Some Internal and External Effects of the Rise in the Price of Oil

Introduction

1. The price of crude oil has trebled in the space of three months. Crude oil is produced and exported by a limited number of countries; for the importing countries it is the most important source of energy (its share on total energy consumption ranging from over 50 per cent for the U.S. to over 80 per cent for countries like Italy and Japan), and is hardly substitutable in the short run. Authoritative bodies, like the IMF and the OECD, have attempted to calculate the immediate effect of this sudden and dramatic price rise on the current balances of importing countries. The results, as is well known, are staggering. The deterioration of most industrialized countries' balances will represent a substantial fraction (between two and three per cent in most cases) of their income. At present prices, and unless a reduction in the general level of activity occurs, the additional revenues of the oil-producing countries may amount to over 60 billion dollars in 1974. An unbearable strain is thus placed upon the payments situation of most industrialized countries and the import capacity of less developed, non oil-producing countries.

It is not the purpose of this paper to suggest solutions to a problem which, as things stand, has by some been defined unmanageable. Its humbler task is to attempt to elucidate some economic implications of the issues which a large number of economies will have to face in the near future.

We shall first consider the primary impact of the rise in the price of crude (or, for that matter, of any other imported non-substitutable primary commodity) on the economy of an importing country considered in isolation; a simple model, reproduced in the Appendix, shows us a very sizeable deflationary effect, which, to a

large extent, can only be offset as a result of deliberate policy decisions. It will also be seen that each importing country's decisions in this matter affect the situation of all others. Some aspects of the international payments problem will be dealt with in the second section: this problem arises to the extent to which the increased cost of imports cannot be paid for by a simultaneous « real » transfer; but any solution merely poses a real transfer problem at some future date.

1 - The Internal Effects

2. The deflationary impact of an increase in the price of an imported non-substitutable commodity is generally recognized; but some confusion is often made between an intrinsic and unavoidable effect operating through the multiplier, which is the most important, and other effects, which, acting *via* the behaviour of internal prices or the money supply, can in principle be avoided. The analysis of these effects and of the possible offsetting mechanisms is best done by means of a simple (Keynesian) model of the real sector of an economy, where the role played by the price of the imported commodity is explicitly brought out.

The model and the formal proofs of the propositions discussed below are set out in the Appendix. We consider an industrialized country in the short run, where investment, government expenditure and exports are exogenously given (though not constant). This country imports manufactured goods and oil (but what we call oil could be a bundle of primary commodities): imports of manufactures are a function of income; imports of oil, which directly or indirectly enter all commodities, are a function of total expenditure. There is one single price for manufactures, whether internally or externally produced and whether internally or externally demanded, whilst imported oil has a different price. (Different import and export prices for manufactures can easily be introduced without altering the results.) The exchange rate is given, so that all prices can be expressed in terms of the national currency. The results, however, would still hold if the currency under consideration, say the lira, keeps a stable rate with the currencies of its main trading partners but floats *vis-à-vis* the currency, say the dollar, with which the

imports of oil are settled: any appreciation or depreciation of the dollar is taken care of by letting the lira price of oil rise or fall.

Since we seek to determine the "real" effects on demand, we shall purposely exclude discussion of any monetary effect. It is thus assumed not only that the size of the external deficit does not affect the creation of the monetary base, but also that the money supply is allowed to adapt itself to money income. When this is not the case, additional deflationary (or reflationary) effects are superimposed upon the primary effects.

Three cases are considered. In the first, consumption is a function of the level, but not of the distribution, of income and there is no money illusion: all items of monetary expenditure instantaneously adapt themselves to any change of the price level, so that the latter leaves real expenditure unaffected. In the second, the distribution of income still plays no role, but there is money illusion, so that a price rise reduces real expenditure: this consequence arises from the fact that part of the autonomous expenditure (e.g. government expenditure) is fixed in money, and not in real, terms and/or from the presence of a constant in the relationship between consumption and income. In the third case, there is no money illusion, but the propensity to consume out of wages is supposed to be greater than the propensity to consume out of non-wages income; the behaviour of wages and of employment (supposed for simplicity to be proportional to real product) is here explicitly considered.

