WIDER

RESEARCH FOR ACTION

FOREIGN RESOURCE FLOWS AND DEVELOPING COUNTRY GROWTH

LANCE TAYLOR

WORLD INSTITUTE FOR DEVELOPMENT ECONOMICS RESEARCH
OF THE
UNITED NATIONS UNIVERSITY

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WIDER was established in 1984 and started work in Helsinki in the spring of 1985. The principal purpose of the Institute is to help identify and meet the need for policy-oriented socio-economic research on pressing global economic problems, particularly those impacting most directly on the developing countries. Its work is carried out by staff researchers and visiting scholars in Helsinki and through networks of collaborating institutions and scholars around the world.

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Contents **Page**

	Preface by Lal Jayawardena	2
	Acknowledgements	5
	Introduction	6
1.	Complications of Capital Flows	7
2.	Initial Conditions	8
3.	A Three Gap Model	13
4.	Three Gap Simulations	21
5.	Extrapolations to the Rest of the Developing World	29
6.	Global Macroeconomic Complications	35
7.	Brief Conclusions	43
	Appendix 1	45
	Appendix 2	45

PREFACE

The WIDER research project dealt with in this paper explores for the decade of the nineties, ways in which the developing countries can improve upon their experience of the eighties which has been widely dismissed as being the "lost" development decade. The eighties was the period when the Third World had to adjust its way out of the twin difficulties of the debt problem and falling commodity prices. Both major Latin America debtors and small open primary producers in sub-Saharan Africa received major external shocks reaching 5-10% of GDP in some cases. The adjustment took the form of sharp curtailments of import capacity accompanied by declines in capacity growth rates of between 2-6% and reductions in capacity utilisation rates of up to 20%. Income and investment fell drastically. The strain on Government budgets also meant sharp reductions in expenditures on economic and social infrastructure and in amounts devoted to basic needs purposes. On any reckoning, these adjustments have been wrenching, in pointed contrast to the inability of the US, for example so far, to reduce a fiscal/trade gap of 1-2% of GDP.

What the WIDER project envisaged for the nineties was a return of developing countries to a path of "socially necessary" growth which would seek to achieve at least three goals. First, the damage done to basic needs objectives in the 1980s would be repaired and suitable targets in this area *e.g.* health, education and poverty alleviation, set for the year 2000. The second goal was to reduce the prevailing backlog of unemployment to manageable levels by the year 2000. A third desideratum was to bring about an improvement in income distribution. The project proceeded at the level of a nucleus of eighteen developing countries whose adjustment experience had for the most part been previously studied by WIDER, and the research was entrusted to a selection of country specialists in almost all cases based in the country concerned. Each researcher was given the discretion of setting for the year 2000 the set of development goals appropriate to his country, and the results of the research translated into conventional national accounting terms. Each study would incorporate appropriate policy reform assumptions needed to reach the development goals set.

The present paper prepared by WIDER Research Adviser Professor Lance Taylor of MIT reports the results of this research for the countries studied. For seventeen countries excluding South Korea, an increase in the rate of growth of output capacity, ie potential output, by 1%, that is, from today's average growth rate of output capacity of 3% to 4%, would require an additional external capital inflow of US$16 billion. An output capacity growth rate increase of 1% would be associated with an increase in the GDP growth rate of two percentage points on average.

The paper also pulls together the aggregative implications of the work for the Third World as a whole, by extrapolating the findings of the sample. A 1% faster capacity growth for all developing countries is estimated to require an additional external resource inflow of US$40 billion in 1990, rising to US$60 billion by the year 2000 if this capacity growth is to be maintained throughout the decade. This growth rate of capacity turns out to be equivalent to a GDP growth rate over the decade 1990 to 2000, of at least 5.5% which would correspond in many cases to socially necessary growth in the sense of permitting minimum development goals to be achieved, although higher growth rates would be required in low-income countries. The task, in other words, is to raise the 1989 growth performance of the Third World of about 3.5% by at least two-percentage points for the decade of the 1990s. Of the initial amount of US$40 billion, broadly speaking, sub-Saharan Africa would require US$7 billion, Asia (except the Middle East) US$18 billion, Europe, the Middle East and North Africa (EMENA) US$7 billion, and Latin America US$8 billion. If this amount of US$40 billion were to be forthcoming as Official Development Assistance (ODA) from the budgets of OECD countries, the task involved is that of doubling the present level of ODA from 0.35% of OECD GNP to reach the internationally agreed target of 0.7%. It is not, in other words, inordinately ambitious and this conclusion has been taken account of in the most recent United Nations World Economic Survey for 1990.[1] It is also of significance in this connection that the South Commission has included in its Six Point Global Programme of Immediate Action the objective of "doubling the volume of concessional transfers of resources to developing countries by 1995".[2] This target date however is almost certainly too late for achieving socially necessary growth *during* the decade of the 1990s as envisaged by WIDER.

WIDER work has stressed the possibility of achieving resource transfers on this scale through a combination of means: debt relief and reduction would appear particularly relevant for Latin America and Eastern Europe; increased ODA remains essential for the low-income countries in Africa and Asia; private direct investment and portfolio flows have potential for middle-income developing countries; while recycling private surpluses under the umbrella of public guarantees (possibly entailing new institution building along the lines of The European Bank for Reconstruction and Development) can benefit a wide range of developing countries. Surpluses of the right order of magnitude could be released for recycling to the Third World as the US begins to reduce its twin deficits in the current climate of détente.

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1 United Nations, World Economic Survey 1990, New York 1990, page 77.

2 South Commission, The Challenge to the South: The Report of the South Commission, Geneva 1990, page 269.

However there are two qualifications that need to be made. The first concerns the possibility of financial strains arising in the global system (already apparent in rising interest rates in Germany and Japan) if increased claims on global savings are not met by reduced claims from the US through a correspondingly rapid adjustment in its claims on foreign savings. The second qualification is that the distribution of flows may not necessarily be consistent with attaining socially necessary growth in all developing countries. This is because middle-income Asia and Eastern Europe may be successful in attracting flows, while Latin America and low-income developing countries may not be, unless the pace of policy reform accelerates significantly in these countries to enhance their capacity to absorb foreign savings.

Lal Jayawardena
Director

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Lance Taylor

FOREIGN RESOURCE FLOWS AND DEVELOPING COUNTRY GROWTH

Introduction

The 1980s were difficult years for developing economies. Throughout the decade, most suffered from low or negative rates of per capita income growth and adverse trends in foreign trade and capital flows. With some exceptions (concentrated in Asia), poor countries' prospects for the 1990s are not much brighter, despite the fact that they have taken big steps toward economic reform. Continued structural change plus additional foreign exchange inflows (or at least reductions of some countries' outflows from several percent of GDP to something closer to zero) can perhaps support a return to adequate growth rates in the Third World as the decade unfolds.

This report presents a quantitative assessment of the possibilities for renewed growth based on plausible structural adjustments plus enhanced capital inflows in 18 countries, along with extrapolations to the rest of the developing world. The results reported here draw upon country case studies prepared by knowledgeable economists (most of them nationals), according to a common methodology described below. Their investigations were supported by the World Institute for Development Economics Research (WIDER). A list of the authors appears in Appendix 1.

Our discussion begins in section 1 with an overview of how economists have thought about the contribution of foreign resource flows to output and capacity growth. Their theories have evolved since development became a matter of international policy concern after World War II, but present growth rates are still constrained by factors perceived in the past. Section 2 takes up specific issues that came to the fore in the 1980s, in particular the excess productive capacity overhanging many economies, and the linked internal (or fiscal) and external (or balance of payments) problems of transferring resources that they face. Section 3 sketches a model incorporating prior contributions which can address these issues, with a formal, algebraic statement deferred to Appendix 2.

Quantitative assessments of how growth rates of productive capacity and output in the countries in the WIDER sample might respond to structural changes and higher capital inflows are the topic of section 4, based on model simulations. Each economy reacted to the events of the 1980s in an historically unique fashion; we briefly discuss how these differences may affect future growth in specific cases. Section 5 is devoted to a broad extrapolation from the country experiences, providing an estimate of global resource "needs" for renewed economic growth. The strains that North-to-South transfers of the magnitudes postulated might impose on the global macroeconomic system are discussed in section 6. Brief conclusions appear in section 7.

1. Complications of Capital Flows

An economy's foreign trade deficits and surpluses (with offsetting capital movements or flows of external aid or finance) clearly affect its style and rate of growth. Many studies over the years have attempted to quantify the effects. The first round — epitomised by Rosenstein-Rodan (1961) — presumed that output expansion was strictly limited by local productive capacity, specifically the physical capital stock. "Foreign saving" in the form of a financial capital inflow covering an external current account deficit could supplement domestic accumulation and allow physical (and perhaps human) capital to grow faster. Output would respond, according to the magnitudes of the incremental capital-output ratio (or ICOR), the national saving rate, and the volume (relative to domestic output or capital stock) of foreign resources obtained. The algebra followed directly from the Harrod-Domar economic growth model which was popular at the time.

One problem with Rodan's and similar calculations is that they failed to take into account specific foreign exchange requirements for both current production and capital formation in developing economies. The initial steps toward industrialisation involve substitution of imports of final goods by domestic products. The difficulty is that this mode of manufacture always depends on imported intermediate inputs (cloth to make garments, pharmaceuticals in bulk for local packaging, and so on). Similarly, agricultural modernisation creates demands for fuels, fertilisers, and pesticides which often are not produced at home. Neither sector can function without hard currency to pay for foreign intermediates to keep production moving. On the investment side, few poor economies extend import substitution to machinery and equipment, i.e. imported capital goods. Thus, hard currency is also an essential input into capital formation.

These multiple requirements for foreign capital — to provide additional saving and also to finance required intermediate and capital goods imports — were highlighted in the two-gap model proposed by Chenery and collaborators, e.g. the foreign aid computations in Chenery and Strout (1966). The "gaps" were respectively the saving-investment balance emphasised by Rosenstein-Rodan and the foreign trade account with the specific forms of external dependence just described. The Chenery-Strout model also included an "absorptive capacity constraint" stating the peak capital inflow that a poor country could effectively utilise. Given the dearth of transfers toward the Third World in the 1980s, such a restriction is not brought in formally here. We do, however, consider possible absorptive capacity limitations in specific contexts below.

In early two-gap calculations, one constraint was treated as being more "binding" than the other in the sense of putting a lower limit on growth for available capital inflow. In ex post national income accounting, this "gap between the gaps" must disappear, i.e. the trade deficit is just equal to the excess of national investment over saving. Bacha (1984) was among the first to point out that the two gaps are equivalent to the familiar internal and external balances of open economy macroeconomics, with specific developing country twists. He described several adjustment mechanisms which can drive the gap between the gaps to zero — in particular output fluctuations that make the output/capital ratio an endogenous macroeconomic variable instead of a "technically determined" parameter as it was for Rosenstein-Rodan, Chenery and Strout. This insight was a key step toward the model developed in section 3.

The interest in income distribution that bloomed in the 1960s added a more humane dimension to all this macroeconomics, as economists asked how much capital inflow might be required to build up capacity to deliver "basic needs", say to half the population by the year 2000 or something similar. Cline (1979) reviewed calculations of this sort, along with gap models. As discussed below, one can also compute "socially necessary" growth rates on employment or distributional grounds, and ask what resource inflows would be needed to support them.

With the oil, debt, interest rate, and terms-of-trade shocks of the 1970s and 1980s, both income distribution and gap computations faded from view as the focus of debate shifted to how poor countries were involuntarily adjusting to repeated blows from abroad. Typical studies concentrated on changes in comparative export and import performance of different economies as well as the extent of economic contraction and investment cutbacks that they undertook. For example, Helleiner (1986) used an approach to "differentiating the balance of payments" proposed by Bacha to quantify investment reductions and also show that the economic contraction that poor countries suffered in the 1980s drove their levels of output well below available capacity. Utilising excess capacity to raise output was a possibility not considered in the early two-gap models; it is brought explicitly into the analysis here.

2. Initial Conditions

Multiple external shocks created severe policy problems for developing economies. Countries with large foreign interest obligations must now transfer resources toward (as opposed to from) the rest of the world. The burden of payment falls largely on the public sector, which in turn is forced to restrain both its current and capital expenditures with decelerating effects on growth. Although they still maintain trade deficits, very small and poor nations (many in Africa) face similar problems because of the collapse in both foreign revenues and fiscal capacity they suffered with declining export volumes and adverse shifts in their external terms of trade. The magnitudes of the resource flows for the countries in the WIDER sample are summarised in Tables 1 and 2, using base year data from the country-level projections of foreign exchange needs and complementary policy adjustments discussed below.

Most column headings are symbols used in the model. The one labelled "Q" gives potential or full capacity output (defined below), expressed in billions of dollars for each economy in its model's base year. The column headed "g" gives growth rates of potential output as calculated in the country models, and "u" stands for the fraction of capacity being utilised.

Several points stand out in these three columns. First, developing economies are small by global standards. Total capacity in the 18 countries is only $1,380 billion or roughly one-third of GDP in the United States. This figure of course reflects the low incomes of even relatively large and prosperous countries like South Korea and Brazil.

Table 1: Country Production, Fiscal, and External Data

	Q	g	u	π	i_g	$\phi + t$	Pop. grth.
Argentina (1988)	76.9	0.0046	0.978	0.0644	0.0705	0.0362	0.014
Brazil (1987)	315.6	0.033	0.8	0.0	0.048	-0.01	0.022
Chile (1988)	23.0	0.074	1.0	0.019	0.069	0.056	0.017
Colombia (1988)	46.3	0.0434	0.877	0.03	0.059	-0.0074	0.019
India (1987-88)	262.7	0.05	0.866	0.098	0.105	0.016	0.021
S. Korea (1987)	146.0	0.091	1.01	-0.04	0.05	-0.062	0.014
Malaysia (1988)	47.8	0.068	0.8	0.028	0.0606	-0.042	0.027
Mexico (1988)	170.3	0.011	0.879	0.021	0.052	0.014	0.022
Nicaragua (1989)	2.8	0.028	0.9	0.0344	0.016	0.128	0.034
Nigeria (1986)	91.1	0.013	0.7	0.0444	0.052	0.004	0.034
Philippines (1988)	46.4	0.04	0.87	0.0269	0.0233	0.036	0.025
Sri Lanka (1987)	8.0	0.052	0.93	0.094	0.124	0.057	0.015
Tanzania (1986)	5.4	0.03	0.7	0.026	0.055	0.088	0.035
Thailand (1987)	55.8	0.078	0.949	0.0121	0.0579	0.0065	0.02
Turkey (1987)	66.2	0.04	0.995	0.0448	0.117	0.012	0.023
Uganda (1987)	4.7	0.0317	0.75	0.09	0.028	0.051	0.031
Zambia (1987)	3.8	0.03	0.82	0.187	0.048	0.067	0.036
Zimbabwe (1986)	6.7	0.035	0.88	0.1538	0.0943	-0.001	0.037

Note: Potential output (Q) in billions of dollars. Other variables are defined in the text and are measured relative to Q except π which is relative to output.

