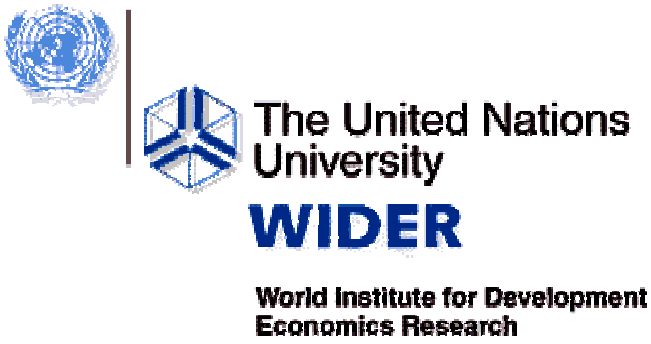

Research for Action 44

Resource Abundance and Economic Development

Improving the Performance of Resource-Rich Countries

Richard M. Auty

This study has been prepared within the UNU/WIDER project on Environmental, Export and Human Development Problems in Natural Resource-Based Growth Models,

which is directed by Professor Richard M. Auty, UNU/WIDER, and University of Lancaster, UK.

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FOREWORD

Until recently, most economists have neglected the role that natural resources play in economic development. They have reported sharp differences in the performance of differing countries and regions but the connection with the natural resource endowment has been either ignored or, at best, underestimated. This paper corrects this neglect by reviewing the existing literature and uncovering systematic relationships between the natural resource endowment of a country and a range of variables. The paper is based upon a literature review undertaken in connection with the UNU/WIDER project that is investigating the export, environmental and human capital development problems of resource-based growth models. The review embraces a diverse literature that, in addition to trade theory, human capital and growth models, includes demography, income distribution, institutional economics, structural change, environmental and natural resource accounting, area studies and political economy. The result is a synthesis that demonstrates clear evidence that since the 1960s resource-abundance has been associated with disappointing economic development and goes on to explain how the natural resource endowment affects the nature of structural change and the rate of accumulation of produced and human capital. The paper also makes a start on expanding the conventional growth accounting framework to include natural capital and institutional capital, two essential components for ensuring that economic development is both environmentally and socially sustainable.

The paper identifies contrasting patterns of development that are distilled into two models. The first is the staple trap model that is associated with resource-abundance. It traces a closure of trade policy that heightens the specialization of the economy on the resource sector and leads to deterioration in investment efficiency. This renders the economy vulnerable to external shocks that bring growth collapses. The associated deterioration in all forms of capital, including institutional capital, implies that recovery will be a lengthy process. Recovery will require policies that go beyond the 'prudent macro and micro measures' promulgated by the international financial institutions in the 1980s and summarised in the Washington Consensus. Governments must also address more deep-seated issues that include construction of the institutional capital that is required to ensure that policies are socially sustainable. The second model is the sequenced industrialization model that is associated with the successful resource-deficient countries. This model sustains a relatively open trade policy and a steady diversification of the economy into a widening range of manufacturing that proves resilient to external shocks. The model provides strong incentives to accumulate both produced and human capital. Finally, the paper draws some policy conclusions for both reforming developing market economies and the transition economies. However, the final prescriptions must await the conclusion of the UNU/WIDER project in late-1999.

Giovanni Andrea Cornia
Director, UNU/WIDER
September 1998

ABSTRACT

Since the 1960s the resource-rich developing economies have under-performed compared with the resource-deficient economies. This paper explains why and outlines the reforms that are required in order to achieve environmentally and socially sustainable resource-rich development. It argues that structural change in the resource-rich countries causes the tradeable sector to shrink vis-à-vis the nontradeables sector (that includes protected manufacturing) in a manner that is not sustainable. This adverse trend in the production structure is associated with policies to close the economy and create discretionary rents behind protective barriers that result in the cumulative misallocation of resources. The build-up of produced capital and skills is slower than in the successful resource-deficient countries. Overall, the inherently slower and less egalitarian economic growth trajectory of the resource-rich countries is intensified and the end result is usually a growth collapse. The collapse causes all forms of capital, including institutional, social and natural capital, to run down. Economic reform is therefore protracted and it may take in excess of one generation to restore sustainable rapid growth. The adverse features of resource-rich development tend to be more pronounced in the smaller countries. They are also heightened where the resource rents accrue mainly to the central government, as in the mineral economies and in the slow-reforming transition economies. Successful reform requires not only appropriate macro and micro policies, but also the construction of institutions to limit the scope for governments to misallocate resources. Part of the explanation for the superior performance of the resource-*deficient* countries is that their spartan endowment of natural capital acts as a constraint on government failure by placing a premium on the need to nurture scarce resources, including skills, institutions and social capital, and to achieve an efficient allocation of capital.

I THE CONTEXT AND BACKGROUND OF THE RESEARCH

1.1 The underperformance of the resource-rich economies

A number of recent studies have shown that the resource-rich developing countries have underperformed compared with the resource-deficient countries (Ranis 1991, Lal and Myint 1996, Sachs and Warner 1995a, Sachs and Warner 1997). There is no consensus among these studies on the measurement of resource abundance. Some have used single indicators, such as export dependence (Sachs and Warner 1995a), per capita land area (Wood and Berge 1994) and labour force share (Gylfason et al. 1997); whereas others have used dual indices such as export orientation and population size (Syrquin and Chenery 1989). However, in justifying his choice of per capita land area, Wood argues that there is little evidence that the basic findings are sensitive to the classification system used. The present study favours dual criteria, namely, per capita cropland (as an index of land endowment) and country size, measured in terms of absolute GDP (as an index of scope for domestic manufacturing). The basic four-fold classification produces a very large group of small resource-rich countries, so it is further modified in two stages (Table 1). The first distinction is that between economies that are crop-driven and those that are mineral-driven. This distinction is important because the principal economic linkage from minerals tends to be fiscal linkage, that is taxation, so that the governments of mineral economies must play a more important role in channelling the economic stimulus from primary exports than in the case of the governments of crop-exporting countries. The second step is to sub-divide the mineral economy category into oil exporters and hard mineral exporters. This is because the rents tend to comprise a significantly higher fraction of oil revenues than is the case of most hard mineral revenues.

TABLE 1

CHARACTERISTICS OF SIX NATURAL RESOURCE ENDOWMENT CATEGORIES

Resource endowment	Number of countries	Cropland (Ha/hd)	GDP 1970 ($b)	PCGDP 1970 ($)	PCGDP growth 1960-90 (%/Yr)	PCGDP growth 1970-93 (%/Yr)
Resource poor						
Large	7	0.15	21.05	196	3.5	3.7
Small	13	0.16	1.94	343	2.5	2.1
Resource rich						
Large	10	0.56	22.99	574	1.6	1.3
Small						
Non-mineral	31	0.57	1.41	250	1.1	0.7
Hard mineral	16	0.66	1.23	304	0.8	-0.2
Oil exporter	8	0.44	2.01	831	1.7	0.8
All countries	85	0.48	5.67	362	1.6	1.1

Source: Auty (1997a), based upon UNCTAD data.

Table 1 shows that between 1960 and 1990 the per capita incomes of the resource-*deficient* countries grew at rates two to three times faster than those of the resource-rich countries and that the gap in the growth rates widened significantly from the 1970s. Although, as shown below, there is reason to expect that crop-led growth in resource-rich countries is inherently slower than the manufacturing-led growth of resource-deficient countries, the difference in the growth rates is much greater than would be expected. Moreover, the *mineral*-driven resource-rich countries have been among the weakest performers, even though they have the potential for very high growth because the mineral exports enhance their capacity both to invest and to import compared with the non-mineral economies.

Any inherent tendency towards slower growth in resource-rich countries has been much exacerbated by the fact that such countries appear more prone than resource-deficient ones to policy failure that leads to growth collapses. The events leading up to growth collapses deflect attention from human capital formation (including the build-up of institutions, or social capital) and from environmental protection. The adverse effects of a growth collapse appear to be most acute in the smaller resource-rich economies, especially where the resource rents accrue principally to the government, as in the cases of the mineral economies and some of the least developed transition economies.

Explanations for the unsatisfactory performance of the resource-rich countries have been sought in terms of both external factors and internal factors (Ranis 1991). Taking the external factors, Ranis advances three hypotheses. First, primary product exports heighten income inequality so that society equates trade with the interests of the rich. Second, the Dutch Disease effects seriously weaken the competitiveness of the non-booming tradeable sectors. Third, the prices of primary products experience higher volatility than do the prices of manufactured goods, causing growth collapses in the absence of export diversification. Turning to the internal causes, there are also three contending hypotheses. They revolve around the mismanagement of the natural resource rents. First, the rents divert attention from the process of wealth creation and into rent-seeking activity; second, the rents from natural resources support the import substitution process long after its contribution to development has ceased to be positive; and third, the rents distract governments from the need to develop human resources. In fact, all six hypotheses concerning the causes of the unsatisfactory performance of the resource-rich countries are compatible with each other.

This paper draws upon a research project that in explaining the disappointing economic performance of the resource-rich countries and devising policies for economic growth that are not only rapid and equitable, but also environmentally and socially sustainable. In explaining the disappointing performance of the resource-rich countries, the research asks: what are the long-term trends in resource-driven growth? Why did economic growth rates diverge so sharply after the 1960s and what role did the heightened commodity price volatility of the 1970s play? Are there systematic patterns in the relationship between the natural resource endowment and the accumulation of produced and human capital, and also with the *social* sustainability of development policies? How does the demographic cycle affect these parameters? Why do resource-rich countries have relatively high-income inequality and how does this characteristic relate to their

generally disappointing rates of human and social capital formation? What roles do the closure of the economy and the associated creation of discretionary rents play in policy failure? What are the implications of policy failure for the sustainable use of natural resources? Why have the smaller resource-rich countries grown slower than the larger ones over recent years? Is policy failure more likely when the resource rents are concentrated on the government, as in the case of the mineral economies and the mid-income transition economies?

Turning to the policy implications of the research, the prescriptions are tailored to take account of differences in: the natural resource bases; per capita income (and associated levels of educational and of institutional and social capital); and also types of political state (which profoundly affect the efficiency of resource use, as a comparison of Nigeria and Botswana starkly attests). The specific policy questions addressed include: What macro policy reforms are required of the resource-rich countries? How rapidly, and in what sequence, should the reform process proceed? How can the destabilizing impact of commodity price swings be reduced? What role can Environmental and Natural Resource Accounting (EARA) play in improving the management of natural resources and in enhancing the overall economic performance of the resource-rich countries? How might reduced income inequality contribute to the more rapid accumulation of educational and institutional capital? Why has the reform process tended to take significantly longer than initially expected? There is reason to believe that many of these questions can be answered to better effect if the growth accounting framework is broadened.

1.2 A broader growth accounting framework

The neo-classical growth model presents output as a function of inputs of capital, labour and technology. It predicts that the long-run rate of growth is constrained by the rate of growth of the labour force. This is so if the production function exhibits diminishing returns to capital, constant returns to scale and zero technological progress. In its most basic form, the model is expressed as:

$$Y = F(K, AL)$$

where Y is output, K is capital, L is labour and A is a measure of the level of technology (Mankiw 1995). The model stresses that medium-term growth arises from the accumulation of capital. If $k = K/AL$, a measure of capital efficiency, it evolves so that:

$$\underline{k} = sf(k) - (n + g + d)k$$

where $\underline{k}$ is change in the capital efficiency level, s is the saving rate, n is the rate of population growth, g is the rate of growth in technology and d is the rate at which capital depreciates. The terms s, n, g and d are exogenous to the neo-classical model. The long-run outcome of the model approaches a steady state where $\underline{k} = 0$.

The application of the neo-classical model tends to produce a sizeable residual. For example, the World Bank (1993) study of the East Asian miracle concludes that the

model explains barely one-third of the difference in economic performance between East Asia and Latin America. Efforts to remedy this deficiency have focused largely upon either the incorporation of qualitative changes in the basic inputs of the neo-classical model (Mankiw 1995, Young 1995), or upon the development of the new, or endogenous, growth theory that targets the role of technological change (Romer 1987 and 1994). The latter approach relaxes the assumptions about constant returns to scale and competitive markets, and seeks to specify the mechanisms by which technology will accumulate. In fact, Barro (1998) concludes that the two models are complementary because standard growth accounting provides useful information within the context of endogenous growth theory, and the latter can be used to extend the usefulness of traditional growth accounting.

Yet despite the elaboration of the neo-classical theory and the development of endogenous growth theory, both models share the common problem of being overly-narrowly-specified (Sachs and Warner 1996, Temple and Johnson 1998). In this vein, Pritchett (1997) argues that a single growth model cannot possibly explain the varied growth patterns to be observed across the spectrum of countries, whether the model is expressed in terms of exogenous or endogenous technological change. Two important omissions are, first, natural capital, whose inclusion facilitates the consideration of the environmental sustainability of economic development and, second, institutional capital, which allows the social sustainability of policies to be analyzed.

Grave doubts have been raised about the long-term sustainability of the development process because chronic market failure has led to the misallocation and over-consumption of natural capital and environmental resources (World Bank 1992). For example, Atkinson et al. (1997) provide clear evidence that whatever growth was achieved in many of the smaller resource-rich countries in the 1970s and 1980s, it was not environmentally sustainable because it was based upon the once-for-all consumption of natural capital. However, a recent attempt to measure the sources of wealth, including natural capital, suggests that both natural capital and produced capital are far less significant than human capital in most global regions (World Bank 1997 and 1998a). The explanatory power of growth models may therefore be improved if, in addition to adding natural capital, the large human capital component is sub-divided. This can be achieved if the human capital component is split between skill (education), a traditional preoccupation of growth accounting, and social or institutional capital. Social capital may be broadly defined as the institutions that moderate the efficiency with which the other factors are deployed (Temple and Johnson 1998). As development proceeds and transactions become more impersonal, social capital increasingly becomes a local level phenomenon because formal institutions at the national level become more important. However, the measurement of institutional capital poses problems. One solution is to develop a surrogate indicator by, for example, using, the Delphi approach to assess government efficiency or, the approach favoured here, to use the type of political state as a proxy for institutional capacity.

This paper therefore examines economic growth by considering environmental capital and institutional capital alongside the traditional factors of produced capital, education and technological change. It deploys a number of growth models, selecting that model

which offers most insight into the specific issue under review. The research also relies strongly on empirical work because that approach extends the factors that can be evaluated and thereby enriches the findings in comparison with the more formal models. More specifically, the next section, Section II, reviews what growth accounting and trade studies have to say about the role of natural resources in economic development and structural change. Section III then goes on to explore the implications of EARA. Section IV turns to human capital and examines the reasons for different rates of skill accumulation, noting the important link between income distribution, skill accumulation and the resource endowment. Section V reviews the emerging literature on social and institutional capital.

The stylized facts of resource-rich and resource-deficient development that are identified in Sections II to V are then used in Section VI to develop two models. The first is the staple trap model of resource-rich development and the second is the sequenced industrialization model of resource-deficient development. The latter provides a useful counterfactual against which to compare the staple trap model. An historical perspective is adopted in Section VII in order to determine whether the problem of resource abundance revealed by the models is a relatively recent phenomenon, or a more deep-rooted one. Finally, Section VIII explores the policy implications of the research for both the developing market economies and also for the economies in transition. The conclusions are summarized in Section IX.

II NATURAL RESOURCE EXPORTS, INVESTMENT AND ECONOMIC GROWTH

2.1 Stylized facts of natural resources and economic growth

Syrquin and Chenery (1989) have examined the stylized facts of economic growth and structural change for more than one hundred countries over a period of more than three decades. They identify systematic changes in the structure of the economy not only with per capita income (summarized in Table 2) but also with the natural resource endowment. There is evidence that differences in the structure of the economy can significantly affect economic growth. For example, in a comprehensive study, Echevarria (1997) finds that the changing sectoral composition of economies may account for more than one-fifth of the observed variation in economic growth rates among countries. An important component of structural change is the size of the manufacturing sector because that sector displays a capacity for higher productivity growth than either agriculture or services. The economic growth rate will therefore be slower in those economies where the share of manufacturing in GDP is smaller. The share of manufacturing in GDP varies systematically with per capita income and typically reaches a peak at mid-income levels, so that all else being equal the rates of investment to GDP and of economic growth tend to be highest at mid-income levels.