3. What are the effects of a rise in the price of oil on the level of activity, if all other magnitudes (autonomous expenditure and the price of manufactures) remain unchanged? In all three cases the percentage fall of real income is a fraction of the percentage rise of oil prices. This fraction is the larger, the higher the ratio between the value of the imports of oil and the value of autonomous expenditure. With not unplausible values of the ratios and the coefficients, a doubling of the price of oil may cause, *ceteris paribus,* a fall of 2-3 percentage points of real income. This far from negligible deflationary effect is due to a decrease of the multiplier: as the price of imports rises, so do the leakages in the process of income creation.

Is there any built-in mechanism which may at least partially

offset this deflationary impact? What happens to demand, if we suppose that the rise in the price of oil induces a rise of the internal price level? The answer here depends on which of the three cases listed above we are considering.

In the first (and unlikely) case, with no money illusion and consumption only depending on the level of income, a rise of internal prices has a univocal reflationary effect: for a given percentage rise, the magnitude of this effect is equal to that of the rise in the price of oil. The limiting case is that of non-oil prices rising at the same rate as oil prices: real income would then remain constant. This vould happen, because the increase of non-oil prices would be such as to leave the terms of trade, and hence the value of the multiplier, unchanged, whilst real expenditure, owing to the absence of money illusion, would remain unaffected. Put it in another way: for real income not to fall, in this case, money expenditures and incomes of the importing country should all remain constant in terms of oil. This result, however, is unplausible not only because of the assumptions of our first case, but also because its validity depends on either of two further conditions: that prices rise at the same rate in other industrialized countries as well; or that the exchange rate of the country under consideration depreciates in proportion to the rise in internal prices. Unless either of these conditions holds, the exports of the country whose internal prices are rising faster would fall and the reflationary effect of the price rise would *pro tanto* be reduced.

Whenever, on the other hand, the money value of some expenditure items lags behind the rise of internal prices (our second case), we cannot even be sure that such rise exerts a positive effect on real income. The outcome here depends on how big the share of demand subject to the money illusion is. If this share exceeds a certain critical value, any rise of internal prices would cause an additional fall, rather than an offsetting rise, of demand, so that real income would fall less if internal prices remained constant. If the share of demand subject to money illusion is not so large, income would rise with internal prices, but by less than in the absence of money illusion: to completely offset the deflationary impact of the increase in oil prices, internal prices would now have to rise more than proportionally — which is hardly possible, for the reasons already explained.

When internal expenditure is influenced by the distribution of income (our third case) the effects of an internal price rise also depend on the behaviour of wages. If the elasticity of money wages with respect to prices is higher than unity, the reflationary effect of a rise in the latter is twofold: on the terms of trade, as in the other cases, and on the weighted propensity to consume *via* a redistribution of income. To fully compensate the deflationary consequences of the rise in the price of oil, in this case, a less than proportional increase of internal prices would be sufficient. Note however that this result, neglecting, as it does, the possible adverse influence on investment of a fall in the share of profits, could only apply to the very short run.

If, as is more probable in the short run, money wages rise less than in proportion to prices, a price rise may have, instead, a deflationary effect, caused by the fall in the share of wages and the ensuing fall in real consumption. For this to happen, the propensity to consume out of wages must be sensibly higher than the propensity to consume out of non-wages income. If the two propensities are not very different, on the other hand, we approach the first case and a price rise can reflate demand.

4. In any real economy, in the short run, it is very probable that a part of monetary expenditure does not adapt itself to price changes (i.e. that there is some money illusion) and that income distribution does affect consumption; money wages, on the other hand, are likely to lag behind prices, when the latter are pushed up by the higher cost of imported materials. We saw above that in this case the very sign of the effect of a rise in internal prices is uncertain and that the size of a positive effect, if any, is limited. It is therefore unlikely that the deflationary impact of the rise in oil prices can automatically be offset by induced changes in the internal price level.