Second, there is wide variation in both rates of growth and capacity utilisation. Eight countries have capacity growth rates of 0.04 or more, giving margin for sustained output increases in excess of the population growth rates (for 1980-87, at annual rates) appearing in the last column. Seven economies, on the other hand, show negative capacity growth per capita. Capacity utilisation ranges from 101 percent in Korea to figures in the 70 percent range in several African economies.

The column headed "π" gives the public sector borrowing requirement (or PSBR), measured as a fraction of output rather than Q since that is how the concept is usually expressed. The PSBR is the amount that the government must raise in national financial markets to pay for its expenditures net of tax and other revenues. Roughly speaking,

PSBR = Government current spending - local revenues
(1) + public investment + foreign interest payments
- net transfers to government from abroad.

<u>How</u> the government obtains resources to cover the PSBR is a key policy question, highly conditioned by the nature of local financial institutions. Options may range from monetary emission through placement of government securities with non-bank financial intermediaries to running up arrears on foreign debt. Table 1 shows that for many countries the PSBR is a large share of output, running to over 15 percent in Zambia and Zimbabwe, for example.

The column headed "i_g" illustrates one reason why developing country PSBR's are high: their governments pursue large public investment programmes (measured relative to Q in Table 1). As described below, state capital formation is an important factor driving growth in poor countries, and the relatively high i_g shares reflect this fact. But investment by governments also strains their finances.

The next-to-last column in Table 1 shows the sum of financial transfers from abroad — the "ϕ" and "t" components flow respectively to the private and public sectors. In other terminology, "ϕ + t" is the current account deficit on the balance of payments. This deficit is a standard indicator of resources coming into the economy, and it takes a reassuringly positive sign in 13 of the 18 countries.

Unfortunately, Table 2 reveals that these resource transfers are much more apparent than real. Omitting minor items, it is true that

(2) Current account deficit - total foreign interest payments
= trade deficit.

This accounting shows that the trade deficit is a more reliable signal of resource flows, basically because interest payments must be covered by foreign exchange revenues from trade plus net transfers from abroad. The column headed "D" in Table 2 shows the trade deficit relative to potential output. Its entries are negative (i.e. there is a trade surplus) for 13 of the 18 countries — not a reassuring sign.

These surpluses exist for historically diverse reasons. In South Korea, three decades of export expansion unprecedented in economic history accompanied by trade deficits of several percent of GDP culminated in a switch to surpluses in the mid-1980s. Thailand may be poised for a structural surplus late in this decade while, as its timber and petroleum resources deplete, Malaysia perhaps is not. Other countries have had less autonomy and far less time to move to a surplus position.

Table 2: Country External Accounts Data

	m_{int}	m_{cap}	m_{oth}	e	D	$\phi + t$	j*	ξ
Argentina	0.056	0.017	0.024	0.115	-0.018	0.036	0.054	0.88
Brazil	0.03	0.016	0.002	0.083	-0.035	-0.01	0.025	0.75
Chile	0.13	0.059	0.096	0.31	-0.025	0.056	0.081	0.67
Colombia	0.045	0.029	0.009	0.105	-0.022	-0.001	0.021	0.83
India	0.037	0.02	0.001	0.042	0.016	0.018	0.002	0.9
S. Korea	0.2	0.127	0.04	0.448	-0.081	-0.062	0.019	0.48
Malaysia	0.145	0.075	0.176	0.463	-0.067	-0.042	0.025	0.88
Mexico	0.064	0.02	0.001	0.115	-0.03	0.014	0.044	0.89
Nicaragua	0.134	0.093	0.049	0.148	0.128	0.128	0.0	0.0
Nigeria	0.012	0.026	0.013	0.052	-0.001	0.004	0.006	1.0
Philippines	0.089	0.034	0.082	0.213	-0.008	0.036	0.044	0.3
Sri Lanka	0.096	0.054	0.103	0.22	0.033	0.057	0.022	0.45
Tanzania	0.038	0.079	0.007	0.061	0.063	0.088	0.021	1.0
Thailand	0.084	0.074	0.114	0.285	-0.013	0.007	0.02	0.82
Turkey	0.113	0.009	-0.016	0.131	-0.02	0.012	0.032	0.84
Uganda	0.04	0.061	0.014	0.068	0.047	0.051	0.004	1.0
Zambia	0.193	0.05	0.021	0.296	-0.032	0.067	0.099	0.8
Zimbabwe	0.088	0.056	0.058	0.228	-0.026	-0.001	0.025	0.66

Source: WIDER Country Papers

One important reason why exports exceed imports in the late 1980s is because many countries' foreign interest obligations relative to potential output are large, as shown in the column headed "j*". Especially for the nations that ran up major external debts with commercial banks in the 1970s, j* values run to several percent. Moreover, they are a burden on the state. The column headed "ξ" gives the fraction of total foreign interest owed by the government. For two types of economies — those in which private foreign obligations were taken over by the government in the wake of the debt crisis, and poorer countries depending on overseas development assistance (ODA) in the form of more-or-less soft loans — ξ takes values close to one. In turn, state interest burdens ξj^* adding up to two or three percent of potential output reappear as part of the PSBR ratio π in Table 1.

These numbers illustrate a "double transfer" problem that plagues many developing countries in the 1990s. They have to send hard currency abroad to meet interest obligations; hence they need a trade surplus since net transfers toward the economy ($\phi + t$ in Table 1) are less than the flow of money out. Second, the state is responsible for a large share of these payments; it either has to run a fiscal surplus (apart from interest obligations) or find local finance for a large PSBR. To increase cash flow, the government may cut back on its investment, with adverse consequences for long-term growth.

These considerations suggest that debt-ridden developing countries confront a "financial" as opposed to the "real" external constraint emphasised by the two-gap model. Like Korea, they shifted from trade deficits of a few percent of GDP to surpluses of the same order — a transformation that would have been viewed as little short of miraculous two decades ago! But unlike Korea, they accomplished these miracles with low capacity utilisation, price inflation, declining public investment, and slow growth. Moreover, the old problems of "external strangulation" remain, as illustrated by the left-hand entries in Table 2.

The first three columns give shares of intermediate, capital goods, and "other" imports in potential output (the last category includes food, competitive imports, and items not elsewhere accounted for). For several reasons, there is substantial variation in these ratios across the sample.

First, populous countries tend to have lower trade shares because of their relatively expansive domestic markets, e.g. Brazil, India, Mexico, and Turkey, with South Korea as a notable exception. Second, the Korean example suggests that policy-induced trade "orientation" matters. Import and export ratios can change over time in response to the policy climate, e.g. Chile's shares were much lower in 1970 than they are today. However, in a medium run of about five years, import coefficients stay relatively stable. All the countries in the sample are dependent on intermediate imports (with ratios to potential output running as high as 15 percent), and most of them are also large purchasers of foreign capital goods. In smaller and more openly oriented economies, other imports are high. Finally, since most countries in the sample have trade surpluses, exports (in the column headed "e") are correspondingly large.

Before going on to projections, it makes sense to ask how economies in the sample have fared over time. Figures 1 through 4 illustrate shifts in growth and utilisation rates in Mexico, the Philippines, Tanzania, and Turkey during the course of a decade.

The lines labelled "S", "E", and "F" crossing through the observed utilisation and growth rate points represent saving, external, and fiscal trade-offs between u and g in the short to medium run — the details are explained in the following section. These restrictions determine local options for policy change, valid for shifts of a percentage point or so in the growth rate and perhaps a bit more for capacity utilisation. All four figures show that the countries in question were subject to non-local economic shocks.

Their magnitudes were on the order of five percent of GDP (say a change from a trade deficit of 2.5 percent to an equivalent surplus). More telling is that fact that they amounted to 20 or 30 percent of the volatile items in the national accounts: import, export, saving, and investment flows. The effects were large. The capacity growth rate fell by 5.5 percent and capacity utilisation by 11 percent in Mexico between 1980 and 1988, corresponding decreases in the Philippines were about 4.4 and 25 percent between 1978 and 1985, and so on. At the same time, in many countries the wealth and income distributions adjusted in regressive fashion (typically accompanied by inflation) to reduce aggregate demand to foreign resource constrained supply. The violent policy manoeuvres and structural shifts that countries went through to deal with five percent shocks are discussed in section 4 and much more fully in a set of previous WIDER studies on economic stabilisation in developing countries summarised in Taylor (1988). Often, drastic stabilisation did not lay a foundation for future economic growth.

3. A Three Gap Model

The foregoing discussion suggests that at least a third gap should be added to Chenery's model, to take into account the linked fiscal and foreign transfer limitations on policy choice that have become crucial in many countries. In principle, further effects of fiscal deficits on inflation and/or the public debt/output ratio should be explored: they are of central policy (and political) importance. However, these linkages depend strongly on national financial institutions and diverse forms of social resistance to financing increased government claims via higher taxes, spiralling prices which transfer resources toward the state through the inflation tax and forced saving, or increases in real volume of nationally held fiscal debt. To ease cross-country comparisons, we concentrate on the PSBR. Inflation gaps and potential debt traps are taken up explicitly in the WIDER country studies and analysed in recent research at the foundation of this section's model, e.g. Fanelli, Frenkel, and Winograd (1987), Carneiro and Werneck (1987), Bacha (1990), and Taylor (1991).

The model has six major features:

First, the data presented in section 2 demonstrate that output and capacity growth rates are not closely linked. Figures 1-4 dramatically portray how output can fall below its potential as determined by the ICOR when the economy is subject to strong enough shocks.

