THE REAL AND MONETARY IMPACTS OF EXOGENOUS ECONOMIC DISTURBANCES UPON CENTRALLY PLANNED ECONOMIES: WITH AN APPLICATION TO POLAND

by

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1. INTRODUCTION

The impact of international economic disturbances upon the centrally planned economies (CPEs) of the Soviet Union and Eastern Europe has been a particularly important area of research. Neuberger and Tyson (1980) and the numerous contributors to that volume provide a bench mark for the development of open economy macroeconomics of CPEs. This paper provides an extension of the work of Wolf (1978b), (1980), inter alia, for the CPE and modified centrally planned economy (MCPE). The analysis below explicitly considers the real and monetary impacts of exogenous disturbances in a model with two types of monies - enterprise deposits and household currency - and both consumer goods and intermediate products (or capital services), each of which may have a fixed or market determined price. The model is unique not only in its detail but also in that it provides a flow of funds approach which incorporates wealth effects. The fundamental result is that exogenous disturbances do have an impact - either real or monetary - upon the domestic economy of the CPE even though price-equalization taxes or subsidies eliminate the most direct potential impacts. Only via a finely tuned policy of price or tax (subsidy) adjustments or the imposition of trade controls can the impact be completely eliminated. This result is contrary to the accepted wisdom that the price-equalization mechanism in CPEs completely and automatically insulates the domestic economy.

This analysis begins with a brief but necessary critique of the analysis of Ames (1953, 1965), Holzman (1968, 1974, 1980), Pryor (1965) and Wolf (1978b, 1980). A comprehensive framework is provided which allows for the comparison of different disturbances and the analysis of their impact, summarizing both the contributions and errors of previous writers. The next section presents the development of a more disaggregated model from microfoundations utilizing the flow of funds or monetary approach which allows for several extensions of their work. The analysis of several potential exogenous disturbances (e.g. a change in the world price of imports) and the impact not only upon the balance

of trade (foreign currency, devisa [hard currency] and domestic currency balances) but also upon price equalization profits and taxes, the government budget, the domestic money supply and sectoral outputs is considered next, with special attention to the Polish economy. The final section provides a concise summary.

2. THE IMPACT OF EXOGENOUS DISTURBANCES AT THE AGGREGATE LEVEL

In analyzing the impact of economic disturbances upon CPEs and MCPEs it is necessary to adopt an appropriate and consistent methodology. The Western literature dealing with balance of payments (BOP) adjustment provides a basis for our analysis and the work of Wolf (1978b, inter alia) rigorously demonstrates its applicability. In this section three alternative approaches to the analysis of BOP adjustment (presented initially by Wolf) are utilized to examine the adjustment process of the CPE and provide a framework for the comparison and critique of several important results derived by earlier writers.

In a market-type economy (MTE) there are three basic approaches to the analysis of balance of payments (BOP) adjustments. The first is the elasticities approach. Wolf (1978b), following the traditional Bickerdike-Robinson-Metzler approach shows that any change in the foreign currency balance of payments (B_T^*) for a small open MTE, caused by external price changes or changes in the quantity of exports can be expressed as (in his notation):

$$dB_T^* = V_x^* \hat{P}_m^* \left[\frac{1}{t^*} (\varepsilon_x+1) - d^*(\eta_m+1) \right] + \hat{Q}_x \ , \tag{1}$$

where * denotes foreign prices, ^ denotes a relative change,

$$t^* = \frac{\hat{P}_m^*}{\hat{P}_x^*}, \ V_x^* = P_x^* \cdot Q_x, \ V_m^* = P_m^* \cdot Q_m, \ d^* = \frac{V_m^*}{V_x^*} \ , \ \varepsilon_x \text{ and } \eta_m$$

are the price elasticities of home's supply of exports and demand for imports. From this expression it can readily be seen that the effect of $\hat{P}_m^*$ or $\hat{Q}_x^*$ upon dB_T^* is dependent upon the initial trade balance (d^*), the terms of trade (t^*) and the relevant elasticities. This approach can readily be applied to a CPE, assuming the elasticities reflect the authorities' response to changes in the prices of traded goods.

A second approach often used in the Western literature is the absorption approach. In this case any change in the domestic currency balance of trade, (dB_T) can be written as:

$$dB_T = dY - dZ = dH. \tag{2}$$

That is, any change in the domestic currency balance of trade is the difference between changes in domestic income (dY) and absorption (dZ). This difference is also equal to the change in hoarding (dH). In this approach a deterioration in the trade balance ($dB_T < 0$) implies domestic expenditure has risen relative to income. If there is external inflation transmitted to the domestic economy by a fixed exchange rate, the trade balance worsens only if the increase in money absorption of both domestic and foreign output (dZ_d and dZ_f respectively, where $dZ = dZ_d + dZ_f$) is greater than the increase in the money value of domestic output (expressed as $dY = dZ_d + dZ_d^*$, where dZ_d^* is foreign expenditure on domestic output in domestic currency). In other words, if dZ_f (imports) increases relatively more than dZ_d^* (exports) the trade balance worsens ($dB_T < 0$).

