STUDIECENTRUM VOOR ECONOMISCH EN SOCIAAL ONDERZOEK

EXPORT PRICE-TAKING BEHAVIOR OF SMALL OPEN ECONOMIES - UNDER NORMAL CONDITIONS OF PRICE ELASTICITY

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Abstract

Empirical evidence shows that price elasticities of demand for exports of small open economies do not significantly differ from those of large countries. Yet, in practice, small open economies often behave as price takers on the world market. In this paper it is suggested that this observation should be explained in terms of price inertia and price followership.

The issue is particularly relevant for export price behavior after a devaluation. Indeed, it is argued in this paper, that increasing export prices (in home currency) with the percentage of the devaluation, is not what we should reasonably expect exporters of small open economies to do.

1. Introduction

An apparent contradiction with respect to export demand and export price behavior of small open economies is the following:

1) on the one hand, many researchers estimating price elasticities of export demand for small open economies obtain "normal" results which do not significantly deviate from those obtained for large countries.

2) on the other hand, research on actual price behavior of small open economies reveals that their export prices do not significantly deviate from "world" prices. This could imply that small open economies actually behave as "price takers" on the world market.

In this short note, both findings are documented (section 2). Next, a model is presented which is often implicitly or explicitly used in discussions on the effects of a devaluation in small open economies (section 3). It is shown that this model is not in accordance with both empirical findings noted above. Therefore an alternative model is put forward which is capable of reconciling both observations (section 4). Finally (section 5), some policy conclusions with respect to pricing after a devaluation are drawn.

2. Price elasticities of demand for exports for small open economies

A large amount of work on price elasticities in international trade has been surveyed by R.M. Stern, J. Francis & B. Schumacher (1976). Table 1, which is taken from this source, shows point estimates of long-run elasticities of demand for exports derived from a comprehensive sample of studies. We have rearranged these data dividing the group of countries into "small open economies" and "large and less open economies". This classification is based on the share of exports in total gross domestic product (as an indicator of openness) and on the share of exports in total "world" exports (as an indicator of smallness). Table 2 shows these data[1].

[1] As is seen from this table a classification into "small open economies" on the one hand and "large and less open economies" on the other hand is rather crude. Typical examples, such as Norway and the United States are more the exception than the rule.

Table 1 : Range and "best" point estimates (median) of long-run elasticities of demand for exports

Country	Range	"Best"
a) "Small open economies"		
Belgium-Luxemburg	-1.02	-1.02
Denmark	-0.56 to -1.98	-1.28
Netherlands	-0.59 to -2.39	-0.95
Austria	-0.93	-0.93
Norway	-0.81	-0.81
Sweden	-1.92 to -1.99	-1.96
Switserland	-0.58 to -1.99	-1.01
b) "Large and less open economies"		
United States	-0.56 to -2.53	-1.41
Japan	-0.71 to -2.38	-1.25
France	-1.06 to -2.27	-1.31
W. Germany	-0.65 to -1.88	-1.11
United Kingdom	-0.24 to -1.94	-0.48
Italy	-0.03 to -1.96	-0.93

Source : based on R.M. Stern, J. Francis & B. Schumacher

(1976), pp. 15-20

Table 2 : Indicators of openness and smallness

	(1) $\frac{X}{GDP} \times 100$	(2) $\frac{X}{\Sigma X} \times 100$
Belgium + Luxemburg	61,03	5,19
Netherlands	52,71	5,95
Norway	47,58	1,49
Austria	39,01	1,40
Switserland	36,76	2,38
Denmark	32,59	1,35
Sweden	30,01	2,49
W. Germany	29,14	15,44
United Kingdom	27,92	9,27
Italy	22,77	6,27
France	21,03	8,96
Japan	15,14	10,44
United States	10,22	17,77

(1) Exports as a % of Gross Domestic Product in 1980. Source : I.M.F.: International Financial Statistics; Yearbook 1983 (line 90c and 99b).

(2) Exports (f.o.b. and in $) as a % of total OECD exports in 1980. Source : O.E.C.D.: Main Economic Indicators, January 1984, p. 29.

If more than one result is available, table 1 shows the range of the outcomes. In that case also the "best" result, i.e. an approximate median, is given.

As can be seen from the table there is no clear distinction between the elasticities found for both groups of countries. Further, most elasticities are not very large in absolute value, the majority of the results being around minus one.

