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Growth with Limited Supplies of Foreign Exchange: A Reappraisal of the Two-Gap Model

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1. Introduction[1]

By the late 1940s, the perception of a foreign exchange constraint became widespread among both European and Latin American economists. To the former, it appeared as the "dollar shortage" problem; to the latter, as the "external strangulation" of the development process. It was one of Hollis Chenery's enduring contributions to have developed and formalized these ideas in the two-gap model.

Conceived during the 1950s, the two-gap model felt into disrepute in the following decade, as trade and financial liberalization among industrial countries progressed and worldwide exports flourished. Booming world markets, increasing commodity prices and low interest rates encouraged outward-oriented industrialization policies, and the elasticity pessimism underlying the two-gap model seemed outdated.

The optimism of orthodox economists recommending LDCs "to get their prices right and forget about the rest" is being put to a rude test in the late seventies and early eighties. Economic growth falters everywhere, protectionism is on the rise, and interest rates are at very high levels. The time seems ripe for a review of the more somber lessons of the two-gap model, for chances unfortunately are that this model may be more relevant to interpret economic conditions during the eighties than competing models from the neo-classical school.

The paper is divided into two parts: a synthesis and an extension. In the next section, a simple formalization is provided of the two-gap model, as conceived by Chenery and his associates. We consider a one-product growth model in a fix-price Keynesian setting, some outstanding characteristics of which are surplus labour and non-competitive imports of intermediate and capital goods. This stylized developing economy is referred to as semi- industrialized because it exports the same product that it consumes domestically. A newly industrializing country fits this conception better than a primary exporting economy. Besides trade variables, the balance of payments of this economy includes only capital transfers or foreign aid.

In this section, the savings and foreign exchange gaps are interpreted as restatements, in a growth context, of the Meade-Swan distinction between external and internal balance. If this interpretation is correct, a sociological mystery remains of why the external-internal balance view could be so easily integrated into mainstream macroeconomics, whereas the two-gap model – paraphrasing Keynes – "could only live on furtively, below the surface, in the underworlds" of Chenery, Prebisch and Nurkse.

Alternative views on the behaviour of exports underlie different perspectives on how "to close

[1] I am indebted for suggestions and comments to my graduate students and colleagues at the Catholic University of Rio de Janeiro (including Lance Taylor and Carlos Díaz-Alejandro), and to participants in seminars at INPES/IPEA, at the 1981 ANPEC Olinda Meeting, and at the Institute of International Economics March 1982 Airlie House Conference on IMF Conditionality. Research support from PNPE/IPEA is gratefully acknowledged.

the gap between the gaps", i.e., on how to reconcile the savings constraint with the foreign-exchange constraint. The first perspective is denominated the programming view, as it treats exports as a government instrument and searches for an optimum level for this variable. Some analytical consequences of pursuing this view suggest a reconsideration of recent empirical studies relating GNP growth to exports. The second perspective is the structuralist view. It assumes a state of excess supply in world product markets. Producers are rationed as they cannot sell as much they want, given their command over idle domestic resources. To our semi-industrialized country, demand-side rationing appears in the form of a maximum level of exports that it can hope to sell at any moment of time. Under these conditions, the savings constraint becomes non-operative, and the Chenery theorem follows that the productivity of foreign aid is higher than when the savings constraint is effective. The third perspective on exports is denominated the cost-of-adjustment view. It takes the structuralist perspective as describing a short-term situation. Over the longer- run, exports are supposed to expand as domestic capacity becomes idle. Underlying microeconomic mechanisms are not made explicit, but a neo-classical story could be told that domestic prices go down as unused capacity emerges: this devaluation of the real exchange rate would then explain the upward movement of exports. The section closes with some thoughts or stabilization policies in developing countries that are suggested by the two-gap approach.

The second part of the paper attempts to update the two-gap model, briefly considering the case where capital movements assume the form of interest-bearing foreign debt. The assumption of credit rationing in world credit markets is necessary to rescue the concept of a foreign exchange constraint under these conditions. However, it is adopted in this section not for expediency but because it appears to be theoretically sound and empirically relevant for an increasing number of less developed countries in the Eurodollar market.

Reflections on some old and new controversies in development economics, deriving from this reappraisal of the two-gap model, close the paper.

2. Growth-Cum-Aid

This section derives the two-gap growth model, assuming that the balance of payments consists only of the trade balance and capital transfers. There follows a discussion of alternative ways of looking at the problem of how to close the gap between the gaps.

2.1. The two-gap model

Domestic output is determined in a Keynesian fashion by the open economy savings-investment equilibrium condition:

$$S = I + X - M \qquad (1)$$

The balance of payments is obtained by adding capital transfers (foreign aid) to the current account balance (with is equal to the trade balance):

$$B = X - M + F \qquad (2)$$

For a semi-industrialized economy, treating all imports as competitive would be unrealistic. Accordingly, imports are assumed to be of two types: competitive (M_c) and non-competitive (M_n) imports, with the later sub-divided into intermediate goods (M_j) and capital goods (M_k) imports[2]. Net exports (E) are then defined as the difference between exports and competitive imports:

$$M = M_c + M_n \qquad (3)$$

$$M_n = M_j + M_k \qquad (4)$$

$$E = X - M_c \qquad (5)$$

The following simplified behavioural and technological relations are assumed to hold:

Savings function:

$$S = sY \qquad (6)$$

Fixed-coefficients production function, with labour assumed to be in perfectly elastic supply:

$$Y^* = aK \qquad (7)$$

where K is the capital stock; a, the (normal) output-capital ratio; and Y^*, potential output.