TABLE 2
PER CAPITA INCOME AND ECONOMIC GROWTH, SYRQUIN/CHENERY AGGREGATES

			Growth				
PC GDP	Net investment	ICOR	Pop.	PC GDP	Value added	Labour prod.	Years
100-140	8	2.2	2.6	1.3	3.8	1.3	27
140-280	10	2.3	2.8	2.0	4.8	1.7	35
280-560	13	2.4	2.5	3.2	5.7	2.8	22
560-1120	15	2.5	2,2	4.1	6.3	4.0	17
1120-2100	16	2.4	2.0	4.6	6.6	4.8	14
2100-3360	16	2.4	1.5	4.7	6.2	4.8	10
3360-5040	14	2.4	1.0	4.6	5.6	4.1	9

Source: Syrquin (1986), 233.

But all else is not equal, and the size of the manufacturing sector also varies systematically with the natural resource endowment. The manufacturing sector of large countries grows to account for a larger share of GDP than in smaller ones (Syrquin and Chenery 1989, 54-59). Therefore, larger countries (whether resource-rich or resource-deficient) have a propensity for faster growth than their smaller counter-parts. Yet Perkins and Syrquin (1989), using data for 1950-83, find little evidence that this growth potential of larger countries has been captured. However, a finer disaggregation of countries covering the period of heightened instability in the international economy

from 1970-93 does show a positive link between country size and growth rate (Table 1). This sensitivity of this outcome to the time period selected suggests that the larger countries have an additional advantage to market size that helps reduce their exposure to external shocks. This is because they depend less on trade than smaller countries and have a wider range of options (including manufacturing sub-sectors that are sensitive to the economies of scale) with which to diversify their economies. The smaller resource-rich economies are likely to be less diversified and more adversely affected by trade shocks.

There is clear evidence that *crop*-driven resource-rich economies do have an inherently slower growth rate than manufacturing-driven resource-deficient economies. For example, among the larger countries, the manufacturing sector expands later (i.e. at a higher per capita income) in the resource-rich ones and peaks at a level that is 4% of GDP lower than in the large resource-deficient economy. Among the smaller economies, resource-*rich* countries typically have manufacturing sectors that expand their share of GDP by 2-3% less than in the small resource-*deficient* ones. Mellor (1995) concludes that the agricultural sector in a *well-managed* economy may expand at 4-6% annually at the most, but that manufacturing has the potential to grow at twice this rate or more. As for the small mineral economies, a pronounced feature of their structural change has been strong Dutch disease effects that either stunt the manufacturing sector or else encourage governments to protect a slow-maturing manufacturing sector (Auty and Mikesell forthcoming).

Sachs and Warner (1995a), using the average share of exports in GDP as their measure of resource dependence, confirm with econometrics a negative link between reliance on natural resources and economic growth. Data for the years 1970-89 show that the cross-country average share of primary exports in GDP was 13%, but that a one unit standard deviation increase (13%) in the share of primary exports reduces the growth rate of per capita GDP by almost 1%. This finding does not appear to be sensitive to the inclusion of other variables in the analysis, or to changes in the chosen measure of resource intensity. Elsewhere, Sachs and Warner (1997) confirm that the underlying adverse effect of a rich natural resource endowment on per capita GDP growth is indeed robust. They show that the finding persists after additional tests that control for institutional quality, the share of investment in GDP, the shift in exports prices compared with import prices, a dummy variable for a regional effect, the removal of outliers such as the oil-exporting countries and splitting the time period into two separate decades.

Among the resource-rich countries, those of sub-Saharan Africa and to a lesser extent those of Latin America, have performed especially poorly. Duncan (1993) finds that, compared with other low-income regions, sub-Saharan African countries failed to diversify out of slow-growth unprocessed primary product exports into faster-growth ones. Yet even if diversification into primary product exports with higher growth potential were to be achieved, Fosu (1996) warns that the expansion of primary exports has a negligible effect on the growth of non-export GDP, although it does have a positive effect on GDP growth. This suggests that industrialization might offer better prospects, but according to Owens and Wood (1997), sub-Saharan Africa has scant potential for *manufactured* exports, even in the form of resource processing. Latin

America has better prospects for resource-based exports, however, thanks to its higher level of skill accumulation. Nevertheless, most countries in that region still failed to avoid a growth collapse after the second oil shock.

Elsewhere, *within* East Asia, Sachs and Warner (1997) note that the resource-deficient countries (Singapore, South Korea and Taiwan) have performed better than the resource-rich countries (Malaysia and Thailand). Interestingly, given the association between *competitive* manufacturing and economic growth, they also point out that two countries out of the handful of relatively high-growth resource-rich countries, namely Malaysia and Mauritius, relied heavily on labour-intensive manufacturing to sustain their growth through the 1980s. It is debatable, however, whether Mauritius still qualified as a resource-rich country even in the 1970s, given its low ratio of cropland per capita. Rather, following the resolution of a bitter struggle between polarized political parties, its development has exhibited strong similarities with that of a resource-deficient country through the 1980s (Findlay and Wellisz, 1993). Among the resource-rich countries, this leaves only Malaysia, Thailand, Indonesia, Congo, Botswana and post-1982 Chile as high-growth outliers. All six countries eventually achieved rates of saving and investment that, relative to GDP, were comparable to those of the successful manufacturing-driven resource-deficient countries. The first three countries did this by diversifying into a widening range of manufactured goods, the others remained dependent on natural resources.

2.2 Saving, investment and the demographic transition

The high-growth developing countries, whether resource-rich or resource-deficient, have lifted their rates of investment to sustain levels of 25% of GDP or higher *and* maintained the efficiency of such investment. Associated with this increase in the level of investment has been a rise in the domestic saving rate. In addition, as is shown below, foreign saving has helped to supplement domestic saving. There is recent evidence that the saving rate, investment rate and dependence on foreign capital are linked to the demographic cycle and, more significantly for this study, that the onset and duration of the demographic cycle are, in turn, linked to the natural resource endowment. More specifically, resource-*deficient* countries embark on the cycle at lower per capita income levels and pass through its basic stages more rapidly than resource-rich countries do.

Williamson (1997) argues that the nature of the demographic transition can significantly impact the rate of saving. His starting point is that the critical population parameter for growth accounting is not the crude growth rate, as used in the neo-classical growth model, but rather the rate of growth of the dependant population. He shows that the worker-dependant ratio traces three stages during the demographic cycle, each with a different implication for saving and economic growth. First, the dependency ratio deteriorates as the second stage of the demographic cycle (high birth rate/ falling mortality) causes the number of children to rise in proportion to the workforce. This acts as a depressant on economic growth because each worker must support more and more people and the ratio of consumption to saving rises over what it would otherwise be. But in the middle stage of the cycle, as population growth slows and the workforce continues to expand, the dependency ratio falls and confers a bonus for economic

growth. This is because the resulting increase in workforce participation rates (and family member income) not only lifts the labour input relative to the population but it also raises the saving rate. The higher saving flows into higher investment in order to set up new (smaller) households and to create new employment. Furthermore, higher tax revenues improve public finances and lift public saving. Meanwhile the scale of transfers relative to the public finances also falls and, therefore, so too do distortionary taxes. Finally, in the third stage of the demographic transition, the ageing of the population increases the dependency ratio once again and depresses the rate of saving, investment and economic growth. In summary, the middle stage of the demographic transition is one of fast economic growth due basically to a favourably low dependency ratio, whereas the initial stage of the transition and the final stage exhibit slower economic growth rates. All else being equal, the resource-deficient countries reap the growth bonus of the middle stage of the cycle earlier than the resource-rich countries for reasons given below.

Williamson (1997) measures the scale of the dependency effect for economic growth for East Asia since the Second World War. The demographic transition was triggered in that region by an exogenous event, the transfer of western medicine in the late-1940s that started a sharp decline in infant mortality. Relative to an underlying trend rate, the East Asian economies should have grown slower prior to 1970 as the initial stage of the demographic transition worked to heighten the dependency ratio. But thereafter, as the dependency ratio became more favourable, then the growth-enhancing effect would come through. The resulting stimulus to saving and investment should taper off in East Asia during the first quarter of the next century as the dependency ratio deteriorates. Williamson estimates that the initial growth-depressing stage of the cycle ran through the 1950s and 1960s in East Asia. Thereafter, those economies grew at 6.1% annually 1970-95, some 4.1% above the underlying trend line. He finds that the demographic transition appears to account for between one-third and one-half of the faster rate (i.e. between 1.5 and 2 percentage points). Moreover, it can be argued that the demographic impact probably accounted for an even larger share of the improved growth trend if the initial recovery back to the trend from the first stage of the cycle is factored in.

Williamson (1997) omits to note that the resource-deficient East Asian countries moved more quickly through the demographic cycle than the more resource-rich countries in that region. This difference arises from the fact that in land-scarce countries, the Boseropian pressures to reduce family size at low-income levels are very strong. This means that such countries complete the growth-depressing stage of the cycle earlier than the more resource-abundant countries. In addition, the benefits of the stimulus to higher saving and investment during the middle stage of the cycle are more compressed and intense. Meanwhile, elsewhere in the region, the closed economies of South Asia, dominated by Pakistan and India, made still slower progress through the transition than more resource-rich Southeast Asia. Bloom and Williamson (1997) argue that South Asian countries can expect to benefit from the growth stimulus of the middle phase of the demographic cycle as the effects fade in East Asia. Elsewhere, resource-rich sub-Saharan Africa is farthest behind in the demographic cycle. It is the only region, aside from the Middle East, that is projected to experience an increase, rather than a fall, in

primary school enrolment by 2020. Moreover the rate of increase may exceed 50% (World Bank 1998b).

Elsewhere, Higgins and Williamson (1997) focus more specifically on trends in the overall saving and investment effects of the demographic transition, including the role of foreign saving. They test the Hoover-Coale hypothesis that a rising dependency ratio raises consumption at the expense of savings while a falling ratio creates a savings boom. The overall pattern of saving and investment is summarized in Table 3 for three Asian regions over the period from the late-1950s to the late-1980s. The authors go on to estimate the relationship between the changing population age distribution and deviations in the saving rate around the mean for the years 1950-92. They find that East Asia's saving rate was 8.4 percentage points of GDP above its mean 1990-92 compared with 5.2% below the mean 1970-74. For Southeast Asia the changes are 7.9% and 3.4%, respectively, whereas for lagging South Asia the figures are far more modest. Turning to investment, the net increase between trough and peak is lower but still a sizeable 8.8% difference for East Asia between the late-1960s and early-1990s.

TABLE 3
SAVINGS, INVESTMENT AND NET CAPITAL FLOWS, THREE ASIAN REGIONS (% GDP)

Regions	Savings	Investment	Current account gap
East Asia			
1955-59	13.9	18.8	-4.9
1965-69	24.0	25.1	-3.4
1975-79	29.7	30.0	-0.7
1985-89	34.0	28.3	5.3
SE Asia			
1955-59	15.5	14.1	1.4
1965-69	16.2	19.0	-2.8
1975-79	26.8	29.7	-2.9
1985-89	28.3	28.2	0.1
South Asia			
1955-59	10.4	12.8	-3.2
1965-69	9.5	13.4	-5.9
1975-79	11.0	16.4	-5.4
1985-89	10.0	18.8	-8.2

Source: Higgins and Williamson (1997), 267.

Higgins and Williamson (1997) also examine the link between foreign capital dependence and the demographic cycle. They find that for countries such as Singapore and Taiwan, the change in the population dependency ratio accounted for some 40-50% of the change in the dependence of those countries upon foreign saving. Interestingly, the demographic effects are much more modest in four resource-rich Southeast Asian economies (Malaysia, Thailand, Indonesia and the Philippines) where the effect was half or less of the impact in the case of resource-deficient Taiwan. Higgins and Williamson (1997) attribute the longer period of dependence on foreign capital to 'vigorous investment booms' being triggered in those countries. However, experience in other resource-rich regions suggests that the resource endowment may have been at work

through a slower passage through the demographic cycle and the more capital-intensive nature of industrial development in such countries (Auty 1990).

In contrast to East Asia, the resource-rich countries of Latin America and sub-Saharan Africa experienced a relatively slow transition through the demographic cycle. Moreover, their saving rates either flattened out at a relative low level (around 20% of GDP in the case of Latin America (Edwards 1997)), or else collapsed. Although they could initially augment investment by foreign saving, the aggregate investment rate (23% of GDP 1960-80) still remained lower than in East Asia. Worse, the efficiency of capital deployment deteriorated and resulted in severe debt service problems when international interest rates turned positive in the early-1980s. For this reason, Lal (1993) goes so far as to argue that the *efficiency* of investment has been a more important determinant of economic growth than has its magnitude.

The beneficial effect of a compressed demographic cycle on economic growth may be further compounded as a result of a virtuous circle between economic growth and private savings, according to a comparative study of savings in Latin America and East Asia by Edwards (1997). Edwards argues that higher growth increases disposable income and encourages saving, which in turns enhances capital accumulation and speeds growth. This is consistent with other recent work in this field, such as that of Stiglitz and Uy (1996). The lower saving and investment rates of the resource-rich regions outside Southeast Asia appear to result, in part, from the slower pace of the demographic transition in those countries and partly from policy error, as discussed below. However, although most primary product exporters did experience growth collapses, it has already been noted that a handful of such countries did not. Several of these anomalous resource-rich economies, but by no means all, are in East Asia. Their experience shows that a growth collapse is not inevitable for a resource-rich country because policy matters. The next section briefly reviews the nature of the policy failure in resource-abundant countries and finds that it is strongly linked to the closure of the economy.

2.3 Policy error in resource-rich countries

Sachs and Warner (1995b) examine the effect of policy error, using trade openness as a proxy for the degree of state intervention. They note a U-shaped relationship between trade policy and natural resource dependence. As primary product export dependence increases, trade policy first closes but then opens again at higher levels of resource dependence (the trough of the U-shape occurs where primary exports reach 33% of GDP, with most LDCs below this level). Sachs and Warner attribute this U-shaped effect to fear of Dutch Disease by the governments of resource-rich countries. They hypothesise that this fear leads to stronger protectionist policies in order to sustain the fledgling manufacturing sector. Interestingly, the downswing of the U-shape reflects the dominance of that section of the curve by those oil-exporters with large mineral reserves that lack an incentive to diversify away from dependence on a depleting mineral asset. This may explain the success of Congo and also of Botswana, whose rent-rich diamonds have given that country many of the characteristics of an oil-exporter, but with the added bonus of less volatility in revenues.

Lal (1993) analyzes policy effects on the long-term growth trajectory of resource-deficient and resource-rich countries. Drawing on twenty-one countries, he finds that whereas eight out of ten land-abundant countries pursued policies that led to growth collapses (the exceptions are Malaysia and Thailand), only three out of eight intermediate countries did so, and all three labour-abundant (i.e. resource-deficient) countries maintained rapid growth. Lal concludes that the labour-abundant countries follow the easiest development trajectory: 'For them the standard policy prescription of the two factor Heckscher-Ohlin model of initially developing labour-intensive industries and then moving up the ladder of comparative advantage is easy to follow' (Lal 1993, 355). The resource-deficient country follows a distinctively sequenced pattern of industrialization that begins with reform in favour of outward-oriented policies. This is because, if the domestic market of the resource-deficient country is small, then reliance on trade is inevitable so that political opposition to trade policy reform is weaker. Such opposition to reform is weakened in any case, because of the lower level of per capita income at which competitive manufacturing takes off in the resource-deficient countries. Basically, the spartan natural resource endowment of resource-deficient countries constrains policy choice, encourages an early concern for the efficient allocation of resources and provides less scope for cumulative policy error (Auty 1997a).

The land-abundant country faces a more difficult development trajectory. A longer initial dependence on primary product exports gives a higher supply price of labour than in the resource-deficient country at a similar level of per capita income. As a result, the resource-rich country skips the stage of labour-intensive manufactured exports and moves into heavy and capital-intensive industry (HCI). HCI has invariably been slow to mature so that the primary sector, even as it shrinks in relative size, must provide foreign exchange and transfers that become increasingly burdensome (Auty 1994). For the reasons given in Section 2.2, capital is likely to accumulate too slowly vis-à-vis the growth in the labour force. Yet foreign borrowing is likely to prove difficult to service in the presence of slow maturation rates in manufacturing. This tempts the governments of resource-rich countries to seek to 'grow' out of their difficulty by engineering a populist boom or a state co-ordinated Big Push. But the expansion outstrips the domestic absorptive capacity and triggers inflation, fiscal repression and a growth collapse (Sachs 1989, Auty 1994). A period of declining real wages is therefore required to restore growth, but that elicits strong political opposition. Meanwhile, growth collapses are associated with the corrosion of all forms of capital, including natural capital to which attention now turns.