It follows that the fall in real income (with respect to the level attainable at the old oil prices) could only be compensated by a rise in autonomous demand and/or a decrease in taxation. Since we cannot know *a priori* in what direction, if at all, the short run private investment expenditure would move as a result of the change in oil prices, we shall confine ourselves to considering a change in export and a change in government deficit.

The effect on the economy is different if real income and employment are kept unchanged thanks to an increase of exports or by means of a larger than planned budget deficit. In the former case, in spite of the rise in oil prices, the balance of payments would not deteriorate, if we neglect the effects (positive or negative) of an induced change in the price of manufactured goods.[1] Since however a greater volume of the latter has to be exported to pay for the same volume of imports, in our economy, at the same level of real income, internal expenditure in real terms (and hence the present or future standard of living) must be lower than before. (We neglect here the possible ways in which this shift of demand may actually take place.)

When, instead, the fall in demand is compensated by means of an increase in the budget deficit,[2] the composition of internal demand may change, but not its level. In this latter case, on the other hand, the balance of payments will deteriorate by the full amount of the additional burden imposed by the change of the terms of trade: whatever the assumptions about money illusion or the consumption function, this additional burden will be the greater, the lower the induced rise in internal prices.

But is there actually a choice between these two possibilities? Obviously not, because, as soon as we consider the group of oil importing countries, and not the individual country in isolation, we realize that there is no real alternative. Since it is unlikely that the individual country can successfully practice beggar-my-neighbour policies to increase its exports towards other countries in the same situation, any rise in exports should be the result of a higher external demand of oil producers. If the absorptive capacity of the latter is limited, each country's exports towards other oil importers, far from rising, will fall, unless each and every country strives to keep its real income constant by means of compensating *internal* expenditure.

We thus realize that the deflationary effects of the rise in the

1 If the price of traded manufactured goods uniformly rises by x percent at home and abroad, all current balances rise in the same proportion: if the country had a surplus, the surplus will rise; if it had a deficit, the deficit will rise.

2 We may note here that, since the budget deficit would increase, because of a fall in revenues, even if real income were allowed to fall, the deterioration of the deficit caused by, say, a compensatory rise of public expenditure would be lower than the full amount of the additional expenditure.

price of oil described above are magnified by the fact that a large number of countries are affected by it. To the extent to which there are countries letting their real income fall, the world production of manufactures, and therefore each country's exports, will fall. Further, for any individual country, the increase in the budget deficit and the deterioration of the balance of payments caused by an economic policy aimed at fully compensating the deflationary effects are the larger, the smaller the compensating increase in domestic expenditure taking place in other countries. Thus, suppose that a country, unable to finance an external deficit exceeding certain limits, sets itself a balance of payments constraint which implies that real income must be allowed to fall to some extent. This may make it impossible for other countries to pursue compensatory policies: if they did, they would run a deficit which they might consider too high in relation to their national income.

II - Some Aspects of the Payments Problem

5. If, after the rise in the price of oil, the producing countries were ready to use their additional revenue to increase their imports, no payments problem would arise. Each oil importing country would have to supply (directly or indirectly) a larger amount of goods to the producers in order to satisfy its oil requirements. The rise of the oil price would thus cause an immediate transfer of real resources from consumers to producers. We shall not pause on the real transfer problem, which has been thoroughly analyzed in the literature; suffice to say that difficulties would arise for individual countries with economies at near full capacity and unable to curtail internal demand, in order to make room for additional exports, and for poorer countries with a limited export potential.