A third approach is the monetary approach. Assuming the money supply (M) consists only of the liabilities of the central bank (CB) then it can be expressed as the difference between the CB's assets, (the net international reserves expressed in terms of domestic currency (F), and loans (L)), and its non-monetary liabilities (government deposits (Dg)): $M = F + L - Dg$. The balance of payments (B_T) can then be written as:

$$B_T = dF = dM - (dL - dDg). \tag{3}$$

From this viewpoint a deterioration in the balance of payments ($dB_T < 0$) arises when the rate of change in domestic credit creation (d(dL - dDg)) is greater than the rate of change in the supply of money (d(dM)) and this excess credit creation "leaks" abroad as an excess of absorption over income.

In their definitional form, these approaches and equations (1) - (3) are applicable to CPEs. As an example, let us consider the impact of a particular disturbance upon a CPE under various conditions. Consider the response of a CPE to external inflation. Suppose that $dP_m^* = dP_x^* > 0$, so the terms of trade do not change ($t^* = 1$) in equation (1) and trade is initially balanced ($d^* = 1$). If the CPE's response is to maintain trade flows unchanged, and here there is no reason to change them, equation (1) indicates $dB_T^* = 0$.

The total net profits on price discrepancies earned by the Ministry of Foreign Trade (MFT) or Foreign Trade Organizations (FTOs) can be written as:

$$\Pi_D = Q_m(P_m - P_m^*R) + Q_x(P_x^*R - P_x), \tag{4}$$

where R is the domestic currency price of foreign exchange. From this Wolf (1978b) shows the change in price equalization (PE) profits due to changes in external prices or quantity of exports is:

$$d\Pi_D = V_x^*R[\hat{P}_m^*(\frac{1}{t^*}[\varepsilon_x(1-\alpha_x)+ 1] - d^*[\eta_m(1-\alpha_m)+ 1]) + \hat{Q}_x(1-\alpha_x)] \tag{5}$$

where $\alpha_x = \frac{P_x}{P_x^*} \cdot \frac{1}{R}$, $\alpha_m = \frac{P_m}{P_m^*} \cdot \frac{1}{R}$,

and all other symbols are previously defined. In this case not only is $dB_T^* =$

0, but $d\Pi_D = 0$ also.

If, on the other hand, we have an initial trade deficit ($D^* > 1.00$), external inflation, with no change in the terms of trade ($dP_m^* = dP_x^* > 0$, $t^* = 1$), and real trade flows are maintained, then $dB_T^* < 0$ and $d\Pi_D < 0$.

A third set of initial conditions to be examined more carefully is when the foreign price of imports increases ($dP_m^* > 0$), the foreign price of exports does not change ($dP_x^* = 0$ so $1/t^* = 0$) and trade is initially balanced ($D^* = 1$). In this case, if the policy response is to maintain trade flows, $dB_T^* = -V_m^* \hat{P}_m^* < 0$ and $d\Pi_D = -RV_m^* \hat{P}_m^* < 0$.

In all of the above cases we have assumed that the policy response has been to maintain real trade flows. The results derived in the two later cases (by Wolf (1978b, 1980)) indicated that the foreign currency balance of trade deteriorates and net PE subsidies to offset Π_D must increase (as Π_D decreases). As Holzman (1974) argues, if real trade flows are maintained there are few direct income effects (and therefore income-related multiplier effects) in the pure CPE because the production and distribution of goods and services are determined by direct control.

With regard to the PE subsidies however, Holzman argues that if the MFT experiences such a loss and the government grants the MFT a credit, or a subsidy (presumably taking away funds from some other agency or granting credits to those other agencies), the result is inflationary. He suggests it is "the smallness of the foreign trade sector ... and the policy of a fairly strict balance of accounts ... that makes this point of greater theoretical than practical interest."[1] It is extremely important to clarify the role of PE subsidies because we have seen that the net losses (profits) in foreign trade and therefore the PE subsidy (tax) may change as a result of an external exogenous disturbance. And, because of the price equalization mechanism it is only through the changes in the MFT's profits and in the subsidies that any effect, other than actual changes in real imports or exports, could be

transmitted to the domestic economy. Thus, if the affect, if any, of changes in MFT profits can be nullified, then the total exogenous disturbance can be (if real trade flows are maintained).

Further, foreign trade is much more important for East European CPEs than for the USSR, with which Holzman was concerned. In fact, in the modified centrally planned economy (MCPE), such as Poland or Hungary, foreign trade may be even more important since some goods are not subject to PE subsidies. Also, in Poland, trade has been unbalanced and is a much larger percent of GNP than in the USSR. Thus, the problem is no longer just of theoretical interest but is also of practical importance.

Holzman (1974), in discussing the PE subsidies, continues an argument by Ames (1965), and suggests (in the framework developed above) that: (1) if the exchange rate (R) is equal to the purchasing power parity for both exports and imports ($\alpha_m = \alpha_x = 1$ and $\beta = \alpha_m/\alpha_x = 1$), then $\Pi_D = 0$, whether trade is balanced or not (i.e., regardless of d^*); (2) if R does not equal purchasing power parity (α_m, $\alpha_x \neq 1$) but trade is balanced, ($d^* = 1$), then $\Pi_D = 0$; and (3) <u>only</u> if R does not equal purchasing power parity (α_m, $\alpha_x \neq 1$) <u>and</u> trade is imbalanced ($d^* \neq 1$), will $\Pi_D \neq 0$ (i.e., α_m, $\alpha_x \neq 1$ and $d^* \neq 1$ are necessary for $\Pi_D \neq 0$). But Wolf (1978b) shows that:

