Economic Growth and the Balance-of-Payments Constraint

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Introduction

Approaches to economic growth

Two paradigms

- The neoclassical supply-oriented approach, based on the production function and full employment
- The Keynesian demand-oriented *balance-of payments-constrained growth*. Output may be less than full employment

The Balance of Payments

Current account:

Exports + *Financial Flows* ≡ *Imports*

$X + F \equiv M$

Confusingly, balance-of-payments equilibrium means X = M

Holds for countries (easily measured), regions and individuals.

If $M > X$ the region has to borrow (F) from other regions.

The Balance of Payments

The problem is that a country cannot go on borrowing indefinitely. The debt (the sum of *F*) cannot go on increasing for ever. Problem of the region or country defaulting on the debt.

How can the balance-of-payments affect economic growth?

Temporary shocks: The Asian financial crisis of 1997.

Long-term growth rates: UK in the 1950s & 1960s

Stop-go cycles.

Transmission of low growth in OCA (e.g. The Eurozone)

Regions also have balance-of-payments although there are no statistics collected.

Problem with the Cumulative Causation Model

- A region or a country can go on exporting as much as it likes. But it will build up trade surpluses if exports exceed imports. Similarly, other countries may be accumulating net overseas debt, but this cannot go on forever. There must be some mechanism that brings the growth of exports and imports into equality.

- There is a balance-of-payments constraint (note that this also applies to regions in a common currency area).

The (weighted) growth exports + the growth of net financial flows = the growth of imports **(excluding the rate of change of relative prices)**

If the growth of imports > growth of exports, net overseas debt will accumulate. But it cannot do this indefinitely.

Exchange Rate Adjustment Mechanism

If imports > exports

(i) Exchange rate adjusts to bring it back into equilibrium

(ii) Relative prices adjust in common currency union or regions

If either of these mechanisms is effective then there is no balance-of-payments constraint.

Effectively, regional and national economies are “delinked”.

The Growth Rates of Countries are Interlinked

- The growth rates of even the advanced countries are inextricably linked – indeed the large OECD simulation macroeconomic model is known as the LINK model

- The beggar-my-neighbour policies of the advanced countries in the 1930s. “Exporting unemployment” by tariffs and quotas.

- Rapid post-war growth led by first the US and then Germany as the engine of growth. Rapid reduction of tariffs under GATT. It was the growth of world demand that became crucial for the Golden Age of 1950-1973

- UK stop-go policies 1950-1973 associated with balance-of-payments crisis. As output grows, so the current account deteriorates as imports increase rapidly, and exports grow at a constant rate determined by world demand.

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- As output grows, so the current account deteriorates as imports increase rapidly, and exports grow at a constant rate determined by world demand.

  Import growth determined by *domestic* output growth.

  Exports determined by the (exogenous) growth of world markets.

  Output growth increases $\Rightarrow$ import growth (export growth constant) $\Rightarrow$ growing current account deficit. Not sustainable in the long run.

The Ineffectiveness of Floating Exchange Rates

- Once we move from considering the changes in the level of output, to the rate of growth, the role of the balance-of-payments becomes important, even with floating exchange rates.

- Changes in the nominal real exchange rate may be short lived because of a rapid-pass through of import prices and “real wage resistance”.

- The price elasticities may be low and the *Marshall-Lerner conditions* barely satisfied
  - Advanced countries: non-price rather than price competitiveness matters
  - Developing countries: price elasticities for primary commodities relative low.

- With Keynesian import and export demand functions, to increase or decrease the growth of exports and imports requires a *continuous* real depreciation of the exchange rate.

EMU & Common Currency Areas

- By definition these have a common currency and so no exchange rate.
- Cost competitiveness can only be increased through a reduction in the regional real wage. Difficult to achieve.
- Prices are determined on national markets
- Regions still have balance-of-payments although not officially recorded as such.
- There are much greater fiscal transfers between regions but these vary. Compare the US with the EMU.

Balance-of-Payments Constrained Growth

The cumulative causation model we discussed last time:

- criticized by Thirlwall himself (Thirlwall, 1979)

- Implicitly KDT model assumes (imports) *M* can grow *permanently* faster than (exports) *X*

- BUT, not true! The implied increasing foreign indebtedness will be ultimately unsustainable…

$\Rightarrow$ **BoP constrained growth**

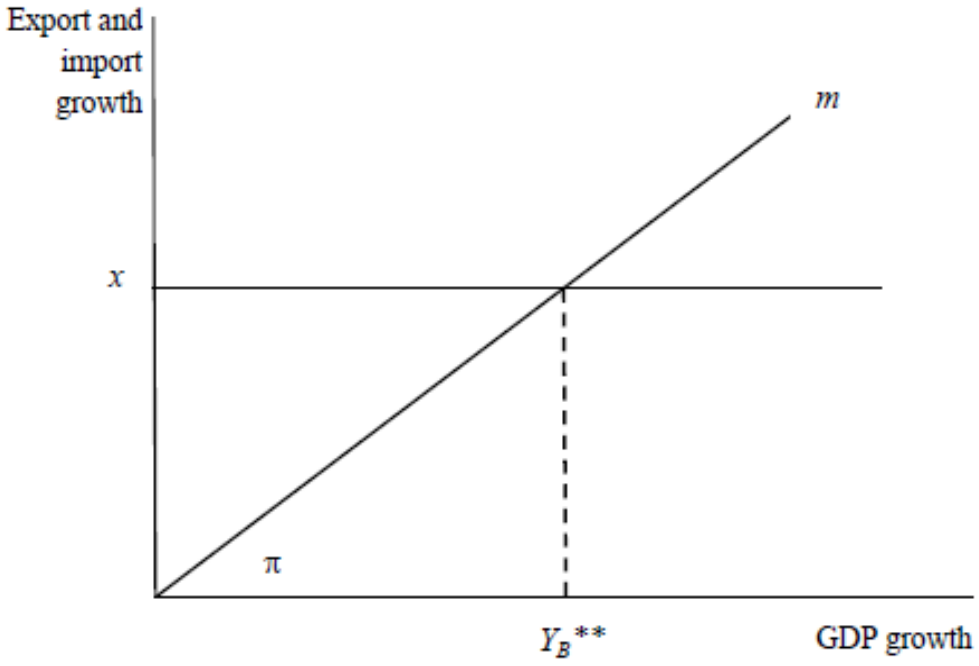
$\therefore$ consider the BoP constrained growth model