Intermediate goods import coefficient:

$$M_j = m_j Y \qquad (8)$$

Capital goods import coefficient:

$$M_k = m_k I \qquad (9)$$

The variables in equations (1) and (2) are now redefined as ratios to the capital stock. For this purpose, the following mnemonic symbols are introduced:

Degree of capacity utilization, u:

$$u = \frac{Y}{Y^*} \qquad (10)$$

Ratio of net exports to potential output, e:

$$e = \frac{E}{Y^*} \qquad (11)$$

Capital transfers to potential output ratio, f:

$$f = \frac{F}{Y^*} \qquad (12)$$

Balance of payments as a proportion of potential output, b:

[2] Consumption goods imports, if luxuries, are treated as competitive goods, and if necessaries, as intermediate imports.

$$b = \frac{B}{Y^*} \qquad (13)$$

Growth rate of capital stock (and of potential output as well), g:

$$g = \frac{I}{K} \qquad (14)$$

where capital is assumed to be immortal, i.e., the rate of depreciation is equal to zero.

Taking (3) to (5) into account, the variables in (1) and (2) are divided in an appropriate fashion by the capital stock, to yield:

$$\left(\frac{\mathrm{S}}{\mathrm{Y}}\right)\left(\frac{\mathrm{Y}}{\mathrm{Y}^*}\right)\left(\frac{\mathrm{Y}^*}{\mathrm{K}}\right) = \frac{\mathrm{I}}{\mathrm{K}} + \left(\frac{\mathrm{E}}{\mathrm{Y}^*}\right)\left(\frac{\mathrm{Y}^*}{\mathrm{K}}\right) - \left(\frac{\mathrm{M_j}}{\mathrm{Y}}\right)\left(\frac{\mathrm{Y}}{\mathrm{Y}^*}\right)\left(\frac{\mathrm{Y}^*}{\mathrm{K}}\right) - \left(\frac{\mathrm{M_k}}{\mathrm{I}}\right)\left(\frac{\mathrm{I}}{\mathrm{K}}\right) \qquad (15)$$

and:

$$\left(\frac{B}{Y^*}\right)\left(\frac{Y^*}{K}\right) = \left(\frac{E}{Y^*}\right)\left(\frac{Y^*}{K}\right) - \left(\frac{M_j}{Y}\right)\left(\frac{Y}{Y^*}\right)\left(\frac{Y^*}{K}\right) - \left(\frac{M_k}{I}\right)\left(\frac{I}{K}\right) + \left(\frac{F}{Y^*}\right)\left(\frac{Y^*}{K}\right) \qquad (16)$$

Introducing the relations (6) to (9) and the definitions (10) to (14) into (15) and (16), after simplification we obtain:

$$u = \left[\frac{1-m_k}{a(s+m_j)}\right] g + \left[\frac{1}{s+m_j}\right] e \qquad (17)$$

and:

$$b = e - m_j u - \left(\frac{m_k}{a}\right) g + f \qquad (18)$$

Equation (17) is recognized as the Keynesian open economy multiplier. It defines the degree of capacity utilization as a function of the "autonomous" variables, the growth rate of capital stock and the export coefficient. The export multiplier is higher than that for investment as capital goods imports have to be netted from the latter, in addition to the intermediate goods needed for current production.

Equation (18) provides a "structuralist" view of the balance of payments in a developing country, once e and f are taken as given. A balance of payments improvement is seen to require either a reduction of the level of activity or a diminution of the potential output growth rate. However, the level of activity is given by (17); taking this into account, the balance of payments equation reduces to:

$$b = \left[\frac{s}{s+m_j}\right] e - \left[\frac{m_j+m_k s}{a(s+m_j)}\right] + f \qquad (19)$$

This confirms the negative link emphasized by the structuralists between the balance of payments and the potential output growth rate.

In the Meade-Swan tradition, equations can be derived for internal and external balance. The economy is said to be in internal balance if effective output is equal to potential output or, from (10), if $u = 1$. We will allow for the possibility that u is bigger as well as smaller than unity, interpreting the former as an extra-shift or an above normal speed of machine operation.

External balance is defined by the condition of zero International reserves change, or $b = 0$.

Solving (18) and (19) under these equilibrium conditions, we have:

$$u = 1: \quad g_u = \left[\frac{a}{1-m_k}\right](m_j + s) - \left[\frac{a}{1-m_k}\right]e \qquad (20)$$

and:

$$b = 0: \quad g_b = \left[\frac{as}{m_k s + m_j}\right]e + \left[\frac{a(m_j+s)}{m_k s + m_j}\right]f \qquad (21)$$

For given values of *all* right-hand variables in (20) and (21), growth is said to savings-constrained if $g_u \leq g_b$ and *foreign-exchange constrained* if $g_b \leq g_u$.

However, at least the net exports ratio cannot reasonably be assumed to be given. It may be bounded from above (under certain foreign market conditions to be discussed presently) but it is not bounded from below. Three alternative ways of looking at the problem of how to close the gap between the gaps (i.e., of how to erase the ex-ante difference between g_b and g_u) suggest themselves. They imply treating net exports alternatively as a policy instrument, as rigidly bounded from above, or as a slowly adjusting variable. We will label them respectively as the programming view, the structuralist view, and the cost-of-adjustment view.