III ACCOUNTING FOR NATURAL CAPITAL: SUSTAINABLE DEVELOPMENT

This section first assesses the implications of three different measures of the dependence of an economy on natural capital. It then briefly reviews EARA and evaluates the contribution that green accounting can make to the achievement of sustainable development. Finally, it adopts the genuine saving rate as a policy index for monitoring the sustainability of development.

3.1 Measuring the importance of natural capital in economic development

Three measures of the role of natural capital in economic development are: the environmental Kuznets curve (EKC), the stock of natural capital, and the rent from natural capital. The EKC suggests that, as per capita income rises, the resource-intensity of GDP (measured per $1000 of per capita income for emissions of pollutants, and also for inputs of materials and energy) first intensifies and then declines. The turning point appears to occur at mid-income levels, although this is not true of all environmental indicators so that individual turning points vary (Grossman 1995). The initial rise in the resource-intensity of per capita GDP is attributed to the build-up of the infrastructure of an industrial state. The subsequent downturn in intensity is believed to reflect a number of factors that includes a switch in expenditure from the consumption of material goods to the consumption of services and also ongoing technological change that encourages input conservation. But the primary factor appears to be the adoption of policies that incorporate the full cost of environmental inputs into the cost of production. The World Bank (1992) has even gone so far as to speculate that economic growth might be decoupled from dependence on environmental resources.

The EKC also has a systematic geographical dimension because the environmental impact becomes concentrated in urban conurbations as the process of structural change causes the roles of both agriculture and early 'rural' industry (such as resource processing) to decline in relative importance (Auty 1997b). The EKC has been strongly criticized, however (Stern et al. 1996, Barbier 1997, Panayotou 1997). This is not surprising because the EKC, like its cousin the income curve, is an artefact of a specific time and a specific configuration of countries. More precisely, the developed market economies (DMEs) adopted pollution abatement measures from the early-1970s, whereas many LDCs lacked the administrative capacity and political will to do so (Hettige et al. 1995, Afsah et al. 1996). There is now evidence, however, that the lagging developing countries may catch up fairly rapidly so that the turning point of the EKC may occur at steadily lower levels of per capita income in the future. For example, trade liberalization is forcing emission abatement in many LDCs as a result of pressure from both industrial country financiers and consumers who increasingly demand that suppliers adopt state-of-the-art technology that which embodies industrial country

abatement standards. The strong sensitivity of the EKC to policy variables (Moomaw and Unruh 1997, Vincent 1997) implies that in the coming decades its shape may be expected to flatten and shift to the left. For the present, however, the EKC suggests that the intensity of natural resource consumption is likely to rise with rising per capita income until mid-income levels are reached.

A second measure of the importance of natural capital in economic development is provided by the valuation of natural capital as a stock of wealth (Table 4). Recent research undertaken by the World Bank (1997 and 1998a) uses data for the early-1990s to compare the share of natural capital in per capita wealth with that of produced capital and human capital. The asset value of the natural capital, such as cropland and minerals, is measured as the stream of commodity outputs that is generated from the natural resource, valued at world prices and discounted at 4% over the lifetime of the workforce. The results show that, in absolute terms, the per capita value of natural capital tends to be higher in the *high*-income countries. However, Table 4 suggests that the *relative* importance of natural capital compared with other forms of capital is negatively correlated with per capita income. For example, natural capital comprises barely 2% of total capital employed in Western Europe and the Pacific OECD, and only 5% in 'resource-rich' North America. By comparison, the LDC figures range upwards from around 5-6% in North Africa and Central America to just over 20% in West Africa, with an outlier of 39% for the oil-rich Middle East.

TABLE 4
PER CAPITA WEALTH, BY MAJOR GLOBAL REGION 1994

Region	Total wealth ($ per capita) (%)	Human resources (%)	Produced assets (%)	Natural capital
North America	326,000	76	19	5
Pacific OECD	302,000	68	30	2
Western Europe	237,000	74	23	2
Middle East	150,000	43	18	39
South America	95,000	74	17	9
North Africa	55,000	69	26	5
Central America	52,000	79	15	6
Caribbean	48,000	69	21	11
East Asia	47,000	77	15	8
East + Southern Africa	30,000	66	25	10
West Africa	22,000	60	18	21
South Asia	22,000	65	19	16

Source: World Bank (1998a).

The wealth estimates suggest that natural capital has greater importance in the LDCs than in the DMEs, albeit less than might intuitively be expected. However, the World Bank estimates of natural capital probably err on the low side due to problems in valuing the 'intangibles' of environmental services, as in the case of forests, for example. More importantly for the purpose of this research project, **even if natural capital assets contribute considerably less to the generation of economic growth than human capital, Section II suggests that natural capital plays a central role in guiding the**

development trajectory and in conditioning the efficiency with which both produced and human capital are deployed. This is especially the case at lower income levels. Moreover, growth in many smaller resource-rich countries seems to have become environmentally unsustainable since the mid-1970s (Atkinson et al. 1997).

A third measure of the importance of natural capital in economic development is provided by the natural resource rent. The rent is defined as the residual after deducting from total revenue all costs of production, including a risk-related return on capital. An early attempt to measure the contribution of natural resources to economic development by Pearson and Cownie (1974) used a combination of rents and 'net external effects'. The net external effects term was designed to pick up the multiplier effects of commodity exports. The study estimates the net social gain coefficient (NSG) which it defines as the total value of commodities minus the value of intermediate inputs and other factors used as inputs, plus the net external effects. It does so for commodity-exporting countries in sub-Saharan Africa. The calculation of the NSG coefficient entails, first, making an estimate of world prices for factor inputs in order to estimate the true rent, second measuring the productive linkages and technological spillover effects, and third calculating the multiplier from fiscal and final demand linkages. Unfortunately, the NSG coefficient has proved difficult to calculate and the case study contributors were unable to furnish directly comparable measures.

Other studies, notably Gelb and Associates (1988), have been somewhat less ambitious, but more successful, by focusing on the measurement of the natural resource rents and their deployment. Gelb and Associates measure the impact of the oil shocks on the scale of the oil rents, noting both price and volume effects. A counter-factual is then devised, based upon extrapolation of the pre-shock trends in economic growth and structural change. The divergence between the pre-shock trend and the actual trend in these indicators is attributed to the impact of the oil rents. This assumption is not unreasonable, given the relatively short duration of the shocks (1974-78 and 1979-81) and the scale of the rent changes. The oil rents range from a low of 8-10% of non-mining GDP in the case of Venezuela to more than one-third of non-mining GDP in the case of Trinidad and Tobago.

Vincent and Ali (1997) recently calculated rents for Malaysia, for the years 1970-90. The authors calculate that, relative to total investment, the rent stream was fairly consistent over the entire period, despite fluctuations in commodity prices and the long-term decline in the share of the primary sector in GDP. Basically, higher mineral rents during the second decade offset a slow decline in rents from timber. Overall, the contribution of the resource rents was consistently around one-third of the total investment, despite the fact that investment increased its share of GDP. More specifically, total investment rose from 20% of GDP to 27% between 1970 and 1990 (Salleh and Meyanathan 1993), and the resource rents contributed between 7 and 9% of GDP annually, a sizeable bonus if deployed effectively.

3.2 Accounting for the consumption of natural and environmental resources

EARA can help to gauge the environmental sustainability of development and the effectiveness of the deployment of resource rents. It proceeds by deducting natural capital consumption from the NNP in a two-stage process (van Tongeren et al. 1991). First, the depletion of finite natural capital, such as minerals and forests that are not replanted, is subtracted. Second, the cost of the damage caused to environmental services by economic activity is deducted. Taking natural capital depletion first, the depletion coefficient is related to the rent. Unfortunately, there are differing procedures for calculating the depletion coefficient and no consensus yet exists. Many researchers follow Repetto et al. (1989) who use the net price method which assigns the entire rent to depletion. This is the approach adopted by the World Bank (1997) so that the figures in Table 4 carry a bias towards over-valuing mineral capital (see below), although its effect on the broader picture of natural capital is reduced by the fact that agricultural land dominants natural capital wealth in low-income countries, typically accounting for four-fifths of the total.

The depletion coefficient preferred here is the user cost approach associated with El-Serafy (1988) because it is consistent with the Hicksian (1946) concept of sustainable consumption. The user cost approach distinguishes within the rent between an income component and a capital component. The latter is that sum which, when set aside each year and invested, accumulates over the life of the finite resource to provide in perpetuity an income stream equivalent to that derived during the period in which the resource was extracted. In the case of hard minerals, the user cost depletion coefficient typically ranges between one-third and one-tenth that of the net price coefficient. However, the user cost coefficient is likely to be too low when the reserves are very large in relation to output, as is often the case with hard minerals. This is because of the risk that the natural resource may be marginalized over the medium-term by new discoveries, by technological substitutes or by changing demand. Consequently, where the reserve to output ratio is high, the depletion component in the rent requires upward adjustment. Auty and Mikesell (forthcoming) argue in the case of mining that the upward adjustment should take the form of assuming a twenty-year cap on the available reserves. Progress in dealing with the second stage of EARA, namely accounting for the depletion of the assets that furnish environmental services (such as damage to pollution sinks like waterways and the atmosphere) has been even slower. This is because there is even less consensus over measurement in this case, although the concept of total economic value, along with measurements such as contingent valuation, hedonistic pricing and pollution damage cost functions have been applied (Pearce 1995).

3.3 Genuine saving as a measure of sustainable development

The measurement problems make it unlikely that EARA will proceed beyond being a 'shadow' appendage to the SNA (*Economist* 1998). But EARA does permit the estimation of the 'genuine saving' rate, which Pearce et al. (1996) argue is the first current measure of trends towards or away from sustainability. The genuine savings rate is defined as:

$$GS = GNP - C - G - D_r - D_n + E \qquad \{1\}$$

where: GS = genuine saving
C = private consumption
G = government consumption
D_r = depreciation of produced assets
D_n = depletion of natural assets[1]
E = current education expenditures

The inclusion of current expenditure on education is a first approximation to measuring investment in human capital. Once again, there is no consensus on the appropriate figure. For example, the Bank of Botswana assigns just one-third of such expenditure to human capital formation and also includes in its calculations of genuine saving a similar ratio for health expenditure (Auty and Mikesell forthcoming).

Atkinson et al. (1997) use an amended version of equation {1}, which in this case excludes any adjustment for education but does adjust for the value of CO_2 pollution in addition to resource depletion. They estimate genuine savings for the period 1980-90, and their results for a range of countries are presented in Table 5. They find that genuine saving has been largely absent in the case of the primary product exporters. The same is true for many sub-Saharan African countries, where Winter Nelson (1995) argues that whatever growth the mineral economies experienced has resulted from natural resource consumption, unless their real exchange rates equated domestic prices with world prices. The other groups of countries studied by Atkinson et al. (1997) either sustained positive genuine saving or did so in most years. The resource-deficient LDCs sustained particularly high positive rates. However, the latter figure would be reduced if environmental damage were to be considered more comprehensively, although it is not clear by just how much. Estimates for the industrial countries suggest a downward adjustment in the region of 3-8% of GDP, for example. Yet, even factoring in such a reduction does not alter the basic conclusion about the high rate of positive rate of genuine saving in the resource-deficient countries. Moreover, the speed with which those countries grow during the mid-income stage of their development suggests that the fraction of capital stock incorporating old high-polluting technology can be reduced to a small faction of the total capital stock in less than a generation, thereby allowing a rapid lowering of the resource-intensity of their GDP.

TABLE 5
GENUINE SAVINGS RATES, SELECTED COUNTRIES 1980-90 (% GDP)

Country	1980-85	1986	1987	1988	1989	1990
S. Korea	18.6	25.2	32.1	38.8	34.6	32.7
Malaysia	6.7	-1.1	13.0	13.6	11.1	11.5
Argentina	2.5	1.5	4.1	7.7	-3.5	7.3
Bolivia	-46.2	-49.3	-43.5	-35.9	-35.4	-31.8
Costa Rica	4.9	14.1	10.3	8.5	7.7	9.4
Mexico	-1.1	-9.1	0.9	-0.8	1.3	2.4
UAE	3.6	-19.1	-2.4	-8.0	-22.0	-23.1
Ghana	-12.4	-3.9	-3.3	-2.3	-2.2	-4.7

Source: Atkinson et al. (1997), 97-98.

The genuine saving estimates suggest that many governments, especially in the small resource-rich countries, have extracted revenues from the primary sector in an manner that is not environmentally sustainable. The two most conspicuous dis-savers in Table 5 are both mineral economies (Bolivia and the UAE), although, for the reasons cited earlier, the use of the net revenue index of depletion overstates the figures by at least one order of magnitude. However, the development of many resource-rich countries has not only been environmentally unsustainable, it has not been economically or socially sustainable either. This is because, where the size of the nontradeable sector (including protected manufacturing industry) has increased sharply relative to the primary sector, governments have extracted revenues well in excess of the rents. This has been done to such an extent in some cases that the incentives to maintain output in the primary sector, let alone expand it, have been eliminated. In mining, for example, this has occurred through the decapitalization of state-owned mining enterprises by governments that were unable or unwilling to adopt efficient taxation. In agriculture, it has occurred mainly by indirect transfers from farmers through instruments such as exchange rate over-valuation, repressive marketing boards and input pricing (Krueger et al. 1992). Very often the pursuit of the resource rents began with a policy measure that did not produce the expected economic outcome and therefore triggered further intervention and greater distortion in an ad hoc fashion. In the case of Ghana, for example, the causes of the distortions had became so complex by the late-1970s that the government was probably unable to determine the effect of its policies on real incentives and the distribution of the tax burden among different groups in society (Krueger et al. 1988). In order to improve future policy implementation, an index of the efficiency of rent deployment is required in order to permit some comparison between the actual scale and return on the rents with the potential scale and return. Such an index can be employed alongside the genuine saving rate to determine the efficiency of resource rent deployment and the environmental sustainability of development.

IV HUMAN CAPITAL: SKILL ACCUMULATION AND INCOME DISTRIBUTION

4.1 Natural resources and skill accumulation

The World Bank (1997) measures human capital as a residual, after deducting both natural capital (see Section 3.1) and produced capital (the physical capital stock and urban land) from the total stock of wealth. Human capital makes the most important contribution to income creation in all the principal global regions. It comprises more than two-thirds of per capita wealth in the OECD countries (Table 4) and just under two-thirds in most developing regions. The resource-deficient East Asian countries have displayed especially rapid rates of human capital accumulation (Birdsall et al. 1997). Londono (1996) draws upon global data to show that a strong positive correlation exists between years of education (of the population over twenty-five years old) and the log of per capita income (measured in terms of purchasing power parity).

Wood and Berge (1997) model the accumulation of skills for economies with differing natural resource endowments using a two-good trade model with two factors of production. They substitute skill and land as the factors of production in place of capital and labour. Capital is eliminated from the discussion by assuming that it is ubiquitous, while labour is also removed on the grounds that both categories of good have the same labour intensity (so that in Heckscher-Ohlin trade theory, labour will not affect the composition of trade). These adjustments leave the skill-land endowment ratio to determine the comparative advantage. Skill is measured in terms of years of schooling and land is taken as the geographical area of each country divided by the adult population. A country that is land-rich and skill-deficient will produce primary products with prices that are low relative to those of manufacturing and will, therefore, tend to trade in primary products.