A similar conclusion can be drawn on the basis of a recent empirical investigation made for the Commission of the European Community. This research covers the period 1964-1981 and distinguishes between "Exports to the rest of the world" and "Exports to the (rest of) the Community". Table 3 shows the results obtained for the price elasticities of demand for exports, rearranged as before to bring out potential differences between the two groups of countries. With the possible exception of the price elasticity of community demand for Belgian industrial products (-2.18) no clear distinction can be made.

3. Export price formation in small open economies

Empirical research on export price formation is at first sight at variance with the conclusions obtained for price elasticities of export demand.

According to a popular view, small open economies are price takers on foreign export markets and subject to the so-called "law of one price"; relatively large countries on the contrary are price makers. This over-simple distinction is often not contradicted by the empirical evidence, at least when the research is carried out at the same aggregate level, as was used (for the estimations of the price elasticities) in section 2.

The OECD (1973a, p. 95) has explained export price levels by means of domestic prices (as an indicator for domestic cost levels) and competitors' export prices. Comparing e.g. the USA with Norway and Sweden it is seen that in general for small open economies the highest explanation comes from the competitors' prices. For Belgium, the same result is reported in the OECD publications (1973b, p. 45).

Table 3 : Price Elasticities of Demand for Exports

	Export to rest of the world		Export to (rest of) community	
	all commodities	industrial products	all commodities	industrial products
Belgium	-0.63* (-1.6)	-0.98[a] (-2.9)	0.19* (0.45)	-2.18[a] (-3.7)
Netherlands	+0.27* (+1.4)	+0.05* (0.0)	-0.88 (-3.8)	-0.30* (-0.2)
United States	-1.50[a] (-3.3)	-0.74 (-2.6)	-0.92 (2.6)	-0.16* (-0.4)
Japan	-0.89 (-2.1)	-0.42* (-1.0)	-0.78 (-2.1)	-0.83 (-2.2)
France	-0.83 (-2.3)	+0.12* (0.2)	-0.84 (-2.2)	-1.29 (-4.2)
W. Germany	-0.99 (-4.2)	-0.48* (-1.7)	-0.58 (-2.7)	-0.84 (-2.5)
United Kingdom	-0.29 (-2.9)	-0.17* (-1.7)	0.44* (1.9)	0.02* (0.1)
Italy	-1.87[a] (-3.7)	-2.05[a] (-5.5)	-0.73[a] (-1.9)	-1.09[a] (-2.4)

a : time lag of one year on relative price variable

* : not significant (confidence interval of 5 %)

Source : based on: Commissie der Europese Gemeenschappen, (1983), table 1, 2, 11 and 12.

Similar results, but using first relative differences are found for Italy, Belgium and Ireland in a study for the EEC-countries by A.P. Barten and G. d'Alcantara (1974 , p. 62-64 and p. C22) and by G. Carrin and A.P. Barten (1976, p. 256 and 258). These results are confirmed by Van Rijckeghem and Maynard (1976, p. 65). Six out of thirteen countries which they investigate are price taker at the aggregate level. As expected, most small countries, including Belgium, belong to this group.

4. The equilibrium of the small export economy: model I

Price-quantity decisions for exporters in small open economies are often explicitly or implicitly caught in terms of models as depicted in figure 1. The model echoes the behaviour of the firm operating under perfect competition.

In figure 1, panel (a) refers to the world market, where total demand (ΣD) and supply (ΣS) interact to define the equilibrium world price and the quantity traded on the world level. It is assumed that world prices are denoted in a foreign currency (e.g. in \$). Panel (b) shows the exchange rate between the foreign currency and the currency of the small open economy (e.g. BF). Initially (line OA), one \$ is exchanged against one BF. Finally, panel (c) shows the output supply curve of the small country, being equivalent to the relevant part of the marginal cost curve. Furthermore, this panel shows that the world price is given for the small export country. Technically speaking, this country faces a horizontal demand curve (D) for its exports with infinite price elasticity.

In figure 1, the small country equilibrium is shown at point E. The export is priced p_1^{BF} which is equivalent to the world price $p_1^{\$}$. Output amounts to x_1. Thus, the export market share equals $x_1/\Sigma x$.