The possibility of an immediate real transfer is however to be ruled out. Though the demand for manufactures by the oil producers is rising very fast (at annual rates of over 20 per cent for OPEC countries) and will probably accelerate in the next few years, it will certainly not increase by anything approaching the full extent of the additional revenues. There thus arises the problem of financing the huge deficits which the oil importers will

incur towards the producers. We shall here consider the following aspects of this problem: how much total finance should be supplied and how it should be apportioned amongst deficit countries; the longer run implications of an accumulation, in the hands of the oil producers, of claims to future resources of the oil importers, which may take the form of reserve assets or of debts issued by the deficit countries.

6. It is often thought that the total finance to be supplied should equal the actual increase in the value of the imported oil due to the price rise. But if there are countries which abstain from fully compensating the deflationary effects of the increase in the oil price, this measure may lead to a serious underestimate of the finance required to prevent a fall in the level of world activity. In this case, as we saw in the previous section, those countries which endeavour to compensate fully the deflationary effects would have to bear, on top of the increased oil deficit, an additional deficit caused by the fall of exports to the non-compensating oil importers. If this additional deficit is not financed, the former countries may have to accept some deflation, in spite of their original decision and through no fault of their own.

There thus appear to be two notions of "oil deficit": a narrow one, which neglects the effects of differential demand policies; and a broader one, which instead allows for the deterioration of the external current account of some countries due to the fact that other countries of the same group accept the deflation induced by the higher oil price. It also follows that, unless each country actually adopts a fully compensatory policy, a supply of finance covering only the oil deficits in the narrower sense would be the vehicle of the international transmission of deflation of the kind considered in par. 4 above.

7. It is a widespread opinion that the market can take care of the problem of supplying the necessary finance and of allocating it between countries according to the needs arising from the new deficits towards the oil producers. International liquidity, drawn from official reserves, would flow back to the national and Euro-markets and be borrowed there by the deficit countries.

A little thought shows, however, that the market mechanism would be neutral only if the initial conditions of borrowing countries with respect to the external balances and foreign reserves were more or less alike and if the rise in the price of oil hit all countries more or less in the same manner. This being certainly not the case, an allocation of finance left entirely to the market would be such as to cause not only cumulative inequalities, but, as a result of these, a reduction of the total supply of finance far below the level required to prevent a fall in the level of activity. The credit worthiness of a prospective borrower would be judged on the basis of balance of payments results which may depend on factors largely outside the control of the individual country — such as its dependence on oil for energy consumption or the limitations to its exports set by other countries' policies. Wide interest rate differentials and, given the magnitude of the financial flows involved, a large additional burden for some countries would result. Poorer countries would even be denied the necessary finance, while at the same time probably suffering from a reduction of the capital flows from richer countries. The market would thus distribute the credit in inverse proportion to the needs for it: credit would flow to the haves far beyond their requirements, but would be denied to the have-nots who could make most use of it.

There are on the other hand several ways to avoid these distortions and to ensure an orderly distribution of finance according to the deficits directly and indirectly incurred as a result of the oil crisis. First, at least a part of these deficits could be compensated through the creation of new Special Drawing Rights.[3] Another part of finance could be provided through the intermediation of international bodies such as the International Monetary Fund: the latter could issue debts subscribed by the oil producing countries and transfer the funds thus raised to the deficit countries.[4] As said above, these funds and the new SDR's should be distributed between

3 We neglect here the problem of the acceptability of an asset like the SDR by the new creditor countries (some of which are not even parties in the SDR scheme). The heart of this problem is a new valuation of the SDR such as to make it desirable as a major reserve asset: several possibilities have been proposed and a solution (though not necessarily the best one) might be found as an interim part of an otherwise remote international monetary reform.