2.2. Programming view

Suppose that the net export ratio is a government instrument. Then the problem consists of choosing the ratio e that maximizes g, subject to $u \leftarrow 1$ and $b \geq 0$. Diagram 1 illustrates the problem graphically. Equation (20) is represented by the downward sloping curve labelled $u = 1$. The upward sloping curve $b = 0$ is a geometric representation of equation (21). To the right of $u = 1$ domestic capacity is overextended (i.e., $u > 1$). To the right of $b = 0$, the balance of payments is in deficit (i.e., $b < 0$). This restricts the choice set to the area left of both $u = 1$ and $b = 0$, as indicated in Diagram 1. In this case, $e = \tilde{e}$ is the export ratio that maximizes the potential growth rate at $g = \tilde{g}$.

In semi-industrialized countries only recently out of the import substitution stage the presumption is that the actual export ratio is below the optimum level $\tilde{e}$. Hence, the widely disseminated idea that in these countries growth can be export- led. By contrast, think of an old island-based industrial empire, for which $e \geq \tilde{e}$. In this case, domestic investment will be crowded out by additional exports and hence a lower output growth rate will result.

The programming view strongly suggests the existence of a non-linear relationship between export ratios and potential GDP growth rates. This stands in sharp contrast to recent statistical exercises by Michaely and Balassa, among others, in which GNP growth is supposed to be monotonically related either to the (average or marginal) export share or to the growth rate of exports. First, a positive relation between GNP growth and the growth of exports would be merely a reflection of a constant export share. Hence, it is irrelevant to the question of determining whether such export ratio is too high or too low. Moreover, simple linear correlations between growth and the export ratio,

as are proposed in those exercises, may turn out to be statistically non-significant simply because the true relation between the two variables is highly non-linear.