$$\Pi_D = RV_x^* [d^*(\beta\alpha_x - 1) + (1 - \alpha_x)] \tag{6}$$

and Holzman's second and third contentions are incorrect. From equation 6 we see that it is β that is important, not merely whether R is at purchasing power parity (α_m, $\alpha_x = 1$) or not. If α_m, $\alpha_x \neq 1$ and $d^* = 1.00$ (Holzman's conditions in (2) above) <u>but</u> also $\beta = 1.00$, then $\Pi_D \neq 0$, which contradicts Holzman's conclusion. Further as equation (6) shows, Π_D may be zero even if both $d^* \neq 1.00$ and α_m, $\alpha_x \neq 1.00$, contradicting Holzman's third claim. In general if $\beta \neq 1.00$, $\Pi_D = 0$ only if $d^* = (\alpha_x - 1)/(\beta\alpha_x - 1)$ and we would expect $\Pi_D \neq 0$ in most cases where $\beta \neq 1.00$.[2]

Wolf's expression makes clear when PE subsidies will arise, but what about the inflationary impact of these subsidies? Let us return to the example above, the third set of initial conditions: $dP_m^* > 0$, $dP_x^* = 0$ so $1/t^* = 0$ and trade initially balanced, $d^* = 1$; and the first policy response -- no change in trade flows. As Wolf notes, there are several methods of financing the increased subsidies (to offset $d\Pi_D = RV_m^{*}\hat{P}_m^{*} < 0$). These can best be illustrated by equation (3), where the ' indicates the *valuta* (or *devisa*) value of the foreign trade balance ($B_T' = B_T^* R$):

$$dB_T' = dM - (dL - dDg) < 0 \tag{7}$$

and the fact that $d\Pi_D = dB_T' - dB_T$ (in this case $dB_T = 0$ since there are no changes in real trade flows or domestic prices).

The first option for financing the subsidies is for the "treasury" to draw down its central bank deposits without altering net loans or the money supply so $dB_T' = dDg$. In this case there is no inflationary impact. The second option for financing is for the "treasury" to increase taxes on households and enterprises and $dB_T' = dM < 0$, which is contractionary and leads to an unnecessary reduction in domestic absorption and output.[3] The third option is to finance the increased subsidies by borrowing from the central bank so $dB_T' = -dL$. The authorities can maintain real domestic absorption by either the first or third option and it is clear that changes in the subsidies are not necessarily inflationary or contractionary, but the impact depends on the method of financing.

Suppose now with the same initial conditions ($d^* = 1$, $1/t^* = 0$) the authorities choose to decrease real imports in order to maintain the *valuta* balance ($dB_T' = dB_T^* = 0$). In this second policy response, $\eta_m = 1.00$ and from Wolf, (1978b):

$$dB_T = V_X[\hat{P}_m^*(\frac{\varepsilon_X}{t^*} - d^*\eta_m) + Q_X], \qquad (8)$$

so $dB_T = V_m\hat{P}_m^* < 0$ and from (5): $d\Pi_D = -V_mP_m^* < 0$.

In this case, in which imports are reduced, there is not only a decrease in MFT profits (increase in subsidies) but also an impact due to changes in real trade flows which Holzman emphasized. The decline in real imports will have a different impact depending on whether the imports are consumer goods or producer goods. If they are consumer goods the increase in enterprise deposits, as a result of not purchasing these imports, will be offset by a decline in retail sales and the initial or first round result will be an increase in household money holding as Wolf points out.

If they are producer goods the effect will be quite different. Holzman notes there will also be a "bottleneck multiplier effect." That is, "output will decline ... to a greater extent than the value of the original decline in imports ... because many of the products of enterprises that use imported materials directly are intermediate products themselves" which further disrupts the economy.[4] The resulting decline in final output is seen to depend not only on the initial decrease in imports but also on the ratio of imports to output in the industries affected and the substitutability of other domestic intermediate goods for those imports and the goods produced by those imports.

In addition to the real effects there is a decrease in MFT profits. These again may be financed in several ways. The first option, here, is to borrow from the CB (assume the treasury maintains constant deposits though, $dDg = 0$) so expression (7) now is zero since $dM = dL > 0$. Further, Wolf (1978b) shows $dB_T = -dZ$, (from equation (2)) or the government is forcing an increase in hoarding. Assuming that the imports are only of consumer goods, consumers may attempt to spend their accumulated cash balances, creating inflationary pressures.

The second financing option, increasing taxes or reducing government expenditures eliminates the inflationary impact as dM = 0. In both cases, however, real absorption has fallen. Under either financing method (repressed inflation or direct taxation), there may be additional disincentive effects in the labor market (as Brada [1978a] points out) due to the decrease in real absorption, causing a further decrease in output.

Now consider a third policy response to world inflation (with $d^* = 1$ still $t^* > 1$ and $\varepsilon_x > 0$). Suppose the authorities choose to increase exports just enough to maintain the foreign currency balance unchanged and do not change imports. In this case the results are basically the same as when imports are reduced, unless the exports come solely from inventories (as Hoeffding [1968] suggests might be a possibility). Holzman (1974), however, notes several "fiscal" effects. Again it is important to differentiate between consumer and producer goods, now due to the tax structure in CPEs. There is a tendency for rather high turnover taxes on consumer goods, and rather low turnover taxes on producers goods. As a result there may be a loss of tax revenue greater for the export of consumer goods than the export of an equal amount of producers goods. Holzman then argues that an export of consumer goods would be more inflationary than an equal export of producer goods because the tax loss would be larger. However, it would appear that there are several ways of financing this tax loss (as in the PE subsidy case) and the tax loss per se may not be inflationary at all if it can be financed with no change in the domestic money supply.