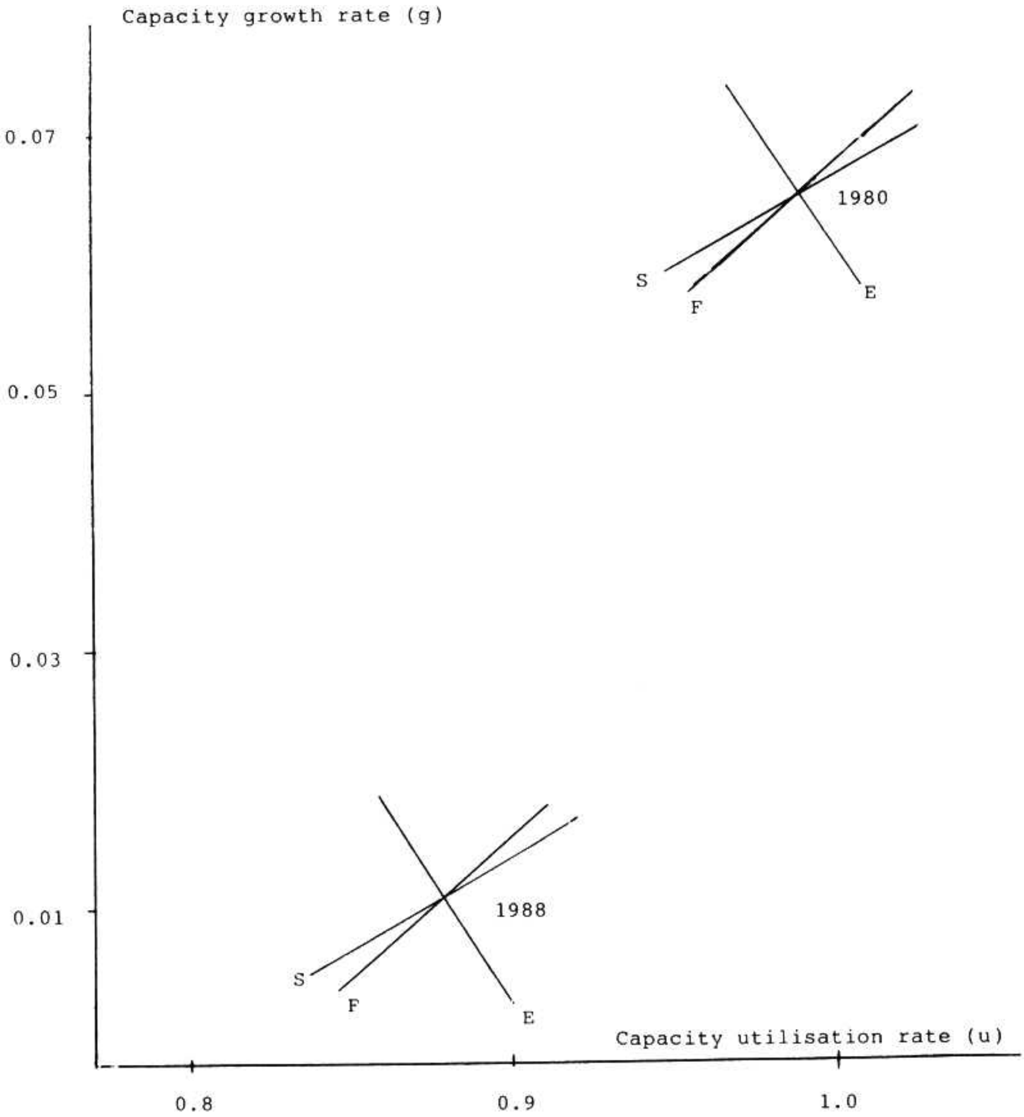

Figure 1: Mexico

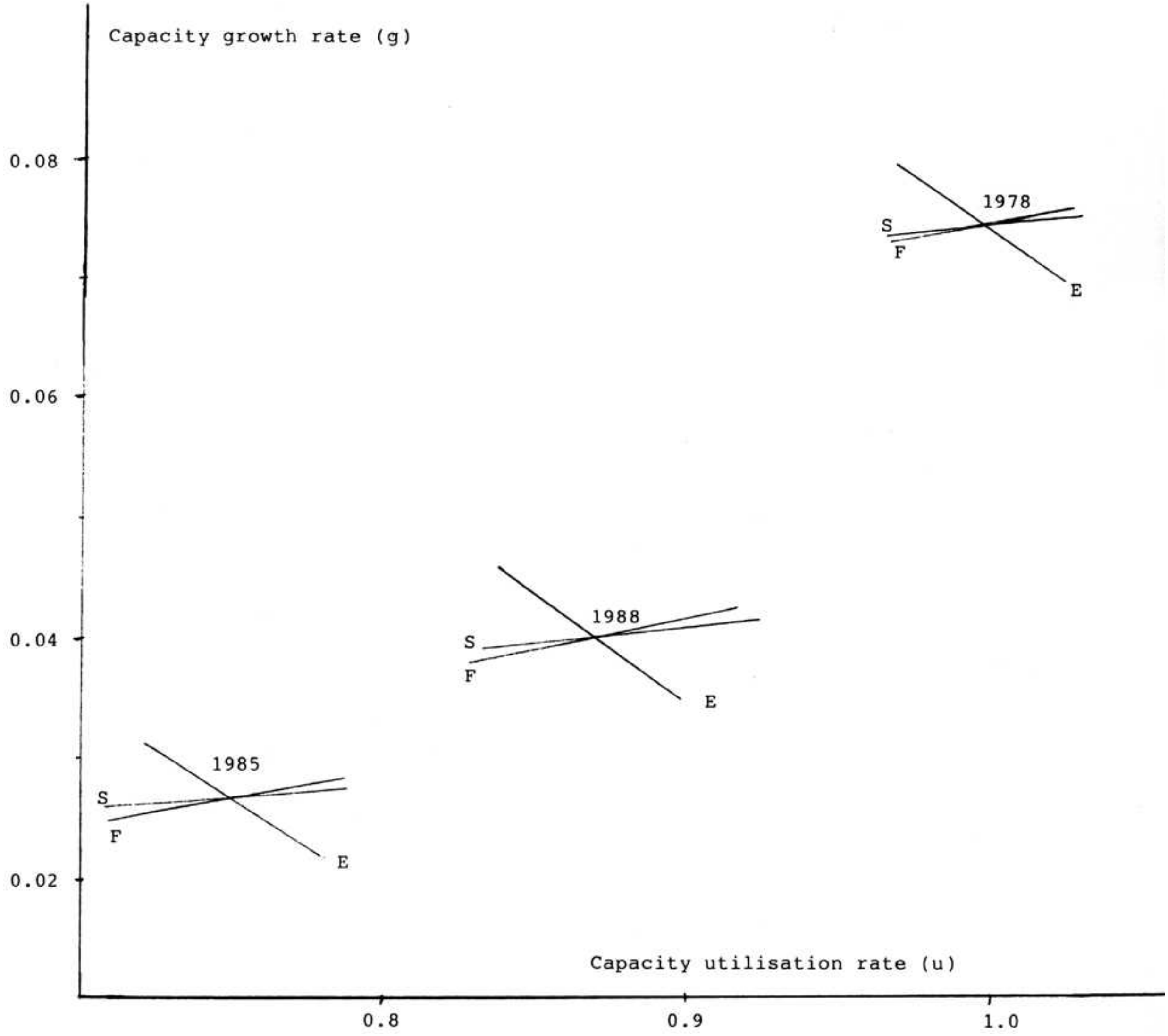

Figure 2: The Philippines

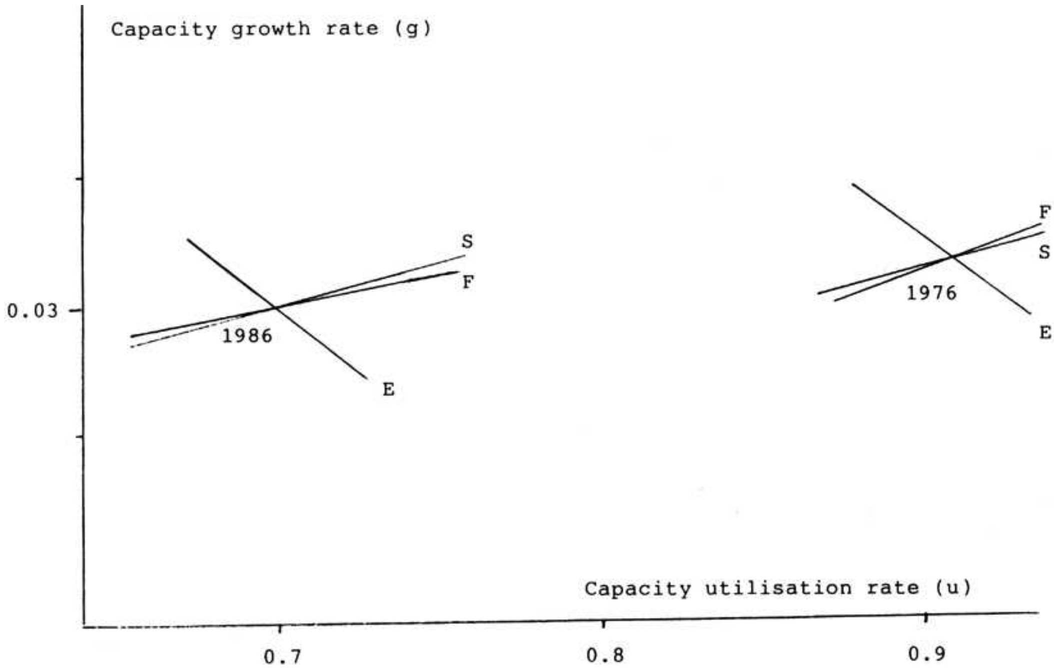

Figure 3: Tanzania

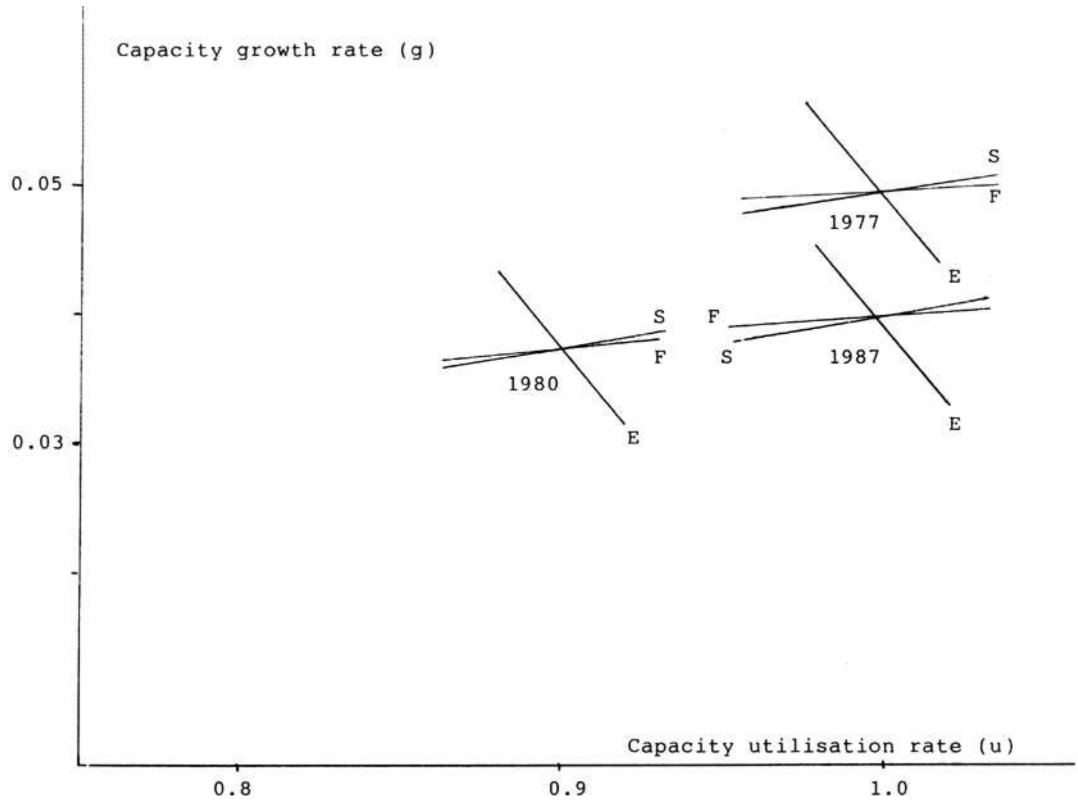

Figure 4: Turkey

The model does incorporate an ICOR equation to determine potential output or capacity as a function of capital stock along Harrod-Domar lines, but it also permits the utilisation rate u to be less than 100 percent. Potential output is typically computed according to a "line through the peaks" (of observed output) over time, and u is the ratio of observed to full capacity production in any given year. Output is defined in somewhat non-standard fashion as the sum of real GDP and intermediate imports, because foreign inputs are essential to production in most developing economies.

The growth rate of capacity (g) depends on current investment according to the ICOR. For algebraic purposes, it is a bit easier to work with its inverse (or the incremental output-capital ratio), labelled by the Greek letter κ. Values of κ for the countries in the study appear in Table A.1 in Appendix 2. By way of example, Argentina's parameter of 0.26 means that a unit increase in investment now will increase capacity by 0.26 units next year.

The second important feature of the model is its treatment of capital formation. A burgeoning literature in the late 1980s emphasised that public and private investment are often complementary — for references and discussion, see the papers cited above and Shapiro and Taylor (1990). One practical implication is that the government's infrastructure, public utility, and even manufacturing projects are likely to "crowd in" investment by the private sector by making it more profitable, instead of crowding it out through the mechanism of higher government borrowing putting pressure on financial markets.

This possible linkage was tested by the country paper authors using a private sector investment function with a term αi_g for crowding-in or -out as well as a contemporaneous accelerator effect βu on capital formation. Their results are summarised in the "α" and "β" columns of Table A.1. The α coefficients take values ranging from -0.4 and -0.23 in Colombia and Chile (where there is crowding-out) to 1.6 in South Korea and Malaysia. Since investment is the sum of public and private components, additional public capital formation increases the rate of growth of potential output even in the two South American countries. Both the α and β coefficients influence how effectively public investment stimulates capacity expansion: low values mean that larger foreign exchange transfers to the state, a more vigourous tax effort, or a bigger PSBR is required to underwrite public investment in support of a given increase in the rate of capacity growth.

The model's third main feature is explicit accounting for the public sector. The key operating assumption is that national public revenue net of current expenditure (say Z) is an increasing function of the rate of capacity use — taxes and other receipts rise more rapidly than real spending when economic activity goes up. The strength of this response is measured by the "z_1" coefficients in Table A.1, which take non-negative values except in Zambia. There, taxes fall and output rises in response to the copper cycle, giving a negative estimated response of Z to u.

Public investment enters the fiscal accounts as shown in equation (1) above. For given values of the PSBR ratio π and the net revenue coefficient z_1, its volume (relative to potential output) i_g will be tied to capacity utilisation, foreign transfers to the government, and interest payments to abroad. By crowding in private investment, a higher i_g raises the rate of capacity growth g. We arrive at the upward-sloping "F" lines in Figures 1-4, which show how a higher u can push up g by generating more net fiscal revenue which is channelled to capital formation. A lower interest burden or more foreign transfers to the government will shift the F-schedule upward, while increases in π or z_1 make it more steep.

Fourth, available saving puts a limit on investment and potential output growth. Three sources are considered: net government saving or the PSBR minus public investment from (1), net foreign transfers from abroad (o+t in Table 1), and national saving by the private sector. We assume that private saving increases with the rate of capacity utilisation according to the σ_1 coefficients in Table A.1. Together with the positive effect of u on Z, this hypothesis underlies the upward-sloping "S" curves in Figures 1-4. Depending on parameter values, the saving limit on growth may rise more or less steeply than the fiscal constraint "F" as a function of u. A steeper S-schedule means that an attempt to increase overall capital formation will land the government in fiscal difficulties, even though overall saving is in principle available to finance the additional investment demand.

Two other aspects of private saving are important in specific countries. First, its level may decline as more foreign transfers ϕ flow toward the private sector. This potential displacement of national by foreign saving was emphasised by early critics of the two-gap model such as Griffin (1970) and Weisskopf (1972), and was visible econometrically in Thailand and Zambia among the countries in Table A.1.

Second, in a related point not all private saving may be directed toward investment at home — it can filter out of the country via capital flight. Typical vehicles are overinvoicing of imports and underinvoicing of exports. Their outcomes in terms of national accounting conventions are lower national and higher foreign savings. According to the country authors for Argentina, in the 1970s "... government savings averaged 1.9 percent of GDP, those of the private sector ... 19.2 percent, and the external sector ... about 0.6 percent. After the debt crisis, during the eighties, the saving/GDP ratios for the government, the private sector, and the external sector were -3.4 percent, 13.2 percent, and 4.3 percent respectively." Similar shifts are notable in other economies prone to capital flight, for example Mexico.

The fifth important linkage in the model is the foreign exchange constraint. As noted above, production and capital formation depend crucially on imports of intermediate and investment goods. The requirements at the margin are shown in the columns headed "a_1" and "$1 - \theta$" in Table A.1, with the coefficients respectively linking imports of intermediate inputs to u and of capital goods to g. Especially for the small, open economies in the sample, the values of these response parameters are large.

The story for exports is more complicated. In most countries, producers appear to cut back on foreign sales as domestic demand rises so that exports decline as a function of u. In a few export-led economies, however, higher domestic production flows naturally abroad; when u goes up then so does export volume. The "ε_1" column in Table A.1 gives the relevant coefficients. They are positive (domestic demand crowds out exports according to the sign conventions of the formal model), except in Zambia, Thailand, and South Korea. Reflecting an ongoing process of import substitution, the econometric results also show that in its unique fashion, Korea cuts back on intermediate imports ($a_1 < 0$) as u goes up.

Putting all these responses together gives a scenario as follows: Rising output pulls in intermediate imports and (more often than not) reduces export sales — a higher u requires more foreign exchange. Since faster capacity growth g also depends upon imports, an increase in one variable forces the other down: we get the downward-sloping external restriction or "E" schedules in Figures 1-4. Only for Korea — the exceptional case in which both a_1 and ε_1 are negative — does this curve slope up.

The sensitivity of the growth rate to foreign exchange availability varies markedly across the countries in the sample, as shown in the second and fifth columns of Table A.2 in Appendix 2 which presents "reduced form" country growth parameters. Column five shows that a one percent increase in capital inflows (relative to potential output) may permit g to rise by 0.5 percent in small economies and by as much as two percent in large ones which have pursued import substitution of capital goods. From column two, a one percent increase in capacity utilisation u may reduce g by 0.1 percent in closed economies and up to one percent in highly open ones.

Such trade-offs are central to macroeconomic decision making in the medium run. In Africa, for example, policy-makers targeted measures such as import quotas and credit restrictions explicitly toward sustaining either capital formation or current production when external strangulation became acute. At the same time, aid donors imposed pressures to keep ongoing investment projects underway. As Figure 3 illustrates, the outcome in Tanzania was continued investment, while capacity utilisation fell by 20 percent between 1976 and 1986. Other countries such as Zimbabwe (which has fewer donor obligations) reacted the other way.

The last issues to be discussed refer to how the model hangs together. Which variables drive the others in practice? How should they be deployed in simulations to illuminate problems of policy choice?