The Balance-of-Payments Constraint

"At the theoretical level, it can be stated as a fundamental proposition that no country can grow faster than the rate consistent with balance-of-payments equilibrium on current account unless it can finance ever-growing deficits, which in general it cannot". (A. P Thirlwall)

- As a rule of thumb international financial markets become distinctly nervous if the overseas debt to GDP ratio exceeds around 50%. It does, however, depend on the size and level of development of the country concerned.

Figure 1 – *The balance of payments and growth*



The growth of a country is said to be *balance-of-payments constrained* if the growth rate consistent with a current account equilibrium (or a *sustainable* growth of overseas borrowing) is below the maximum growth of the economy determined by the maximum growth of supply-side factors.

Growth of the supply side:

1. growth of the labour force
2. rate of capital accumulation (function of the growth of output)
3. rate of technical progress (function of the growth of output; Verdoorn law)

The Balance-of-Payments Equilibrium Growth Model

Some Definitions

y_P = the growth of productive capacity (maximum growth rate)

y_B = the balance-of-payments constrained growth rate

y_A = the actual growth rate

$y_P > y_B \geq y_A$ Balance-of-payments constrained growth

(lower rate of capital accumulation, technical progress, disguised unemployment)

The Model

- Exports are a function of the income world market and relative prices. (*Export demand function*)
- Imports are a function of domestic income and relative prices. (*Import demand function*)
- Exports + net financial flows (long-term and short-term speculative flows) = imports (*identity*)

Let's express these in growth rates

The Balance-of-Payments Equilibrium Growth Model

(1) Export demand equation

$$x = \varepsilon z - \eta(p_d - p_z - er)$$

The growth of exports (x) is determined by the growth of world income (z) and the rate of change of relative prices

(2) Import demand equation

$$m = \pi y + \psi(p_d - p_z - er)$$

The growth of imports (m) is determined by the growth of domestic income (y) and the rate of change of relative prices.

The Balance-of-Payments Equilibrium Growth Model

(3) Balance-of-payments identity

$$\omega x + (1-\omega)f \equiv m + p_z - p_d - er$$

The (weighted) growth of exports and the (weighted) growth of capital flows must equal the growth of imports plus the rate of change of prices in a common currency.

The Balance-of-Payments Equilibrium Growth Model

(3) Balance-of-payments identity

$$\omega x + (1-\omega) f \equiv m$$

Suppose relative prices do not change, then if the growth of imports is greater than export growth, there must borrowing from abroad; hence the growth of capital flows into the country.

Solution to the model

We substitute the three equations into each other and solve for the growth of domestic income.

$$y_B = \frac{\omega\varepsilon z + (1-\omega\eta-\psi)(p_d - p_f - er) + (1-\omega)f}{\pi}$$

The growth of output ***y*** is determined by the growth of world income ***z*** (as this determines the growth of exports ***x***), the rate of change of relative prices (relative price competitiveness) and the growth of capital inflows ***f*** .

Solution to the model

$$y = \frac{\omega\varepsilon z + (1-\omega\eta-\psi)(p_d - p_f - er) + (1-\omega)f}{\pi}$$

1. The first term is the effect of the exogenous growth of world income.
2. The second teem gives the effect of the changes in relative prices.
3. The third term gives the effect of real capital inflows/outflows.

Solution to the model

The balance-of-payments equation

$$y_B = \frac{\omega\varepsilon z + (1-\omega\eta-\psi)(p_d - p_f - er) + (1-\omega)f}{\pi}$$

But changes in relative prices have little effect on growth rates of *X* and *M* because of (i) **Marshall-Lerner** conditions just met or (ii) oligopolistic competition (iii) national wage bargaining

$$(1-\omega\eta-\psi)(p_d - p_f - er) = 0$$

Thirlwall's Law

Also if f = 0 so:

$$y_B = \varepsilon z/\pi = x/\pi$$

UK $\varepsilon = 0.5$ $\pi = 1.0$ $z = 4.0\%$ $x = 2\%$ $y_B = 2\%$
JAPAN $\varepsilon = 3.5$ $\pi = 1.0$ $z = 4.0\%$ $x = 14\%$ $y_B = 14\%$

If $y = y_B$ then we can infer that

(i) the growth of capital flows is negligible

(ii) price effects are also minimal

How do we interpret ε and π?

- These are the world income elasticity of demand for a country's exports (ε) and the domestic income elasticity of demand for imports (π).

  - **ε = 0.5 (UK) World income grows at 4%, UK exports grow at 2%**
  - **ε = 3 (Japan) World income grows at 4% , Japanese exports grow at 12%.**

  They reflect differences in non-price competitiveness (quality, delivery times, distribution networks etc. Composition of exports)

The Key to Differences in Export Growth

The value of ε, the world income elasticity of demand for a country's exports. Differences reflect non-price competitiveness and the growth of demand for the exports as world income grows.

Why do these values vary between countries?

Composition of exports (not the advanced countries)

Quality, delivery times, characteristics of the goods.

Primary commodities

The value of π, the domestic income elasticity of imports may vary. High for developing countries: imported advanced consumer goods and capital goods.

Theoretical foundations
The Dynamic Harrod Foreign Trade Multiplier

Simplest possible model. (With the usual notation.)