Low-income, land-rich sub-Saharan Africa has the lowest ratio of manufactured exports to primary exports and also the lowest density of schooling per unit area of land. The highest ratios of manufactured exports and of years of schooling per unit of land are recorded in the resource-deficient East Asian countries. South Asia, Latin America and Southeast Asia occupy intermediate positions. Wood and Berge (1997) speculate that economic growth has been faster among exporters of manufactured goods because that sector makes strong demands on skill and, in that respect, it works to strengthen a key variable that is positively associated with the rate of economic growth. Manufacturing-driven growth may also augment technical progress and beneficial 'learning-by-doing' effects (Matsuyama 1992), a view echoed by Sachs (1996). Sachs and Warner (1997) note that the manufacturing sector has stronger externalities (from ‘learning by doing’) than either the resource or service sectors so that a resource boom can lower the long-run growth rate if it retards diversification into manufacturing. In addition, if manufacturing confers higher wages than other sectors do upon workers who upgrade

their skills, then the accumulation of human capital will proceed faster in resource-deficient economies than in resource-rich countries.

Owens and Wood (1997) examine the potential for the resource-rich countries to acquire skills through resource-based industry (RBI), which dominates the early stages of industrialization in such countries (Auty 1997b). They find that RBI has higher land-intensity and a higher skill-intensity (and lower employment-intensity) than manufacturing as a whole. Meyer (1997) qualifies this conclusion: he finds that RBI occupies an intermediate position in terms of its skill requirement between manufacturing and crude primary product production. Nevertheless, both studies suggest that a comparative advantage in RBI is more likely in those resource-rich countries with higher skills, than in those with low skills. RBI has been an important route to industrialization for Latin America, but not for sub-Saharan Africa. Even so, the social benefits from RBI are less widely diffused than the benefits from East Asian manufacturing because of the more capital-intensive nature of RBI. Owens and Wood (1997) conclude that sub-Saharan Africa needs to substantially upgrade its worker skills and may require some protection of its manufacturing sector in order to do so.

Consistent with this pattern, Birdsall et al. (1997) show that resource-rich Latin America has lagged the predominantly resource-deficient East Asia countries in the accumulation of skills. Not only have the Latin American countries fallen behind East Asia in terms of average years of schooling, but there is clear evidence that the quality of schooling in Latin America has also declined with rising incomes. Elsewhere, Londono (1996) shows that the average educational level for Latin America (5.2 years) is around two years less than expected, given the region's per capita income. Compared with Southeast Asia, Latin America neglected basic primary and secondary education but built up its university-educated workforce much faster. These trends have adverse implications for income distribution, as is discussed in the next section, because the poor tend to suffer disproportionately from both a slow rate of expansion of education and the lower quality in its provision.

Birdsall et al. (1997) find that the *supply* of education, measured in terms of expenditure as a percentage of GDP does not differ significantly between East Asia and Latin America. The critical difference is in the *demand* for education and that, they find, is largely a function of the structure of production. More specifically, the East Asian combination of a more intensive agricultural system and a larger and also initially less capital-intensive manufacturing sector makes greater demands on skills than does the combination of primary product exports and import substitution industry of Latin America. The East Asian combination also provides higher rewards for education. As a result, a virtuous cycle is produced that is linked to the demographic cycle described in Section II. The earlier development of manufacturing led to the earlier provision of primary education in East Asia, especially for women. This helped to lower the birth rate sooner and that, in turn, reduced the dependency ratio earlier. As a result, for a given fraction of GDP spent on education, *per capita* expenditure was higher in East Asia than in Latin America. Moreover, the rapid accumulation of East Asian skills increased GDP faster, so that a given fraction of GDP provided more resources per capita in absolute terms for educational expenditure. For example, per capita levels of

educational expenditure were slightly higher in Korea than Mexico in 1970, but over the next twenty years the level of expenditure quadrupled in real terms in Korea, whereas it barely doubled in Mexico. Yet the share of GDP expended on education had risen in Mexico while that of Korea had fallen. Over the same period the school cohort had declined 2% in absolute size in Korea, but it rose 60% in Mexico (Birdsall et al., 1997, 119). This means that the more compressed demographic cycle in resource-deficient East Asia (see Section 2.2) provided an additional important stimulus to skill acquisition that Birdsall et al. (1997) neglect.

4.2 Skill accumulation, income distribution and economic growth

There is growing evidence that an inequitable income distribution is inversely related to skill acquisition and also to the economic growth rate. Significantly for the present study, income inequality is markedly higher in resource-rich countries than in resource-deficient countries. For example, drawing on data for the 1960s and 1970s, Nankani (1979) concluded that the mineral economies exhibited relatively high levels of income inequality and relatively weak social indicators. Davis (1995) disputes this claim, but his comparison is with LDCs as a whole, rather than with the resource-deficient countries. The resource-rich LDCs as a whole do exhibit higher levels of income inequality as well as lower levels of human capital development than the resource-deficient LDCs at a similar level of development. In fact, it was the dominance of the mid-income category of countries in the 1950s by resource-rich Latin America, with its highly skewed incomes (Williamson 1965), that led Kuznets (1955) to hypothesize that income inequality will initially rise with increasing per capita income and then fall. More recent studies show that passage along the Kuznets curve appears to be uncommon (Fields 1989, Anand and Kanbur 1993, Deininger and Squire 1996 and Bowman 1997). There are many more factors that affect the distribution of income than those linked to the decline of low-productivity agriculture and an enhanced propensity to equalize incomes at higher income levels.

A more robust finding about income distribution is that heightened income inequality is associated with the resource-rich regions, at both mid-income and low-income levels (Latin American compared with East Asia and sub-Saharan Africa compared with South Asia, respectively). This may be a persistent feature because Williamson (1997) also reports this basic relationship for the pre-1914 Atlantic economy. He finds that between 1870 and 1914 income inequality rose rapidly in the rich, land-abundant, labour-scarce economies like those of North America and Oceania but fell dramatically in land-scarce, labour-abundant NICs like Italy, Norway, Sweden and Denmark. This outcome is consistent with trade theory, which predicts that a boom will raise demand for the abundant factor among all participants. In Williamson's historical example, mass migration contributed to the fact that the labour-abundant (resource-deficient) economies experienced rising real wages for the poor and falling returns to land (rents) for the wealthy.

A second robust conclusion is that income inequality adversely affects economic growth and that, in turn, retards the rates of poverty reduction and improvement in social indicators. The causal link does not run from slower growth to income inequality:

therefore, heightened inequality causes slow growth. Deininger and Squire (1996) identify the distribution of assets (wealth) as more important than income distribution in determining economic growth. This is because, a more equitable distribution of assets enhances the capacity of the poor to borrow and so makes it easier for them to acquire skills through education, to boost farm output, and to establish new businesses. More specifically, Lipton (1997) finds that land redistribution transfers resources to the rural 'near-landless' and that small farmers make more productive use of scarce land and employ more labour-intensive methods than larger farms. Binswanger and Deininger (1993) concur.

But Londono (1996) argues that in mid-income countries unequal access to land affords a less convincing explanation of income inequality. Londono (1996) notes with reference to resource-rich Latin America that unequal access to land may have been important forty years ago when the land employed half the population and generated one-third of GDP, and rents provided one-fifth of household income. But subsequent structural change means that the cause of inequality must now lie elsewhere (although, as shown below, Londono neglects evidence that income inequality is persistent, once it has become established). Yet neither the unequal distribution of urban assets nor the unequal control of markets explain inequality because economic reform has enhanced the forces of competition. Rather, Londono argues that the Latin American process of structural change retarded the rise of the average education to that point (6.5 years) when, based on global data, convergence in educational attainment (and also wages) appears to begin. Therefore, a relatively slow rate of accumulation of skill in resource-rich Latin America has more than offset trends in economic growth that were working in the opposite direction to boost educational levels and narrow the income gap. Birdsall et al. (1997, 105) confirm that wage convergence is associated with higher rates of educational provision. They show that in South Korea between 1975 and 1985 the rise in the number of secondary and tertiary education graduates was associated with a decline in the wage premium. In the case of secondary school graduates the wage premium compared with those with only primary school education fell from 47% to 30% and for tertiary education it fell from 97% to 60%.

A higher average educational attainment will lower income differentials and be beneficial for economic growth. Birdsall et al. (1997) argue that this is because more equitable income distribution improves the chances of low-income families investing in superior goods such as schooling and health care that improve the quality of human capital. This, in turn boosts the x-efficiency of the workforce. Greater income equality also contributes towards lower political and macroeconomic instability so that investment risk is reduced and public expenditure is less likely to be diverted away from socially optimal projects and towards rent-seekers due to a preoccupation with the need to shore up political support. In addition, the poor appear more likely to accept hardship in adjusting to economic shocks if they have experienced poverty reduction. The poor will also spend more of any increase in income on locally-produced foods and manufactured products than the rich, who have a high propensity to import consumer goods. Therefore, in addition to the direct positive effects on economic growth arising out of higher productivity, the rapid acquisition of skills may boost the economic growth rate indirectly, by contributing to reduced income inequality.

Yet, if greater income equality seems favourable to growth, it is difficult to achieve, once income differentials have been heightened, as is the case in most resource-rich countries. Li et al. (1998) present strong evidence that income inequality is persistent. They argue that the adverse impact of inequality on growth reflects the ability of the rich to wield their political power to maintain their privileged position and reduce the access of the poor to education, productive assets and credit. Moreover, any redistribution of wealth may *retard* economic growth (Alesina and Rodrik 1994). This is because, where a large fraction of the population lacks access to productive resources, there will be strong pressure for redistribution that will lead to increasing distortion of the economy and discourage investment. Alesina and Rodrik (1994) run regressions for economic growth 1960-85 against both land distribution and income distribution and find an especially strong negative correlation between inequality in access to land and economic growth. Persson and Tabellini (1995) concur, but argue that the detrimental outcome applies particularly to democratic governments because such governments redistribute in a manner that weakens both property rights and also the ability of investors to appropriate the benefits of their activity. But both pairs of researchers neglect to consider the impact of differences in the natural resource endowment on this outcome. There is evidence that the impact of redistributive stress may be less detrimental to economic growth in land-scarce countries than in resource-rich ones. This is because extreme shortages of land have, historically, tended to prompt political crises that lead to a political realignment between the poor majority and governments and, thereafter, to the creation of a widely shared interest in raising the quality of the sole abundant resource, labour (Auty 1997a).

Summarizing, resource-abundance is associated with lagging skill accumulation and heightened income inequality, both of which lower the rate of economic growth. The more rapid rate of skill accumulation observed in the resource-deficient countries increases the economic growth rate directly by raising productivity, but it also appears to do so indirectly, by reducing income inequality. But similar quantities of produced capital and skill have been observed to result in differing rates of growth in differing countries (World Bank 1993). The conventional growth models attribute this discrepancy to differences in total factor productivity or to a higher rate of depreciation of produced capital (Gylfason 1998). But neither of these designations provides much guidance in devising policy prescriptions for example. That task requires an analysis of the social and institutional context within which produced capital and skill are combined. The natural resource endowment may play a role in explaining the rate of social and institutional capital formation. There is evidence, for example, that the type of political state is an important determinant of the rate of accumulation of institutional capital and skill, and that the type of political state may vary systematically with the natural resource endowment. Attention now turns to this final component of the expanded growth accounting framework.

V HUMAN CAPITAL: SOCIAL AND INSTITUTIONAL CAPITAL

The definition and measurement of social and institutional capital is still at a relatively early stage. This section therefore takes stock of the progress made and the evidence provided by early empirical studies. It begins by reviewing definitions of social capital.

5.1 Defining social and institutional capital

In its broadest sense, social capital is defined by the World Bank (1997, 81) as being embedded in group knowledge and trust, backed up by sanctions, that provides information and security to facilitate economic exchange by reducing risk and uncertainty. It manifests itself in economic terms through differences in transaction costs between differing regions and countries. Three basic sub-components of social capital are commonly recognized, namely: trust, civic spirit and civic associations. Civic spirit is defined as the reluctance of individuals within society to take advantage of private misfortune or public administrative error. Civic associations are the horizontal networks such as membership of societies for politics, sport, environment, arts, professions and trade unions.

More specific definitions of social capital range from the narrowest conceptualization, which sees it as the density of social networks that influence the productivity of a community (Putnam 1993); through more complex social structures that facilitate individual or corporate activity; to the broader consideration of social and political factors which mediate socio-economic activity at all levels within a country. The broadest definition therefore encompasses national institutions as well as local ones, and embodies formalized structures such as the political regime, legal system and ethical norms in addition to financial and economic institutions. These institutional factors are of most importance to the present study because of its concern with macro factors rather than micro ones, where social networks have greater import.

An important characteristic of social and institutional capital is that it is a public good, whereas human capital in the form of education can be embodied in an individual and acquired by the individual regardless of what other people do. Social and institutional capital therefore requires time to produce (it needs a simultaneous 'thickening' of informal local social networks and a proliferation of national-level formal codes of exchange) and so it entails an opportunity cost that will be afforded in relation to its value. It will tend to be under-produced, unless individuals can determine ways of internalizing their share of the external benefits (World Bank 1997). These twin characteristics of a slow rate of accumulation and a requirement for public provision have two important implications for resource-rich countries. First, there are grounds for expecting that resource-deficient countries will accumulate positive social and institutional capital more rapidly because, as noted in Section 4.2, they tend to have a

more equitable distribution of income and social and institutional capital appear to accumulate more readily where income, and therefore power, is more evenly shared. For example, Knack and Keefer (1997) find that higher income equality and checks on political executive power are strongly and positively associated with higher trust and civic spirit. Second, resource-rich countries are associated with factional political states (Auty 1997a) and, as explained below, such states have been relatively unsuccessful in both the maintenance and accumulation of social and institutional capital. This is discussed further in Section 5.3.

This association between resource endowment and the political state opens up the possibility that a typology of political states may provide a useful proxy for capturing the myriad factors that contribute to the dynamics of social and institutional capital and their effect on economic development. It also carries implications for the relative importance of the two sub-components of the human capital 'residual', social and institutional capital. A strong case can be made for restricting the term social capital to a local scale, where informal contacts are more practical. The term 'institutional capital' is more significant at a national level where the impersonality of most exchanges calls for more formal codification. A crucial assumption is that both national institutional capital and local social capital are more likely to accumulate where the national government is effective and has as its principal goal the promotion of long-run social welfare. An important objective of national government policy is, therefore, to strengthen the positive aspects of institutional and social capital in order to ensure the social sustainability of economic policies.

5.2 Measuring social and institutional capital

Two recent studies have attempted to measure social capital with reference to trust and civic associations, one at the village level (Narayan 1997) and the other at the national level (Knack and Keefer 1997). Narayan (1997) derives a social capital index for Tanzanian villages using the arithmetic average of both the number of groups an individual is associated with, and the characteristics of those groups. A positive relationship is found between the index and village expenditure (as a proxy for income), such that a one standard deviation in the index of social capital is associated with an increase of 20% or more in household expenditure. By comparison, a shift of a similar magnitude in the level of education, the equivalent of almost three years extra instruction, raises income by only 5%. Tests of the causal direction show that social capital increases income and not vice versa. The positive contribution from social capital derives from a number of factors, notably, the freer dissemination of yield-enhancing information, greater readiness to work in groups on infrastructure construction and easier access to credit. Membership of village associations, notably the church, burial societies and farmers' groups, is an important mechanism in building social capital in rural East Africa.

Knack and Keefer (1997) have attempted to compare social capital between countries at the national level. They take as their indices of social capital, trust and civic spirit as well as civic associations. They draw on World Value Survey data for 29 DMEs and LDCs to test the relationship between these three variables and economic growth. They

argue that in trusting societies, less recourse will be made to either litigation or to criminal protection rackets in order to enforce contracts (as is common in post-Soviet Russia, but not in Poland or the Czech Republic, for example). In trusting societies, ostracism and shame are the sanctions that prevent backsliding within agreements. The results of the analysis yield high trust scores for Scandinavia (60%), medium-high for Britain, the US and the Netherlands (45%), but low for Chile (22%), Mexico (18%) and Brazil (7%). There is also a virtuous circle effect here, because trust appears to be strongly positively associated with both GDP growth and investment growth.

Civic spirit is only slightly less strongly associated with trust, GDP growth and investment growth. However, contrary to Putnam (1993) and Narayan (1997), Knack and Keefer (1997) report little evidence of beneficial effects from civic associations. This may be because, although civic associations can enhance trust (producing 'Putnam' effects), they can also promote rent-seeking behaviour that furthers group interests at the expense of the broader social good ('Olson' effects). An example of the latter is provided by the 'deliberation councils' in Japan and Korea that are praised by Serageldin and Grooteart (forthcoming) for facilitating capital allocation, but which appear to have had the unanticipated drawback of blunting the sensitivity of investment to risk and profitability in those countries.