Diagram 1

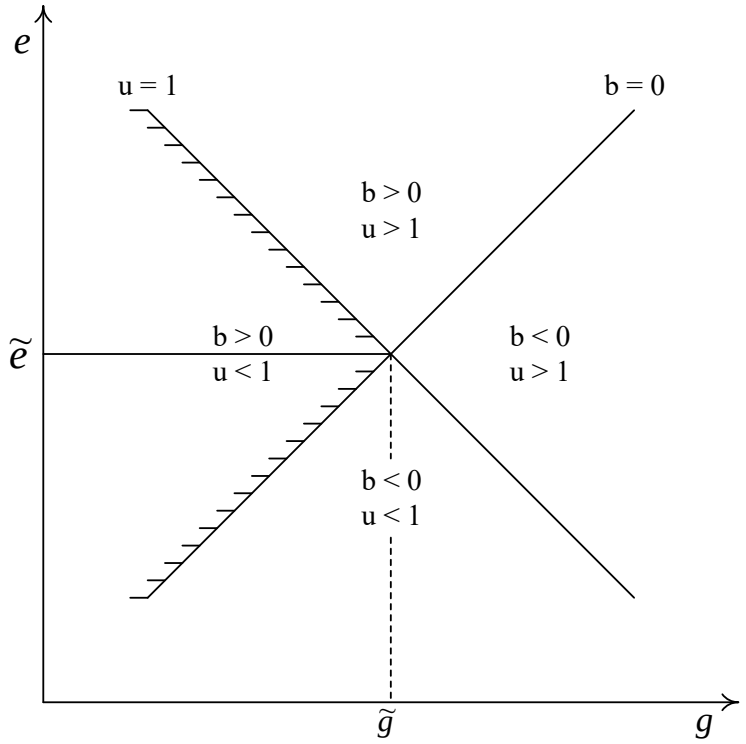


Diagram 2

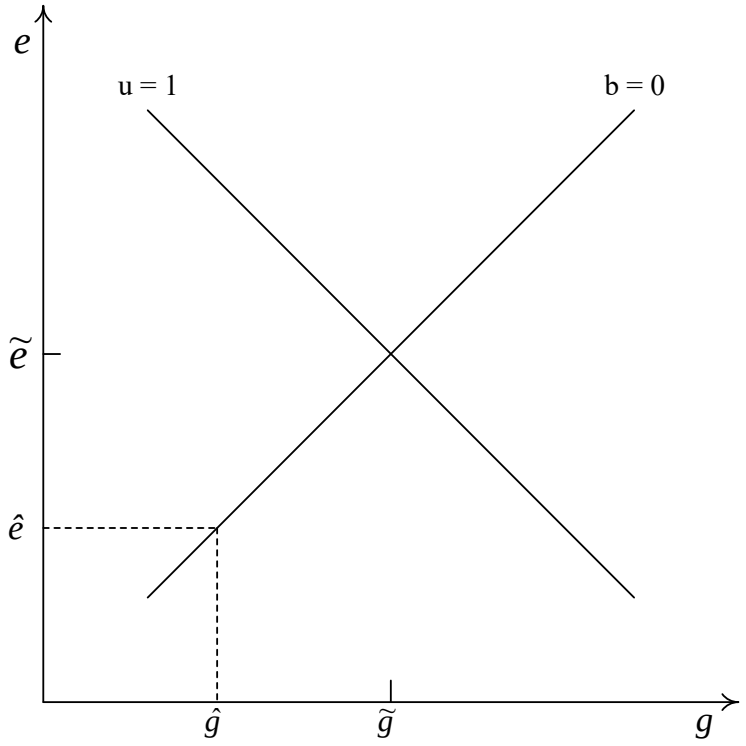


Diagram 3

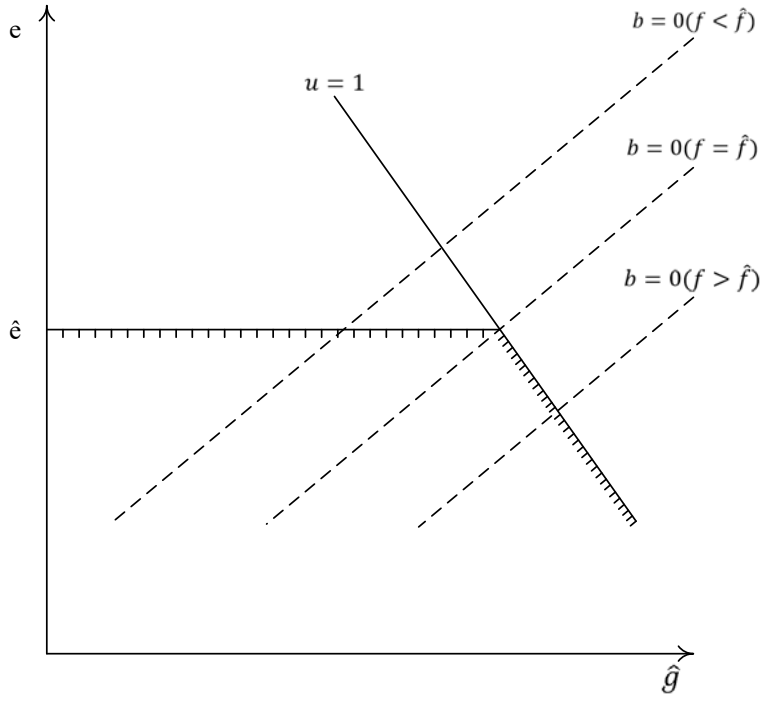
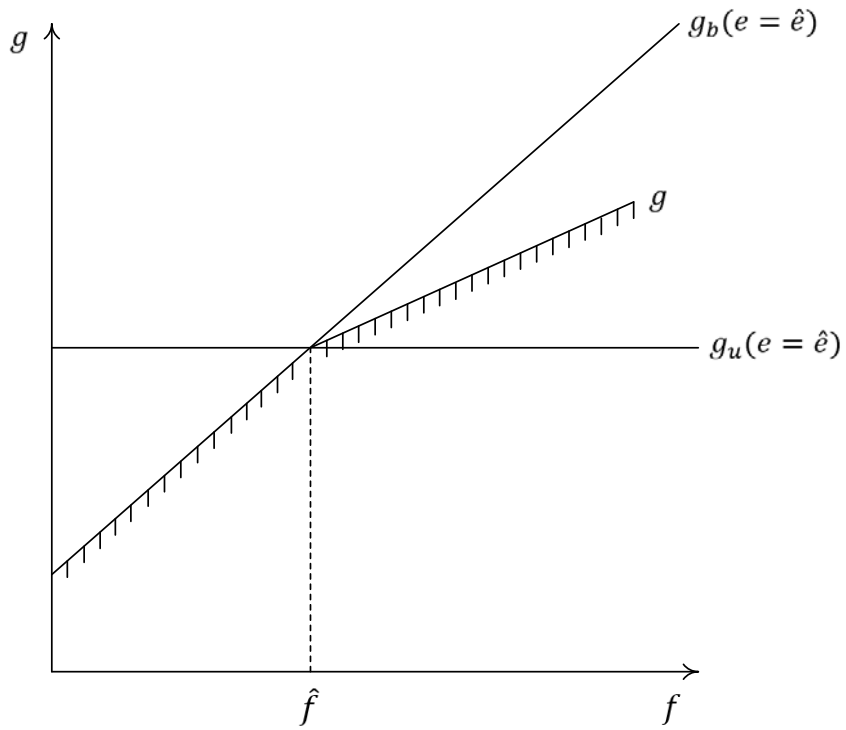


Diagram 4



2.3. Structuralist view

If the world economy is in a State of Keynesian unemployment, in spite of its small size our semi-industrialized country may see its exports restricted from the demand side[3]. This means that the maximum export ratio ê is lower than the desired level, $\tilde{e}$, as indicated in Diagram 2.

If the no deficit condition, $b \geq 0$, continues to apply then the country is restricted to grow at the rate $\hat{e}$, in Diagram 2. This is a foreign exchange constrained growth rate, as domestic capacity is being wasted (i.e., $u < 1$)under the combination $(\hat{e}, \hat{g})$.

This is the view that underlies the Chenery approach to the productivity of foreign aid. Consider Diagram 3. At $f = \hat{f}$, by construction the curves $u = 1$ and $b = 0$ cross each other at the limiting export ratio, $\hat{e}$. For $f < \hat{f}$, the $b = 0$ curve shifts to the left. The economy then is foreign exchange constrained and hence forced to grow at the rate determined by the $b = 0$ condition with $e = \hat{e}$. Suppose now that f is bigger than $\hat{f}$. In this case, there is a regime change. If more foreign exchange is available, the investment rate can be higher. But if it is so, excess domestic demand will result.

To cure this problem, exports need to go down; but then, less foreign exchange will be available and the output growth rate will not be raised by as a much as previously, when exports were constrained by foreign demand rather than by domestic supply.

This point can perhaps be seen more clearly in a diagram popularized by McKinnon. But first note that if exports were flexible, (20) could use to obtain an expression for the equilibrium level of e. When this is substituted back in (21), the following Harrod-Domar expression results for the equilibrium growth rate of potential output.

$$g = a(s + f) \qquad (22)$$

Equation (22) gives the value of the growth rate when the economy is *simultaneously* restricted by savings and by foreign exchange.