- $Y = C + X$ (5)
- $Y = C + M$ (6)
- $M = mY$ (7)

For expositional ease, following Harrod, we ignore investment, savings, government expenditure and taxation and relative prices.

The Dynamic Harrod Foreign Trade Multiplier

If $X = M$ (equilibrium on the current account)

$$Y = X/m \qquad (8)$$

$$\Delta Y = (1/m)\Delta X \qquad (9)$$

$$\Delta Y/Y = (1/m)(X/Y)(\Delta X/X) \qquad (10)$$

But .....

$$(1/m)(X/Y) \equiv 1/\pi$$

So.....

$$\Delta Y/Y = (\Delta X/X)/\pi \text{ or } y = x/\pi$$ **(Thirlwall's Law)**

The Hicks Super-multiplier

When we introduce other components of domestic demand (*I*, *G*, etc), the effect of an increase is the ***Hicks super-multiplier*** which is:

(i) Harrod trade multiplier

plus

(ii) the effect of the relaxation of the balance-of-payments constraint that allows other components of domestic demand (*I*, *G*) to increase.

How does the BoP relate to the cumulative causation model?

- Faster output growth leads to increasing price competitiveness – may not be effective.

- Faster output growth leads to greater capital accumulation, development of new goods etc, greater innovation, greater non-price competitiveness (likely to be a very slow adjustment process).

Recent Developments

- Nell's generalisation of the model to many countries

  South Africa; Rest of the Southern Africa Development Community and the OECD.

- Araujo and Lima's multi-sectoral model; composition of imports and exports could be important. Those developing countries that have closed the gap fastest have concentrated on high income elasticity of demand goods

$$y = \frac{\sum_{i=1}^{n} w_{xi} \varepsilon_i(z)}{\sum_{i=1}^{n} w_{mi} \pi_i}$$

Fallacy of composition argument

Palley, etc

- Problem of identities
- Reciprocal nature of growth
- Applies to domestic output, and the individual

"What You Export Matters". Rodrik, Dani; Hausmann, Ricardo; Hwang, Jason
Journal of Economic Growth 2007.

Construct an index for export sophistication and find it is a good predictor of per capita GDP

Take an export category; calculate each country's productivity and produce an index using the weighted country figures. Then see the percentage of exports that a country has in this export category. The initial level of this variable is a very good predictor of a country's subsequent growth rate.

"What you export matters"

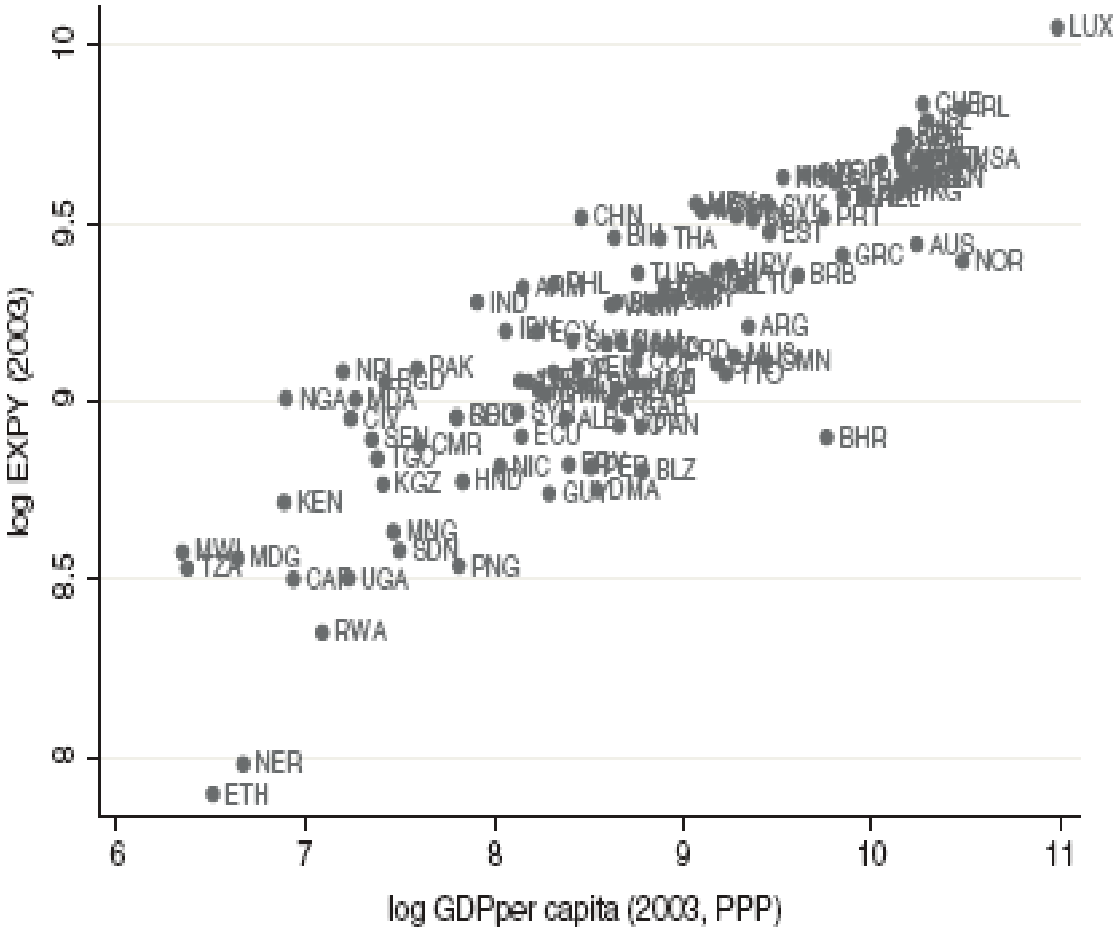


Fig. 4 Relationship between per-capita GDP and EXPY, 2003

“What you export matters”