4 This is the substance of the "oil facility" proposed by the managing Director of the IMF, Dr. Witteween.

countries on the basis of their oil deficits defined in the broader sense, if overall deflationary effects are to be avoided.[5]

Thirdly, countries relatively less hit by the oil crises and/or relatively well endowed with foreign assets could, and should, alleviate the situation of worse-off countries in several complementary ways. Above all they certainly should maintain a high rate of internal expansion, so as to increase their imports from other industrialized and from the less developed countries. This would be the most efficient manner of redistributing the overall deficit towards the oil producers *and* of maintainining at the same time a high level of activity, without relying entirely on the complex and uncertain working of compensating financial flows. This same end could be achieved through revaluations of the richer countries' currencies. Further, there could be a flow of long-term capital from the richer to the poorer oil importers, encouraged by an appropriate monetary and fiscal policy.[6]

8. Is there, beside the distortions caused by an exclusive reliance on the market mechanism, any substantial difference between the various forms of financing the oil deficits considered in the previous section, and in particular between the allocation of SDR's and the issuing of debts (whether through the market or through the intermediation of international organizations)?

Obviously, while SDR's, like gold, are not a debt of any

5 The possibility should be considered of giving the less developed countries amounts of SDR's and/or other means of payment larger than the value of their oil deficits. The excess would certainly be spent by the recipients to buy manufactured goods, while the proceeds of the additional exports of the industrialized countries would be used to pay for the oil imports. In this case a real transfer would immediately take place towards the less developed countries. Contrariwise, a distribution according to the shares in the IMF would discriminate against the poorer countries.

6 A crucial role in determining the supply of international finance to be made available will be played by the monetary and fiscal policy pursued in the United States. To appreciate this role, the following circumstances should be considered: the US have a lower ratio of oil imports to total energy consumption than most other countries; the US current (non-oil) balance towards the rest of the world has been rapidly improving and will further improve; there will probably be heavy capital inflows into the US, also because of expectations of further revaluations of the dollar. In this situation the possibility of an adequate growth of international liquidity will depend on the US attitude towards the financial problems of other countries and in particular on the monetary policy pursued by the Federal Reserve.

particular country, debts will come to maturity at some time in the future. A single country either is in a position to renew its maturing debts continuously or must provide for their amortization by accumulating a sinking fund in foreign assets (e.g. dollars). Given the expansion of world trade, and in particular given the limited absorption capacity of oil producing countries, the accumulation of a sinking fund requires that the individual country pursues internal deflationary policies in the attempt to achieve a current surplus. But if all debtor countries behave in this fashion, if each of them wishes to achieve a current surplus to provide for its sinking fund, the outcome will be a fall in each country's exports with the resulting impossibility, for any country, of amortizing the debts previously incurred. This highlights the composition fallacy which is an inherent characteristic of the world economic situation: what may be valid for the individual country is no longer valid when all countries are considered together.

It follows from this that, if the level of world economic activity is not to fall in the future, debtor countries can repay their debts only to the extent to which they can achieve an export surplus towards the creditor countries. If the oil producing countries, which are the ultimate creditors, are ready to accumulate foreign assets without spending them, the repayment of whatever loans were initially granted by some richer industrialized country would imply for the latter a huge current deficit accompanied by an increase of its liabilities towards the oil producers. Debtor countries, on the other hand, would in this case repay the loans by a transfer of real resources, to be obtained by curtailing (through inflation or by demand policies) the domestic use of their full-capacity output.

The story is not very different if SDR's are given to the oil importers to settle their bill with the oil producers, except that there is no danger here of deficit countries each attempting to accumulate a sinking fund. Otherwise, the alternative is the same as in the previous case. Either the oil producers are ready to accumulate ever-growing amounts of SDR's or other claims, which is equivalent to a continuous renewal of the debt or to the issue of perpetuities; or the producers will use their accumulated claims to buy manufactured goods and other commodities, which other countries will have to provide out of their current production flows. The analogy between the two cases rests of course on the condition

that debts can somehow be recycled amongst oil importing countries, so that country A can repay with exports of goods the debts contracted by country B, while B is granted a loan by A.