Thus far we have seen that there are several responses the authorities of a CPE may choose and several results: there are indirect effects due to changes in PE subsidies which vary according to the means of financing (if financed properly there should be no effect if there is no change in real trade flows) and, if there are changes in trade flows, there may be bottleneck multipliers, reduced absorption of consumer goods, indirect labor market effects, and other possible fiscal effects. The above deals only with a CPE though. Only Wolf

(1977b, 1978b, 1980) has examined a MCPE and we shall now turn to this problem.

For a MCPE there are two sets of traded goods: A goods, which are subject to PE subsidies; and B goods, those which are no longer subject to PE subsidies. We can write:

$$B_T' = B_{TA}' + B_{TB}' = dM - (dL - dDg) \text{ or } B_T = B_{TA} + B_{TB} \tag{9}$$

where the A and B subscripts refer to the balance of trade in those goods only. We can further write the international price arbitrage equations as $P_A = P_A^* R\alpha_A$ and $P_B = P_B^* R\alpha_B$ where P_A is constant and thus $\hat{\alpha}_A = -(\hat{P}_A^* + \hat{R})$, α_B is constant and thus $\hat{P}_B = \hat{P}_B^* + \hat{R}$. For the MCPE, the analysis is somewhat more complicated and the exchange rate now takes on more meaning. For example, if we consider the case where the small MCPE is subjected to external inflation and a change in the terms of trade (e.g., $\hat{P}_x^* = 0$, $\hat{P}_m^* > 0$ and, assuming the rate of inflation is identical for both A and B goods where we have A and B imports and exports and also non-traded goods), we have $\hat{P}_{Am}^* = \hat{P}_{Bm}^* > 0$, $\hat{P}_{Bx}^* = \hat{P}_{Ax}^* = 0$, $\hat{P}_{Am} = \hat{P}_{Ax} = \hat{P}_{NT} = 0$ and $\hat{P}_{Bm} > 0$, where subscript NT refers to non-traded goods.

From these Wolf (1978b) shows that $dB_T^* \gtrless 0$ according to a rather complicated expression involving the measures of overvaluation (αs) of exports and imports of both A and B goods, the initial trade values evaluated in both domestic and foreign currency prices and several cross and own price elasticities of export supply and import demand. Nonetheless Wolf (1977b, 1978b) shows that the MCPE can in theory prevent external inflation from effecting the domestic price level by revaluing its currency in proportion to the rate of external inflation or, if worse comes to worse, emulate the standard CPE, with complete price equalization and direct controls. In fact, there are several reasons why a MCPE may not choose to devalue, from domestic monopoly power to constraints arising from trading in two different markets:

dollar and ruble.[5]

Overall, Wolf's analysis (1977b, 1978b, 1980) makes clear the types of responses possible and the effects of these responses in a detailed and concise manner. An analytical framework was developed which allowed the different responses of CPEs to be examined. He showed that "price equalization subsidies (taxes) per se are unlikely to affect the domestic money supply or real variables such as output or expenditures,"[6] if real trade flows have not changed and the authorities take appropriate actions to finance the change in price equalization subsidies. An important point to emphasize, pursued further by Wolf (1978b) is that under conditions of full employment the MTE, the traditional CPE and the MCPE can all, in theory, completely insulate themselves (i.e., maintain internal equilibrium), from both real and monetary effects of external inflation, but suffer external disequilibrium in doing so.[7] In a more complex four goods model, (Wolf, 1980), these results are extended for a hypothetical MCPE pursuing three alternative policy strategies (wait and see, emulate the CPE, and emulate the MTE).

The important conclusions of this section are first that the methods of analysis of BOP adjustment typically utilized in the Western literature are applicable and second that the results are generally not simple and there have been errors in previous analysis.

3. A DISAGGREGATED MODEL

3.1. The Domestic Economy

To extend the analysis above one needs to consider both the monetary and real effects as well as the inter-sectoral effects in more detail. Here we develop a concise equilibrium macro-economic model similar to that initially detailed in Kemme (1980). It is assumed that households maximize utility, a function of consumption goods, c (later disaggregated to A-type and B-type goods), labor services offered, ℓ, and government provided public goods g_p.