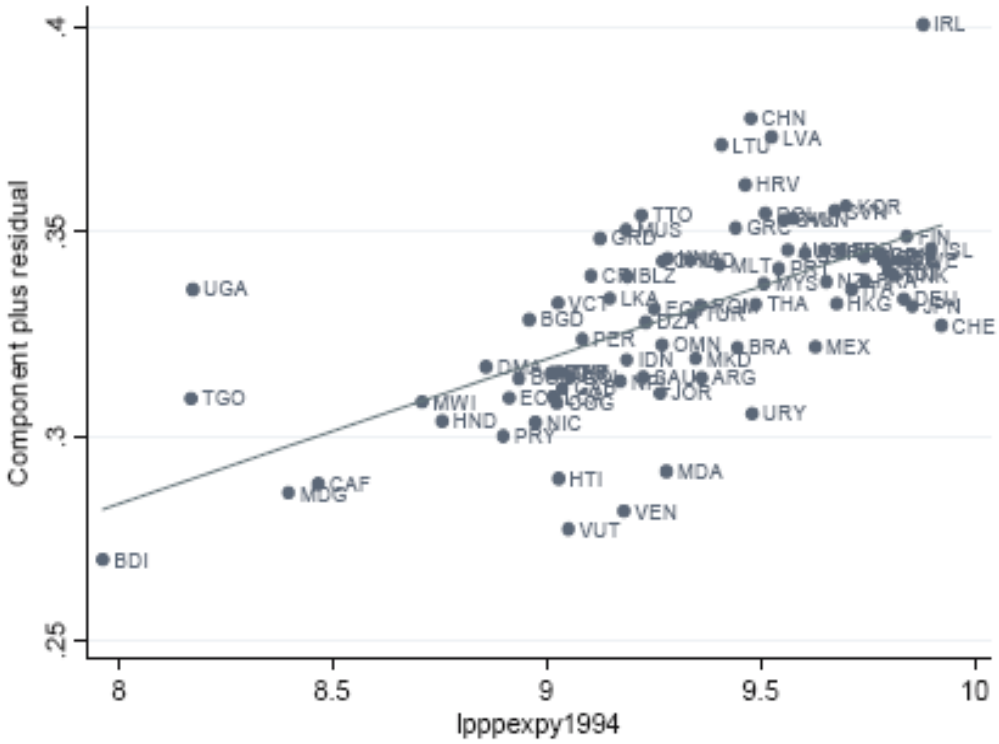


Fig. 8 Partial relationship between EXPY and subsequent growth (Table 8, col. 5)

How does the law explain overall growth?

(i) the growth of exports increases the growth of output through Harrod dynamic multiplier effects.

(ii) By initially relaxing the balance-of-payments constraint, it allows other domestic components of expenditure to increase, thereby increasing the balance-of-payments deficit until it comes back into equilibrium.

Both effects are called the “Hick’s supermultiplier”

Calculations of the Growth Rate Consistent with Balance-of-Payments Equilibrium 1951-1973

Country	Change in GDP %	Change in Exports (x) %	Income Elasticity of Demand for Imports (π)	Balance of Payments Equilibrium Growth Rate
Austria	5.1	10.7	n.a.	-
Belgium	4.4	9.4	1.94	4.84
Canada	4.6	6.9	1.20	5.75
Denmark	4.2	6.1	1.31	4.65
France	5.0	8.1	1.62	5.00
Germany	5.7	10.8	1.89	5.71
Italy	5.1	11.7	2.25	5.20
Japan	9.5	15.4	1.23	12.52
Netherlands	5.0	10.1	1.82	5.55
Norway	4.2	7.2	1.40	5.14
United Kingdom	2.7	4.1	1.51	2.71
U.S.A.	3.7	5.1	1.51	3.38

Balance-of-Payments Constrained Growth: An Illustrative Example

Initial growth rates

	y_P	y_B	π	ε	m	x
Group I	**5%**	**-**	**1.0**	**2.0**	**5%**	**10%**
Group II	**5%**	**-**	**2.0**	**1.0**	**10%**	**5%**

Balance-of-payments equilibrium growth rate

	y_P	y_B	π	ε	m	x
Group I	**5%**	**5%**	**1.0**	**2.0**	**5%**	**5%**
Group II	**5%**	**2.5%**	**2.0**	**1.0**	**5%**	**5%**

The countries comprising Group I which is the more competitive trading bloc may be (i) resource constrained (ii) policy constrained. Its growth rate determines the growth of Group II which is balance-of-payments constrained.

An Example: Is Pakistan's Growth Rate Balance-of-Payments Constrained?

- Pakistan's growth rate was about 6% in the 1960s. In the 1970s and 1980s it became a rapidly industrialising country but never at the rate of growth of the Asian Tigers or China.
- Poverty reduction plan 7 to 7.5% growth per annum
- But problem of recurrent balance-of-payments crises.
- Latest was 2007-2008. Had to go to the IMF for a loan of $11.3 billion.

Pakistan Economic Survey (2007-08, p. xvi-xvii)

Pakistan's exports suffer from serious structural issues which need to be addressed primarily by the industry itself, with government playing its role of a facilitator. Textile is the backbone of Pakistan's exports but bears various tribulations.

These include:

(i) low value added and poor quality products fetching low international prices;

(ii) the machinery installed in recent years has depreciated considerably relative to Pakistan's competitors;

(iii) these machines are power-intensive, less productive, and carry high maintenance cost;

(iv) augmented wastage of inputs adding to the cost of production;

(v) little or no efforts on the part of industry to improve their workers' skills;

(vi) industry spending less money on research and development and;

(vii) export houses lacking capacity to meet bulk orders as well as meeting requirements of consumers in terms of fashion, design and delivery schedule.

Policy Implications

- Supply characteristics are important. Improve ε

- It is no use if Pakistan is able to manufacture, say, *cheap* brass automobile radiators when technology has moved on so that the leading world automobile manufacturers are now using aluminium radiators. (The exception is that Pakistan can sell these radiators in its small protected domestic market.)