Answers to both questions require deep understanding of the institutions and structure of the economy at hand. The country authors of the WIDER studies typically focus on growth and investment demand, asking how capacity utilisation, capital inflows, the PSBR, and other variables such as the exchange rate and trade quotas have to adjust to meet changing levels of capital formation. At the same time, investment itself is affected by economic shocks and policy changes. For example, if the government cuts back on its investment projects then the private sector will do so as well. If capital flight accelerates in response to lack of confidence or an overvalued currency, then firms' expansion programmes suffer also.

In the following section, we take up the second question from a similar angle, asking first how capacity utilisation u, foreign transfers to the government t, and the PSBR ratio π would have to adjust to meet one percent faster growth in capacity g in the base year. Specifically, we solve the saving and external gap equations for changes in capacity utilisation and foreign transfers Δu and Δt, given $\Delta g = 0.01$, and then find the change in the PSBR ratio $\Delta\pi$ that supports one percent faster capacity growth from the fiscal gap. (If the economy is at or near full capacity then the change in the base level of government net revenue Δz_0 is taken as the adjusting variable in place of Δu.) The point of this exercise is to estimate in a planning context the volume of foreign resources that would be required to support modestly more rapid medium term expansion in the countries in the WIDER sample.

A second exercise estimates foreign capital requirements $\Delta\phi$ and capacity utilisation and PSBR changes Δu and $\Delta\pi$ needed for one percent faster capacity growth under plausible changes in policy and external conditions, as specified for each economy. As the use of the variable $\Delta\phi$ implies, capital inflows are assumed to go to the private sector. The object is to see how much resource "needs" may change if the countries enjoy plausible structural change and luck, and also to illustrate how fiscal limitations may be tightened by actions of the private sector and its financiers.

4. Three Gap Simulations

Lines (1) and (2) for each economy in Table 3 summarise these calculations. We take up specific results after discussing the general outcomes of the first set of simulations in which one percent faster capacity growth ($\Delta g = 0.01$) is supported by an increase Δt in capital inflows directed toward the government. The Δt values are given relative to potential output and (in parentheses) in billions of dollars.

There is a fairly wide range of net transfers required to support the increment in potential output. South Korea has a negative value because of its "wrong-signed" export and import responses discussed above. With their relatively large, diversified economies, Argentina, Brazil, India, and the Philippines have Δt values less than 0.01 (although their corresponding dollar resource flow increments are not trivial sums). At the other end of the spectrum, the small, import-dependent economies of Nicaragua, Sri Lanka, Tanzania, Uganda, and Zimbabwe require transfers of around three percent of capacity for one percent faster growth.

Table A-2 shows that the effect of capital inflows on capacity use ($\Delta u/\Delta t$) exceeds the effect on capacity growth ($\Delta g/\Delta t$) when the saving and foreign gaps are solved together. The implication for the line (1) simulations in Table 3 is that, except when capacity limits bind, increases in u exceed one percent. We will see below that in some cases, the extra foreign exchange required for one percent capacity growth is adequate to support the output expansion "necessary" for social ends such as employment and income redistribution.

Table 3: Simulations for Increasing the Capacity Growth Rate by One Percent

		Δt or $\Delta\phi$		Δi_g	Δu	$\Delta\pi$	Other changes
Argentina	(1)	0.0072	(0.554)	0.0256	0.022*	-0.0064	$\Delta z_0 = 0.0181$
	(2)	0.02	(1.538)	0.0123	0.022*	0.0005	$\Delta i_0 = 0.02$ $\Delta z_0 = 0.0053$ $\Delta\varepsilon_0 = -0.0128$
Brazil	(1)	0.0085	(2.68)	0.012	0.0546	-0.015	
	(2)	0.0063	(2.0)	0.0158	0.0175	-0.0118	$\Delta z_0 = 0.0202$
Chile	(1)	0.0194	(0.446)	0.039	0.0*	0.009	$\Delta z_0 = 0.0106$
	(2)	0.0194	(0.446)	0.039	0.0*	0.009	$\Delta z_0 = -0.02$ $\Delta z_1 = 0.05$
Colombia	(1)	0.0129	(0.597)	0.0417	0.0488	0.0301	
	(2)	-0.0158	(-0.732)	0.0394	0.0584	0.0131	$\Delta\varepsilon_0 = 0.03$ $\Delta z_0 = 0.025$
India	(1)	0.0085	(2.243)	0.0184	0.025	-0.0018	
	(2)	0.0031	(0.807)	0.0201	0.0031	-0.0016	$\Delta z_0 = 0.02$
S. Korea	(1)	-0.0031	(-0.453)	0.0015	0.0442	-0.0016	
Malaysia	(1)	0.0256	(1.224)	0.0127	0.0154	-0.0205	
	(2)	0.0245	(1.172)	0.0128	-0.0024	0.0042	$\Delta\varepsilon_0 = -0.01$ $\Delta z_0 = 0.01$

Table 3 (continued)

		Δt or $\Delta\phi$		Δi_g	Δu	$\Delta\pi$	Other changes
Mexico	(1)	0.015	(2.555)	0.0106	0.0212	-0.0103	
	(2)	0.0047	(0.8)	0.0089	-0.0112	0.0128	$\Delta z_0 = 0.02$
							$\Delta i_0 = 0.005$
Nicaragua	(1)	0.027	(0.076)	0.0267	0.037	-0.01	
	(2)	0.015	(0.042)	0.0267	0.0716	0.011	$\Delta\varepsilon_0 = 0.02$
Nigeria	(1)	0.0191	(1.741)	0.0127	0.0587	-0.0138	
	(2)	0.0157	(1.429)	0.0152	0.0339	0.0048	$\Delta z_0 = 0.01$
Philippines	(1)	0.0063	(0.292)	0.0224	0.0277	0.0173	
	(2)	0.0031	(0.144)	0.0238	-0.0138	0.005	$\Delta z_0 = 0.02$
Sri Lanka	(1)	0.0353	(0.282)	0.029	0.0145	-0.0104	
	(2)	0.0303	(0.242)	0.029	0.0244	0.0251	$\Delta\varepsilon_0 = 0.02$
Tanzania	(1)	0.028	(0.151)	0.031	0.06	-0.005	
	(2)	0.006	(0.032)	0.031	0.05	0.0079	$\Delta\varepsilon_0 = 0.02$
							$\Delta z_0 = 0.02$
Thailand	(1)	0.0157	(0.876)	0.0162	0.0265	-0.0147	
	(2)	0.0156	(0.866)	0.0162	0.0261	0.0043	$\Delta z_0 = 0.01$
Turkey	(1)	0.0122	(0.808)	0.0468	0.0*	-0.0087	$\Delta z_0 = 0.0432$
	(2)	0.0072	(0.477)	0.0468	0.0*	-0.0115	$\Delta z_0 = 0.0582$
							$\Delta a_0 = -0.005$
							$\Delta\sigma_1 = -0.01$
Uganda	(1)	0.0287	(0.135)	0.0163	0.0521	-0.0252	
	(2)	0.0186	(0.087)	0.0166	0.052	-0.0002	$\Delta z_0 = 0.01$
							$\Delta a_0 = -0.01$
Zambia	(1)	0.0315	(0.112)	0.0241	0.0121	-0.0098	
	(2)	0.0214	(0.081)	0.0287	0.0044	0.0226	$\Delta z_0 = 0.01$
							$\Delta\varepsilon_0 = 0.01$
Zimbabwe	(1)	0.0318	(0.213)	0.0318	0.0636	-0.0183	
	(2)	0.0159	(0.107)	0.0339	0.0	-0.0016	$\Delta z_0 = 0.035$

Notes: Capacity use changes (Δu) marked with an asterisk are determined by the full capacity use condition $u = 1$. Public saving (Δz_0) is assumed to adjust to balance the saving gap in this case. The adjusting capital flow variables in simulation (1) and (2) are Δt and $\Delta\phi$ respectively, measured as fractions of potential output and billions of dollars (in parentheses).

In part because foreign inflows Δt are assumed to go directly into the fiscal accounts, 15 of the 18 countries have reduced PSBR ratios ($\Delta\pi < 0$) in the simulations, even though public investment has to go up to make overall capital formation rise. Other contributory factors to the fiscal improvement are increased capacity use which generates more net government revenue and the postulated increase Δz_0 in public saving when capacity limits bind; offsetting factors are a weak public investment effect on private capital formation (α is negative in Chile and Colombia which have positive $\Delta\pi$'s) and a low incremental output-capital ratio κ.

Adding up the foreign transfers required for one percent more rapid capacity growth for the sample countries excluding South Korea gives a total of $15 billion ($12.1 billion for the second set of simulations). This flow is 1.2 percent of the total potential output of the 17 economies ($1234 billion), and would be associated with output growth of $43.8 billion, or 3.5 percent of capacity (perhaps 4.5 percent of base year GDP). These growth vs. inflow relationships look favourable, but an additional resource transfer of $15 billion is large compared to annual net ODA flows to all developing economies, which are a bit more than $40 billion. This requirements estimate is extrapolated to the rest of the developing world in the following section.

Our broad application of the simulation model should not divert attention from the fact that each economy evolved in its own institutionally and historically unique fashion during the 1980s. Bringing in the second set of simulations, we can comment briefly about past and future developments at the country level:

Argentina The economy is tightly constrained by the fiscal and external gaps stemming from its large commercial bank debt, exacerbated by capital flight. As of early 1990, stabilising a virtual hyperinflation is an urgent task. Simulation one shows that even with additional capital inflows of over $500 million to the government, it would still have to raise net fiscal revenue by almost two percent to sustain one percent faster capacity growth. The variant simulation assumes that restoration of stable prices leads to "good luck" in the form of repatriation of $1.538 billion of flight capital ($\Delta\phi = 0.02$) which is directed toward private capital formation ($\Delta i_0 = 0.02$). Fiscal reform would still be necessary ($\Delta z_0 = 0.0053$) but the trade surplus of 1.8 percent of potential output could be cut back by a reduced export effort ($\Delta\varepsilon_0 = -0.0128$). Table 1 shows that Argentina's population is growing at 1.4 percent per year. Hence, given a plausible value of the elasticity of employment with respect to output (one-half or less) or of labour productivity growth (one or two percent per year), neither simulation raises capacity growth to anywhere near the three or four percent that would be required to generate reasonably full employment in the medium run.

Brazil The external and fiscal restrictions resemble Argentina's, but there is a more solid production and export base. In the second simulation, a strong fiscal reform ($\Delta z_0 = 0.02$) plus $2 billion in capital inflows to the private sector (perhaps feasible with some capital repatriation plus direct foreign investment) can support one percent faster capacity growth with a markedly reduced PSBR. However, reaching the country's historical percent per capita growth rate of over four percent would require a fiscal adjustment of about six percent of GDP combined with cancellation of foreign interest payments of 2.5 percent of potential output ($7.9 billion) or an equal amount of "fresh money" on a continued basis. In other words, sustained growth might be feasible with a zero trade balance instead of a two or three percent surplus. (In the 1960s and 1970s, the trade deficit ran to two or three percent of output.)

Chile There has been buoyant export and output growth since the mid-1980s, propelled by an agroexport breakthrough (the result of draconian real wage reductions and concentrated public intervention over decades) and a high world price of copper. As of early 1990, the economy is at full capacity with accelerating inflation; the new democratic government is under great pressure to pursue progressive income redistribution. The fiscal constraint is tight because public investment crowds out private capital formation and the tax base is small. The PSBR rises in simulation one (even with capital inflow assumed to finance state spending). In the second simulation, the private sector is assumed to benefit from $446 million of direct foreign investment, and the net public revenue rate z_1 is raised by five percentage points from the 10 percent that currently applies. This move permits a spending increase of two percent of potential output for distributional ends, but still with an increase in the PSBR.

Colombia In the first simulation, the PSBR rises by almost three percentage points since state investment crowds out private capital formation and the net revenue coefficient z_1 is only 0.02. This weak fiscal performance may improve in the future. New export projects coming on stream should raise the base markedly ($\Delta e_0 = 0.03$) and most of the revenue will be collected by the government ($\Delta z_0 = 0.025$). These changes should permit one percent faster capacity growth with a negative foreign transfer of $732 million, but the PSBR still goes up. The fiscal and savings constraints would jointly bind if Colombia were to attempt to accelerate growth beyond its historical rate of about six percent. Rising political demands for redistribution may make future fiscal difficulties worse.

India The fiscal constraint has tightened over the 1980s because of rising expenditures on food, fertiliser, and other subsidies (intimately linked with the capital-intensive agricultural development strategy that has been pursued) as well as defense spending and interest on the fiscal debt. Both simulations presuppose that the growth trend for these outlays is reversed so that the marginal net fiscal revenue rate (z_1)

is 36 percent. Under this assumption, one percent faster capacity growth calls for a large absolute capital inflow (over $2.2 billion) but fiscal and saving limitations are not tight. The second simulation assumes a greater fiscal effort ($\Delta z_0 = 0.02$) which slows output growth (Δu) from 2.5 to 0.3 percent between the two model solutions. Capital inflows drop to $800 million. Even with this hard currency flowing to the private sector, the PSBR can fall if spending can be restrained. Because of its extensive import substitution in the past, India is not highly dependent on imports of capital goods. One implication is that an enhanced fiscal effort substitutes directly for foreign inflows as a source of saving along Harrod-Domar lines.

South Korea demonstrates formally unstable behaviour in the simulations. A higher capital inflow means that capacity growth can increase under the external constraint. The resulting demand injection leads output to go up. With the economy's estimated "wrong-signed" coefficients a_1 and ε_1, imports fall and exports rise, permitting growth to increase even more. In the late 1980s, Korea showed diverse manifestations of this problem, with rising foreign reserves, an appreciating currency, and tendencies to falling interest rates which were attacked by tight monetary policy. In early 1990, there was overshooting into a trade deficit, devaluation, and fiscal duress. Until (or unless) the economy adjusts to its trade imbalances, these problems seem likely to persist. They may possibly appear in Thailand or other economies which show a strong, positive export response to higher output.

Malaysia was another high saving, trade surplus economy during the late 1980s. There is strong investment crowding-in ($\alpha = 1.6$), so that the $1.22 billion of capital inflow required for one percent faster capacity growth in the first simulation permits the PSBR to decline. However, Malaysia's medium-term future may be less buoyant than the past as exploitable timber and petroleum reserves are used up. If export growth drops off ($\Delta\varepsilon_0 = -0.01$), then an improved fiscal effort ($\Delta z_0 = 0.01$) can hold foreign transfers necessary to support one percent faster capacity growth roughly constant at $1.2 billion, at the cost of decreased capacity utilisation but still with a rapid rate of potential output growth. Even with the inflows going to the private sector, the PSBR will rise only slightly if public investment crowding-in remains strong.