A consensus concerning indices of institutional capital at the national level has yet to be established. One approach has been to draw upon estimates of country investment risk (Clague et al. 1997). An alternative approach is to apply the Delphi technique, selecting key components of institutional capital and then asking informed development practitioners to gauge a specific government's achievement in establishing them. This broad approach has been usefully applied to derive indices of political freedom and economic liberalization for the transition economies (de Melo et al. 1996). Elsewhere, it has been used to generate an index of the effectiveness of government in sub-Saharan Africa (personal communication, A. Gelb).

Some of the constituents of an index of national institutional capital have a specific economic dimension. Examples of this are an independent central bank, a soundly-regulated financial system, a commodity revenue stabilization fund and government regulators to prevent the abuse of market power (i.e. to sustain a competitiveness policy) and to restrict environmental damage. Other national institutional factors are less directly within the economic sphere but draw on elements of political freedom such as an efficient legal system, an effective civil service (that is insulated from corrupting political pressures) and government accountability. However, as Aron (1997) cautions, democracy may be a two-edged sword for which the benefits of accountability are offset by delays and policy compromises required in order to build a consensus within an under-informed electorate.

The national institutions described above can increase the efficiency of economic exchanges and have positive 'top-down' effects on the accumulation of *local* social capital. This should manifest itself in the building of trust and civic responsibility at the local level. Such a process will likely entail the devolution of locally important social and economic decisions to local authorities. However, in cases of extreme government

failure, for example when there is a growth collapse, local social capital may assume a critical and more independent role. Local social capital may also assume more prominence in the early stages of development, when an inadequate communication network hampers both local and national interaction. Its accumulation is likely to be assisted under such circumstances by outside agencies, notably the NGOs. Of course, like national institutional capital, local social capital may also disintegrate as well as accumulate.

5.3 Patterns of social and institutional capital accumulation

By deploying the political state as a proxy for the stock of institutional capital and its likely rate of accumulation, the numerous factors involved can be distilled into a single index. The subcomponents of this index are, in effect, contracted out to other researchers for analysis (Aron 1997). The adoption of the state as the critical determinant of the rate of institutional capital accumulation (and the efficiency of resource allocation generally) requires a simple, but also powerful, classification of types of political state. Lal (1995) provides a platform on which to build. He insightfully classifies developing country states using two criteria: the degree of policy autonomy and the objectives of the state. Table 6 presents an elaboration of his classification with some examples. It also links the eight main categories of political state to categories that are in common use by political scientists. The classification is capable of tighter specification and that is an important objective of ongoing research.

TABLE 6
TYPOLOGY OF POLITICAL STATES, AFTER LAL

Autonomy	Aims	Variants	Examples
Autonomous	Benevolent	Monarchy	Brunei
		Bureaucracy	South Korea
	Predatory	Authoritarian	Zaire
		Bureaucratic	Peru 68-78
Factional	Democratic	Consensual	Botswana
		Polarized	Jamaica 72-88
	Oligopolistic	Plantocracy	El Salvador
		Populist	Argentina 45-90

Source: Auty (1997a).

The *autonomous* state is able to formulate and achieve its own aims. Lal makes a useful distinction within the autonomous category on the basis of the aims of the state between the platonic (or benevolent) state and the predatory state. Institutional capital is likely to accumulate fastest in the autonomous benevolent state, a category that has much in common with those LDCs that Leftwich (1995) identifies as 'developmental states'. Leftwich considers that South Korea, Taiwan, China, Indonesia, Malaysia, Thailand and Botswana are developmental states. They have six key characteristics that are:

- a determined developmental elite, in:
- a weak and subordinated civil society, which confers:
- relative autonomy, that is deployed by:

- a powerful, competent, insulated economic bureaucracy, in:
- the effective management of non-state economic interests, while:
- political legitimacy is conferred first by repression, and then, by performance (Krause 1995). But long-democratic Botswana queries the necessity of this last characteristic.

The autonomous benevolent states of the resource-deficient East Asian NICs faced pressure for democracy. But they mitigated such pressure, at least initially, by the pursuit of rational welfare-maximizing economic policies. Their success in this objective enhanced the longevity of the regime and thereby captured the benefits of policy consistency, creating a virtuous circle. The concentration of power by the autonomous political state is deployed to create institutions that improve the effectiveness of economic transactions. This, together with an existing solid foundation of (local) social capital, facilitated the rapid accumulation of institutional capital, alongside produced capital and skill.

The *factional* state is constrained by the need to appease political groupings. Such states have varying combinations of autonomy and objectives and they tend to accumulate institutional capital more slowly than autonomous benevolent states. In the least favourable cases (for example, a polarized democracy or a predatory authoritarian state), they are likely to diminish the stock of institutional capital. The two main sub-groups of the factional state are the oligopolistic state (in which long-established, powerful elite groups may manipulate token democracies) and the democratic state. Each can usefully be further subdivided (Table 6). The developmental state is uncommon in Latin America and sub-Saharan Africa. In Latin America, landed elites have tended to sustain power long after the achievement of independence from the colonial powers. When those elites were eventually displaced, it was often by new sectional interest groups. Kurer (1996) argues that the clientelistic relations of the new groups undermined the effectiveness of government, corroded institutions and adversely affected long-term economic growth. Consequently, the successor states to the plantocracies failed to develop legitimacy, a fact that is reflected in the low trust ratios reported for that region by Knack and Keefer (1997).

In sub-Saharan Africa, ethnic loyalties deflected political energies into strategies for policy capture by specific tribes or tribal coalitions. Such groups have rarely succeeded in establishing their political legitimacy and the end-result has been repression that risks deteriorating into a sequence of violent government changes. Alesina and Perotti (1994) show this outcome to be negatively associated with economic growth. Easterley and Levine (1997) analyse the impact of ethnic diversity on the economic performance of sub-Saharan Africa more specifically. They find that up to two-fifths of the growth differential between sub-Saharan Africa and East Asia can be explained by differences in indices of public policy effectiveness, such as years of schooling, telephones per worker, civic associations, budget deficits, black market premiums and financial depth. Knack and Keefer ascribe the unfavourable sub-Saharan African ratio to policy failure arising from the preoccupation of each group within ethnically-diversified societies with seeking to maximize its welfare. Economic policy under such circumstances is

conditioned by the need for coalition-building and lacks cohesion because each group seeks to boost its own interests, irrespective of the implications for society as a whole.

Elsewhere, Krueger et al. (1992) present empirical evidence of the scale of the damage inflicted by such policy distortions which exhibited especially high rates of revenue extraction in sub-Saharan Africa. They show that direct agricultural taxation in sub-Saharan Africa has averaged 25% of revenue, some four times that of Latin America and ten times Asian rates. The figure doubles when indirect taxes, such as overvalued exchange rates are added (Krueger et al. 1992). In fact the rates of taxation have reached levels well above those required to maximize the tax take. Part of the reason for this is imperfect information arising out of the complex interplay of numerous distortions. But another reason lies in the short time horizons of factional governments. Such governments recognize that farmers (and mining companies even more so) often have high fixed costs, as in the case of tree crops. Government officials set tax rates in relation to the variable costs of production and, in effect capture the returns to the farmers' investment in planting. For example, Mcmillan (1997) finds that crops with a relatively high ratio of sunk costs to total costs such as cocoa and coffee have been much more heavily taxed than crops with relatively low sunk costs, such as groundnuts. Farmers respond by withdrawing from planting the next time round, so that the government revenue base shrinks, creating even greater pressure to squeeze revenues from elsewhere in the system.

Such counter-productive policies do appear to be more common in the resource-rich countries. Lane and Tornell (1996) argue that commodity windfalls in resource-rich countries are likely to engender an intensification of redistributive activity (the 'voracity effect'), especially where governments are weak. Competition for rents causes public subsidies and other forms of transfer (construction projects, public-sector loans and higher public-sector employment and/or wages) to grow faster than the increase in the windfall. This lowers the return to investment and slows economic growth, as occurred, for example, in Trinidad and Tobago (Auty and Gelb 1988).

Institutional capital may vary through time as well as across countries. Killick (1995) speculates that the rate of accumulation of institutional and social capital will vary systematically with the level of per capita income. He suggests that the positive impact of institutions may first wax and then wane as development proceeds, just as the rates of saving and of economic growth first accelerate and then slow down (Syrquin and Chenery 1989). More specifically, at low-income levels, LDCs lack the institutions needed to use capital efficiently and require new forms of social capital. The deficiencies are well described by Johnson (1970) and Owen (1967) with reference to India in the 1960s. The basic unit of socio-economic organization, the village, is too small to support competitive banking, crop markets and an all-weather road, without which little progress can be made in specializing in high-productivity crops, the response required to boost incomes where land and labour are scarce. Transaction costs are high, imposing a developmental trap, which the fostering of positive social capital, locally triggered at this stage, can help to reduce. But as development proceeds, however slowly, the function of social capital will change because, ultimately, national institutional capital dominates. This is because, 'large anonymous markets are more

effective than [informal] networks because the 'best' buyer or seller may not be part of the network,' (Serageldin and Grooteart forthcoming, 213). It may well be, therefore, that during the middle level stages of the economic transition, the realization of rapid growth and fulfilment of rising expectations fosters the positive evolution of social capital.

However, Killick goes on to argue that at high income levels, institutions may become so elaborate and powerful as to damage the efficiency of resource use due to 'Olson' effects. In addition, as noted in Section 2.2, as the national population ages, it becomes more resistant to change and the ratio of workers to dependants also deteriorates. Social capital may also decline because of the rising opportunity cost of the time input required to maintain social groups. It should be noted that social and institutional capital can regress at lower income levels also, as in the face of profound socio-economic shocks that cause sizeable numbers of individuals to withdraw from civil society.

VI MODELS OF RESOURCE-RICH AND RESOURCE-DEFICIENT GROWTH

Sections II-V have examined the relationship between the natural resource endowment and produced capital, natural capital, skill and institutional capital. This section of the paper distils the insights from these relationships into models of resource-rich development and resource-deficient development. The latter provides a useful counter-factual to the trajectory of resource-abundant development. The models are developed in two stages, the difference being the addition of policy variables in the second stage (see 6.2).

6.1 Diverging development models: sequenced industrialization versus staple trap

Sachs (1996) draws on an earlier empirical study of the contrasting responses of East Asian and Latin American countries to the debt crisis (Sachs 1985) to sketch a three-sector model that captures key features of both resource-rich and resource-deficient development. The three sectors comprise a resource sector (R), whose output is exogenously determined and combines imported inputs with intensive use of land; a labour-intensive manufacturing sector (M) with constant returns to scale; and a non-tradeable sector (N) which is capital-intensive and uses an internationally-traded input. Three basic properties of the model are, first, real wages in the two economies move in opposite directions in response to rising prices for R; second, the production structure in the resource-rich economy tends towards specialization whereas that of the resource-deficient economy does not; and third, capital accumulation in N can be sustained in the resource-deficient economy, but eventually requires a sharp and politically costly correction in real wages in order to do so in the resource-rich economy.

More specifically, an expansion of R in the resource-rich economy causes real wages to rise in N, but not in M. This results in an expansion of N and a contraction of M. If the growth in R is strong enough, the shrinkage in M may be down to nothing, leaving all the workforce in N with higher real wages. This process reflects the impact of Dutch disease effects. However, by definition, within the resource-*deficient* economy, R cannot expand on a similar scale so that the majority of workers there remain in M and they experience a real wage decline due to the higher price they must pay for goods/services from N. Meanwhile, the tradeable sector of the resource-rich economy has specialized in R, while that of the resource-deficient economy includes both R and M.

But the process of rising real wages can only continue in the resource-rich country as long as the expansion in R will sustain it. It will be recalled that the growth in N will cause an expansion in the volume of imported inputs used by N. When R can no longer expand at a sufficiently rapid rate, a real depreciation of the exchange rate is required. This will push up the cost of imported inputs and cause real wages in N to decline. The

decline will continue until such time as an expansion of M at last becomes feasible, that is, the country has effectively returned to a resource deficient condition. This situation occurred in Indonesia over the period of softening oil prices 1981-86 (Auty and Mikesell forthcoming). However, Indonesia then functioned as an autonomous benevolent state and a factional state would be likely to have greater difficulty in coping with the political unpopularity of the large depreciation in the real wage that is required. The fierce opposition to such a course renders reform much more difficult in under such a government.

The differing responses of the two economies to capital accumulation reflect the differing elasticity of demand for primary products compared with manufactured goods. Basically, it is assumed that there is greater scope to expand the production of labour-intensive manufactured goods than there is to expand primary products. Moreover, it is also assumed that an increased flow of capital into N within a resource-*deficient* economy triggers productivity gains that outweigh any adverse real wage effects. This is because of the imperative in the resource-deficient economy to maintain the competitiveness of M (see Section 6.2 for a fuller justification). The expansion of N therefore enhances the competitiveness of M (where real wages had initially fallen) so that production expands. Any subsequent deterioration in the terms of trade of the resource-deficient economy, triggers a real depreciation of the exchange rate that strengthens the competitiveness of the manufacturing sector. This further diversifies the economy away from dependence on R. More important, it will also ultimately raise real wages because the expanding production of M absorbs surplus labour and pushes the labour market to its turning point at which time real wages will rise. This speed of the labour absorption is accelerated in the case of the resource-deficient economy by the fact that its passage through the demographic cycle is compressed compared with the more leisurely cycle of the resource-rich economy.

In contrast, an inflow of capital into N within the resource-rich country lacks the efficiency incentive that the resource-deficient country derives from the need to ensure that M remains competitive. Therefore, as a consequence of the Dutch disease effects on M in the resource-rich country, when the expansion of R eventually slows or ceases, the continued accumulation of capital requires either a sharp depreciation of the real exchange rate and real wages, as noted earlier, or else recourse to foreign borrowing. But the latter merely postpones the required external adjustment until the emergence of debt service problems finally forces reforms.

These sharply contrasting trends in real wages, production structure and capital flows between the two resource endowments also affect the accumulation of skill (and institutional capital). It may be assumed that the export of R has limited learning effects compared with the production of manufactured exports, consistent with the Matsuyama (1992) model with economy-wide externalities from learning-by-doing spillover effects of manufacturing. Such spillover effects boost productivity growth and widen the comparative advantage of the resource-deficient economy. A second source of diverging rates of skill accumulation between resource-rich and resource-deficient countries lies in differences in the incentive to directly invest in education. This is consistent with case studies (Siamwalla 1995) and cross-country comparisons (Birdsall et al. 1997) and

Sachs (1996) models this outcome by adding a fourth sector, education (E), to his model.

The model of skill accumulation assumes a two-period life cycle in which people are initially unskilled workers but can then choose whether to invest in the acquisition of skill or not. This assumption implies that in Period 2 there are unskilled workers, skilled workers and educators. The model also assumes that the future productivity of students depends upon the productivity of their teachers, so that each teacher is better trained. Endogenous growth within the model is thereby sustained. Basically, within these parameters, younger workers will opt for education as long as the discounted additional wage exceeds the costs of acquiring education.

The mechanism for the divergence in skill accumulation functions as follows. If a change in the output or price of R occurs within the resource-*rich* country, it pushes up wages in the (unskilled) nontradeable sector, N. It is therefore feasible that unskilled workers as well as the skilled workers will find it more remunerative to work in N than in M. Therefore younger workers will work in N and they will be better off if they make no investment in education. The resource-rich economy therefore specializes in nontradeables and there is neither a competitive manufacturing sector nor an education sector. In contrast, within the resource-deficient country, Period 2 workers are better remunerated in either M or E than they are in N. Moreover, unskilled Period 1 workers are engaged at a lower wage in either N or else in M (depending on the parameters of the model). Under these circumstances, all Period 1 workers in the resource-deficient economy have an incentive to become skilled and will do so. By definition, the skill level within the resource-deficient economy therefore expands with succeeding generations.

6.2 Modelling the political economy of resource-driven growth

In the discussion so far, any closure of the economy comes about from the changing structure of production due to the fluctuations in R and the associated shrinkage of M relative to N, but the same outcome may result from policy choice. An autarkic trade and industry policy can be modelled by assuming the incentives take the form of an import tariff, M_t that raises domestic prices of manufactured goods P_M above world levels. In the resource-rich country, such a policy would sharply reduce the incentive to export manufactures and hasten the specialization of the tradeable sector of the economy in resources.