Pakistan's Balance-of-Payments Constrained Equilibrium Growth Rate

Sophisticated estimation puts this between 4% and 5% per annum; well below the target rates.

Contribution of the Components of the *Ex Post* Balance-of-Payments Growth Rate to the Actual Growth Rate: Pakistan, 1980-2007

Component	*(A)* *Weak Test*	*(B)* *Strong Test*
Exports, $\frac{\theta'_X x}{\pi}$, $\frac{\theta'_X \varepsilon z}{\pi}$	**88% (4.66 pp)**	**58% (3.06 pp)**
Unrequited remittances, $\frac{\theta'_R(r - p_X)}{\pi}$	**40% (2.11 pp)**	**40% (2.11 pp)**
Real effective exchange rate, $\frac{\eta(reer)}{\pi}$, $\frac{(\eta + \theta_X \psi)(reer)}{\pi}$	**12% (0.62 pp)**	**23% (1.23 pp)**
Terms of trade, $\frac{(p_X - p_M)}{\pi}$	**-44% (-2.34 pp)**	**-44% (-2.34 pp)**
Financial flows, $\frac{\theta'_F(f - p_X)}{\pi}$	**5% (0.26 pp)**	**24% (1.25 pp)**
Total	**100% (5.30)**	**100% (5.30)**

Notes: The figures in parentheses are the contributions expressed as a percentage point growth rate (pp). Columns may not sum to the value of the totals because of rounding errors.

Table 6
Pakistan's exports ranked by PRODY (SITC Rev2 4-digit level) and share (%) in total exports

Commodity	Sophistication Product-Level (PRODY)	Export share (in percent)						
		1980	1985	1990	1995	2000	2005	2006
Medical instruments and appliances, nes	20,814	1.25	1.23	0.95	0.89	0.88	0.97	1.00
Other sporting goods and fairground amusements, etc	15,712	1.66	1.22	1.87	2.00	1.85	1.76	1.94
Furniture for medical, surgical, dental or veterinary practice	13,534	0.01	0.00	0.09	0.07	0.31	0.91	0.98
Cotton fabrics, woven, bleached, dyed, etc, or otherwise finished	11,214	1.44	3.46	4.11	6.02	3.61	4.78	4.48
Leather of other bovine cattle and equine leather	10,168	0.91	2.21	2.04	1.31	0.92	1.17	1.14
Clothing accessories, knitted or crocheted, nes	9,429	0.14	0.23	0.36	0.73	0.90	1.65	1.95
Fabrics, woven, less 85% of discontinuous synthetic fibres	8,683	0.04	0.10	2.49	3.09	4.00	3.48	3.17
Womens, girls, infants outerwear, textile, not knitted or crocheted; other outer garments of textile fabrics, not knitted, crocheted	8,585	0.31	1.24	2.59	1.90	2.44	2.59	2.77
Other made-up articles of textile materials, nes	8,359	0.28	0.89	0.93	1.60	2.86	2.79	2.72
Outerwear knitted or crocheted, not elastic nor rubberized; jerseys, pullovers, slip-overs, cardigans, etc	8,199	0.17	0.16	1.16	1.65	3.79	3.23	3.05
Articles of apparel, clothing accessories of leather	8,176	1.26	2.11	4.49	4.80	4.61	2.96	2.73
Outerwear knitted or crocheted, not elastic nor rubberized; other, clothing accessories, non-elastic, knitted or crocheted	8,119	0.06	0.28	0.96	1.63	1.70	2.18	2.17
Linens and furnishing articles of textile, not knitted or crocheted	7,345	1.93	3.66	5.45	5.94	9.30	12.63	13.38
Under-garments, knitted or crocheted; of cotton, not elastic nor rubberized	7,122	1.01	1.00	2.27	4.27	3.62	3.55	3.87
Men's and boys' outerwear, textile fabrics not knitted or crocheted; trousers, breeches and the like	6,798	0.03	0.28	0.64	1.25	2.75	2.96	3.15
Copper and copper alloys, refined or not, unwrought	6,556				0.01		0.60	0.95
Cotton yarn	5,728	10.74	10.32	16.91	18.91	13.21	10.14	10.53
Carpets, carpeting and rugs, knotted	5,309	14.14	4.57	3.86	1.82	2.33	1.93	1.74
Rice, semi-milled or wholly milled	5,060	6.69	8.63	4.64	5.55	5.71	5.82	6.46
Cotton fabrics, woven, unbleached, not mercerized	4,578	6.91	5.07	5.15	6.88	6.16	5.15	5.20
sub-total		48.98	46.66	60.96	70.32	70.95	71.25	73.38
Sophistication, Country-level (EXPY)		6,998	7,231	7,693	8,268	8,362	8,833	8,728

Authors' calculations
note: The units of PRODY and EXPY are in 2005 constant $, PPP adjusted.
Source of raw data: UN COMTRADE

Policy Implications

- Tariff protection to reduce π, but needs a sunset clause.
- Subsidies for exports, but needs a sunset clause (problems of rent seeking)

Extending the Theoretical Model for an Individual Country

The Country Growth Equation

The equation $y_B = \varepsilon z/\pi$ is an equilibrium locus. We need to introduce another element into the model.

From the traditional Keynesian income expenditure model we have (ignoring the balance of payments):

Income = (1/k)(Exports + Other Autonomous Expenditure)

$Y = (1/k)(X + A)$ where $1/k$ is the traditional Keynesian multiplier.

But exports are a function of world income so $X = f(Z)$.

Thus, in terms of growth rates we have the growth of output:

$y = f$***(autonomous expenditure growth***$) + g_1($***export growth***$)$

$y = f$***(autonomous expenditure growth***$) + g_2($***world income growth or the growth of the other trading bloc***$)$.

