- Puga, D. and A.J. Venables (1996) “The spread of industry: spatial agglomeration in economic development”, *Journal of the Japanese and International Economy*, 10, 440-464.
- Redding, S. and A. J. Venables (2004) ‘Economic geography and International Inequality’, *Journal of International Economics* 62(1), 53–82.
- Rosenthal, S.S. and W.C. Strange (2004) ‘Evidence on the nature and sources of agglomeration economies’, in J. V. Henderson and J. F. Thisse (eds.) *Handbook of Regional and Urban Economics*, Vol. 4, 2004. Amsterdam: North Holland.
- Sachs, J. and P. Malaney (2002) ‘The economic and social burden of malaria’, *Nature*, 415, 680-685
- Teravaninthorn, S. and Raballand, G. (2008), *Transport prices and cost in Africa: A review of the main international corridors*, World Bank: Washington D.C.
- UN (2008), *World Population Prospects: The 2008 Revision*, Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, New York.
- Wigstrom, C., (2008), ‘Does Size Matter?’ M.Phil. Thesis, Oxford University.
- World Bank (2010) ‘*Doing Business 2010*’, World Bank, Washington DC.