The model is particularly interesting for its predictions of the output and price effects of a devaluation of the currency of the small country. Such a devaluation is graphically shown by a downward rotation of the exchange rate line (which now becomes OB) and hence by an upward shift of the country demand curve (D'). The outcome for price and output quantity is easily derived: the export price rises to p_2^{BF} in domestic currency;

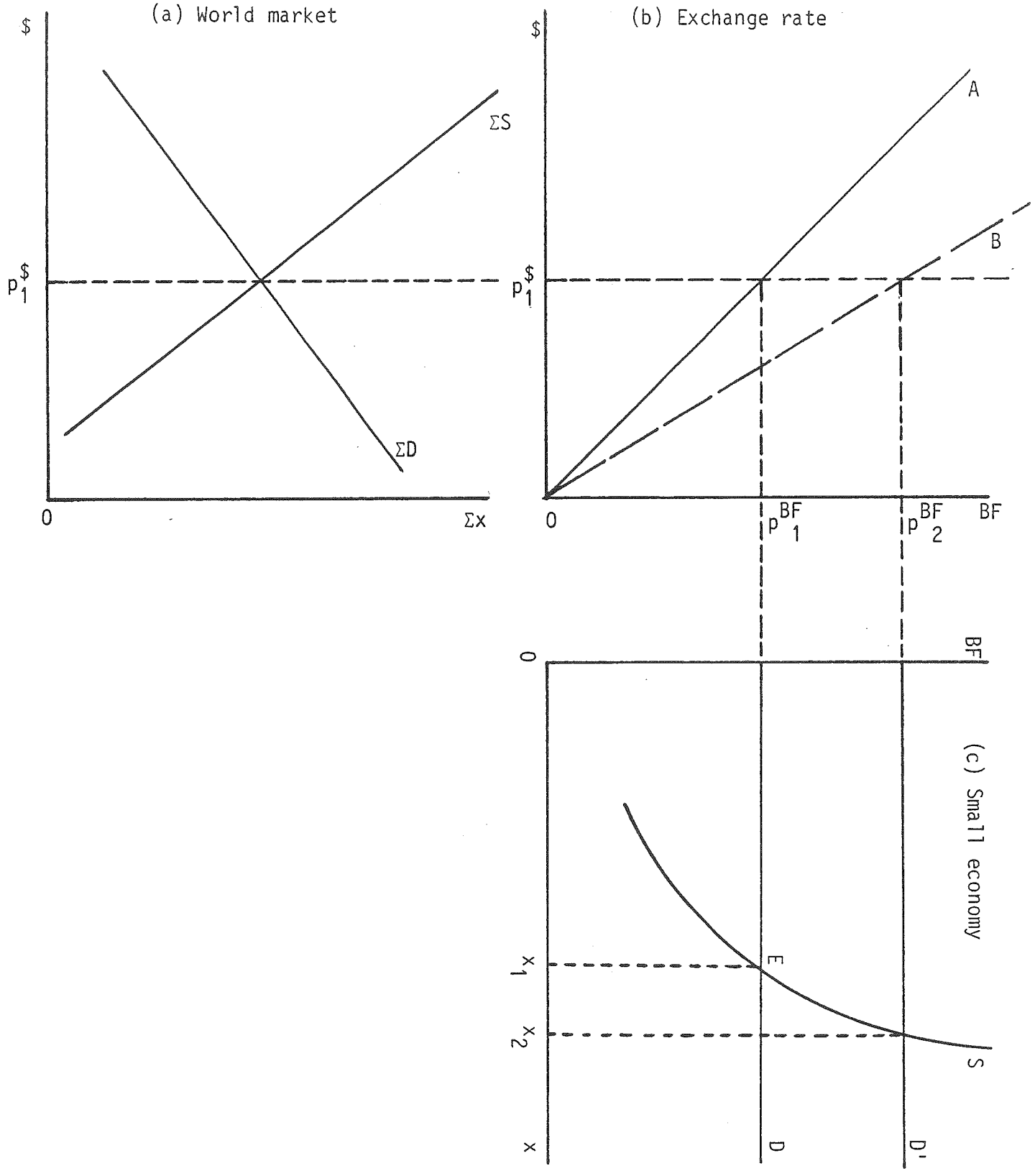
(a) World market
$
ΣS
$
p1
ΣD
0
Σx
(b) Exchange rate
$
A
B
$
p1
0
p BF 1
p BF 2
BF
0
BF
(c) Small economy
x1
E
x2
S
x
D
D'

Figure 1

output increases to x_2. Hence, the country raises its export share $(x_2/\Sigma x)$.

It is informative to digress on the causes of the export volume increase following a devaluation in the above model. This increased output is not the result of a price effect on demand. Indeed, export prices in foreign currency have not changed after the devaluation. The output increase purely results from a supply effect. At increased prices (denoted in home currency) more output can profitably be produced.

The model also has a normative aspect. After a devaluation we should not blame exporters in small countries to raise their prices with the full percentage of the devaluation. Indeed the model shows that they would be irrational not to do so. If prices were only increased with a fraction of the devaluation percentage, profits would not be maximized.