In other words, the growth of income will increase if export growth, investment growth, or the growth of government expenditures increase.

Figure 1
Balance-of-Payments Equilibrium Growth

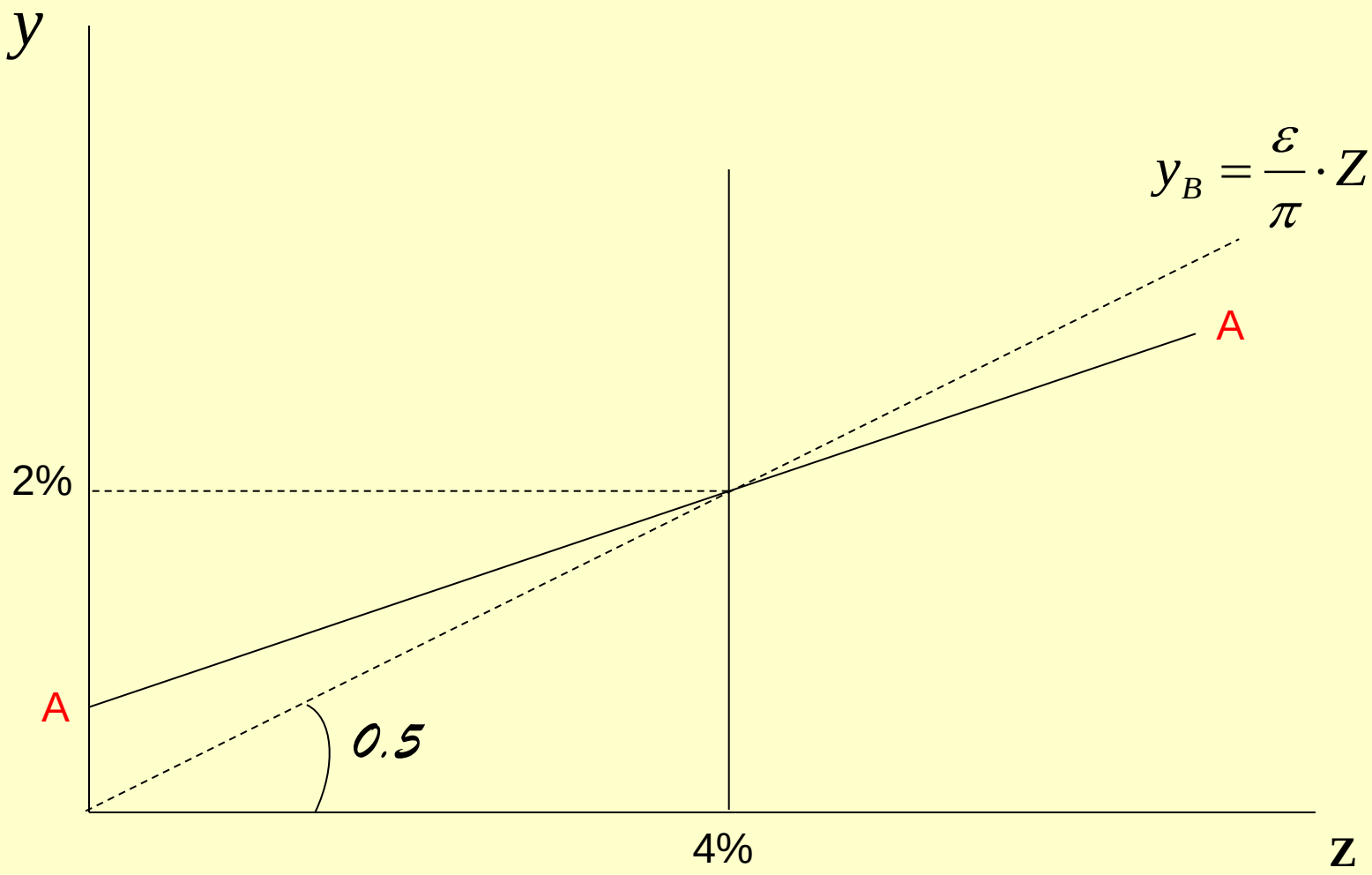
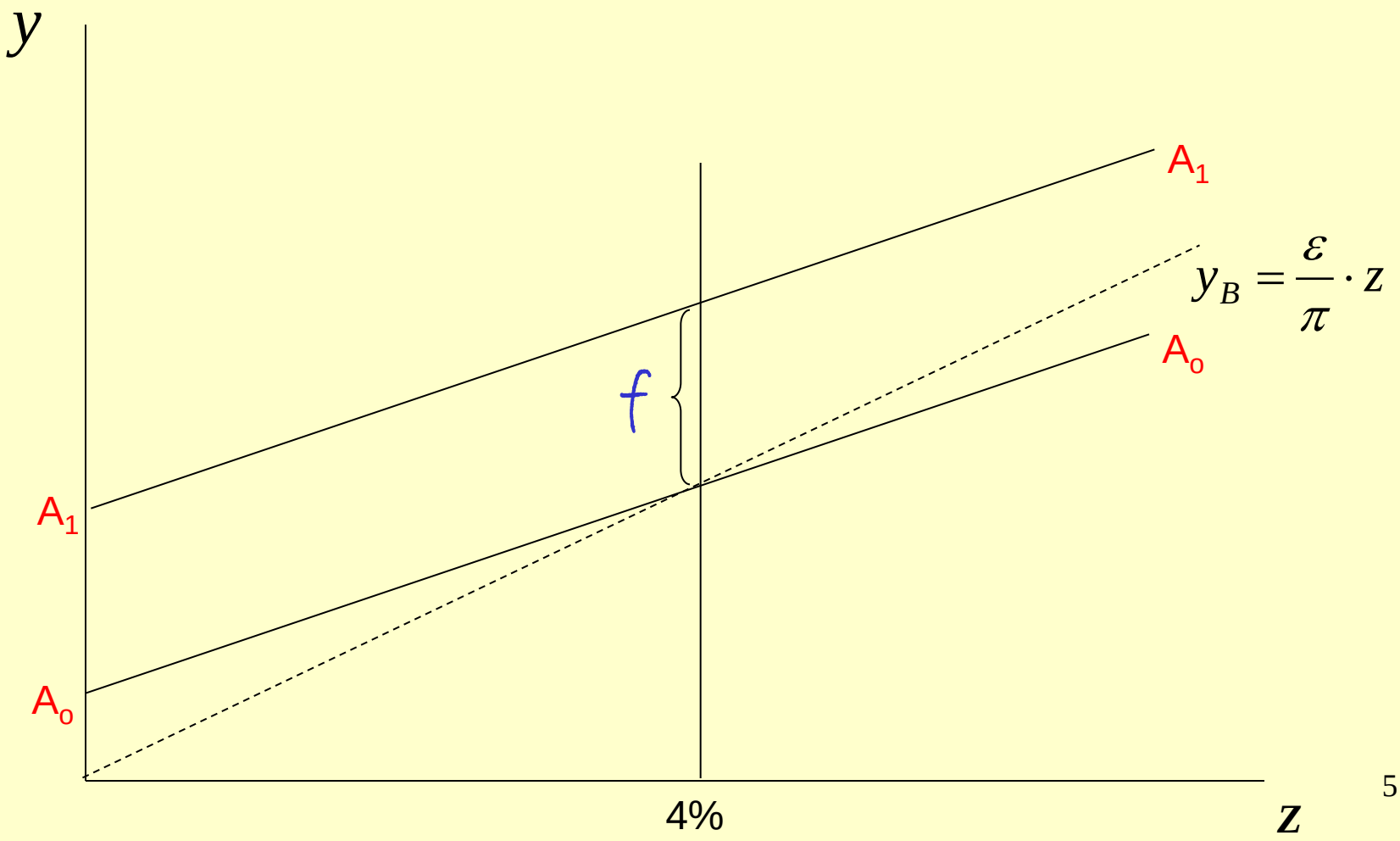