Let us now consider the McKinnon diagram, with g in the vertical axis and f in the horizontal axis. First introduce the value $e = \hat{e}$ in equations (20) and (21). The value $\hat{e}$ is assumed to be lower than the sum $m_k s + m_j$, which is the equilibrium value of the export ratio when $f = 0$. Otherwise, the economy would be savings constrained, not foreign exchange constrained, even if foreign aid were non-existent. There result the curves marked $g_u(e = \hat{e})$ and $g_b(e = \hat{e})$ in Diagram 4. At $f = \hat{f}$, $g_u = g_b$, for the critical value of the export ratio, $\hat{e}$. If $f < \hat{f}$, the economy is foreign exchange

[3] In this Keynes-Malinvaud world, the usual assumption of orthodox trade theory (see, for example, Desai and Bhagwati), according to which a "small country" cannot face effective demand problems, obviously breaks down. The precise form in which specific countries are rationed in a buyers' market (by quotas, compensatory duties, or VERs) need to be spelled out in empirical applications of the structuralist view. The important point, however, is that in this non-Walrasian context, a "small country" in spite of being atomistic in world markets can indeed experience a foreign exchange bottleneck. For the choice-theoretical problems involved in treating the two-gap model as a fix-price equilibrium, see Gunning.

constrained only, hence the growth rate goes down along the $g_b(e = \hat{e})$ schedule. If $f > \hat{f}$, then, as explained before, $e < \hat{e}$ (which is perfectly admissible). Then the equilibrium output growth rate is found from (22). As $0 < m_k < 1$, clearly $\frac{\delta g_b}{\delta f} > \frac{d_g}{d_f}$ (compare equations (21) and (22)). Hence, the Chenery theorem that the productivity of foreign aid for $f > \hat{f}$ will be lower than for $f < \hat{f}$.

2.4. Cost-of-adjustment view

An alternative view of the export problem of semi-industrialized countries is that in the long run net exports will adapt themselves to the domestic capacity constraint[4]. However, in the short-run past export experience determines current export behaviour. This view can be represented by the assumption that the export coefficient changes through time according to:

$$\frac{de}{dt} = -h(u - 1), h > 0 \qquad (23)$$

with a positive but less than infinite speed of adjustment, h.

An additional assumption is that even in the short-run balance of payments deficits cannot be financed. Hence, the economy is always bounded by the condition $b \geq 0$. If we assume that all growth opportunities are taken, we can substitute the condition $b = 0$ for this inequality, thus generating a short-run view of foreign exchange constrained growth.

Consider Diagram 5. Assume the initial position is at A. We may presume that a was an equilibrium position in the recent past, which was disturbed by some external shock, such as a reduction of foreign aid. A terms of trade deterioration or an export crop failure would do as well, except that in these cases point A should be placed midway between the two curves in the diagram, as such shocks, besides shifting the $b = 0$ curve to the right, would also shift the $u = 1$ curve to the left.

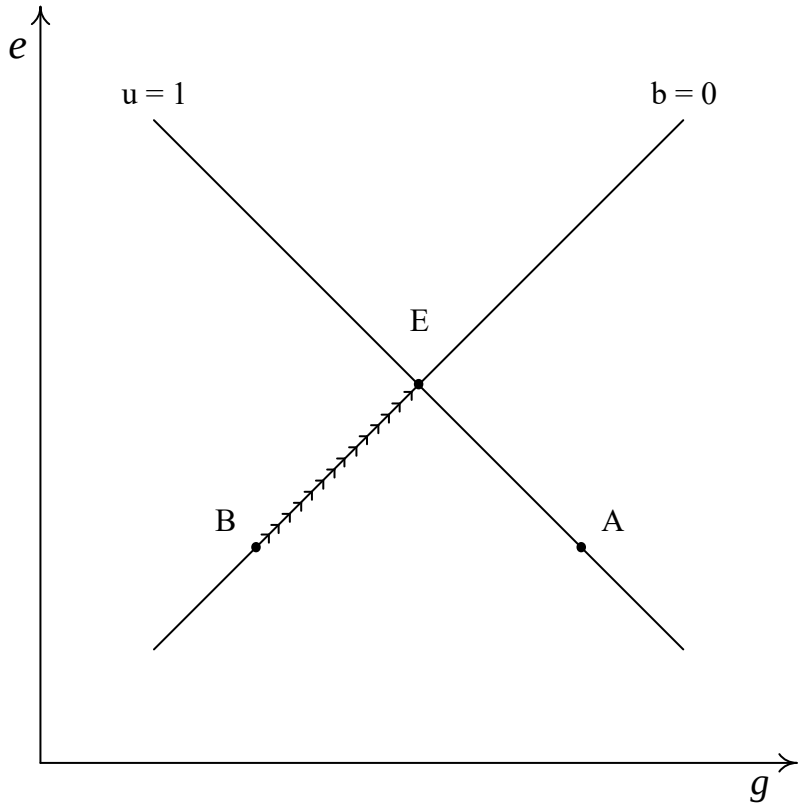
If external finance is not available, the country will have to reduce sharply its growth rate from A to B in order to establish external balance. From B, given (23), exports will keep growing until a new equilibrium is reached at E.