Mexico As Figure 1 illustrates, the economy was hit hard in the 1980s by the debt crisis and capital flight. The first simulation shows that new money in the amount of $2.55 billion flowing toward the government (rather more than the amount agreed upon in the heralded 1989 Brady Plan debt rescheduling) would permit one percent capacity and two percent output growth rates with a lower PSBR. In the second model run, a private sector capital inflow of $800 million (or $\Delta\phi = 0.0047$) and a slightly bigger private investment increase ($\Delta i_0 = 0.005$) combined with fiscal reform ($\Delta z_0 = 0.02$) give one percent capacity growth with a one percent output loss and a higher PSBR. A combination of the two packages approximates the government's current strategy. It is obviously dependent on sustained high capital inflows and falls well short of the historical growth rate of over six percent.

Nicaragua has a trade deficit of 12.8 percent of potential output, which it covered entirely with ODA (and not meeting any interest obligations) in the late 1980s. However, the economy is so small that an additional inflow of $76 million permits one percent faster capacity growth. The second simulation assumes export improvement ($\Delta\varepsilon_0$ = 0.02). Nonetheless, extra growth still requires an extra inflow of $42 million and a higher PSBR. The incremental capital flows in both simulations are small compared to the estimated 1989 current account deficit of $358 million. Concerted efforts at import substitution and export promotion will be essential if the new non-Sandinista government finds such a large capital inflow impossible to maintain.

Nigeria The country data generate saving and fiscal constraints with shallow slopes. Hence, capital inflows permit a large increment in capacity utilisation by shifting the external restriction to the right (consult Figures 1-4). In the first simulation, net new inflows of $1.7 billion raise capacity use by 5.9 percent with one percent additional capacity growth. Better export performance is not likely in the medium run, but a greater fiscal effort (Δz_0 = 0.01) reduces required inflows by 0.0034 to $1.43 billion while still permitting utilisation to rise by 3.4 percent. However, even these big increases in u do not approach socially necessary levels because of Nigeria's continuing population growth of 3.4 percent.

Philippines Even with new money going to the government in the first simulation, the PSBR rises by 1.7 percent due to low tax responsiveness to increased output. A two percent upward shift in the revenue function in the second simulation cuts foreign exchange requirements for one percent extra growth in half and holds the PSBR almost constant, while output declines. The economy is still suffering from the external shocks (reduced capital inflows and an increased interest burden) which caused it to shift from the 1978 to the 1985 position in Figure 2. The recovery between 1985 and 1988 was led by fiscal expansion, and probably cannot be sustained in the medium run. Maintaining four percent capacity growth while trying to improve the external account on a sustained basis is the strategy that the country authors recommend. Somewhat more rapid growth may be possible during the 1990s if large foreign direct investment flows toward East Asian economies permit both private transfers ϕ and the investment function to shift up.

Sri Lanka The first simulation shows that an inflow of $280 million will support one percent extra growth; probably $500 million on a sustained basis would be required for the economy to reach a socially desirable growth rate of over seven percent. An extra export effort of two percent of potential output reduces the required inflow but creates potential fiscal problems by increasing the PSBR by 2.5 percent. If the government revenue function shifts upward by two percent, it could be combined with export push to attain socially desirable growth (still with some fiscal risk) with an annual inflow of about $250 million.

Tanzania The economy sustained severe output reductions between the mid-1970s and the mid-1980s, as Figure 3 illustrates. About $150 million in additional capital inflow (added to a base of $475 million) would permit a six percent output increase with one percent capacity growth and a stable PSBR. A locally ambitious programme of two percent sustained growth in both exports and net government revenues would cut the capital flow requirement to $30 million. By assumption, the new money in the second scenario flows to the private sector and the PSBR ratio rises. If the extra inflow were used to support the fiscal accounts (the typical case in Africa), the PSBR would be stable. However, whether additional resources could be channelled effectively to capital formation despite potential absorptive capacity limitations is an open question for Tanzania (which has a relatively competent public sector) along with most other countries in Sub-Saharan Africa.

Thailand This is another strong export economy (with exports increasing along with output). In the first simulation, public investment goes up a bit more than new capital inflows of $876 million but increased capacity utilisation generates enough fiscal revenue to permit the PSBR ratio to fall. In the second simulation, a one percent upward shift in the government revenue function slightly reduces output growth and capital flow requirements in comparison to simulation one, but the PSBR goes up. In an economy which expanded very rapidly in the late 1980s, such a restrictive fiscal policy move (coupled with efforts to channel extra foreign resources toward public as opposed to private ends) might make sense.

Turkey Between 1977 and 1980, Turkey was subject to severe import compression as shown in Figure 4. The subsequent recovery was led by exports with a degree of import liberalisation and substantial access to capital inflows early in the 1980s. The economy is now at essentially full capacity with a poor tax performance. In the first simulation, a four percent upward shift in the public revenue function is required for macro balance with an extra capital inflow of $808 million. The second simulation assumes renewed import substitution (a strengthened export push seems unlikely) and downward adjustment in the private saving rate in response to progressive income redistribution. Capital inflow requirements for one percent capacity growth fall by $330 million, but the need for better public revenue performance remains.

Uganda A socially acceptable medium term growth rate would be at least one point above the current 3.2 percent (especially given 3.1 percent population growth). The required foreign inflow in simulation one is $375 million as opposed to the base level of $240 million. These additional resources would permit five percent faster output growth in the medium run and a lower PSBR. One percent shifts in the import and fiscal revenue functions ($-\Delta a_0 = \Delta z_0 = 0.01$) would cut the required additional capital inflow to about $87 (from $135) million.

Zambia The economy has traditionally been led by copper exports an d has a strong investment response to increased output ($\beta = 0.76$). It also has incurred large foreign interest obligations ($j^* =$ 10 percent), partially offset by new money ($\phi + t = 6.75$ percent). In simulation one, $112 million of new capital inflow is required for one percent extra growth. Utilisation increases by 1.2 percent, leading private investment to increase enough to allow the PSBR ratio to fall. One percent improvements in the export ratio (perhaps feasible with peace and better access to transport facilities in Southern Africa) and fiscal performance permit needed new inflows to decline to $81 million. However, if this new money goes to the private sector, the PSBR ratio will rise by 2.2 percent from a dangerously high initial level of 18.7 percent.

Zimbabwe As in Zambia, the PSBR ratio is extremely high. With π hovering in the 15 percent range throughout the 1980s, the government has avoided hyperinflation by aggressive placement of securities with local financial intermediaries. Also as in Zambia, simulation two in comparison to simulation one assumes one percent improvements in export performance and fiscal revenues. Capital inflow requirements fall dramatically, but the fiscal situation remains tight. A "peace dividend" in the region could substantially benefit the government's accounts. Further fiscal restraint may prove necessary as capacity restrictions begin to bind.

5. Extrapolations to the Rest of the Developing World

The foregoing results suggest that extra capital inflows along with increased capacity use and trade and fiscal policy reform can support more rapid potential output growth in the countries in the WIDER sample. However, the amount of new money needed for even the 17 economies considered (omitting Korea) is large. How do these results extrapolate to the rest of the developing world?

The most direct way to address this question is by simple regression analysis based on the first set of projections just described. After some experimentation with 1987 data taken from the World Bank's 1989 World Development Report, the following equation was estimated for the capital inflow (FLOW) required for one percent faster capacity growth according to simulation one for all countries but South Korea in Table 3:

$$(3) \quad \ln\left(\frac{FLOW}{GDP}\right) = -7.15 + 2.067\left(\frac{Exports}{GDP}\right) - 0.478 \ln\left(\frac{GDP}{Pop}\right) - 0.238 \ln(Pop),$$

$$(-7.25) \quad (1.68) \qquad (-3.19) \qquad (-2.35) \quad R^2 = 0.56,$$

where Pop stands for population, and t-ratios are in parentheses.

The goodness of fit is adequate for an empirical regression on a small cross section, and the coefficients have signs that agree with observations raised in previous sections. Populous countries on the whole have lower import coefficients and thus require smaller foreign transfers (relative to GDP) for a given increment in growth. But given population, a higher export ratio signals more openness, leading to a greater FLOW. As might be expected, reliance on capital inflows to support faster growth also declines with GDP per head.

Table 4 gives results of applying equation (3) to compute capital inflow "needs" for one percent faster capacity growth in 77 countries with populations exceeding one million people for which data from the 1989 World Development Report were available. The total flow estimate is $37.431 billion, which can be disaggregated in several ways.

First, the table contains 26 "large" countries with populations exceeding 20 million, and 51 "small" economies. The estimated flows to the former group are $26.915 billion ($24.793 billion if South Korea

Table 4: Capital Inflow Requirements for One Percent Faster Capacity Growth

	Region	Pop.	GDP per cap.	Exp. share	Requirement	
Low income						
Ethiopia	SSA	44.8	130	0.11	0.227	
Chad	SSA	5.3	150	0.17	0.054	
Zaire	SSA	32.6	150	0.33	0.302	
Bangladesh	Asia	106.1	160	0.06	0.439	
Malawi	SSA	7.9	160	0.24	0.088	
Nepal	Asia	17.6	160	0.13	0.129	
Mozambique	SSA	14.6	170	0.11	0.111	
Tanzania	SSA	23.9	180	0.13	0.173	(0.151)
Burkina Faso	SSA	8.3	190	0.17	0.087	
Madagascar	SSA	10.9	210	0.2	0.119	
Mali	SSA	7.8	210	0.17	0.087	
Burundi	SSA	5.0	250	0.09	0.058	
Zambia	SSA	7.2	250	0.47	0.167	(0.112)
Niger	SSA	6.8	260	0.19	0.091	
Uganda	SSA	15.7	260	0.10	0.143	(0.135)

Table 4 (continued)

	Region	Pop.	GDP per cap.	Exp. share	Requirement	
China	Asia	1068.5	290	0.13	4.025	
Somalia	SSA	5.7	290	0.11	0.072	
Togo	SSA	3.2	290	0.31	0.07	
India	Asia	797.5	300	0.07	2.896	(2.243)
Rwanda	SSA	6.4	300	0.08	0.075	
Sierra Leone	SSA	3.8	300	0.09	0.051	
Benin	SSA	4.3	310	0.15	0.065	
Cent. Af. Rep.	SSA	2.7	330	0.17	0.049	
Kenya	SSA	22.1	330	0.21	0.264	
Sudan	SSA	23.1	330	0.08	0.209	
Pakistan	Asia	102.5	350	0.13	0.744	
Haiti	LAC	6.1	360	0.12	0.086	
Lesotho	SSA	1.6	370	0.1	0.03	
Nigeria	SSA	106.6	370	0.31	1.145	(1.741)
Ghana	SSA	13.6	390	0.2	0.195	
Sri Lanka	Asia	16.4	400	0.25	0.253	(0.282)
Mauritania	SSA	1.9	440	0.5	0.086	
Indonesia	Asia	171.4	450	0.26	1.642	
Liberia	SSA	2.3	450	0.43	0.087	
<u>Low Middle Income</u>						
Senegal	SSA	7.0	520	0.28	0.161	
Bolivia	LAC	6.7	580	0.14	0.124	
Zimbabwe	SSA	9.0	580	0.27	0.203	(0.213)
Philippines	Asia	58.4	590	0.23	0.783	(0.292)
Yemen Arab Rep	EMENA	8.5	590	0.04	0.122	
Morocco	EMENA	23.3	610	0.25	0.412	
Egypt	EMENA	50.1	680	0.15	0.636	
Papua New Guin.	Asia	3.7	700	0.44	0.161	
Cote d'Ivoire	SSA	11.1	740	0.34	0.312	
Honduras	LAC	4.7	810	0.24	0.138	
Thailand	Asia	53.6	850	0.3	1.025	(0.876)
El Salvador	LAC	4.9	860	0.19	0.133	
Congo	SSA	2.0	870	0.43	0.111	
Jamaica	LAC	2.4	940	0.55	0.17	
Guatemala	LAC	8.4	950	0.16	0.198	
Cameroon	SSA	10.9	970	0.16	0.244	
Paraguay	LAC	3.9	990	0.22	0.128	
Ecuador	LAC	9.9	1040	0.23	0.272	
Tunisia	EMENA	7.6	1180	0.35	0.305	
Turkey	EMENA	52.6	1210	0.21	1.009	(0.808)
Colombia	LAC	29.5	1240	0.19	0.631	(0.597)
Chile	LAC	12.5	1310	0.34	0.46	(0.446)
Peru	LAC	20.2	1470	0.09	0.42	
Mauritius	SSA	1.0	1490	0.69	0.148	

Table 4 (continued)

	Region	Pop.	GDP per cap.	Exp. share	Requirement	
Jordan	EMENA	3.8	1560	0.45	0.255	
Costa Rica	LAC	2.6	1610	0.34	0.155	
Syria	EMENA	11.2	1640	0.15	0.321	
Malaysia	Asia	16.5	1810	0.64	1.252	(1.224)
Mexico	LAC	81.9	1830	0.07	1.314	(2.555)
South Africa	SSA	33.1	1890	0.29	1.056	
Poland	EMENA	37.7	1930	0.18	0.939	
<u>High Middle Income</u>						
Brazil	LAC	141.4	2020	0.09	2.186	(2.68)
Uruguay	LAC	3.0	2190	0.21	0.155	
Hungary	EMENA	10.6	2240	0.38	0.583	
Argentina	LAC	31.1	2390	0.1	0.768	(0.554)
Yugoslavia	EMENA	23.4	2480	0.24	0.842	
Algeria	EMENA	23.1	2680	0.14	0.706	
South Korea	Asia	42.1	2690	0.45	2.122	
Gabon	SSA	1.1	2700	0.41	0.122	
Portugal	EMENA	10.2	2830	0.34	0.589	
Venezuela	LAC	18.3	3230	0.22	0.769	
Greece	EMENA	10.0	4020	0.21	0.533	
Trinidad	LAC	1.2	4210	0.33	0.139	

Notes: Data refer to 1987, and come from the World Bank's <u>World Development Report</u> for 1989. Population is in millions and inflow requirements in billions of dollars. The requirements estimates in parentheses are model results from Table 3, simulation one.

is excluded) and $10.516 billion to the latter. Even if they absorb less in relation to output, big countries still account for the bulk of foreign transfers.

Second, total flows to the countries grouped by per capita GDP in the table are: 34 low income countries, $14.319 billion; 31 low middle income, $13.598 billion; 12 high middle income, $9.514 billion. In the low income group, India and China account for $6.921 billion, or almost half the total. Aside from a few other large absorbers, many small, poor economies require inflows in the 100 million dollar range. They are concentrated in Sub-Saharan Africa (SSA).

More generally by region, flows to the World Bank's four major groupings are:

Asia (except Middle East)	$15.471 billion
Latin America and the Caribbean (LAC)	8.246 billion
Europe, Middle East, and North Africa (EMENA)	7.252 billion
Sub-Saharan Africa (SSA)	6.462 billion

The SSA total is heavily influenced by Nigeria and South Africa (a total of $2.201 billion) and the LAC total by Mexico and Brazil ($3.5 billion). In light of our previous discussion, South Korea's estimated inflow of $2.122 billion might reasonably be dropped from Asia.