In the resource-*deficient* country, the closure of the economy will also reduce the incentive for M to export and shift resources into N. However, the smaller size and lower growth potential of R vis-à-vis the rest of the economy quickly makes it clear that the transfer burden of slow-maturing infant industry will be directly imposed upon M. It is also clear that the fraction of rent within the revenue stream of M is less than in the case of R, so that M is more sensitive to the burden of transfers, including the provision of foreign exchange. Moreover, M can ill-afford to pay the higher cost of those inputs that it must now purchase from protected domestic producers as a consequence of the closure in trade policy. The maintenance of sustained economic growth therefore

requires the abandonment of the autarkic policy early in the resource-deficient economy, and much earlier than in the case of the typical resource-rich country. In this way, the duration of infant industry protection and the size of the protected manufacturing sector are both constrained in the resource-deficient economy. In fact, only sectors of emerging comparative advantage can be supported on any scale in the resource-deficient country and even then, their rapid maturation is required. These conditions are consistent with the sequenced industrialization pursued by the resource-deficient East Asian countries and summarized in Table 7 drawing upon the example of Taiwan. This is why the resource-deficient model is designated as the sequenced industrialization model.

TABLE 7
SEQUENCED INDUSTRIALIZATION, TAIWAN 1950-90

Index	Stage 1	Stage 2	Stage 3	Stage 4
Industry Stage	ISI	Labour-Intensive	HCI Drive	Liberalization
Years	1950-58	1959-71	1972-81	1982-91
Growth				
GDP Growth (%)	7.9	9.5	9.1	8.2
I/GDP (%)	12.2	17.2	27.4	21.4
ICOR	1.5	1.9	4.1	3.0
Structure (% GDP)	1960	1970	1980	1990
Agriculture	32.9	18.0	9.2	4.8
Manufacturing	16.8	26.2	33.2	33.3
Light	11.1	13.3	12.4	9.6
HCI	5.7	12.9	20.8	23.7

Source: Auty (1997c).

The government of the resource-rich country pursues an autarkic policy for much longer and, as a result, it creates vested interests so that reform is politically very costly. Meanwhile, as noted in Section 5.3, the typical factional government of the resource-rich country extracts revenues in excess of the rents so that the viability of R is undermined. The trend towards specialization is thereby intensified and the outcome is that the country gets caught in a staple trap. The staple trap is therefore the designation given to the model of resource-rich development.

Gelb et al. (1991) model the political process by which the staple trap is brought about. They model a resource-rich country whose government creates unproductive jobs in public administration and in state-owned enterprises (SOEs) in order to alleviate urban unemployment. They use a Harris-Todaro migration model and assume a single urban wage in the three urban sub-sectors (which comprise a private sector, a productive public sector and a non-productive public sector). The model posits that an exogenous rise in the urban wage creates a wage gap that raises the premium on rural out-migration so that unemployment expands in the modern urban sector. The government responds to additional urban unemployment by increasing taxation (whose burden falls disproportionately on the private sector) in order to invest capital in the creation of additional urban jobs. But this process is self-defeating because it renders work in the unproductive public sector preferable to farming, so that more people migrate to the city where their unemployed presence intimidates the government from which the unemployed rural migrants extract still more rent. As noted in Section 5.3, Krueger et al.

(1992) find that the fraction of primary sector revenue extracted by the governments in sub-Saharan Africa may have reached 50%.

Gelb et al. (1991) use a CGE model to estimate the potential scale and impact of the resulting rent misallocation. They test the sensitivity of the model against widely differing savings functions. The functions range from, at one extreme, forced saving by the government (which is assumed to use a tax that squeezes private consumption without reducing productive investment), through to a level of taxation at the other extreme that does not change consumption but does cut productive investment in direct proportion to the scale of the tax. Simulations using empirically plausible data over thirteen time periods suggest that the consumption losses are invariably significant and that the efficiency of capital can be depressed below the level required to sustain economic growth within a decade.

Rodrik (1998) models a 'typical' African economy in order to gives an indication of the political difficulty of reform, based on the simulation of the division of revenues. He assumes a two-sector economy, each sector producing a single product with a different production function, namely a capital-intensive manufactured good in the urban sector and labour-intensive agricultural product in the rural sector. There are five groups in society that comprise farmers and informal sector urban workers who receive the same wage, formal sector urban workers who receive a wage premium, urban employers who generate profits and government officials who extract rents. The simulation assumes a 40% import tariff and 71% of the workforce in the rural sector. It yields a distribution of national income of 27% to farmers, 61% to workers (both urban and rural, but with formal sector workers securing a 17% premium), 8% to urban capitalists and 3% to the recipients of trade rents or tariff revenues. A reform that cut the tariff from 40% to 10% would depress the income of urban rent recipients by two-fifths and raise farm incomes by one-fifth. Yet it would confer a net gain to GDP of only 2.5%. Such a reform in trade policy is therefore likely to be vociferously opposed by the vocal urban constituency.

Summarizing, the sequenced industrialization model of the resource-deficient development exhibits modest Dutch disease effects, diversifies its economic structure, makes effective use of produced capital and accumulates skills. The production structure of the economy also demonstrates at a relatively early stage the non-sustainability of an autarkic industrial policy, thereby avoiding policy capture by vested interest groups in N. In contrast, the staple trap model of resource-rich development experiences strong Dutch disease effects, closes its economy and retains fewer incentives for the efficient deployment of capital. It remains dependent on the resource sector for foreign exchange and revenues so that when growth in that sector slackens, sharp real depreciations of the exchange rate and real wages are required to restore growth. But before then, vested interests are likely to have captured trade and industry policy, maintaining an inward stance so that reform is difficult. Foreign borrowing merely postpones the problem of adjustment and intensifies the growth collapse.

But, the question remains as to why, given the staggered start of the LDCs as a group on the path of economic development, so many countries experienced a growth collapse in the late-1970s or early-1980s? This concentration in time suggests that the problems of

resource-abundance are a relatively recent phenomenon, an issue towards which attention now turns in Section VII.

VII HISTORICAL PERSPECTIVE ON RESOURCE ABUNDANCE

The stylized facts of lacklustre resource-rich development appear to be a relatively recent outcome. They may arise from the changing relative prices of intermediates due to falling transport costs from the mid-1950s and/or the simultaneous trend towards interventionist policies. This section examines models of temporal change in the advantages of resource-abundance, reviews the empirical evidence and draws some policy implications.

7.1 Models of long-term trends in natural resources and growth

Findlay (1995) models the relationship between falling transport costs (conceived as declining economic autarky), resource endowment and comparative advantage. He does so for two different resource endowments: land-rich America and land-scarce Europe. He identifies a period of initial income convergence in favour of the resource-rich region. In Findlay's model, as improving trade prospects reduce the level of autarky, the resource-rich region (America) experiences a rise in crop prices (i.e. prices of resource-based goods) that draws capital and labour from manufacturing/ crafts. As a result, the return to land rises and the spatial frontier therefore expands. This causes real incomes to rise broadly through the economy because the basic production unit of the family farm yields an egalitarian income distribution. This contrasts with the skewed income distribution associated with a plantation or mining society more common in sub-tropical and tropical regions (Auty 1995, 215-19).

Findlay (1995) also specifically models the implications of a sharp decline in bulk shipping costs, as occurred in the 1950s, for a pair of resource-rich and resource-deficient countries. He develops a model with three products (a labour-intensive final good, a capital-intensive final good and an intermediate good) and three factors of production (land, labour and capital). In the initial conditions, Findlay shows that, with trade occurring in the final good but autarky persisting for the intermediate good, the rate of capital accumulation in the resource-rich country is enhanced vis-à-vis that in the resource-poor country (due to the availability of the 'cheap' intermediate). Consequently, trade in the final good widens the initial gap in wealth between the two countries.

However, when falling bulk transport costs remove the assumption of autarky with regard to the intermediate good, the expanding production of that good in the resource-rich country triggers a process of adjustment. The adjustment equalizes both the real wage and the interest rate between the two countries. This is because, as the resource sector and its stream of rents expand, the interest rate falls in the resource-rich country and manufacturing output and employment both contract. The resource-deficient country, however, becomes an exporter of the capital-intensive good, loses its erstwhile

comparative advantage in the labour-intensive good, and in the process acquires a higher per capita endowment of physical capital than the resource-rich country.

Findlay (1995) points out that his model is consistent with a study by the economic historian, Wright (1990), into the resource-derived basis of the pre-war strength of the US economy. It is also consistent with the subsequent loss by the US of its comparative advantage in some areas of manufacturing to resource-deficient Japan. Finally, Findlay notes a more general property of his model which is that it captures the Dutch Disease effect that is associated with booming primary product exports and the weakening of the non-booming tradeables sector. Findlay's model is quite specific in dating the reversal of the resource-deficient country's disadvantage to declining shipping costs from the 1950s.

Elsewhere, Sachs (1996) concludes that during the period 1870-1914, a resource-rich natural endowment was advantageous due to strong demand for primary products. But real prices subsequently declined as transport improvements widened the scope for expanding primary products through the 1950s, while simultaneously rapid growth in the *productivity* of manufacturing accommodated rising real wages for those making the products exported by that sector. This basic hypothesis about the 1950s 'hinge' is examined in the next two sections in the light of empirical evidence, beginning with the pre-1950s period.

7.2 Pre-1950s historical evidence

The expansion of world trade through the late-nineteenth century and until the outbreak of the Great War helped to sustain a rate of per capita GDP growth of 1.3% in Western Europe (Table 8). International capital flows also expanded: Western Europe supplied the bulk of overseas investment and one-quarter of it went to the Western Offshoots, while Latin America came next with one-fifth (Maddison 1995, 63). As a consequence of trade and investment, the resource-rich temperate lands of new settlement (North America, Oceania and southern South America) achieved an even faster rate of economic growth than the predominantly land-scarce European core. By 1913 land-abundant Argentina was the richest country in South America with a per capita income 10% above that of the West European industrial country average.

TABLE 8

REAL PER CAPITA GDP GROWTH 1820-1992, BY REGION SAMPLE COUNTRIES (%)

	1820-1870	1870-1913	1913-1950	1950-1973	1973-92
W. Europe	0.9	1.3	1.2	3.8	1.8
W. Offshoots	1.4	1.5	1.3	2.4	1.2
E. Asia	0.1	0.8	0.1	5.6	5.3
SE. Asia	n.a.	n.a	-0.1	2.5	3.6
S. Asia	0.1	0.4	-0.6	0.9	2.4
Latin America	n.a.	1.5	1.9	2.4	0.4
SS. Africa	n.a.	n.a	1.5	1.9	-1.2

Source: Maddison (1995), 62-63.

Economic growth in the resource-rich temperate regions was not only faster than in the industrial core, but income was also less equitably distributed. In contradiction of Findlay's model, Williamson (1997) finds that between 1870 and 1914 income inequality rose rapidly in the rich, land-abundant, labour-scarce economies like those of North America and Oceania. Meanwhile, inequality fell dramatically in land-scarce, labour-abundant newly industrializing countries like Italy, Norway, Sweden and Denmark. This outcome is consistent with trade theory that predicts that a boom will raise demand for the abundant factor among all participants. In Williamson's specific example, mass migration contributed to the fact that the labour-abundant (resource-deficient) economies experienced rising real wages for the poor and falling returns to land (rents) for the wealthy.

Elsewhere, Lewis (1978) finds that outside the 'temperate' regions, the principal benefits of world trade were confined to the well-watered and accessible areas (usually by railways) in the land-abundant tropics where an exportable surplus was more easily produced and marketed. For example, peasant land capable of supplying cash crop exports was abundant in the moister parts of sub-Saharan Africa. Although per capita GDP data are scarce, data for per capita exports lead Lewis (1978, 203) to suggest that sub-Saharan African trade lagged the other tropical regions during the first golden age, with per capita levels that were less than one-third those of Latin America and barely half those of Southeast Asia. Peasant farming thrived in Southeast Asia, apart from densely-settled Java where the Culture System depressed incentives (Geertz 1963). Japan differed from Java, because it was a densely-settled country that also experienced a relatively rapid per capita GDP growth rate, averaging 1.4% per annum 1870-1913 (Maddison 1995).

Lewis (1978, 226) estimates that the growth of tropical agricultural exports slowed to an average annual rate of 0.9% 1937-55, compared with 2.1% 1929-37 and 3% during the years 1883-1929. This loss of dynamism in primary product exports elicited efforts at greater self-sufficiency among exporting countries, especially in Latin America, where the process of import substitution was accelerated. In fact, the Latin American countries were able to sustain, or even to accelerate, their per capita growth during the post-1929 regression in world trade. Consequently, by 1950 the average per capita income for that region was $3500, almost twice the level of 1913, and the gap with resource-deficient Western Europe had narrowed slightly. Per capita income also seems to have risen significantly in eight countries in resource-rich sub-Saharan African for which Maddison provides figures of per capita income. By 1950, the average per capita income for sub-Saharan Africa, based upon Maddison's eight countries, was $775. That figure is higher than the average of South Asia ($600), and not far off the $800 of East Asia (excluding Japan, whose per capita income had reached almost $1900 by then). The sub-Saharan African figure is only slightly below the $850 of resource-rich Southeast Asia.

The fact that some catch-up does seem to have occurred in sub-Saharan Africa means that Latin America was not the only resource-rich region to close the per capita income gap on the richer countries during the bleak inter-boom years. This leaves Southeast Asia as an anomaly among the principal resource-rich countries because its per capita income declined (Table 8). Part of the explanation for sluggish economic growth in

Southeast Asia may lie in the war-time dislocation occasioned by the Japanese invasion, and the subsequent lagged recovery.

7.3 Empirical evidence of post-1950s growth collapse

Consistent with Findlay's model, the advantage of resource-abundance does appear to have declined during the second golden age of economic growth. Among the industrial countries, per capita incomes in resource-deficient Western Europe grew at 3.8% per annum during the period 1950-73, significantly faster than the 2.4% achieved by the resource-rich Western Offshoots (Table 8). A similar pattern began to emerge among the developing countries, where Maddison's sample of four resource-deficient East Asian economies exhibited faster growth than most of the more generously endowed tropical regions, whether elsewhere in Asia or in Latin America and sub-Saharan Africa. The tendency for the per capita GDP growth of the resource-rich regions to lag that of the resource-deficient ones strengthened after 1973. But, once again, Southeast Asia is an anomaly.

The Southeast Asian anomaly casts doubt on the thesis that the growth collapses in Latin America and sub-Saharan Africa are attributable to a deterioration in the export markets of resource-rich countries. For example, Sachs (1985) uses a comparison of East Asian and Latin American countries over the period 1970-84 to demonstrate that there was not much difference between the sub-regions in terms of the scale of the external shocks, nor in their accumulated debt, nor in the role of government (as measured by government expenditure relative to GDP). A large difference does occur, however, in the degree of openness of the two sets of economies and in their resulting capacity to service their foreign debt. In Sachs' thesis, the external shocks were the catalyst that revealed the weakness of a protected and relatively undiversified economy. But he has difficulty in explaining why resource-rich Southeast Asian countries like Malaysia and Thailand avoided the staple trap. In fact, the staple trap is a less deterministic outcome than Sachs' assumes and owes more to policy choice.

The staple trap model appears to capture the gist of the deterioration in the economic performance of the Latin American and sub-Saharan African countries. But it does not explain why the impact of the staple trap did not occur earlier in Latin America, given that region's head start. Nor does it explain why growth ceased in most sub-Saharan African countries after the first oil shock whereas the Latin American slowdown occurred after the second shock. One plausible explanation for the delayed impact of the staple trap in Latin America (and elsewhere) is that during the post-war period, development economics produced poor policy advice that encouraged the closure of the primary product exporting economies (Lal 1983). Prior to this period, resource-rich economies remained relatively open or underwent a forced, as opposed to voluntary, closure of their economies. The scale and skill of the intervention required to execute a policy of voluntary trade autarky outstripped the capacity of most governments to provide it effectively. Lal (1983) expresses it archly: if sophisticated governments in Western Europe encounter difficulty in executing ambitiously interventionist policies, the equivalent of eighteenth century governments in developing countries cannot be expected to administer even more ambitious policies.