However, the model depicted in figure 1 does not confirm to the empirical findings of the preceding sections. As was shown there, empirical results on price elasticities of export demand of small countries do not significantly differ from those found for large countries. The "given export price, resp. horizontal demand curve"-paradigm is simply at odd with these empirical results.

5. Equilibrium of the small export economy: model II

The point estimates of price elasticities of export demand that were reviewed in section 2 imply a "normal" negatively sloped demand curve for the small country's export. This calls for another framework than the one used in section 4.

Figure 2 therefore starts from a negatively sloped demand curve. This model is akin to the one used for a monopolist or in the case of monopolistic competitions, but of course applies by extension to all situations where the "perfect competition model" is less appropriate. In this figure the price-axis is denoted in home currency (similar to figure 1, panel c), since the calculations of the export firm are made in one currency (normally the own currency). Originally, the exchange rate is set one $ against one BF, and the export sector faces the demand curve D_1. With given cost curves, profit maximization is reached with output x_1 and price p^{BF}_1 (cf. point a).

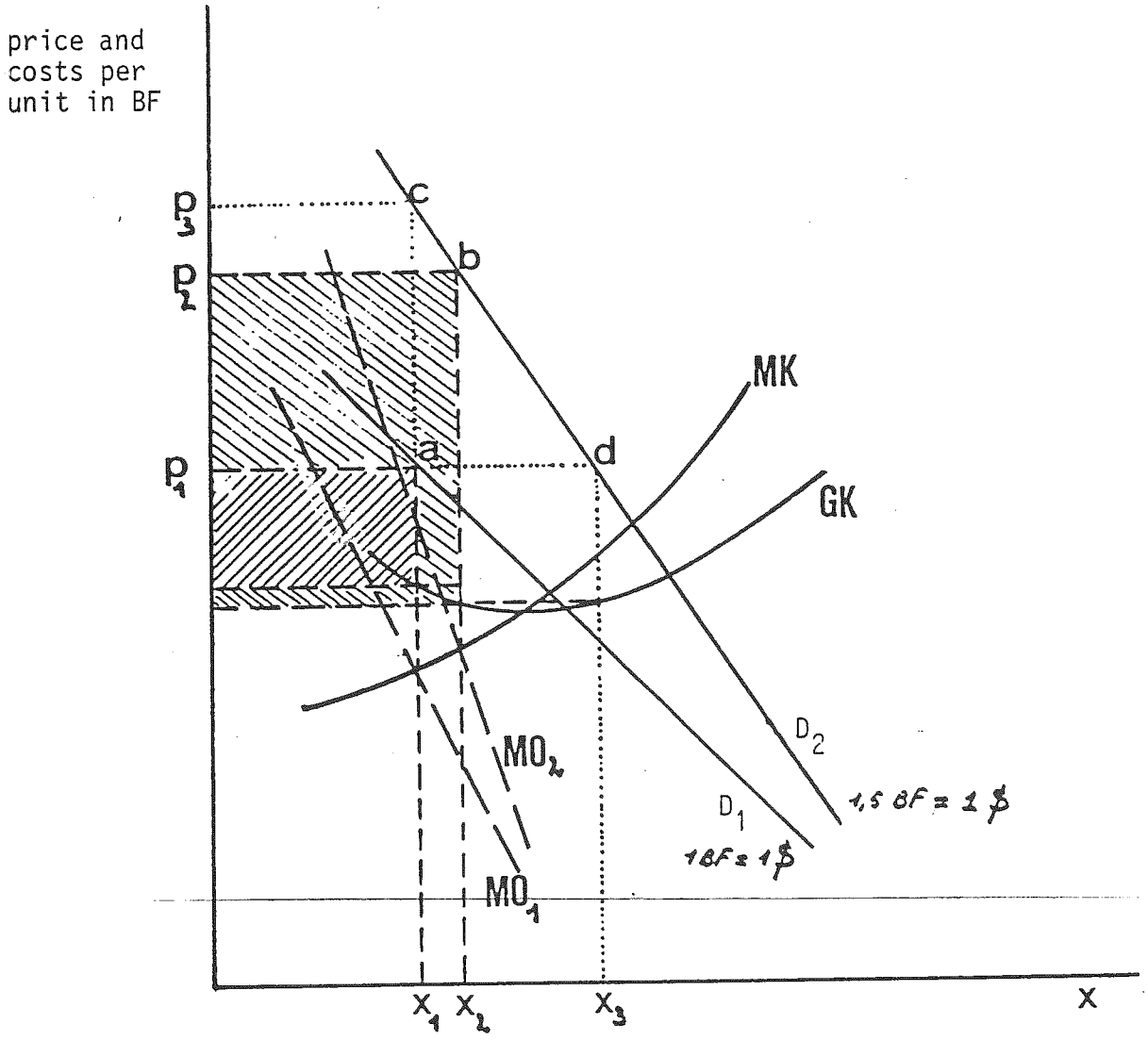
price and
costs per
unit in BF
p3
p2
p1
c
b
a
d
MK
GK
D2
1,5 BF = 1 $
D1
1 BF = 1 $
MO2
MO1
X1
X2
X3
X