These estimates can be compared to other computations of foreign exchange needs and supplies, especially for Sub-Saharan Africa and Latin America and the Caribbean, the two most visibly troubled regions.

For SSA, a recent World Bank (1989) report estimates that an increase of 1.5 percent in the region's output growth rate in the late 1980s would require additional capital inflows of $4 billion. In the year 2000, five percent output growth would require flow support of $19 billion (compared to $8 billion in 1986-87). These numbers are similar to those derived in Table 4, and contrast sharply with the region's external financing losses averaging $7.6 billion per year between 1979-81 and 1985-87 (United Nations, 1988). The three major negative shifts according to the United Nations were adverse movements in the terms of trade, $2.9 billion; increased interest payments, $2.1 billion; and reduced net credit flow, $2.4 billion.

The importance of worsened terms of trade for African economies stands out when one notes that total exports from SSA countries in Table 4 (excluding Nigeria and South Africa) are $21.95 billion. A 19.4 percent increase in export prices would be equivalent to the $4.26 billion in additional aid flows required for one percent faster capacity growth (and more than two percent output growth on average). The United Nations (1988) and World Bank (1989) both estimate that the deterioration in SSA terms of trade has been in the 40 to 50 percent range since the late 1970s. Similar losses occurred for other small, primary exporting economies, e.g. Nicaragua and Sri Lanka in the WIDER sample.

Finally, potential absorptive capacity constraints merit consideration in the African context. The data on current account deficits (ϕ + t) in Table 1 show that African countries in the WIDER sample are now absorbing gross transfers amounting to five to ten percent of potential output. GDP in 1987 for the entire region was $134 billion. Our postulated additional transfers of $6.5 billion for one percent faster capacity growth are almost five percent of GDP, and socially acceptable growth rates would require even more money. But at that point, many economies would be running current account deficits of 15-20 percent of GDP. How to manage such large inflows effectively is sticky policy and planning point.

As we have already noted, interest obligations not offset by "fresh money" are the main financial burden affecting countries in the LAC region. According to the Economic Commission for Latin America and the Caribbean (ECLAC, 1990), the regional net transfer on credit transactions peaked at over $20 billion in 1982, fell steadily to -$27 billion in 1985, and was around -$20 billion per year at the end of the decade. The estimate here of $8.25 billion required for one percent faster capacity growth is dwarfed by these numbers; they are closer to the $25 billion (approximately) that would be needed to support historical growth rates of per capita GDP.

As discussed in more detail below, programmes to offset the debt burden have been ineffective, to say the least. The latest initiative is the American Brady Plan, launched last year. ECLAC (1990) estimates that for countries in its region, Brady will provide well less than $5 billion per year in net relief of interest burdens — a small figure in comparison to the requirements estimates here.

Returning to global figures, we can round up the Table 4 grand estimate of $37.431 billion to account for omitted countries (inter alia, Iraq, Iran, Afghanistan, and Vietnam) to get a total of at least $40 billion in aid flows in the late 1980s, needed for one percent faster capacity growth in all the developing world. For some Asian and Middle Eastern economies, this increment would come close to satisfying reasonable social goals, but such a judgement clearly does not apply to Sub-Saharan Africa and Latin America. In those regions, double or triple the regional estimates presented above would be needed to underwrite growth rates of two or three percent per head. Also, if a target annual growth rate of capacity (or Q) in the developing world as a whole is four percent, $40 billion around 1990 would have to rise to $60 billion in constant prices by the year 2000 to hold the FLOW/Q ratio stable. These numbers should be compared to an ODA flow of about $40 billion in the late 1980s and a net transfer from developing to developed economies in the $20-40 billion range at the decade's end (down from about $50 billion in 1985).

Global resource estimates of this magnitude are compatible with those in other studies, when the computations are put on a comparable basis. Fishlow (1987) provides a useful review of the debate through the mid-1980s. He uses a global projection model based on World Bank exercises of the type discussed below to come up with a total current account estimate of $69 billion (plus an extra $22 billion to add to foreign reserves) to support "minimal" growth rates in developing countries in 1990. On an incremental basis, his implied requirements for one percent additional output (equivalent to capacity) growth by region work out to be

Non Latin America	$26.7 billion
Bangladesh, India, China Pakistan	3.3 billion
Sub-Saharan Africa	13.3 billion
Latin America	15.6 billion

for a 1990-based total of $42.3 billion in 1985 prices. There are regional differences, but the total is remarkably similar to the one we have derived.

Even ignoring political difficulties, how would the world economy adjust to transfers of this magnitude toward the South? Without providing a full answer, the following section takes up some of the factors that bear on this very large question.

6. Global Macroeconomic Complications

The growth performance of developing economies has fluctuated violently over the past two decades, according to World Bank estimates. Even after the first oil shock, their average GDP growth rate was 5.3 percent per year between 1973 and 1980. Thereafter, the average fell off to 3.8 percent in 1980-86, recovered to 4.6 percent in 1986-88 but dropped again to 3.5 percent in 1989 and probably will be no higher in 1990. Regional differentiation has been pronounced, with early 1990s growth rate projections for three of the World Bank's four regions hovering around three percent while Asia — the outlier — may grow at around six.

These developments and future prospects can be analysed in terms of a global analytical framework that both theorists and practitioners have come to share over the past decade. However, extending the framework to ask how the world economic system might respond to a doubling of resource flows to developing countries as proposed in the previous section is still on the research agenda. A credible numerical model of economic interactions between rich and poor countries (or the "North" and "South") does not exist. Both the World Bank and International Monetary Fund do make projections of capital flows and output growth rates for developing economies, but these are based on informed input from country economists subject to global consistency checks as opposed to mathematically closed models. The Bank/Fund procedures are practical but focus less on global interactions than individual country trends. A broader perspective is attempted here, following Lal and van Wijnbergen (1985), Vos (1989), and Taylor (1991).

The main features of the North-South framework go as follows:

Global economic expansion is largely driven by developments in the North. The simplest representation is the real/financial macro model illustrated in Figure 5. An increase in the Northern activity level on the horizontal axis drives up the interest rate (conventionally the London interbank offered rate, or LIBOR) for loans from international commercial banks. The NA curve represents financial equilibrium in the market for <u>non</u>-bank assets. An upward shift in the interest rate structure pulls desired portfolios away from other assets toward bank deposits, while more Northern activity increases the flow demand for financial assets overall. The NA locus combines the activity levels and interest rates that generate zero excess demand for assets. The offsetting positive and negative effects just pointed out give the NA schedule its positive slope.

The IS schedule crossing NA shows how the activity level in the North responds to interest rate changes (plus feedbacks from the South as discussed below). Cheaper credit means that investment and overall activity rise, so IS slopes downward. Its intersection with NA at point X represents an initial macro equilibrium.

Growth in the South as a whole is conditioned by the North. A simple worldwide theorem of accounting states that

$$(4) \qquad (I_n - S_n) + (I_s - S_s) = 0,$$

where the I_i and S_i terms stand for investment and saving flows, and the subscripts denote the two regions. The difference $I_i - S_i$ is region i's trade surplus, in line with the model accounting in Appendix 2. If I_n, S_n, and S_s respond autonomously to interest rates and activity levels, then I_s and thereby growth of potential output in the South must be determined endogenously by the global macro system. Not being able to make an independent investment decision is an important aspect of the entire South's dependent position in the global system, even though in specific historical circumstances (e.g. the big borrowers before the debt crisis; economies in Southeast Asia now) individual countries may control their own accumulation.

Plausibly, I_s responds negatively to higher interest rates and positively to Northern activity. The GG schedule is one of a family of iso-growth or contour curves showing interest rate and activity combinations that hold I_s and the South's growth rate constant. It has a positive slope since a higher interest rate must be offset by more activity to keep investment unchanged. Points to the right of GG represent more developed country output and lower financial costs; hence faster growth. A similar family of contour lines (not shown) will determine the capacity growth rate in the North.

For the North, the scenario of the 1970s (at least after the first oil shock) was a downward shift of the IS curve from the initial equilibrium at X. Higher raw material prices drove up the cost of production,

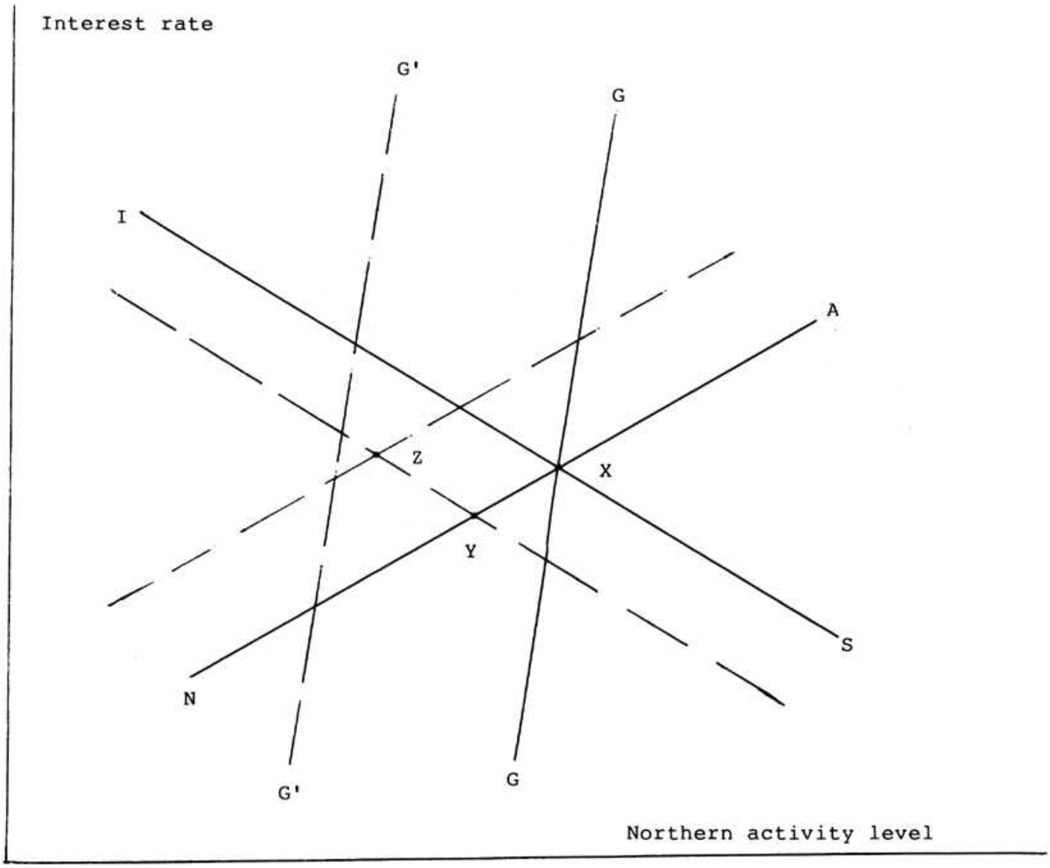

Figure 5: Real and financial world equilibrium: the 1970s.

thereby squeezing real income and reducing aggregate demand. For a steep GG, a new temporary equilibrium at Y would lead to slower growth in the South by reducing demand for that region's exports and bidding down their terms of trade.

The NA curve also shifted in the 1970s. Relatively restrictive monetary policy aimed at slowing the oil shock's cost-push made nominal interest rates go up. At point Z (after both IS and NA adjustments), the South's growth prospects appeared even worse. But the oil shock was also accompanied by "recycling" of OPEC's new bank deposits to the South. The financial transfers (at least for the two dozen countries that got access to commercial bank lending) shifted growth contour lines: a contour like GG corresponding to Third World growth early in the 1970s moved to G'G' to the left of the equilibrium at Z, and the Southern capacity (and output) growth rate went up. Besides oil, prices of other raw materials followed their own rising dynamics until late in the 1970s, also contributing to faster Southern growth. As we saw above, commodity prices then reversed and fell on average by forty or fifty percent over the following decade.

One outcome of this process was that the debt burden rose, making the GG contours more sensitive to interest rate changes and thus less steep. The 1980s picture looks more like Figure 6. Still tighter money (the "Volcker shock" of the early 1980s) and loose fiscal policy (the Reagan tax cut and defense spending increase) shifted Northern equilibrium from X to Y. Relatively high interest rates and economic activity supported the 1982-89 spurt in OECD growth as well as more than four percent annual expansion in world trade over the decade. However, with shallow GG contours, Southern growth was relatively insensitive to this flurry, and declined. With potential high performers in Latin America and elsewhere fettered by debt burdens, the South's overall rate of expansion could not respond as strongly as in the past to Northern activity, as experience in the 1980s clearly demonstrates. The brief acceleration during 1986-88 fell back as a brief rally in the terms of trade faltered and export volume became stagnant in 1989.

Despite its broad verisimilitude, the framework just discussed leaves a number of questions unanswered.