This view provides a rationale for temporary financing facilities of the IMF type, conditional on the country's acceptance of lower rates of domestic absorption (in Diagram 5, this is achieved by reducing the growth rate from A to E, but it could as well be done by a higher savings rate). The difficult part is defining conditions that will ensure a movement directly from A to E, cutting short the expensive detour through B. The IMF record of overkill would hardly suggest that a satisfactory

[4] Analytically, this case is a natural extension of Findlay's analysis, in which the proportion of imported and domestic goods consumed is assumed to depend on relative prices. Implicitly, the additional assumption is adopted here that relative prices remain constant only if $u = 1$; otherwise, they will be changing through tine causing net exports to vary according to (23)

institutional answer has been found for the stabilization dilemma posed by the export adjustment equation (23). If price related measures (i.e., an exchange rate devaluation) cannot to the job expeditiously, maybe closer consideration should be given in stabilization programs to the establishment of minimum export targets at the firm level, which seem to be an integral part of the successful export promotion schemes of Korea and Brazil, for example.

Diagram 5



3. Growth-Cum-Debt

This section briefly considers an extension of the two-gap model for the case of interest earning capital inflows. The critical assumption is that there is credit rationing in international financial markets[5] so that the country is constrained to maintain a minimum "equity-to-debt ratio" established by its foreign creditors.

To simplify the algebra, we omit reference to intermediate imports. External, internal and overall balance are considered successively. The section concludes with an extension of the Chenery theorem for the case of growth-cum-debt.

[5] Credit rationing is not an ad-hoc assumption without theoretical support. The informational failures that tend to generate supply-side rationing in domestic credit markets (Cf. Stiglitz and Weiss), are aggravated in international credit markets by the so-called sovereignty risk (Cf. Eaton and Gersovitz, and Sachs).

3.1. External balance

The balance of payments is given by:

$$B = E - M_k - R + F \qquad (24)$$

where R is net interest payments and F is reinterpreted as net foreign financial inflows.

Interest payments are obtained from:

$$R = rK_f \qquad (25)$$

where r is the world interest rate (inclusive of a country risk spread, which is assumed to be constant), and is outstanding foreign debt.

The growth rate of foreign debt, g_f, is given by:

$$g_f = \frac{F}{K_f} \qquad (26)$$

Dividing both sides of (24) by the domestic capital stock, use being made of (7), (9), (11), (13), (14) and (26), after simplification we obtain:

$$b = e - \frac{m_k}{a} g + \frac{k_f}{a}(g_f - r) \qquad (27)$$

where the "leverage ratio", k_f, defined as:

$$k_f = \frac{K_f}{K} \qquad (28)$$

is assumed to be set by the country's foreign creditors. If k_f is given[6], then $g_f = g$ and (27) reduces to:

$$b = e - \left[\frac{m_k - k_f}{a}\right] g - \frac{k_f}{a} r \qquad (29)$$

From (29) it is evident that the country growth rate cannot be foreign exchange constrained if $k_f > m_k$. If this were the case, raising the potential output growth rate would lead to an improvement, not to a deterioration of the balance of payments. This may explain why colonies, with an ample capital supply from the mother country, are not foreign exchange constrained. But such bootstrap operation generally is not available to independent developing countries[7]. In the following, we assume that the country foreign credit limit ratio is lower than the import content of its investment rate.

External balance as before means zero reserve changes, or $b = 0$. This leads to the following expression for the foreign exchange constrained growth rate, g_b:

$$b = 0: \quad g_b = [\frac{1}{m_k - k_f}](ae - k_f r) \qquad (30)$$

[6] The ratio k_f will be constant along a steady State growth path. Convergence to such an equilibrium could be ensured by an adequate set of adjustment conditions, which will not be considered here.

[7] Lance Taylor seems to have been the first to point out the need to impose the condition $m_k > k_f$ in North-South trade models with capital mobility. He considers this to be the empirically relevant case for a typical sovereign country in the Periphery.

An increase in e will raise g_b if $m_k > k_f$. But the variation of g_b with respect to k_f will be positive only if $ae > m_k r$. If this condition is violated, g_b will be lower than the value of the world interest rate[8]. This means that the country in unable to generate on its own that minimum of foreign exchange surplus needed to cover the interest earnings of an additional iota of foreign debt. Our semi-industrialized country is assumed to have graduated from this initial development stage. Hence, its export ratio – even when constrained from the demand side – is assumed to be set at a value higher than $\frac{m_k}{a} r$. Under these conditions a higher leverage ratio k_f will lead to a higher potential output growth rate, when the foreign exchange constraint applies.

3.2. Internal balance

The equation for internal balance takes into account that the balance of payments in current account is now defined as the sum of the trade balance with interest remittances. Hence, the savings-investment equilibrium relation is written as:

$$S = I + E - M_k - R \qquad (31)$$

The equation for the savings ratio now refers to national, not to domestic output. Thus:

$$S = s(Y - R) \qquad (32)$$

To make use of our previous definitions, we use a long expression to divide S by K:

$$\frac{S}{K} = \left[\frac{S}{Y-R}\right]\left[1 - \frac{R}{K_f}\frac{K_f}{K}\frac{K}{Y^*}\frac{Y^*}{Y}\right]\frac{Y}{Y^*}\frac{Y^*}{K}$$

This simplifies to:

$$\frac{S}{K} = sua - srk_f \qquad (33)$$

Dividing both sides of (31) by K, introducing (33), and simplifying, we conclude that the degree of capacity utilization, u, is given by:

$$u = \frac{1}{s}\left[\frac{1-m_k}{a}\right] g + \frac{1}{s} e - \left[\frac{1-s}{s}\frac{1}{a}\right] r k_f \qquad (34)$$

Internal balance obtains when $u = 1$, which yields the following expression for the savings constrained growth rate, g_u:

$$u = 1: \quad g_u = \left[\frac{a}{1-m_k}\right](s - e + \frac{1-s}{a} r k_f) \qquad (35)$$

A higher export ratio e reduces g_u. Increased foreign interest payments subtracts from home consumption; to maintain full capacity utilization, the investment rate has to go up and this *raises* the value of g_u.