9. We have seen in the previous sections that, if the present terms of trade between oil and other goods remain unaltered for some time and if oil consumption is not substantially reduced, there appear to be three outcomes to the payments problem in the medium term: a fall in the level of output and trade; an ever-growing accumulation of claims on the resources of the oil importers by the oil producers; a real transfer from the former to the latter. Whether the first and least desirable possibility occurs does indeed depend also on the shape and the way in which the necessary finance is provided: as we saw, a cumulative deflationary mechanism might be set in motion if the deficits were entirely financed by the issue of debts and all debtor countries simultaneously attempted to repay such debts by running current surpluses, the sum of which exceeds the current deficits of the ultimate creditors. The alternative between the second and the third possibility, on the other hand, is in no way influenced by the choice between alternative financial mechanisms, but depends on factors affecting the size of the real debt which will be incurred towards the oil producers in future years: on the rate of price inflation in industrialized countries, therefore, on the industrial policy and the growth of the absorptive capacity of the producers, and so forth. The sign and the magnitude of these factors, and hence the extent to which a real transfer of goods from the oil consumers to the producers will take place in the future, are at present unknown.

This uncertainty may be a cause of further immediate disorder in the international economic relations and anticipate the least desirable of the outcomes listed above. Individual countries, for fear that their future burden would increase intolerably, may be induced to engage themselves now in aggressive export drives (through competitive devaluations and other weapons), in the attempt to pay for their current oil imports. Other countries would then be led to pursue non-compensatory or even explicitly deflationary policies and to adopt restrictive trade practices in order to limit their imports of manufactures. Individual attempts to shift one's own oil deficit onto other countries would thus be self-defeating, without

greatly altering the overall burden of the oil deficit. A plea for a concerted action aimed at achieving an orderly and equitable allocation of this burden, such as to avoid any sacrifice in terms of the level of activity, is therefore in order. Past and current experience, however, offers little ground for optimism.

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APPENDIX

LIST OF SYMBOLS

Y : GNP in money terms
y : GNP in real terms $= \frac{Y}{p}$
a : exogenously given expenditure in real terms
F : exogenously given expenditure in money terms
i : investment in real terms
x : exports in real terms
g : government expenditure in real terms
c : consumption in real terms
m' : imports of manufactured goods in real terms
m'' : imports of crude oil in real terms
p : price of internal expenditure, and of exports and imports of manufactured goods
π : price of the imported crude oil
D : budget deficit
B : balance of payments' surplus
k : autonomous consumption in money terms
H : total expenditure given in money terms
L : employment
w : money wage rate
b : marginal propensity to consume
t : rate of income taxation
b'_1 : marginal propensity to consume out of wages disposable income
b'_2 : marginal propensity to consume out of non-wages disposable income
γ : propensity to import manufactures
μ : propensity to import oil
λ : elasticity of the price of manufactures with respect to the price of oil
β : elasticity of money wages with respect to the price of manufactures
ε : labour per unit of output.

THE MODEL

1st Variant Without money illusion	2nd Variant With money illusion	3rd Variant Different propensities to consume
(1) $Y = pc + pa - pm' - \pi m''$	(1′) $Y = pc + pa + F - pm' - \pi m''$	(1″) see (1)
(2) $a = i + g + x$	(2′) $pa + F = p(i + g + x)$	(2″) see (2)
(3) $pc = b(1-t)Y = b'Y$	(3′) $pc = k + b(1-t)Y = k + b'Y$	(3″) $pc = b'_1 wL + b'_2 (Y - wL)$; $b'_1 > b'_2$
(4) $pm' = \gamma Y$; $b' - \gamma = \alpha$	(4′) see (4)	(4″) see (4)
(5) $m'' = \mu(c + a - m')$	(5′) $m'' = \mu\left(c + a + \frac{F}{p} - m'\right)$	(5″) see (5)
(6) $D = pg - tY$	(6′) see (6)	(6″) see (6)
(7) $B = px - pm' - \pi m''$	(7′) see (7)	(7″) see (7)
(8) $\frac{dp}{p} = \lambda \frac{d\pi}{\pi}$	(8′) see (8)	(8″) see (8)
	(9′) $k + F = H$	(9″) $L = \varepsilon y$
		(10″) $\frac{dw}{w} = \beta \frac{dp}{p}$