First, transfer mechanisms between and within the regions need to be spelled out. As noted in connection with equation (4), the framework presumes that growth in the South is determined by available foreign exchange, with the saving-investment and fiscal gaps adjusting to changes in interest payments to abroad, capital inflows, export volumes, and the terms of trade. As we saw in section 4, the degrees of freedom that different developing countries have in adjusting to the external restriction differ markedly. Poor, primary product exporters are strongly affected by movements in export volumes and the terms of trade; countries that export manufactures face (in the recent period at least) more buoyant markets. Some economies like

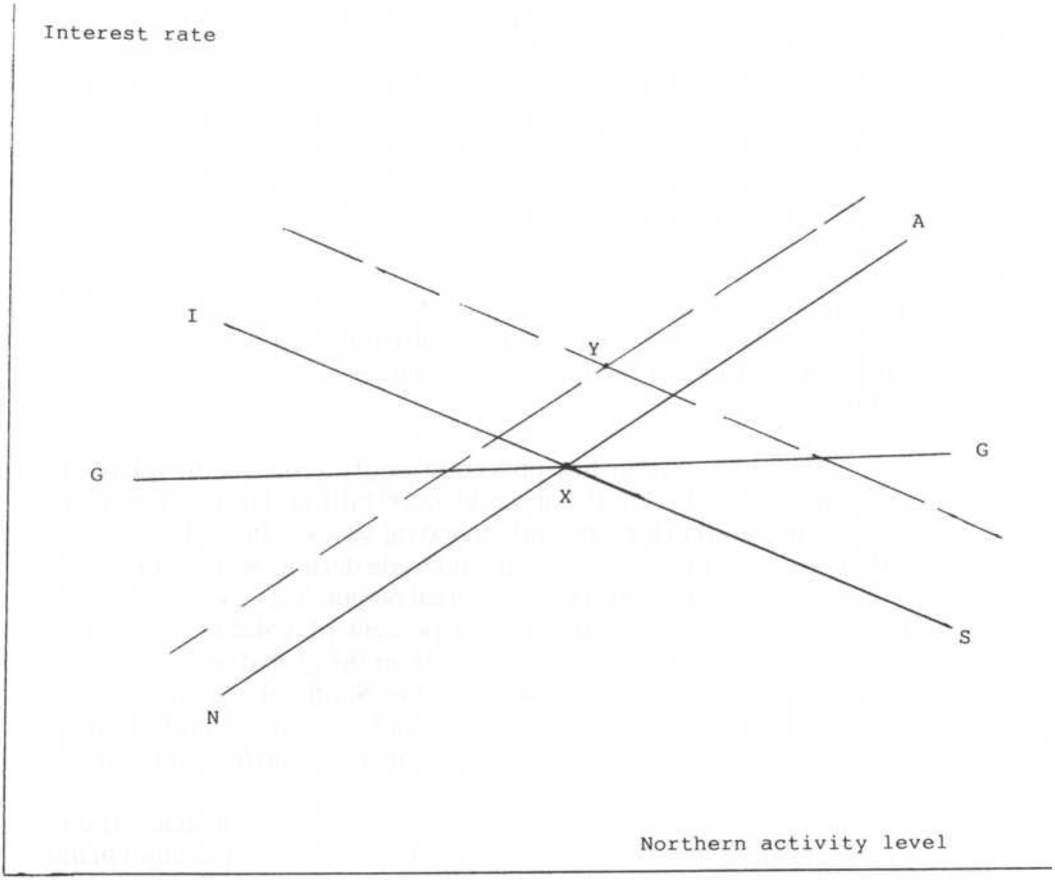

Figure 6: Real and financial world equilibrium: the 1980s.

Thailand's have liberal access to international commercial banks, so that in 1990 Thai capital formation is far less limited by external finance than Mexico's or Brazil's. Such evolving distinctions within the South have to be taken into account.

Second, feedbacks between North and South are not fully clear. An increase in primary product prices may either stimulate markets for Northern exports by increasing demand from the South or retard growth as did the increases in oil and other raw material prices in the 1970s. The dynamics of changes in these prices as well as export volumes are complex, depending not only on forces of demand and supply but on political events such as the breakdown of the international coffee agreement in 1989. Equally, financial markets are sensitive to developments such as the OPEC recycling exercise in the 1970s and (perhaps) increased credit demands from Eastern European economies during the decade to come. The North is more nearly autonomous with respect to such feedbacks than the rest of the world, but not completely so.

Third, the system has proven strongly sensitive to relatively small shocks. Global GDP is about $15,000 billion. The magnitudes of transfers involved in the first and second oil shocks, the Volcker shock, and the linked United States fiscal and trade deficits were in the range of $100-150 billion, or one percent of total output. Yet — in part because the shocks amounted to five or ten percent of volatile saving and investment flows — their repercussions on the global economy were profound. Increased capital flows to the South of the magnitudes suggested in section 5 are about one-half percent of global GDP; history suggests that attempting such a transfer could have big effects.

Fourth, even the directions of these effects are not clear. At one extreme is the "global Keynesianism" implied by some passages in the report of the Brandt Commission (1980): the argument is that increased aid flows to the South will lead that region's import demand to rise and stimulate faster Northern growth.

The other extreme position is built into recent numerical models based on the optimal growth theory that dominated mainstream macroeconomics in the 1980s. For example, McKibben and Sachs (1989) argue that an attempted transfer to the South financed by Northern government borrowing would increase world interest rates enough to reduce the North's (and possibly the South's) investment and output growth after the transfer. Vines and Muscatelli (1989) add that higher rates might also induce commodity traders to run down inventories, reducing the terms of trade. Assumptions regarding monetary policy may soften these scenarios: would the U. S. Federal Reserve stand by and let interest rates go up in the wake of a (politically improbable) jump in foreign aid, especially if exports weren't growing to offset the rise in unemployment?

Reconciling all these views is not easy. They depend in part upon empirical evidence, but also on the dynamic properties of models that different investigators postulate. Taylor (1991) argues that the financial crowding-out results of McKibben-Sachs and Vines-Muscatelli follow from an underlying model structure that dynamises the ancient doctrine of loanable funds: the term structure of interest rates adjusts to bring investment demand in line with saving supply at full utilisation of resources. In fact, "full utilisation" is a maintained hypothesis in optimal growth theory, often in the short run and certainly in steady state. The observation that global financial market equilibrium left many developing economies with resources painfully unemployed in the 1980s suggests that the new loanable funds models may be leaving something out. At the same time, global Keynesians are certainly naive in omitting capital market complications from their specifications.

The tentative conclusion must be that evaluation of potential macroeconomic effects of an increase in North-to-South transfers of $40-50 billion per year is a tricky question. Informed opinions differ, and much would obviously depend on the institutional nature of any transfer package that might be put in place. Following Fitzgerald, Jansen, and Vos (1988), we close with a few observations along these lines.

Three major types of international macroeconomic restructuring are currently being discussed: policy coordination, recycling of Japanese-German trade surpluses, and debt relief. We take them up in reverse order.

The discussion of country models in section 4 suggests that two sorts of debtor countries should be distinguished: those with large commercial bank debts remaining from the 1970s (especially Mexico, Brazil, Argentina, Turkey, the Philippines, and Nigeria in our sample) and those with debts to foreign governments and institutions (most countries in Sub-Saharan Africa and other small, poor, open economies worldwide).

The "private borrowers" in IMF terminology could typically respond to reductions in their trade surpluses from a few percent of GDP to zero with an acceleration in growth and reduced inflation. Most have <u>not</u> been able to cope with a decline in resource inflows of five to seven percent (from a two to four percent deficit to an equal surplus), but may have adjusted roughly halfway to the highly non-local shock they received in the early 1980s. They could also absorb massive amounts of funds, e.g. our observation in section 4 that Brazil alone might need $8 billion in new money (rising to perhaps $15 billion by the year 2000) to sustain its historical four percent rate of per capita GDP growth.

"Official borrower" economies are much smaller and have grown more slowly, with correspondingly reduced needs. The section 4 blow-ups suggest that Sub-Saharan Africa (even including Nigeria and South Africa) might need an inflow of only $6.5 billion for one percent faster growth; the figure for low income economies apart from India and China is a bit over $7 billion.

The official borrowers' requirements could in principle be met by politically plausible increments to current ODA flows of about 0.35 percent of OECD GDP or $40 billion. However, a solution for private borrowers is more difficult to foresee. The endless stream of debt relief proposals has effectively gone through four phases: a lender of last resort intervention orchestrated by the Federal Reserve and the International Monetary Fund to shore up the global financial system (1982-84); the Baker Plan (1985-86); sporadic debt reduction attempts on a country-by-country basis after Baker ran out of steam (1987-88); and the Brady Plan (1989-). These efforts have not provided debtor countries with very much relief.

A realistic ex post appreciation of the Baker Plan is that it was put in place to give the United States banking community time to adjust to the debt crisis. Even the U. S. Treasury didn't seem to pay much attention to the Plan's rationale (that structural adjustment in response to modest capital inflows would permit debtor countries to meet their obligations), and "commitments" made under it were not fulfilled. As Yanagihara (1990) observes, for example, "... the largest single recipient of funds under the original [Japanese commitment to the Baker] recycling plan was Indonesia, a country not on anyone's list of problem debtors." The Brady initiative seems largely directed to propping up politically problematic debtors — the United States' preferences perhaps being Mexico, the Philippines, Venezuela, Brazil, and Argentina in that order. As we have seen, the reductions in net interest payments implicit in the Brady proposal will not suffice for acceptable rates of growth. For example, the results for Mexico in section 4 suggest that unless there is a substantial reversal of capital flight, the funds provided by that country's 1989 Brady settlement will at best support an increase of a percentage point or so in output growth.

Could the "debt overhang" (or hangover) be relieved by other policy changes? Recycling the structural trade surpluses of Germany and Japan (Okita, Jayawardena, and Sengupta, 1987) is an attractive notion but its global macroeconomic implications remain to be thought through. There are already Japanese direct foreign investment flows in the $7-10 billion range to selected developing countries (mostly in East and Southeast Asia), but to be effective, the magnitudes recycled would have to be far larger. What would be the effect on world interest rates of an attempt by the Germans and Japanese to transform (say) $40 billion of their trade surpluses annually from investment in U.S. capital markets into low interest loans to the South? The question brings us directly back to the model conundrums noted above.

Policy coordination usually takes the form of exhortations to the U.S. to reduce its fiscal and trade deficits, and to the Germans and Japanese to expand aggregate demand faster and liberalise restrictions on trade. Steps may yet be taken in these directions, their effects on global financial equilibrium and demand for developing country exports are by no means clear.

One key problem with coordination, as Fitzgerald, Jansen, and Vos (1988) point out, is that "... given the existing ... world distribution of assets and liabilities, ... trade patterns should ideally be the exact inverse of the present situation if smooth adjustment is to be achieved by major debtor countries, and the U. S. [is to] be able to run substantial trade surpluses so as to reduce ... current account deficits." Specifically, at the margin Japan and Germany don't import much from the U.S., with Japan's major suppliers including Asian economies which already have acceptable rates of growth. Major debtors, meanwhile, sell to the United States. Coordination therefore aids the wrong countries.

Without coordination, the story is not better. America's options reduce to attempting to keep interest rates high enough to continue to draw in capital, dollar depreciation and trade restriction, and (conceivably) interest rate ceilings coupled with rising prices to inflate its way out of debt. None of these three options is system-stabilising, and only the third would help developing debtor nations.

Finally, there is a question about how secure developing countries are against downside risk. The rapidly expanding Asian economies, in particular, have cast their lots firmly with continuing double digit export growth. Some, such as Malaysia, may be in danger of a reversal, while a big enough slump in the wake of the OECD boom of the 1980s could threaten prospects even for Indonesia and Thailand. If such eventualities occur, then the $15.5 billion capital flow requirement estimate for Asia in section 4 could double or even triple in very short order.

7. Brief Conclusions

The main points we have raised go as follows:

(1) Growth performance in each developing economy depends crucially on its own history and institutions. Nonetheless, in the 1980s both major debtor countries and small, open, primary-exporting countries (many in Sub-Saharan Africa) received major external jolts, reaching almost five to ten percent of GDP in some cases. These required non-local macroeconomic adjustments in the form of reductions in capacity growth rates in the two to six percent range and decreases in capacity utilisation rates of up to 20 percent. An interesting counterpoint to these wrenching real adjustments is the oratorical fury provoked by proposals to reduce the one to two percent fiscal/trade gap in the United States.

(2) Many countries also face fiscal difficulties. Typically, public capital formation crowds in private investment and enhances growth. But with domestic revenue-gathering capacity limited by recession, export-linked revenues suffering from low volume and adverse price trends, stagnating transfers from abroad, and big foreign interest obligations, the only way that many poor country governments can keep up their investment spending is via unsustainably high levels of the public sector borrowing requirement, or PSBR. In short, investment and growth are fiscally constrained.

(3) Even more successful economies face problems, e.g. a big redistributive agenda in the face of full capacity utilisation in Chile, difficulty in reining in food and fertiliser subsidies in India, dependence on continued spectacular export growth in Malaysia, Turkey, and Thailand, possible export-linked macroeconomic instability in South Korea, a PSBR exceeding 15 percent of GDP in Zimbabwe and Zambia, etc.

(4) Possible policy reforms to deal with the foregoing problems and also capital inflow needs to support faster capacity expansion are analysed for a sample of 18 countries, using a "three-gap" model which highlights saving, PSBR, and external limitations to accelerated growth. An increase of one percent in the potential output growth rate (linked with somewhat larger percentage increases in capacity utilisation) would require an incoming foreign transfer of an extra $15 billion in the country sample excluding South Korea. The corresponding figure for all developing countries is estimated to exceed $40 billion per year, rising to $60 billion by the year 2000.

(5) Current overseas development assistance (ODA) flows to developing countries are about $40 billion, and net transfers to the "South" are in fact negative in the $20-40 billion range. Hence, a major realignment in international payments flows would be required to accelerate growth for developing nations overall. The repercussions of such an effort on global macroeconomic equilibrium — in particular on interest rates and macroeconomic performance in the "North" — remain to be explored.

Appendix 1

Authors of the WIDER Country Studies

Argentina: José Maria Fanelli and Roberto Frenkel
Brazil: Dionisio Carneiro and Rogerio Werneck
Chile: Andrés Solimano
Colombia: Leonardo Villar
India: Abhijit Sen and Pronab Sen
South Korea: Alice Amsden, Man-woo Lee, and Sang-dal Shim
Malaysia: Jomo Sundaram
Mexico: Jaime Ros
Nicaragua: Bill Gibson
Nigeria: T. Ademola Oyejide and Mufutau Raheem
Philippines: Manuel Montes, Joseph Lim, and Agnes Quisumbing
Sri Lanka: S. S. Karunaratne and M. D. R. Senanayake
Tanzania: Benno Ndulu
Thailand: Somchai Jitsuchon and Chalangphob Sussangkarn
Turkey: Korkut Boratav and Oktar Türel
Uganda: Ardeshir Sepehri and John Loxley
Zambia: Thandika Mkandawire
Zimbabwe: Rob Davies and Jörn Rattsö

Appendix 2

Formal Statement of the Three-Gap Model

We begin by setting up accounts. Let X stand for "real output", interpreted as the sum of GDP (or real value-added) and real intermediate imports in base year prices.

The accounting in the model is based on a very simple set of relationships around X. The "material balance" equation can be written as

$$X = C + \theta I + G + E - M,$$

where the symbols have their usual meanings except that θ is the share of investment demand satisfied by goods produced domestically and M stands for competitive imports only.

If W stands for tax revenues less transfers plus public enterprise profits, and so on (that is, W is the net revenue that the government receives from the private sector), private consumption C can be expressed as

$$C = X - aX - \lambda S_p - (1 - \lambda)S_p - W,$$

where aX stands for real intermediate imports (a is the import/output ratio), S_p is private saving, and λ and $1 - \lambda$ are respectively the shares of S_p directed to asset accumulation within and outside the country. In other words, $(1 - \lambda) S_p$ is capital flight. Besides this particular external transfer, the model carries three others along explicitly. One is foreign interest payments J^*, of which the government pays a share ξ and the private sextor $1 - \xi$. The others are incoming foreign transfers T and Φ, flowing respectively to the government and private sector.