[8] Subtracting $k_f r$ from both sides of $ae > m_k r$ and dividing through by $m_k - k_f$ this inequality can be written as $g_b > r$

Diagram 6

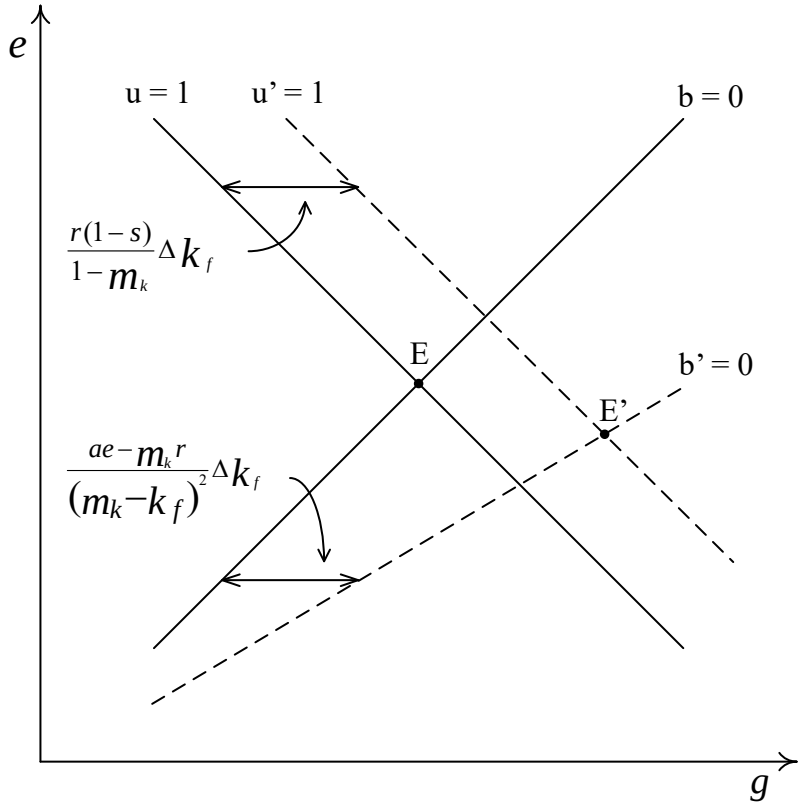
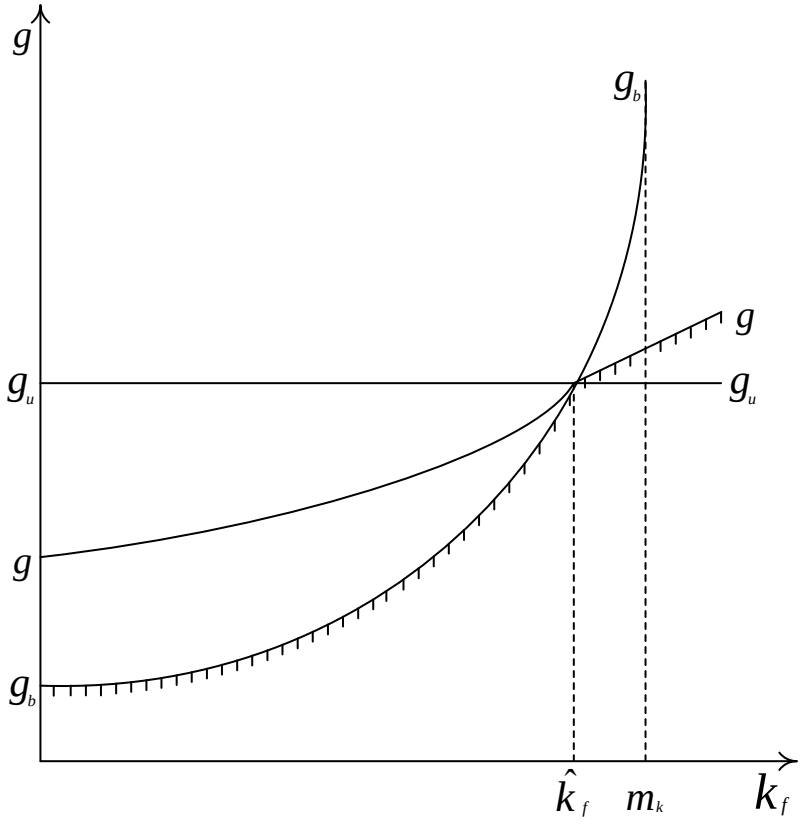


Diagram 7



3.3. Overall balance

When the economy is simultaneously in internal and external balance, equilibrium values for g and e can be derived from (30) and (35).

The revised Harrod-Domar expression for the equilibrium potential output growth rate is:

$$g = \frac{1}{1-k_f} s(a - rk_f) \qquad (36)$$

A higher leverage ratio, k_f, will lead to a higher g, provided that $a > r$, i.e., that the (marginal = average) domestic productivity of capital is higher than the world interest rate.