Figure 2
An Increase in the Growth of Autonomous Expenditure



The working of the model

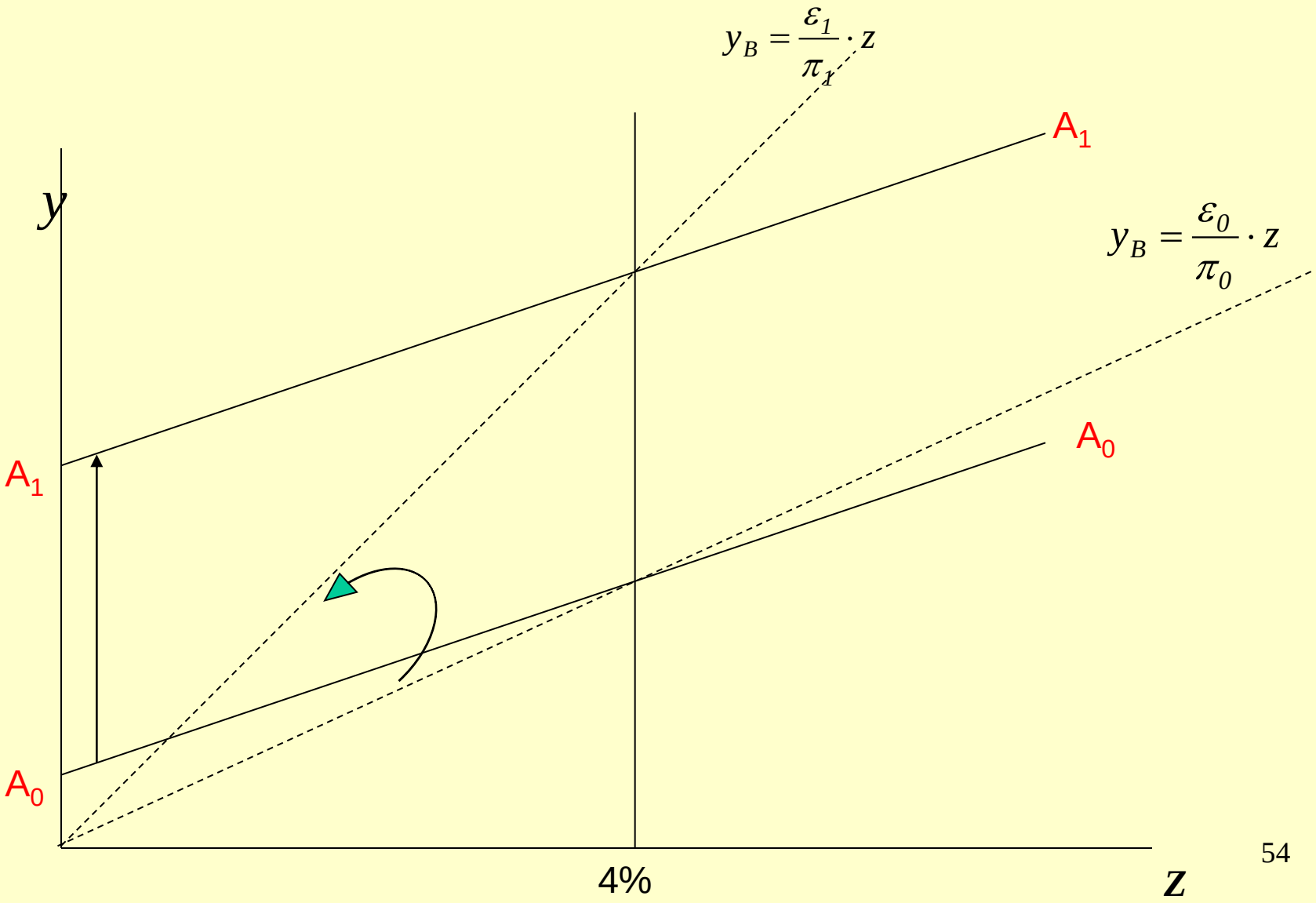
So let us suppose that the country is growing below its potential and the government decides to increase the growth of its expenditures through deficit financing. This shifts the line ***AA*** upwards.