Putting the consumption function together with the material balance and including the transfers gives the following equation for investment-saving balance:

$$I = [(1 - \theta)I + aX + M + J^* + (1 - \lambda)S_p - E - T - \Phi] + [\lambda S_p + \Phi - (1 - \xi)J^*] + [W + T - G - \xi J^*].$$

The three terms in brackets on the right-hand side are savings flows available to finance national investment, from foreign, recorded private, and government sources respectively. They underlie the three-gap model we now discuss.

To begin, let Q stand for "potential real output", or the highest level of X that can reasonably be produced with existing capacity. In the base year, the level of Q was estimated by country authors using various methods. Extrapolating lines through previous peak outputs was adopted by some, but that approach does not make sense in economies which simply have not been growing. In such circumstances, the best guess at Q was usually based on a judgment about how far output could rise without running into bottlenecks if foreign exchange (or some other critical input) were freely available.

Let g stand for the rate of growth of potential output, and assume that

(1) $$g = \frac{Q(t+1) - Q(t)}{Q(t)} = g_0 + \kappa \frac{I(t)}{Q(t)} = g_0 + \kappa i.$$

Here I(t) stands for gross capital formation in year t, κ is the incremental output-capital ratio, and g_0 is a base level of growth (usually negative to account for depreciation). We define $i = I/Q$, or investment normalised by the level of potential output. This sort of normalisation will be used extensively in what follows.

Let i_g and i_p stand respectively for public investment (that is, investment undertaken by the government and parastatals and public enterprises) and private investment normalised by Q. We stick with linear behavioural equations for simplicity, assuming a private investment function of the form

(2) $$i_p = i_0 + \alpha i_g + \beta u,$$

where the coefficient α captures the public investment crowding-in effect and β is the simplest version of an accelerator.

Since $i = i_p + i_g$, equation (2) implies that the overall investment function is

(3) $i = i_0 + (1+\alpha)i_g + \beta u.$

The next step is to set out savings functions preparatory to writing equations for gaps. Begin with the level of real public saving, which can be written as

$$S_g = (W - G) - \xi J^* + T = Z + T - \xi J^*,$$

in which W — net public revenue from the private sector — includes tax revenues, public enterprise profits, internal transfers as a negative item, and real interest on internal government debt.

The new variable Z after the second equality is net revenue less current government spending. We assume that $Z = z_0Q + z_1X$, so that government saving normalised by Q is

(4) $s_g = S_g/Q = z_0 + z_1u - \xi j^* + t,$

in which $j^* = J^*/Q$ and $t = T/Q$. One might typically assume that $z_1 > 0$, if tax takes and public enterprise profits rise with the level of economic activity.

Besides government saving, it is also worthwhile to consider the overall public borrowing requirement, or PSBR. If π is the share of the PSBR in total output X, we have $PSBR/Q = (PSBR/X)(X/Q) = \pi u$, and

(5) $\pi u = i_g - (z_0 + z_1u) + \xi j^* - t.$

The reason to use a parameter like π is that PSBR targets are usually set relative to actual instead of potential output. In interpreting numerical values of π, bear in mind that X exceeds GDP.

Relative to capacity, private saving can be expressed in linear form as

(6) $s_p = \sigma_0 + \sigma_1u - \sigma_2\phi,$

where $\phi = \Phi/Q$ stands for capital inflow available to the private sector relative to potential output. The parameter σ_0 implicitly includes private foreign interest payments $-(1 - \xi)j^*$ — this is one reason why it is in practice negative. The level of σ_0 may also shift over time in response to the magnitude of capital flight. The marginal saving rate σ_1 implicitly includes the effects of transfers and taxes. A positive value of σ_2 means that capital inflows partially substitute for domestic saving along Griffin

(1970) and Weisskopf (1972) lines.

Uses less sources of foreign exchange for the economy can be written as

$$S_f = M + (a_0Q + a_1X) + (1-\theta)I + J^* + (1-\lambda)s_p uQ - (\varepsilon_0 Q - \varepsilon_1 X) = T + \Phi.$$

As in the material balance expression, M stands for competitive imports and/or other inflow items in the current account. Intermediate imports are $aX = a_0Q + a_1X$, or $au = a_0 + a_1u$ in normalised form. The idea is that intermediates may be more than unit elastic with respect to capacity utilisation, in which case $a_0 < 0$ and a_1 is just the product of the average intermediate share (a) and the import elasticity.

A similar trick is applied to other items of the trade balance. For example, competitive or consumption imports may depend on the level of activity: $m = M/Q = \mu_0 + \mu_1 u$. At least in some countries export sales may be cut back as domestic activity rises according to the parameter ε_1. However, other authors found complementarity between exports and domestic production, making $\varepsilon_1 < 0$. Export and intermediate import expansion at the same rate as potential output is built into this formulation, since ε_0 (a_0) stands for the share of exports (intermediate imports) in Q, which is presumably growing. These shares should change if exports (imports) are exported to grow faster or slower than Q.

The parameter θ is the share of nationally produced goods in total investment. The import share $1 - \theta$ in some circumstances may be elastic to investment itself: $(1-\theta)i = \upsilon_0 + \upsilon_1 i$ is a specification adopted in several papers. We have already noted that a share $(1 - \lambda)$ of total private saving $s_p uQ$ may take the form of capital flight.

In normalised form, foreign saving is

(7) $s_f = m + (a_0 + a_1u) + (1-\theta)i + j^* + (1-\lambda)s_p u - (\varepsilon_0 + \varepsilon_1 u) = t + \phi.$

We can now set up our three gap equations, treating public investment i_g and capacity utilisation u as the variables that trade off to give macro equilibrium. The variable i_g can be related to capacity utilisation and a target $\bar{g}$ for potential output growth from (1) and (3) as

(8) $i_g = [1/(1+\alpha)][(\bar{g} - g_0)/\kappa - (i_0 + \beta u)].$

Setting investment from (3) equal to the sum of savings flows from (4), (6), and the second line of (7) gives a <u>saving gap</u>:

(9) $(1+\alpha)i_g - (\lambda\sigma_1 + z_1 - \beta)u = z_0 - \xi j^* + (1-\lambda\sigma_2)\phi + \lambda\sigma_0 - i_0 + t,$

in which the standard macro stability condition is $\lambda\sigma_1 + z_1 > \beta$. Higher capacity utilisation in this equation generates more (private plus public) saving, permitting i_g and the growth rate g to rise. Note that only the share of private saving not subject to capital flight enters this balance. If $\lambda < 1$, the part of national saving diverted abroad is not available to finance investment at home.

Using (1) and (3), the saving gap can be written in growth rate form as

$$(9') \quad g = \kappa(\lambda\sigma_1 + z_1)u + \kappa[z_0 - \xi j^* + (1-\lambda\sigma_2)\phi + \lambda\sigma_0 + t] + g_0,$$

which is used for the calculations in section 4 in the text. Growth is limited by capacity utilisation according to the coefficient $\kappa(\lambda\sigma_1 + z_1)$, in Harrod-Domar form.

Rewriting (7) gives a foreign exchange gap:

$$(10) \quad (1-\theta)(1+\alpha)i_g + [a_1 + (1-\theta)\beta + \varepsilon_1 + (1-\lambda)\sigma_1]u = [1 + (1-\lambda)\sigma_2]\phi - m - j^* - (1-\theta)i_0 - a_0 + \varepsilon_0 + t - (1-\lambda)\sigma_0.$$

This formulation emphasises the inverse trade-off between capital goods imports for investment and intermediates to support current output (and exports) that African and other authors stress. Note also that when there is capital flight ($\lambda < 1$), the flow term $(1-\lambda)\sigma_1 u$ is equivalent to an import leakage.

The growth rate version of this equation is

$$(10') \quad g = -\frac{\kappa[a_1 + \varepsilon_1 + (1-\lambda)\sigma_1]}{1-\theta}u + \frac{\kappa}{1-\theta}\{[1 + (1-\lambda)\sigma_2]\phi - m - j^* - a_0 + \varepsilon_0 + t - (1-\lambda)\sigma_0\} + g_0,$$

showing how increased output cuts back on growth while increments in the intercept terms increase g with a coefficient $\kappa/(1-\theta)$.

Finally, rewriting (5) gives a fiscal gap:

$$(11) \quad i_g - (\pi + z_1)u = z_0 - \xi j^* + t.$$

Here, with the PSBR target π set in terms of output, greater capacity utilisation permits an increase in government capital formation and growth. Higher foreign transfers t permit greater public investment, while increased interest obligations ξj^* cut i_g back.

In growth rate form, the fiscal gap becomes

$$(11') \quad g = \kappa[(1+\alpha)(\pi + z_1) + \beta]u + \kappa(1+\alpha)(z_0 - \xi j^* + t) + g_0 + \kappa i_0.$$

Increases in both capacity utilisation and the intercept terms permit the growth rate to increase by the factor $\kappa(1 + \alpha)$, due to public investment crowding-in. Note also that the investment function parameters α and β appear only in (11'), but not in (9') and (10'). In effect, we adopt a closure for our three-gap exercises similar to the one used by Johansen (1960) in his pioneering computable general equilibrium model — the fiscal accounts are used to accommodate an independent investment function. Several country authors selected other closures as being more appropriate to their particular cases; the fiscal adjustment or Johansen approach is followed here to permit direct cross-country comparisons.

In full equilibrium, the three gaps cross each other as shown in Figures 1-4. Either the saving or fiscal gap may be steeper, while the negatively sloped foreign exchange gap will be steep when a_1 and/or ε_1 is large, or $1 - \theta$ small. The curves are defined by the country parameters summarised in Table A-1, while Table A-2 presents reduced form responses of g to changes in u and the intercept terms. Country authors used a combination of econometrics and informed judgment in arriving at their parameters — both methods required substantial expertise and experience regarding the economy at hand.

The following observations about the parameters apply:

(1) There is a wide range of values for a. the public investment crowding-in coefficient. Countries with high accelerator coefficients β also have high marginal public and private saving shares z_1 and σ_1, so that overall macroeconomic stability is attained.

(2) As is to be expected, marginal import coefficients a_1 and $1 - \theta$ are higher in smaller economies.

(3) The papers for South Korea, Thailand, and Zambia came up with a positive response of exports to output changes, i.e. $\varepsilon_1 < 0$; as noted in the text, the Korean coefficient is big enough to upset macroeconomic stability.

The first three columns of Table A-2 set out the $\partial g/\partial u$ slope parameters of the three gap equations (9') - (11'), and the next three give the effects on g of changes in variables on the right-hand sides. Again, a considerable range of values is observed, and either the fiscal or saving gap can be more steep.

The last two columns show reduced form multipliers for g and u with respect to changes in t from the saving and trade gaps. As noted above, the multiplier for u always exceeds the one for g, by a wide margin in cases in which the saving gap has a low positive slope.

Table A-1: Key Country Parameters

	κ	α	β	σ_1	z_1	a_1	ε_1	$1-\theta$
Argentina	0.26	0.5	0.0	0.364	0.234	0.1	0.0	0.13
Brazil	0.286	1.0	0.2	0.2	0.285	0.01	0.05	0.15
Chile	0.333	-0.23	0.059	0.16	0.10	0.487	0.0	0.645
Colombia	0.32	-0.4	0.13	0.36	0.02	0.128	0.0	0.21
India	0.4	0.232	0.091	0.3	0.36	0.1	0.15	0.092
S. Korea	0.29	1.6	0.69	0.67	0.18	-0.13	-0.26	0.41
Malaysia	0.3	1.6	0.024	0.3	0.2	0.62	0.01	0.48
Mexico	0.47	0.9	0.054	0.096	0.199	0.16	0.16	0.387
Nicaragua	0.25	0.5	0.0	0.15	0.2	0.182	0.05	0.46
Nigeria	0.29	0.853	0.185	0.25	0.012	0.045	0.094	0.318
Philippines	0.286	0.5	0.05	0.069	0.012	0.153	0.0	0.237
Sri Lanka	0.236	0.458	0.0	0.473	0.141	1.362	0.161	0.31
Tanzania*	0.25	0.148	0.089	0.2	0.083	0.076	0.179	0.33
Thailand	0.317	0.546	0.25	0.527	0.07	0.33	-0.169	0.363
Turkey	0.181	0.185	0.05	0.245	0.0	0.2	0.144	0.22
Uganda	0.27	1.0	0.086	0.127	0.034	0.195	0.0	0.5
Zambia**	0.255	0.249	0.756	0.775	-0.0136	0.292	-0.12	0.749
Zimbabwe	0.197	0.5	0.05	0.2	0.1	0.15	0.1	0.313

* Private saving in Thailand responds negatively to capital inflows (ϕ) with a coefficient of 0.63.

** Private saving in Zambia responds negatively to ϕ with a coefficient of 0.69.

Source: WIDER Country Papers

Table A-2: Reduced Form Country Parameters

	Effects of u on g			Effects of t on g			Full model effects	
	Sav.	For.	Fisc.	Sav.	For.	Fisc.	Δg/Δt	Δu/Δt
Argentina	0.155	-0.2	0.116	0.26	2.0	0.39	1.019	4.901
Brazil	0.139	-0.114	0.22	0.286	1.905	0.571	1.173	6.402
Chile	0.087	-0.252	0.051	0.333	0.517	0.257	0.38	0.542
Colombia	0.122	-0.198	0.051	0.32	1.524	0.192	0.778	3.765
India	0.264	-1.087	0.262	0.4	4.348	0.493	1.171	2.922
S. Korea	0.247	0.276	0.306	0.29	0.707	0.754	-3.201	-14.194
Malaysia	0.15	-0.392	0.184	0.3	0.625	0.78	0.39	0.6
Mexico	0.139	-0.389	0.222	0.47	1.215	0.893	0.666	1.412
Nicaragua	0.088	-0.126	0.088	0.25	0.544	0.375	0.371	1.377
Nigeria	0.076	-0.127	0.084	0.29	0.913	0.537	0.523	3.069
Philippines	0.023	-0.185	0.031	0.286	1.201	0.429	1.598	4.422
Sri Lanka	0.145	-1.161	0.081	0.236	0.762	0.344	0.284	0.412
Tanzania	0.071	-0.193	0.054	0.25	0.758	0.0287	0.386	1.924
Thailand	0.189	-0.141	0.119	0.317	0.872	0.489	0.635	1.685
Turkey	0.044	-0.282	0.019	0.181	0.819	0.214	0.267	1.958
Uganda	0.044	-0.105	0.09	0.27	0.54	0.54	0.349	1.814
Zambia	0.163	-0.059	0.209	0.255	0.34	0.319	0.318	0.385
Zimbabwe	0.059	-0.157	0.085	0.197	0.629	0.295	0.315	2.003

Source: WIDER Country Papers

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WIDER Publications
World Institute for Development Economics Research
Annankatu 42 C
00100 Helsinki
Finland
Telephone: (3580) 693 841
Telefax: (3580) 693 8548
Telex: 123455 unuei sf