From this demand for consumer goods, the supply of labor services and the flow demand for money balances are:

$$c^d = c^d\left(\underset{+}{\frac{w}{p}}, \underset{+}{\Omega}, \underset{\pm}{g_p}\right) \tag{10}$$

$$\ell^s = \ell^s\left(\underset{+}{\frac{w}{p}}, \underset{-}{\Omega}, \underset{+}{g_p}\right) \tag{11}$$

$$\frac{m^d}{p} = \frac{w}{p}\,\ell^s - T - c^d = \underset{-}{\frac{m^d}{p}}\left(\Omega, \underset{+}{\frac{w}{p}}, \underset{\pm}{g_p}\right), \tag{12}$$

where Ω, the real stock of wealth at time t (assumed to be held only in the form of money balances) is $\int_o^t m_d/p\ dt$, T is government taxes, w/p is the real wage and the signs beneath the variables are the signs of the partial derivatives.[8]

Enterprises are assumed to produce output of consumer goods (both A- and B-types) and intermediate goods or capital services (k, both A- and B-types). Their activity may be summarized by

$$y^s = y^s\left(\underset{+}{\ell^d}, \underset{+}{k^d}, \underset{+}{g_s}\right) \tag{13}$$

$$\ell^d = \ell^d\left(\underset{-}{\frac{w}{p}}, \underset{+}{\frac{r}{p}}, \underset{+}{g_s}\right) \tag{14}$$

$$k^d = k^d\left(\underset{+}{\frac{w}{p}}, \underset{-}{\frac{r}{p}}, \underset{+}{g_s}\right) \tag{15}$$

where g_s is net government subsidies and all other variables are as defined

above. In addition, the enterprise faces a financing constraint:

$$E + y^s - \frac{w\ell^d}{p} - \frac{rk}{p} + g_s \geq 0 \tag{16}$$

where E is the initial stock of enterprise deposits. The flow demand for deposits is:

$$e^d = \Pi + g_s \tag{17}$$

where $\Pi = y^s - w\ell/p - rk/p$, and Π is enterprise profits.

The state sector is assumed to demand some of both A- and B-type goods and these are then redistributed as public services:

$$g^d = g_A + g_B = g_p \tag{18}$$

In general, expenditures by the state sector must be financed by direct taxes, T, or by changes in the money supply. Taxes, T, are taken to be direct taxes on the population for simplicity while taxes on enterprises are subsumed in g_s. Changes in the money supply may manifest themselves in several ways. The government may increase domestic credit to enterprises or to households. The first increases enterprise deposits as the government simply creates deposits at the CB to pay for purchases from enterprises or increase subsidies. That is, the supply of money is the amount of government purchases plus subsidies not financed by taxes. Thus we can write:

$$\frac{e^s}{p} = g^d + g_s - T. \tag{19}$$

Bank loans and the supply of enterprise deposits are policy variables

completely independent of the amount of deposits (or savings by households) on hand. (There may be an expansion of enterprise deposits by enterprises granting credits to each other, or accepting delays in contract payments, but these are limited and assumed to be negligible in the model developed here.[9]) We take the supply of enterprise deposits to be an exogenous policy variable determined by the central planners.

The second, an increase in the household money supply, occurs only indirectly in the model since the state makes no purchases directly from households. We assume employment in the state sector may be considered as employment by a representative enterprise and thus increased government employment appears as an increase in purchases from enterprises. In general, there is no direct change in cash holdings as a result of government purchases. However, when government purchases are made or subsidies allocated and credit or money is created, it is initially enterprise deposits, but part of it leaks into household currency. The total creation of money is e^s/p and the distribution of this between enterprise deposits and household currency depends on the demand for deposits and the demand for currency. The amount of additional household money is equal to additional payments to workers ($d(w\ell/p)$), less the additional expenditures and taxes which are converted back into enterprise deposits ($d(c+T)$). The net amount is exactly equal to the amount households are willing to hold, m^d/p. (To maintain the equilibrium characteristics of the model we assume that c^d and ℓ^s meet with planners' approval since the actual amount of cash in circulation is controlled by means of bank control over wage payments.)

The only other means of increasing the household money supply is an increase in direct credits to households. We assume this to be negligible and ignore it here. Further, since credit creation is generally independent of the amount of savings deposited and interest paid on savings deposits is negligible, savings may be thought of in our model as being held by households themselves without affecting the analytical results of the model. This means

that the supply of household money is in a sense endogenous and automatically equal to the demand for household money. (The only way to get more currency into circulation is through increasing payments to labor, ceteris paribus, and this occurs only if households choose to accept these payments, that is, demand more money.) The state can also directly influence the amount of currency in circulation by changing taxes. From equation (12), m^d/p changes automatically as taxes change. Thus, increased government expenditures financed by increased taxes do have an effect on the amount of currency in circulation.

We assume also that government policy-makers have several domestic goals which they actively pursue: (1) price stability, (2) full employment, and (3) stable and relatively high levels of economic growth. Our model differs from the work of Portes (1976) since planners have these as goals. For his initial model, Portes assumes prices are fixed and output is completely determined by planners without mention of full employment as a goal. In a later respecification, (Portes, 1979), full employment and price stability are taken as given and he assumes the planners' primary goal is to maximize output.

Finally the equilibrium conditions for the labor and goods markets may be summarized as:

$$\ell^d = \ell^s \tag{20}$$

$$y^s = c^d + k^d + g^d \tag{21}$$

and from the household's budget constraint:

$$c^d + \frac{m^d}{p} + T = \frac{w\ell^s}{p} \tag{22}$$

3.2. The Role of Trade

We assume that the MCPE is a "small" country which can buy as many importables and sell as many exportables on world markets as it desires at given world market prices. We also ignore the distinction between East-West trade and intra-CMEA trade. This is obviously an over-simplification but the ultimate goal is to examine the impact of changes in world prices upon the domestic economy, which historically has been manifested primarily through East-West trade. We consider the economy under equilibrium conditions in which prices for all goods are adjusting either via market pressures or central planners' perfect knowledge of scarcity prices. We shall also now consider both A and B goods as well, and thus imports and exports are classified accordingly.