The earlier collapse of sub-Saharan African countries compared with those of Latin America appears to be explained by the inability of most sub-Saharan African countries to borrow recycled petrodollars after the 1973 oil shock. This was a result of their lower creditworthiness vis-à-vis the more industrialized Latin American countries. The first oil shock more than halved the GDP growth rate of sub-Saharan Africa, whereas the second shock cut it to 0.3% (World Bank 1987). Few sub-Saharan African countries were able to expand fast enough into other primary product exports in order to pay for the higher costs of imported oil. They were therefore forced to respond to higher oil prices by lowering oil imports and also curbing non-oil imports, so that their protected manufacturing sectors were deprived of imported inputs and experienced sharp falls in output (Balassa 1982). In some instances, notably Zambia, large inflows of foreign aid merely served to postpone the necessary adjustment of the economy to the less hospitable external conditions.

In drawing policy lessons from the historical record, a word of caution is appropriate. The sequenced industrialization model of the resource-deficient countries that was so successful 1955-95 may not remain advantageous. This is because a new global trade pattern is emerging in which the Prebisch effect may apply to labour-intensive manufactured goods. Moreover, the demand from the burgeoning Eurasian region for food and raw materials may put pressure on supplies of primary commodities and restore the advantage of resource abundance. Finally, the evolving pattern of global trade may also confer stronger growth opportunities in the future upon global service suppliers.

VIII POLICIES FOR IMPROVING THE PERFORMANCE OF RESOURCE-RICH DEVELOPING AND TRANSITION ECONOMIES

8.1 Overview: learning from post-war experience

This section draws upon the literature review and the findings to date from in-depth case studies of resource-rich countries in order to set out the principal policy lessons for reform of both developing market economies and transition economies. The case studies comprise two sets of countries that each span the range in resource endowment. They cover differences in primary commodities (minerals and crops) and in country size. The first set of case studies comprises four pairs of countries at different levels of per capita income. It includes: relatively low-income Ghana and Bolivia; mid-income Malaysia and United Arab Emirates; the large mid-income economies of Argentina and Mexico; and finally, high-income Norway and Finland. The second set of countries comprises two groups only: one of reforming market economies (South Africa and Costa Rica) and one of transition economies (Russia, Kazakstan and Uzbekistan).

The case study of Malaysia is especially illuminating because that country is one of a handful of resource-rich countries that sustained rapid economic growth. Three others (Botswana, Indonesia and post-1982 Chile) are analyzed elsewhere (Auty and Mikesell forthcoming). Malaysia provides the basis for developing a model of successful resource-driven development. Interestingly, Malaysia did close its trade policy somewhat from the late-1960s. For example, import substituting manufacturing received transfers estimated at around 4% of GDP during the 1970s (Edwards 1993), and in the mid-1980s an over-ambitious public-sector-led HCI Big Push created severe macroeconomic imbalances (Auty 1990). But first priority was given to macroeconomic stability, and trade policy remained relatively open. Moreover, the adverse effects of the 1986 commodity price shock were quickly offset by a rapid expansion in export-oriented manufacturing (Salleh and Meyanathan 1993). The modest degree of closure of the economy appears to be the result of a political compromise reached between representatives of the Malay majority and the sizeable Chinese minority that ceded political power to the Malays in return for guarantees to maintain commercial opportunities for Chinese businesses. This explanation of Malaysian success assigns a critical role to the singular ethnic composition of Malaysia. It does not, however, invalidate the conclusion that a resource-rich country can achieve competitive diversification by pursuing sound economic policies that maintain market disciplines. Nevertheless, it does underline the important role that social capital can play in determining the outcome.

A word of caution concerning the robustness of the policy conclusions drawn in this section is in order. This is because, at this stage, the lessons that can be distilled from the literature review and an initial consideration of the case studies must be regarded as preliminary. However, although some of the details may change, in particular the

adjustments required for success in specific types of resource-rich country, the conclusions concerning the basic reform requirements are not expected to alter very much.

8.2 Reforming developing market economies

The legacy of a growth collapse includes a large fiscal deficit with inflationary consequences, severe price distortion, and sizeable foreign debt that presents acute servicing problems. The three principal policy objectives are, therefore, stabilization, trade and price liberalization and capital market liberalization. However, economists remain divided over both the degree of monetary and fiscal tightening that is required and their timing in relation to price and capital market liberalization. For example, the IMF advocates a 'big bang' approach whereas Corbo and Fischer (1994) recommend a more gradual and sequenced process on the basis of Chilean experience. Chile pursued a three-stage sequence. The sequence initially targets stabilization until prices fall below 20-25%. The second stage, trade reform, requires raising taxes to compensate for lost revenues as tariff barriers are reduced. Fiscal reform also calls for a reduction in subsidies and the broadening of tax revenues into, for example, a value added tax. Such a tax is, however, potentially inflationary and deeply unpopular. The third stage of the reform process, capital market liberalization, may lead to large capital flows that have destabilizing impacts. This unfortunate aspect of successful reform pushes up the real exchange rate and hampers diversification of the tradeable sector (Williamson 1996). It is still unclear how to ameliorate this problem, which is especially acute for small resource-rich countries like Jamaica and Trinidad and Tobago whose diversification options are structurally constrained (Auty and Mikesell forthcoming).

A successful big bang reform strategy does not escape this difficulty of a relatively high but potentially volatile exchange rate, but it does entail other risks of its own. The big bang reform adopted by Peru in the early-1990s compressed the three basic reform stages outlined above and led to three years of economic stagnation before a fairly robust recovery got under way. The period of stagnation might have been avoided by a combination of more gradual fiscal and monetary tightening and slower trade liberalization. In addition, government spending and incentives to investment would have benefited low-income groups who otherwise are seen as bearing a disproportionate share of the adjustment. Yet, to set against this, there is the risk that a more gradual strategy may over-stimulate the economy and lengthen the stabilization process. This can put the commitment of the government to reform in doubt and further postpone the recovery of investment, as Ghana illustrates.

Whether the reforms proceed as a big bang or a more gradual sequence, commodity-exporting countries are especially prone to external shocks. Therefore, the success of the basic reforms is enhanced by the construction of appropriate institutions to mitigate such destabilizing events. One such institution is a commodity revenue stabilization fund that absorbs revenues in excess of export price projections during a commodity boom. The accumulated reserves can subsequently be used to smooth the adjustment of government expenditure to a price downswing. Such a system can be adapted so that it sterilizes commodity foreign exchange flows in order to dampen the volatility of the exchange

rate, a volatility that is likely to deter investment in the non-booming tradeables (Gylfason et al. 1997). This can be managed by the central bank buying foreign exchange with domestic currency during a commodity boom, taking care to ensure that such measures are closely integrated with monetary and fiscal policies. Should an improvement in the commodity income stream prove more permanent, then an adjustment to a new equilibrium in the real exchange rate and in government revenues can be smoothly engineered. The destabilizing impact of external capital flows associated with a boom, or with successful stabilization, may also be reduced by obliging foreign investors to maintain their holdings for a minimum specified time period. In the case of Chile, this was set at twelve months. The effectiveness of the central bank in performing these functions and also in curbing inflation is likely to be enhanced by granting it a high degree of autonomy and this is an important component of institutional capital.

The reform of distorted resource-rich economies has generally taken much longer than first anticipated. This is because early programmes underestimated the contribution to successful reform that those factors make that can only be changed over the longer term, notably the state of the capital stock (all its components). The Ghana case study provides a clear illustration. When the government of Ghana agreed an IMF loan in 1983 it negotiated to downgrade the importance of stabilization and delayed exchange rate realignment for fear of the political repercussions. As a result, inflationary pressures persisted longer in Ghana and retarded the achievement of a competitive exchange rate until the late-1980s. Although investment subsequently recovered to 18% of GDP, the lack of private investor confidence meant that less than one-third emanated from the private sector. In fact, half of the investment drew on aid and soft loans and they barely offset capital depreciation in the 1980s. Therefore, although GDP growth averaged 5%, this was a result of the more effective use of existing resources rather than the expansion of the capital stock. It was estimated that the stock of produced capital might take a generation merely to restore it to its condition before the growth collapse. Meanwhile, the country's human capital had also declined as many of its better-educated citizens migrated overseas and public expenditure on health and education slumped to a meagre 2.5% of GDP. In addition, the suspension of democracy and more than two decades of government hostility to private enterprise set back the accumulation of positive social and institutional capital.

Edwards (1997) suggests that during the recovery from an economic collapse, public saving might first be increased, provided that socio-political institutions enhance political stability and leave governments with some expectation that they may remain in power to benefit from their 'prudent' behaviour. In addition, private saving can also be increased by institutional measures, such as the extension of the private pension system. Nevertheless, the principal cause of improved saving rates is sustained economic growth and so Gavin et al. (1997) warn against concentrating on medium-term measures to boost saving. They point out that the policies required to boost saving over the long-term (stabilization and financial and trade liberalization) may, paradoxically, initially depress the saving rate. Therefore, the tardy response to the economic policy reform of the 1980s is partly due to the fact that the reform measures initially stimulate consumption at the expense of private saving. One implication of this is that

convalescing economies will be more dependent on foreign capital for a while, rendering them vulnerable to volatile capital flows. Expressed another way: a staple trap may be replaced by a capital trap, as noted earlier.

Mineral-driven economies like Bolivia and UAE among the case study countries experience additional problems arising out of the fact that mining is usually large-scale, capital-intensive, foreign-owned and generates few local productive linkages. This is especially so in smaller countries where complementary inputs for RBI are usually lacking. The economic stimulus from mining is therefore heavily concentrated on fiscal linkage, so that the government must tax the rents and then ensure their effective deployment. This makes the mineral-driven economies especially vulnerable to government failure and the squandering of finite natural capital. For these countries it is especially important to construct institutions that constrain inappropriate public expenditure. One such institution is a dedicated capital development fund (CDF) for the mineral rents which, in order to assist in sterilization, may be invested offshore. In addition the use of EARA and the calculation of the genuine saving rate can also improve the domestic absorption of the rents by distinguishing the capital component from the income component within the rents and gauging the degree to which economic growth is sustainable. The capital component of the rents must be invested in wealth-producing assets in addition to those arising from non-mineral investment in order to maintain the income stream from the depleting mineral resource and prevent leakage of the rents into consumption.

Bolivia, like Ghana, also experienced a disappointingly slow recovery following its espousal of reform in 1987. The nationalized mines had been run down as investment in maintenance and exploration were skimped. Table 5 shows that the genuine saving rate for Bolivia during the 1980s was profoundly negative, in other words that a substantial depletion of natural capital occurred without a compensating accumulation of produced or human capital. A pre-condition for the discovery and development of new reserves was privatization and investor-friendly regulations. Although agricultural output in Bolivia has the potential to respond faster, the benefits of extensive land reform undertaken during the 1950s in the Andes (where the bulk of the population resided) were overtaken by a combination of rising population and inadequate access to credit. The eastern lowlands offer greater development opportunities than the overpopulated Andean plateaux, notably in farming and gas-based industry, but living conditions there are often unhealthy and harsh. Meanwhile, much of the ISI collapsed when tariff protection was removed. Industrialization is constrained by the small size and geographically fragmented nature of the domestic market, problems that are compounded by the country's land-locked location and mountainous geography. In the absence of a robust economic recovery, illegal coca cultivation has thrived, with attendant problems of unrecorded and untaxable revenue flows and tensions between government and farmers. The basic reform message has been distilled down into 'get prices right', but it might be more accurately stated as: get prices right *and* nurture institutional capital.

Many oil-exporting countries have highly favourable ratios of oil reserves to population, a characteristic that earned them the designation of 'capital-surplus' oil-exporters during

the 1974-78 and 1979-81 oil booms. The case study of the United Arab Emirates shows that, like most such countries, it experienced a relatively modest real decline in per capita income when oil prices dropped in the mid-1980s and that economic growth has yet to resume. Many of these countries diversified into RBI, notably aluminium smelting and petrochemicals, which are highly capital-intensive and produce few jobs. Meanwhile aridity limits agricultural production. The service sector must therefore provide most employment. However, heavy government expenditure on human capital has failed to create the workforce skills required in order to diversify economic activity. Instead, it has created a dependency on public sector employment, much of it unproductive that leaves more menial tasks to migrant workers. The closer adjustment of wage rates in line with productivity is therefore required within the public sector, along with expanded provision of vocational instruction.

Unfortunately, the likelihood of policy demands outstripping the implementation capacity of the government is higher for the mineral-driven economies than it is for most other commodities. For example, the production function of *crop* production triggers a more diverse set of linkages than mining. This is because crop revenues are more likely to flow to domestic farmers and into final demand linkage and also into domestic backward and forward productive linkages, rather than into fiscal linkage only as is the case in mining. The less capital-intensive nature of much agricultural production also promises a swifter response to price realignments than either mining or manufacturing can provide. Moreover, the introduction of rational pricing policies can ensure that water, soil and forest resources are sustainably managed. However, as noted in Section 5.3, the realization of these advantages of crop-driven growth over mineral-driven growth are based upon the accumulation of *positive* social and institutional capital. All too often the factional governments of these countries ran this capital down.

The problems of the mineral economies appear to be inherent to the production function of mining and demand especially stringent constraints on government policy. The transition economies share with the mineral economies a similar inherent bias towards high levels of state intervention, at least at the outset of reform, even if, like Uzbekistan, they are not mineral-driven.

8.3 Reforming the transition economies

Overall, an abundant natural resource endowment seems more likely to amplify the problems of the transition to a market economy than to reduce them. One important reason for this is that a rich resource endowment encourages a slow response to reform and, as noted below, a slow response amplifies the loss of output and heightens the risk of policy corruption. For example, the resource-rich transition economies' greater reliance upon agriculture and/or minerals (as in Central Asia) has inclined their governments to believe that the gradualist East Asian transition is a more appropriate model for them than the big bang reform adopted in the more industrialized countries of Eastern Europe. A second and related reason why resource abundance may hamper the transition is that the resource rents are perceived as a cushion against the harshness of reform. In the case of minerals, for example, demands for advance payments from foreign investors during contract negotiations can draw the resource rents forward. But

such advance revenues, like other public revenues, are vulnerable to leakage in the absence of either financial transparency or market discipline. Meanwhile, the future production on which they are premised, may not materialize. A third reason is that agriculture is heavily subsidized under central planning, so that it experiences a massive adjustment during reform. The adjustment includes a legacy of inappropriately capital-intensive technology, weak institutions and mismanaged soil and water resources that require urgent and expensive attention (Esty 1997).

The transition from a socialist economy to a market economy calls for more extensive reforms than in the case of distorted market economies. Fischer et al. (1996) argue that reforms are required in six areas. In addition, to macroeconomic stabilization, price liberalization and trade liberalization, and current account convertibility; transition economies must also pursue enterprise reform, the creation of a social safety net, and the provision of an institutional and legal framework for a market economy (including an appropriate financial system). As with the developing market economies, much debate has centred on the speed of reform. However, for the transition economies, a 'big bang' strategy can only apply to stabilization, and to trade and price liberalization because the other reforms tackle social and institutional capital so that, of necessity, they take longer to put in place. A massive restructuring must occur that shifts resources away from state-run agriculture and inefficient HCI, which were both heavily subsidized under central planning, towards private firms in the most repressed sector, namely services.

Some researchers argue that stabilization must be achieved first, with the maximum tolerable annual inflation rate variously estimated to lie between 25% and 50%. But others assert that monthly inflation rates of 10% may have to be tolerated in order to maintain the flow of credit to SOEs. Yet, de Melo et al. (1996) note that inflation may be prolonged by the support of SOEs through subsidies because the subsidies outstrip public revenues and also hamper the emergence of private enterprises in response to adjusted price signals and trade. The drain on resources to support fossilized production, while likely to ameliorate adjustment stress over the medium-term, jeopardizes long-term prospects by crippling public finances. Smaller fiscal deficits and a fixed exchange rate appear to be especially important in reducing inflation and therefore in raising growth rates.