THE RESULTS

Solving the model for y we obtain:

in the 1st Variant : $$y = \frac{1 - \mu\frac{\pi}{p}}{1 - \alpha\left(1 - \mu\frac{\pi}{p}\right)} a;$$

in the 2nd Variant : $$y = \frac{1 - \mu\frac{\pi}{p}}{1 - \alpha\left(1 - \mu\frac{\pi}{p}\right)} \left(\frac{H}{p} + a\right);$$

$$\text{in the 3rd Variant : } y=\frac{(1-\mu\frac{\pi}{p})\,a}{1-[(b'_1-b'_2)\,\varepsilon\frac{w}{p}+b'_2-\gamma]\,(1-\mu\,\pi/p)}.$$

By total differentiation of y we obtain:

$$\text{in the 1st Variant : } \frac{dy}{y}=\frac{da}{a}-\frac{1}{1-\mu\pi/p}\frac{\pi m''}{pa}(1-\lambda)\frac{d\pi}{\pi};$$

$$\text{in the 2nd Variant : } \frac{dy}{y}=\frac{da}{\frac{H}{p}+a}-\frac{H/p}{\frac{H}{p}+a}\lambda\frac{d\pi}{\pi}-\frac{1}{1-\mu\,\pi/p}\frac{\pi m''}{H+pa}(1-\lambda)\frac{d\pi}{\pi},$$

a rise of the internal price level has a deflationary effect unless $\frac{H}{\pi m''}<1/(1-\mu\,\pi/p)$; if this latter condition holds, the value of λ which can completely offset the deflationary effect of $d\pi/\pi$ is

$$\lambda=\frac{\pi m''}{\pi m''-H\,(1-\mu\,\pi/p)}>1;$$

$$\text{in the 3rd Variant : } \frac{dy}{y}=\frac{da}{a}+\frac{1}{1-\mu\frac{\pi}{p}}\left[\frac{(b'_1-b'_2)\,wL}{pa}(\beta-1)\,\lambda-\frac{\pi m''}{pa}(1-\lambda)\right]\frac{d\pi}{\pi},$$

if $\beta>1$, the rise of the internal price level which completely offsets the deflationary effect of $d\pi/\pi$ is

$$0<\lambda=\frac{\pi m''}{\pi m''-(b'_1-b'_2)\,wL\,(\beta-1)}<1;$$

if $\beta<1$, a rise of the internal price level has a deflationary effect unless $\pi m''>(b'_1-b'_2)\,wL\,(1-\beta)$; if this latter condition holds, the value of λ which can completely offset the deflationary effect of $d\pi/\pi$ is

$$\lambda=\frac{\pi m''}{\pi m''-(b'_1-b'_2)\,wL\,(1-\beta)}>1.$$

The propositions in the text concerning the effects on the budget deficit D and on the balance of payments surplus B are obtained by total differentiation of these two magnitudes. In particular, if da=dx, we have:

$$\text{in the 1st Variant : } dB\Big|_{dy=0}=B\lambda\frac{d\pi}{\pi};$$

$$\text{in the 2nd Variant : } dB\Big|_{dy=0}=B\lambda\frac{d\pi}{\pi}+\lambda\frac{H}{p}d\pi;$$

$$\text{in the 3rd Variant : } dB\Big|_{dy=0}=B\lambda\frac{d\pi}{\pi}+\frac{b'_1-b'_2}{1-\mu\,\pi/p}wL\,(1-\beta)\frac{d\pi}{\pi}.$$

If da=dg, we have for all the three variants considered:

$$dB\Big|_{dy=0}=[B\lambda-\frac{\pi m''}{1-\mu\,\pi/p}(1-\lambda)]\frac{d\pi}{\pi}.$$

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