We assume all foreign transactions involving A goods are conducted by FTOs, as described below. Price-equalization taxes and subsidies are applicable to A goods and as a result of these taxes (subsidies) and because of the fact that all A goods trade must be conducted by way of the FTOs, central planners are able to maintain a fixed price for A goods on the domestic market. One of the fundamental differences between the classical centrally planned economy and the modified centrally planned economy is the influence of market forces which central planners allow in some markets, namely the market for B goods. An important aspect is the elimination of price equalization taxes and subsidies for these goods in foreign trade. That is, world market prices have a direct impact upon the domestic prices of B goods. B goods may be bought or sold by enterprises directly on world markets without the intermediate transaction with the FTO or they may be purchased through the FTO on a commission basis.[10] We shall assume though, for simplicity, that all foreign trade takes place through the FTO.

FTOs then conduct all international transactions involving all A goods for enterprises and households, the import or export of B consumer goods for households and the import or export of B capital services on a commission

basis for enterprises. We also assume for simplicity that there is only one FTO which conducts all trade for enterprises and households, and that the FTO is a passive actor in the economy simply fulfilling the export supply and import demand of the other actors, abstracting from sales commissions, etc. The case in which the state imposes trade controls on A goods is more complex since domestic disequilibrium is a natural result (Kemme, 1980). The FTO plays a more active role in that case since part of its function is to control the flow of A goods according to the central planners' restrictions. We now have five entities within the MCPE which we must consider: (1) enterprises producing A goods, (2) enterprises producing B goods, (3) households, (4) the foreign trade organization, and (5) the state, or government sector (which includes the central planners and the central bank). We take all world market prices as exogenous to the model.

A portion of the demand for capital services by enterprises and consumer goods by households may be met by foreign sources and a portion of the supply of output of enterprises may be sold abroad. Let us briefly consider the differences in behavior which arise as a result of the opportunity for foreign trade, first for enterprises then for households.

The enterprise sector is now divided into enterprises producing A goods and enterprises producing B goods. Some of the output may be produced for export, the actual level of export of A and B goods being determined by domestic suppliers which can sell as much as they desire at world market prices.[11] We assume that enterprises are indifferent between sales to domestic enterprises and sales to the FTO. In both the A goods sector and the B goods sector the domestic prices are the same regardless of the buyer (as a result of price equalization taxes and subsidies for A goods, and the small-country assumption for B goods). Enterprises then produce a given supply of both A and B goods, some of which is purchased domestically, the remainder purchased by the FTO for export. They use labor and both A and B inputs, some of which may now be imported. We also assume that enterprises are indifferent between purchasing

these inputs on foreign or domestic markets. (We ignore possible quality differences, etc.)

A and B imported inputs are purchased from the FTO and the total amount of each is determined by the amount of the input demand not satisfied by domestic producers. To the extent that the input is produced only abroad then the level of imports is equal to the total domestic demand. The excess demand for A-type inputs is evaluated in terms of the fixed domestic price, and the difference between the domestic value and the foreign currency value converted to domestic currency at a fixed, given exchange rate will be offset by (absorbed by) price equalizaiton subsidies (taxes). In contrast, the excess demand for B-type inputs which is filled by imports arises at the domestic currency equivalent of the foreign currency price. That is, the price of B goods is simply the world market price converted to domestic currency at the official exchange rate, R.[12]

A convenient method of illustrating the different domestic and foreign transactions which may take place is to examine the components of the enterprises' demand for enterprise deposits. Conceptually there are two components of the demand for deposits by enterprises: (1) the demand originating from transactions with domestic enterprises, and (2) the demand originating from transactions with the FTO. We can write the flow demand for deposits in each sector as:

$$e_A^d = P_A c_A^s + r_A k_A^s - w\ell_A^d - r_B k_B^{d,A} - r_A k_A^{d,A} + g_{s,A} \tag{23}$$

$$e_B^d = P_B c_B^S + r_B k_B^s - w\ell_B^d - r_B k_B^{d,B} - r_A k_A^{d,B} + g_{s,B} \tag{24}$$

where each symbol is as previously defined and the superscripts d,A and d,B refer to demand by A enterprises and by B enterprises respectively. Equation (23) indicates that A enterprises produce and supply consumer goods which are

sold for price P_A, on domestic markets, or to the FTO for export. In addition they may produce capital services, intermediate inputs, which are sold for a price r_A on domestic markets, or to the FTO for export. These sales along with government subsidies, $g_{s,A}$, are the enterprises' sources of revenue. The enterprise makes expenditures for labor in the amount $w \cdot \ell_A^d$. It also pays r_A for A-type capital services and r_B for B-type capital services whether purchased on domestic markets or from the FTO. All of the A enterprise transactions which occur on domestic markets or with the FTO are conducted in domestic currency or enterprise deposits. The transactions with the FTO give rise to a demand for foreign exchange which shall be discussed further below. Equation (24) for B enterprises may be interpreted in a similar manner.

We see that the enterprise sector contributes substantially to potential foreign trade flows since A enterprises supply A-type consumer goods and capital services for export and B enterprises supply B-type consumer goods and capital services for export. The enterprise sector accounts for the entire supply of exports and the entire demand for imported A- and B-type capital services. The remaining components of the demand for imports are from the household sector. (We assume that g^d, the government's demand for goods and services is satisfied on domestic markets.)