But this is unsustainable as it needs the rate of growth of output given by ***f*** to be covered by the growth of financial inflows.

Increase in non-price competitiveness

We can see how an increase in non-price competitiveness will allow the country to *increase* its rate of growth without encountering the balance-of-payments constraint.

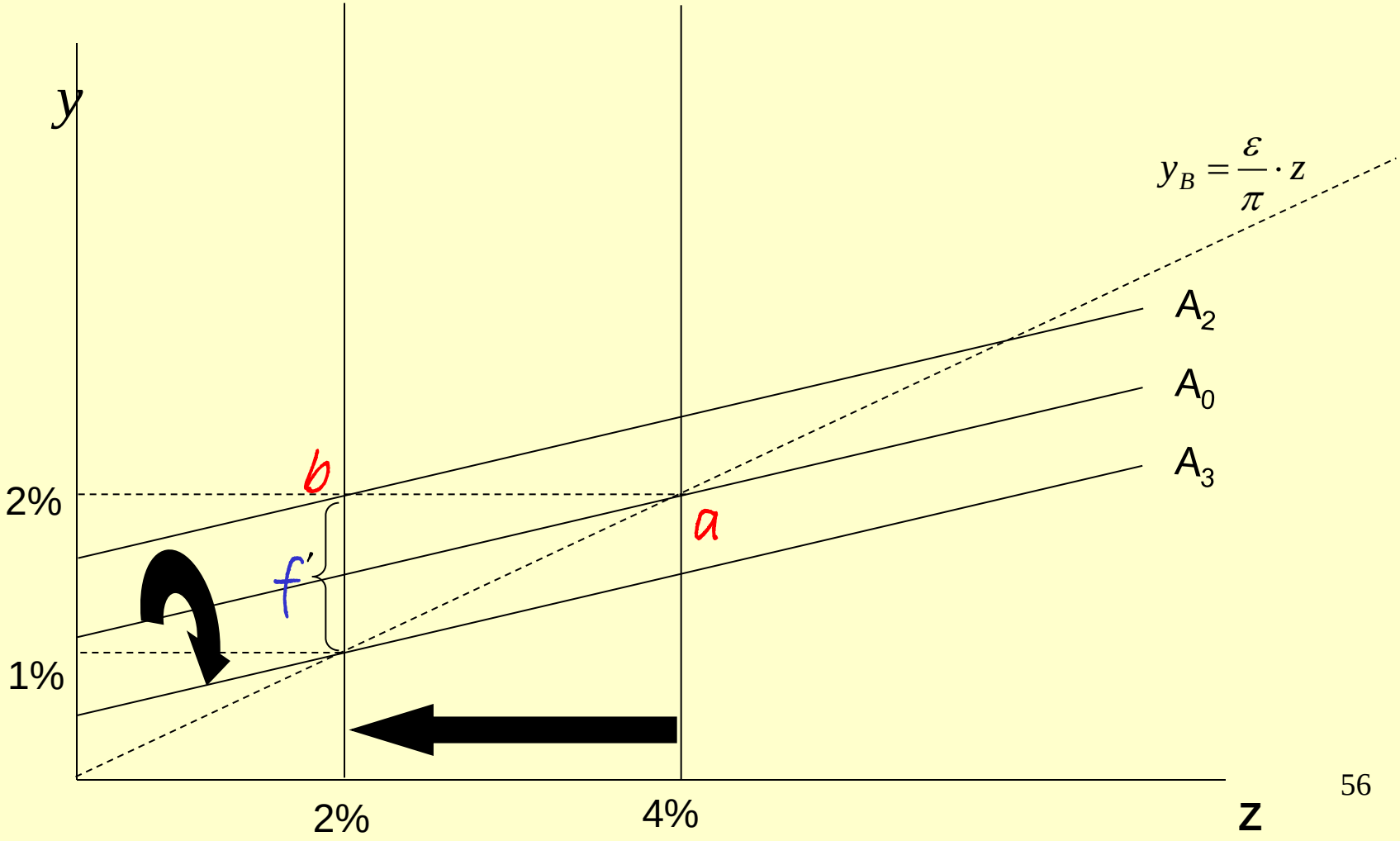
Figure 3
An Increase in Non-price Competitiveness



A World Recession

We can see how if a major country reduces its growth for policy reasons (e.g. to combat inflation), it will induce a slower rate of growth of the other countries because of the balance-of-payments constraint.

Figure 4
The Effect of a World Recession



Lifting the Balance-of-Payments Constraint: Policy Implications

1. Currency Devaluation
2. More Capital Inflows
3. Import Restrictions
4. Structural Change

The Balance of Payments Does Not Look After Itself!

EMU problems are ‘balance-of- payments problems’

- Suppose a region suffers from a collapse of demand for exports.
- To maintain the growth of standard of living requires an ever increasing level of fiscal transfers.
- These may not be sufficient (EMU).
- The capacity of the country to borrow. commercially from the rest of the currency area is limited.

Readings

The PSL Quarterly Review, vol. 64, No 259 (2011)

http://bib03.caspur.it/ojspadis/index.php/PSLQuarterlyReview/issue/view/370/showToc (All downloadable.)

"Balance of payments constrained growth models: history and overview", Anthony P. Thirlwall

"Criticisms and defences of the balance-of-payments constrained growth model: some old, some new", John S.L. McCombie

"The remarkable durability of Thirlwall's Law", Mark Setterfield

"The Balance of Payments Constraint as an Explanation of International Growth Rate Differences", Anthony P. Thirlwall