Figure 2

Now consider the effects of a devaluation. Given the fact that foreign demand is based on prices denoted in foreign currency, a devaluation leads to an upward shift of the demand curve in BF (to D_2). E.g. if the Belgian franc is devalued by 1/3, the demand curve shifts upward by 50 %. An output x_1 e.g., which could previously be sold at price p^{BF}_1 after the devaluation sells at price p^{BF}_3. Note that $p^{BF}_3 = 1.5p^{BF}_1$.

How does a devaluation affect the optimal price-output combination in this model ? With given cost curves, after the devaluation equilibrium shifts from point a to point b. Prices are increased, but with less than the full amount of the devaluation. Output increases from x_1 to x_2. Hence the export market share rises too, from $x_1/\Sigma x$ to $x_2/\Sigma x$.

The model depicted in figure 2, however, fails to reveal the price-taker aspect of small open economies, which has been confirmed by many empirical studies. Consequently, this model is also at odd with the empirical findings (cf. section 3). Indeed, since $p^{BF}_2 < p^{BF}_3$, it follows that export prices in foreign currency have fallen after the devaluation. Hence, the small country's export price (denoted in $) is now below the world price.

Price-taking behavior can only be an outcome in figure 2 if additional elements are introduced. Some of them are given below:

- firms may be subject to price inertia. Given the fact that prices are set in foreign currency, there is automatic price-taking behavior if after the devaluation these prices are not changed. Since such changes often imply administration expenses (e.g. catalog changes, etc.), it might be possible that firms actually do not carry them through. Graphically this means that in figure 2 point c is reached instead of point b;

- firms may base their prices more on expected future costs than on current costs. If import prices are structurally important in determining cost behavior, both directly and indirectly (through consumer price increases and wage adaptation), as is the case for small open economies, firms may again end up in a point like c.

The model depicted in figure 2, supplemented with the additional elements explained above, is capable of reconciling the two empirical observations that were made in the introduction. Hence we believe that this paradigm is more appropriate as a model of the behavior of small open economies on the export market than the one explained in section 4.

6. Devaluation, output- and employment effects

Devaluation is an economic policy measure which can be directed towards several policy objectives: trade balance equilibrium, increased domestic output and employment, increased profitability, etc. These objectives do not necessarily converge. Trade balance equilibrium and profits e.g. are caught in nominal terms, whereas output and employment are defined in real terms.

Formally, we are confronted with a world demand function for domestic output and with a domestic cost function:

(1) demand function : $p = p(x)$
(2) cost function : $c = c(x)$

The policy objectives mentioned above are
(a) trade balance objective: max. $R = p.x$
(b) output and employment objective: max. x
(c) profit objective: max. $\pi = p.x - c$.

Graphically (see figure 2) these alternative objective functions are maximized at different points along the D_2-curve. Trade balance maximization will always imply a lower price than profit maximization, since the former requires marginal revenue to equal zero, whereas the latter requires equality between marginal revenue and marginal cost. Output and employment maximization will be reached at zero price.

These elementary findings can now be used to derive some normative conclusions with respect to pricing after a devaluation. It is readily seen that a movement from point a to point c, i.e. a pure price-taking behavior, will not be consistent with any of the objectives mentioned before. Even profit maximization requires a price decrease in foreign currency (point b).

However, if policy-makers want to give priority to the employment effects of a devaluation they should attend to it that prices are set below the profit maximization price. A devaluation normally creates good conditions to administer such a price behavior. Indeed, it is only required that prices in domestic currency remain constant (cf. point d) or only rise to a limited extent (points beween d and b).

A final comment concerns possible measures to increase convergence between policy objectives. Convergence between profit maximization on the one hand and maximum

employment effects of a devaluation on the other hand could be promoted by a system of subsidy reallocation. Government subsidies at the firm level could be (re)allocated in terms of realized (increases in) employment after a devaluation. Such a system would affect the position of the cost lines in figure 2, so that point d could be made consistent with profit maximization.

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