Households demand both A- and B-type consumer goods, some of which may now be imported. We assume for simplicity that all imported goods which households demand are purchased from the FTO and that households do not export any goods. They sell only labor services on the domestic market. Further, we assume that households do not hold any foreign exchange, and there are no invisibles or direct remittances from abroad.[13] As a result we may write the household demand for money as:

$$m^d = w\ell^s - \tau - (P_A c_A^d + P_B c_B^d), \text{ where } \tau \text{ is nominal taxes.} \qquad (25)$$

The household demands no foreign exchange, only domestic currency since all of

its income ($w \cdot \ell^s - \tau$), and all of its expenditures ($P_A c_A^d + P_B d_B^d$) are in domestic currency. However, some of its transactions involve foreign trade and the last component of the domestic currency value of A-goods imports arises from the household sector, i.e. that part of c_A^d which cannot be satisfied by domestic enterprises. Similarly, the last component of the domestic currency value of B-goods imports also arises from the household sector, that part of c_B^d which cannot be satisfied by domestic enterprises.

FTOs conduct all foreign trade activities for A-type goods. We assume for simplicity that there is only one FTO which handles all A-type goods. Further we assume away all operating expenses which the FTO may have and all commissions it earns. We assume that the only profits which the FTO earns arise due to the difference between the domestic currency prices and devisa-valued prices for A goods, that B goods are bought and sold at world market prices and the devisa value equals the domestic value. From above, these may be written in general as:

$$\Pi_D = V_{m_A} - V'_{m_A} + V'_{x_A} - V_{x_A} , \tag{26}$$

where V_{m_A} is the domestic currency value of A-type imports (i.e.: $P_A(c_A^d + g_{c_A}^d - c_A^s) + r_A(k_A^d + g_{k_A}^d - k_A^s)$ for those cases in which there is excess demand on domestic markets), V'_{m_A} is the devisa value of those imports ($V'_{m_A} = RV^*_{m_A}$), and V_{x_A} is the domestic currency value of A-type exports ($P_A(c_A^d + g_{c_A}^d - c_A^s) + r_A(k_A^d + g_{k_A}^d - k_A^s)$ for those cases in which there is excess supply on the domestic market), and V'_{x_A} is the devisa value of those exports.[14]

Because of the limited or nonexistent capital markets we assume there are no capital flows between the MCPE and the rest of the world, other than those directly offsetting the flows of goods. Thus the balance of payments (trade) may be found by summing all of the components of export supply and import demand as outlined above. We may compute, then, balances in terms of domestic

prices, foreign prices and the devisa value of foreign prices.

The foreign currency values may be computed by evaluating the same trade flows in foreign currency units, and the devisa value of these balances is simply the foreign currency balance converted to domestic currency by means of the official exchange rate. These are not necessarily equal to the domestic currency balances above, because the devisa prices of A goods may not be equal to the domestic prices of A goods, i.e. as mentioned above $P_A^*R = P_A' \neq P_A$ and therefore $B_A^*R = B_A' \neq B_A$. However, the devisa prices of B goods do equal the domestic prices of B goods, since $P_B^*R = P_B' = P_B$ and therefore $B_B^*R = B_B' = B_B$. The profits on price discrepancies may then be written as (from Wolf, 1978b):

$$\Pi_D = B_A' - B_A \tag{27}$$

As a result, the difference between the devisa balance of payments and the domestic value of the balance of payments is simply the profits (or losses) resulting from price discrepancies (since $B_B' = B_B$).

We can also compare the flow demands and supplies of currency and deposits to arrive at the familiar Western definition of the balance of payments via the monetary approach: the balance of payments is the difference between the flow demand and supply of money (household currency plus deposits in this case). Since we have assumed that all foreign trade takes place through the FTO, the net demand for foreign exchange may be observed by examining the FTO's flow demand for money balances. We can compute this demand for money, household currency plus enterprise deposits, by summing the FTO's revenues and expenditures in either domestic or foreign currency. A detailed derivation is provided in the appendix. The demand for domestic currency deposits before price equalization taxes or subsidies is the difference between the FTO's domestic revenue and expenditures:

$$e^d_{FTO} = P_A E^d_{c_A} + r_A E^d_{k_A} + P_B E^d_{c_B} + r_B E^d_{k_B} , \tag{28}$$

where $E^d_{c_A} = c^s_A - c^d_A$, and $E^d_{c_A} = c^d_{A,FT}$ if $c^s_A - c^d_A < 0$ and $E^d_{c_A} = c^s_{A,FT}$ if $c^s_A - c^d_A > 0$ (similarly for $E^d_{c_B}$, $E^d_{k_A}$, $E^d_{k_B}$). e^d_{FTO} then, is the demand for enterprise deposits which results from the FTO's purchases and sales of A- and B-type goods on domestic markets. The demand for foreign currency holdings before price equalization subsidies or taxes is:

$$f^{d^*}_{FTO} = P^*_A E^d_{c_A} + r^*_A E^d_{k_A} + P^*_B E^d_{c_B} + r^*_B E^d_{k_B} \tag{29}$$

where $f^{d^*}_{FTO}$ is the demand for enterprise deposits which arise as a result of the FTO's transactions on world markets. The devisa value of these holdings is