In overall equilibrium, the value of the export ratio is:

$$e = \left[\frac{m_k - k_f}{1-k_f}\right] s + \left[\frac{(1-m_k)+(1-s)(m_k-k_f)}{a(1-k_f)}\right] r k_f \qquad (37)$$

A higher savings ratio in equilibrium will lead to a higher export ratio. An increase in world interest rates also will raise the equilibrium value of the export ratio. The variation of e with respect to k_f is more difficult to derive, as two contradictory forces are at play. In itself, a higher leverage ratio increases the availability of foreign exchange and hence permits a higher investment ratio to materialize, at a constant export ratio. However, a higher leverage ratio also means that interest outflows will be higher than before. This additional leakage from domestic income flows implies that a higher investment ratio needs to emerge in order to maintain full capacity utilization, at a constant export ratio. If the investment expansion permitted by the balance of payments effect is larger than that required by the capacity utilization effect, the export ratio will have to fall as this will have the simultaneous effect of decreasing the availability of foreign exchange and increasing the availability of domestic capacity. This situation is illustrated in Diagram 6, where equations (30) and (35), respectively for $b = 0$ and $u = 1$ are plotted. A positive variation of the leverage ratio will shift both curves to the right, but at the equilibrium export ratio the horizontal displacement of $b = 0$ is assumed to be bigger than that of $u = 1$. Consequently, the new equilibrium export ratio at E' is lower than its previous equilibrium value at E.

Algebraic manipulations ensure us that the derivative of e with respect to in (37) is negative if the following condition on s holds:

$$s > \frac{ae + r(1-2k_f)}{a + r(m_k - 2k_f)} \qquad (38)$$

In order to understand the reason for this inequality, observe that an increase in k_f will not have the effect of lowering domestic capacity utilization when $s = 1$. In this case, the additional interest outflows will come entirely out of domestic savings, hence domestic absorption will be the same as before and no room will be open for an investment expansion, at a constant export ratio. Under these conditions, the export ratio needs to come down in order to accommodate a higher k_f. The

relationship in (38) asserts that the condition $s = 1$ is not necessary for this result. In fact, (38) does not place a very stringent restriction on s, under plausible parameter values for a typical semi-industrialized economy. Hence, we will assume (38) to hold, from which it follows that an increase in k_f will lower the equilibrium value of e.

An extension of the Chenery theorem can now be derived for the case of growth-cum-debt. Consider the value of the equilibrium export ratio in (37) when $k_f = 0$. This is $e = m_k s$. Thus, if the export ratio is constrained from the demand side to be $e = \hat{e} < m_k s$, the country will be foreign exchange constrained, when the foreign debt ratio is equal to zero. This is as in Diagram 7, where the relationships to k_f of $g_u(e = \hat{e})$, g and $g_b(e = \hat{e})$ are shown. At $k_f = 0$, $g_b < g < g_u$. If (38) is valid, g_b will increase by more than either g or g_u as k_f goes up starting from zero[9]. At $k_f = \hat{k}_f$, we obtain the condition $g = g_u = g_b$. This means that the limiting export ratio $\hat{e}$ is no longer binding the economy growth rate. From this point onwards, for $k_f > \hat{k}_f$,the actual growth rate will be that consistent with overall equilibrium (g) rather than that constrained by the availability of foreign exchange (g_b). At the switch point as elsewhere it is true that $\frac{dg}{dk_f} > \frac{\delta g_b}{\delta k_f}$. Hence, in the neighbourhood of $\hat{k}_f$, a qualified version of the Chenery theorem remains valid for the case of debt-led growth.

4. Conclusions

Practical orthodoxy seems unable to understand a simple but important message of the two-gap model: from the accounting identity $S - I = X - M - R$ plus the observation of a current account deficit in the balance of payments, one *cannot* derive the conclusion that a particular developing country is "living beyond its means". The conclusion follows only if net exports are restricted by excess domestic demand: it is not correct when net exports are conditioned by insufficient demand in world markets.

The characterization of one or other of these situations is an empirical question. It cannot be disposed of by hiding behind an accounting identity a full-capacity assumption, which a priori denies the possibility that effective demand problems may be part of the universe of open developing economies.

One purpose of this paper was to put in the language of mainstream macroeconomics this neglected message of the two-gap model. This hopefully will help to dissolve the communication problem that may be part of the mystery why the two gap model has been relegated "to the underworlds" by the theoretical orthodoxy.

[9] We compute the change of g_b and g_u respectively from (30) and (36), maintaining e constant at $\hat{e}$, whereas the change in g is obtained from (36), which implies that e is declining, in accordance to (37), from an initial value of $m_k s$.

Another purpose was to argue that the possibility of a foreign exchange restriction cannot be assumed away in the 1980s merely because of the existence of a competitive world capital market. First, because developing countries, as shown in the paper, have to pass an export performance test before entitling themselves to enter the world credit market, and required performance criteria may be too stringent for the poorest developing countries. Second, because credit rationing is an important characteristic of these markets – and the country credit limits established by international banks may be too low, under given export opportunities, to free individual developing countries from the foreign exchange bind.

A third reason for the paper was not explored in the text, but it is reminiscent of a point made by Chenery in his 1975 paper on the structuralist approach to development policy. It is an implicit defence for a large developing country of an import substitution stage, along which it moves not towards autarchy but towards a transformation in competitive imports of at least some of its non-competitive imports of intermediate and capital goods. Net exports were defined as the difference between (gross) exports minus competitive imports: $E = X - M_c$. If M_c is large vis-a-vis X (which means that M_n, non-competitive imports, is correspondingly lower, for a given degree of trade openness) , an adverse external shock can be compensated for by a decline in M_c, without the lower growth or reduced capacity utilization that typically accompany a reduction of M_n in the developing economies. Northern economists, at trouble to fit "energy substitution" into their theoretical schemes, now may not find this view as alien to their own concerns as in the 1950s and 1960s.

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