Those countries with the longest and most sustained reform experience the most modest decline in output, averaging around one-fifth of GDP. This conclusion is derived from a liberalization index devised by De Melo et al. (1996) that is based upon progress in three dimensions (internal market liberalization, foreign trade liberalization and expansion of private enterprises and banking reform). The one-fifth decline in output of the advanced reformers compares with a fall of one-third for the high-intermediate reformers, most of which had stabilized their output by 1994. The low intermediate reformers fared worst, experiencing a halving in their GDP, while the slow reformers managed to contain their losses to one-third of GDP. Consistent with the growth-inflation link, the advanced reformers controlled inflation most successfully whereas the slow reformers experienced the worst episodes of inflation.

Faster reformers also experienced smaller budget deficits and minimal declines in the share of government revenue in GDP (from 54% to 50%), whereas high-intermediate reformers had wider deficits and a far steeper fall in revenue to around one-third of GDP. Revenue shares dropped to one-quarter of GDP in the case of the low-intermediate reformers. Meanwhile, the slow reformers incurred large quasi-fiscal deficits, i.e. losses accumulated by the central bank through debt write-offs, subsidies to guarantee foreign exchange and credit provision to banks and SOEs (state-owned enterprises) at negative real rates of interest. The transfers that sustain SOEs have perpetuated quasi-fiscal deficits in the slow-reforming economies because the SOEs either generate no revenue or absorb revenue. These quasi-fiscal deficits are a key cause of the sharp decline in the share of government revenue in GDP among late reformers and also of persistent inflation so that these economies fail to stabilize. This failure, in turn, delays the expansion of the private investment that is required in order to restructure the economy.

Finally, slow economic reform is strongly linked to limited political reform and corrupt rent-seeking by ex-communist officials that corrodes social and institutional capital. The evidence suggests that early reformers experience at least as much institutional evolution as slow reformers and that rapid reform may actually stimulate the required institution building. For example, the growth of private enterprise and market exchange creates a demand for measures to defend property rights and to enforce contracts. Aslund et al. (1996) find no evidence of rapid reform generating a political backlash that will jeopardize the entire reform process. On the contrary, rapid and early reform raises the likelihood that a reforming government will win a future election and reduces the chances of the reforms being reversed.

The resource-rich transition economies are not only more likely to experience the penalties of slow reform, they are also more likely to experience difficulty in creating new institutional capital and in curbing the corrosion of social capital. Frye and Shleifer (1997) usefully identify three basic modes of government behaviour during the economic transition towards a developed market economy. The first mode is the 'invisible-hand' in which the government has the characteristics of the benevolent state. It is well organized and relatively uncorrupted and likely to seek to improve long-term social welfare. Such governments adopt the strategy of creating an enabling environment (which includes sustaining law and order, regulation and contract enforcement) and leave most allocation decisions to the private sector. In the 'helping-hand' model, the transition government functions as a factional bureaucratic state. It supports some sectors and some firms, and it may also have economic or kinship links with the entrepreneurs. The legal system in this case is less important because conflicts are arbitrated by bureaucrats who, although they may be corrupt, both control and constrain the resulting adverse effects. Finally, the third model, the 'grabbing-hand', is an extreme version of the predatory bureaucratic state that has a far from cohesive bureaucracy in which individuals within the bureaucracy pursue their own interests. Such governments may lose coherence and be unable to sustain law and order so that it is then maintained by private means. Russia provides an extreme example. Aslund et al. (1996) estimate that in 1992 import subsidies, subsidized credit and export controls in Russia created rents equivalent to between 55 and 75% of GNP. Much of this was

secured by former leading communist politicians and officials. Other means of capturing rents include subsidies for SOEs and also closed-bid privatization that, in the case of resource-extracting industries, can transfer large sums in terms of the mineral assets to the new owners.

One troubling consequence of the transition has been heightened income inequality, a process that has been greatest in Russia, where early large-scale privatization was combined with hesitant policy reform and strong government corruption. Compared with the late-1980s, when gini coefficients in the transition economies ranged between 0.2 to 0.3, they rose towards, and even above, the OECD average of 0.35. In Russia the deterioration was more extreme and exceeded the relatively high mid-income country mean of 0.45. The World Bank (1996) solution to income inequality is a combination of market-led growth, transfers for the elderly, and measures to improve labour mobility (including freeing up the housing market and unemployment benefit in order to both facilitate movement and reduce the risk of transferring between employers). Without a guarantee of income support during unemployment, workers are likely to resist SOE reform and to thereby increase the risk that they will become trapped within declining economic regions. Yet IMF estimates suggest that targeted social spending to alleviate the social hardship of transition need be no greater than 2.4% of GNP, well below the scale of transfers actually observed.

Consistent with the overall thesis about the likely negative effects of resource abundance on the transition, the transitional *mineral* economies can expect the Dutch disease effects to amplify the inherent potential rebound in the real exchange rate of the transition recession. This will depress still further investment in the competitive diversification of the economy. Rosenberg and Saavalainen (1998) show that in the case of Azerbaijan, the transition recession caused a strong under-valuation of the real exchange rate that harboured a great potential for a rebound. The onset of the rebound is accelerated by the inflow of foreign capital that is associated with expanded mineral production. Although the nature of mineral production results in a lag between the investment and the revenue flow, the negotiation of advanced payments in the mine or oilfield development contracts offsets this. However, in the case of Kazakstan the rebound may be retarded because exploration and transportation bottlenecks will delay the expansion of oil production there compared with Azerbaijan. The latter anticipates a three-fold rise oil in production 1997-2002 that will push the share of the hydrocarbon sector to 30% of GDP and 85% of exports. Nevertheless, there is evidence that over-optimistic expectations of the arrival of hydrocarbon revenues has encouraged far slower reform in Kazakstan.

The double-edged sword of mineral wealth, means that a mineral-*deficient* but land-abundant country like Uzbekistan that borders a resource-rich economy may, paradoxically, be at an advantage. Such a country can take advantage of the impact of Dutch disease effects on the neighbouring mineral-rich country by being more competitive in non-mining tradeables and exporting manufactured and agricultural goods to its neighbour. With the largest domestic market in the Central Asian region, Uzbekistan is well placed to capture the more scale-sensitive manufacturing that is directed at the regional market. Unfortunately, the basic policy stance of the Uzbekistan

government is flawed. Favourable price trends in the country's relatively large agricultural sector encouraged slow reform. Instead of leaving more economic decisions to markets, the Uzbekistan government intervened on an over-ambitious scale. Its drive for food self-sufficiency has squeezed the rural sector for extra resources to shore up an excessively protected manufacturing sector, often in an arbitrary fashion. Levels of production and productivity in the agricultural sector are declining and thwarting the government's goals, while manufacturing firms have been accumulating stocks of unsaleable goods.

Gradualism may have appeared feasible in Uzbekistan because of its pre-conditions, but the economic restructuring that is occurring is not sustainable. The basic policy stance has much in common with that of pre-reform Latin America so that a growth collapse seems the most likely outcome. The experience of Uzbekistan supports the contention that a favourable natural resource endowment slows transition reform, and slow reform is likely to fail.

IX CONCLUSIONS

Although a recent World Bank (1997) estimate of the sources of wealth suggests that natural capital contributes significantly less to economic growth than human capital, natural capital plays a central role in three critical respects. These are: in guiding the trajectory of economic development and structural change; in conditioning the accumulation of produced capital, skills and institutional capital; and in helping to determine the efficiency with which both produced capital and human capital are deployed. Moreover, the sound management of natural capital is essential for environmentally sustainable development. Nevertheless, economic development also calls for policies that are socially sustainable so that the vital role of natural capital should not be allowed to eclipse the importance of institutional capital in the formulation of policy prescriptions.

The underperformance of the resource-rich developing countries compared with the resource-deficient ones since the 1960s is rooted in a sharp divergence in the production structure of the two sets of economies. The resource-rich countries evolved a specialized production structure (the staple trap) in all but a handful of cases, whereas the resource-deficient countries pursued a sequenced economic diversification. Those resource-rich countries that did manage to avoid the staple trap did so either by maintaining an open trade policy and/or by having an unusually buoyant resource sector.

The rates of accumulation of produced capital, skill and institutional capital as well as the genuine saving rate are inversely associated with a dependence on natural resources. The successful resource-deficient countries managed to lift their rate of investment to a level above 25% of GDP *and* to maintain the efficiency of that investment. This achievement benefited from the early start and compressed passage of these countries through the demographic cycle. This is because they experienced the growth bonus of a falling dependency rate within little more than a generation of embarking upon the cycle. A few resource-rich countries achieved similarly high investment levels, but usually somewhat later in their development due a more leisurely passage through the demographic cycle and to the inherently slower growth of crop-driven economies. But the vast majority of the resource-rich countries could not raise investment to 25% of GDP, even with recourse to substantial foreign borrowing. Worse, investment efficiency invariably declined sharply. Many of the smaller countries, especially the mineral economies, failed to maintain positive rates of genuine saving through the 1970s and 1980s. In other words those countries were maintaining whatever growth they achieved through the consumption of natural capital.

The accumulation of skills is also linked to the natural resource endowment, with the rapid rate that the resource-deficient countries achieved being driven by the needs of intensive agriculture as well as their early and labour-intensive industrialization. There may also have been external spillovers from manufacturing technology and organization

throughout the rest of the economy. In contrast, educational provision lagged in the resource-rich countries and this may have contributed to the heightened income inequality that is a feature of most resource-rich countries because it delayed the attainment of that mean level of educational attainment at which wage differentials narrow. Heightened income inequality is associated with slower economic growth. This is just one of a number of reinforcing cycles that are at work within resource-driven development.

However, the efficiency with which produced capital and skilled labour are deployed varies significantly among countries, so that a further explanatory variable must be sought. That missing variable has been variously attributed within the conventional growth accounting framework to total factor productivity or the depreciation rate. The extension of the growth accounting framework to include institutional capital promises more insight, although it does create more problems for formal modelling. Institutional capital appears to be linked to the type of state which, in turn, appears to be associated with the natural resource endowment. The autonomous benevolent state is found with most frequency in resource-deficient East Asia. It has one of the most impressive postwar records in stimulating rapid economic growth. It used its autonomy to intervene effectively in accommodating the transition from labour-intensive to skill-intensive growth in the resource-deficient countries.

The resource-rich countries, however, are most commonly associated with factional states of varying forms. These states are more constrained and they must seek political compromises that all too often occur at the cost of policy coherence. Typically, such governments compound initial policy errors, partly as a result of ill-considered ad hoc responses to unanticipated adverse economic outcomes, and partly to secure more rents in order to bolster political support. As a result, the primary sector is squeezed for additional revenues even as its share of GDP shrinks in relation to the burgeoning nontradeable sector. This is a central feature of the growth collapses that most of the resource-rich countries experience. The collapses are accompanied by shrinking government revenues, deteriorating institutional capital and declining quality in the provision of education and in investment more generally.

The above stylized facts of resource-rich development can be distilled into the staple trap model which contrasts with the sequenced industrialization model of the successful resource-deficient country. The two models differ in four important respects, namely: the response of real wages to an expansion of the resource sector; the reaction of the production structure to changes in the real exchange rate; the capacity to absorb capital flows effectively; and the incentive to acquire skills. The staple trap model predicts a closure of the economy and increasing specialization in the structure of production. The accumulation of produced capital proves unsustainable under these conditions and the build-up of skills in tardy. Worse, trade closure facilitates distortionary interventions by factional governments that simultaneously depress the efficiency of investment and entrench opposition to trade and industry policy reform. The economic distortions cumulate behind the protective barriers. Foreign borrowing may postpone the need to correct the distortions in the face of flagging relative or absolute growth in the primary sector, but a growth collapse that corrodes all forms of capital is the eventual outcome.

The resource-rich countries exhibit wider variations in performance than the resource-deficient countries, a fact that is to be expected, given the larger number of such countries and the greater range not only in their size, but also in the nature of their natural capital. Overall, the large resource-rich countries sustain slightly faster and less erratic per capita GDP growth than the smaller ones. However, they have seldom secured the full potential advantages for economic diversification that their large size offers. The smaller resource-rich countries face greater constraints on competitive economic diversification than the larger resource-rich countries. They are more vulnerable to external shocks and also more likely to sustain negative genuine saving, especially if, as noted in Section 3.3, they rely on mineral exports. The heavy dependence of the mineral exporters on fiscal linkage has also heightened their exposure to government failure.

A counter-factual to the staple trap model of resource-rich development is provided by the sequenced industrialization model of resource-deficient development. The critical characteristic of the resource-deficient model is a sustained competitive diversification away from a dependence on primary products and an in-built resistance to the closure of trade and industry policy by vested interests. This resistance arises from the early reliance on manufactured exports which lack rents and focus government attention on maintaining export competitiveness. The government is more likely to become an autonomous maximizer of long-run social welfare under such circumstances. Its pursuit of sequenced industrial diversification sustains a strongly positive genuine saving rate and the rapid accumulation of produced capital, skills and institutional capital. The compression of the demographic transition gives a sharp boost to savings, investment and GDP growth at a relatively low level of development. It also absorbs surplus labour rapidly and this helps to maintain a relatively equitable income distribution and also to give priority to skill accumulation among workers, employers and government alike. Rising real wages propel the resource-deficient economy through the sequenced stages of industrialization. The net result is that the resource-deficient East Asian countries completed the industrial transition within two generations, as opposed to the five generations that the Syrquin and Chenery cross-country database suggests as more typical (Table 2). Overall, the GDP of resource-deficient countries grows faster and less erratically compared with the resource-rich countries and confers faster *per capita* GDP growth while also maintaining a more equitable income distribution.

The historical evidence reinforces the importance of policy to the outcome. Time series data since the late-nineteenth century suggest that an abundant resource endowment was initially advantageous to economic development, but that it began to become a mixed blessing during the 1960s. At that time many countries either embraced fashionable policies for promoting ISI, as in sub-Saharan Africa, or reinforced what had been voluntary ISI policies, as in much of Latin America. Such policies ran counter to the global trend of trade liberalization, however, and they proved unsustainable. The least diversified of the resource-rich oil-importing developing economies succumbed to growth collapses first, notably in sub-Saharan Africa. The genuine saving rate turned negative in many of these countries, especially the mineral economies, indicating an unsustainable development trajectory. But an inability to service foreign debt eventually extended the net of the staple trap to include most of Latin America in the early-1980s.

The historical perspective also suggests that population growth pushes all countries towards the resource-deficient state, although many may complete the demographic cycle before reaching it. Yet where the demographic cycle is prolonged and countries fall into the staple trap so that population growth and the dependency ratio stay high, they can move from resource-abundance to resource-deficiency within two or three generations. This is especially likely to occur when the growth collapse comes at a relatively low level of per capita income. Among the case study countries examined here, Ghana provides an example, but perhaps the most striking case is that of Kenya whose population increased four-fold between the late-1940s and the early-1990s. Kenya may now have as many policy lessons to learn, if not more, from the sequenced industrialization model as it does from the staple trap model.

The gist of the policy lessons can be stated quite briefly, but more specific policy guidelines will be derived from the study as the models are tightened and elaborated as part of an iterative process with the execution of the in-depth case studies. A central question in the reform of resource-rich countries that have experienced a growth collapse is the sequencing of the three basic measures required: stabilization, trade and price liberalization and capital market reform. Although a big bang approach carries lower risk of a government losing its commitment to reform, it is likely to adversely affect some of the most vulnerable in society. It also ignores the political constraints within which governments must function so that a sequenced reform, like that pursued by Chile, is likely to prove more politically acceptable. Moreover, the basic policy prescription must include institutional components such as central bank autonomy, a commodity revenue stabilization fund and a capital development fund. Even with appropriate measures, the restoration of sustained rapid economic growth is likely to be protracted due to the corrosion of all forms of capital and, ironically, the more successful the initial implementation of the package, the more capital inflows are likely to hamper competitive diversification and leave the economy vulnerable to capital flight.

An abundant natural resource endowment seems more likely to amplify the problems of the transition to a market economy than to reduce them. One reason for this is that the rents are perceived as a cushion against the harshness of reform. This encourages a slow response to reform, and a slow response amplifies the loss of output and revenues, and heightens the risk of policy corruption. A second reason why resource abundance may hamper the transition is because agriculture is often the principal sector in such economies and it heavily subsidized under central planning, so that a massive adjustment is required during reform. Meanwhile, the *mineral* economies in transition are likely to experience a stronger real exchange rate rebound, with obvious adverse implications for structural diversification.

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