$$f^{d'}_{FTO} = R f^{d^*}_{FTO} \tag{30}$$

Thus we have two expressions which describe the demand for enterprise deposits by the FTO in domestic currency: the domestic currency value, (28), and the devisa value, (30), based on foreign currency prices converted at the official exchange rate. The difference between the two is profits (losses) on prices discrepancies:

$$\Pi_D = f^{d'}_{FTO} - e^d_{FTO}. \tag{31}$$

Note that since $P_B = P^*_B R$, all of the components of (31) dealing with B goods net out. The state then imposes a tax (subsidy) upon the FTO exactly equal to the profits (losses) on foreign trade transactions.[15] This tax is:

$$A = \Pi_D = f^{d'}_{FTO} - e^{d}_{FTO} \tag{32}$$

In effect, then, the state may be thought of as holding all of the FTO's deposits, always leaving the FTO with a balance of zero in its deposit accounts. These taxes (subsidies) may then be thought of as government revenues (expenditures) placed in (taken from) a distinct account of the government at the central bank.[16]

Now let us define the total aggregate demand for money, ma^d (household currency, domestically denominated enterprise deposits, and the devisa value of deposits arising from foreign transactions), as the sum of the household, enterprise, and FTO's demands:

$$ma^d = m^d + e^d_A + e^d_B + (f^{d'}_{FTO} - e^d_{FTO}), \tag{33}$$

This is the domestic currency value of all demands for money arising from domestic and foreign transactions of households and enterprises and the demands by the FTO.

Now recall that the flow supply of enterprise deposits in the closed economy (e^s) is the difference between government expenditures ($g^d + g_s$) and tax receipts (τ). In the open economy model, the government now also receives revenues, or pays out subsidies, as a result of price equalization (A). The flow supply of money is still the difference between domestic expenditures and revenues, but now let us denote as f^s, that component of the money supply which results from changes in price equalization subsidies ($f^s = -A$):

$$e^s + f^s = g^d + g^s - \tau - A. \tag{34}$$

Thus $e^s + f^s$ is the flow supply of money in the open economy. The excess demand for money (household currency and enterprise deposits) may now be

written as:

$$ma^d - (e^s + f^s) = (m^d + e_A^d + e_B^d) + (f_{FTO}^{d'} - e_{FTO}^d) - (g^d + g^s - \tau - A). \quad (35)$$

If the flow supply of money created by the excess of expenditures by the government and central planners over domestic taxes is just equal to the flow demand for money for purchases of domestic goods, then the flow demand for purchases of goods above this level, i.e. purchases from abroad, will be equal to an excess demand for money balances by households and enterprises (net hoarding) met by foreign sources: the balance of payments. Thus, as in the market type economy the excess flow demand for money balances is equal to the balance of payments, in this case equal to the <u>devisa</u> balance. To show this substitute (23), (24), (25), and (32) into (35) to get

$$\begin{aligned} e_A^d + e_B^d + ma^d + (f_{FTO}^{d'} - e_{FTO}^d) - (e^s + f^s) = [&P_A(c_A^s - c_A^d - g_{c_A}^d) + \\ &P_B(c_B^s - c_B^d - g_{c_B}^d) + r_A(k_A^s - k_A^d - g_{k_A}^d) + r_B(k_B^s - k_B^d - g_{k_B}^d) + \\ &w(\ell^s - \ell_A^d - \ell_B^d) + 2A] \end{aligned} \quad (36)$$

Assuming equilibrium in the labor market we arrive at the monetary form of the basic identity:

$$(e_A^d + e_B^d + m^d) - (e^s + f^s) = B_A + B_B + A = B'. \quad (37)$$

That is, net domestic hoarding by enterprises and households $(e_A^d + e_B^d + m^d)$ plus the government budget surplus $(e^s + f^s)$ is equal to the <u>devisa</u> value of the balance of payments.[17]

4. THE IMPACT OF EXOGENOUS DISTRUBANCES WITH NO TRADE CONTROLS

We now have a complete model of the open MCPE. In this section several disturbances to the domestic economy will be considered with the use of this model. Before we consider the impact upon the domestic economy as well as the balance of trade, let us consider the definitions of internal and external balance. We define domestic equilibrium or internal balance as the unconstrained (i.e. when wages and prices are flexible) full employment level of employment and output (all markets clear). The economy then may be at either a notional equilibrium, which we consider internal balance or an effective equilibrium, i.e., a constrained equilibrium (which is not considered here).

Similarly, we define external balance as a balance of trade deficit equal to zero when the supply and demand for exports and imports arise from the notional demand and supply functions. We may also have the case in which there are fixed prices (and trade controls) which generate effective supply and demand functions, an effective internal balance, and an effective external balance when the balance of trade (resulting from the effective supply and demand functions) is zero. Thus, here, external balance refers to a balance of trade deficit equal to zero when the balance is determined by the notional supply and demand functions of the domestic actors. With these distinctions in mind, let us consider an exogenous disturbance, a change in foreign or domestic prices for example, in the case in which there are no foreign trade controls. When there are trade controls and potential disequilibrium the effective supply and demand functions must be considered. This case is pursued in Kemme (1980).

The model we have developed here will allow us to examine the same types of disturbances in the MCPE examined by Wolf (1978b, 1980), critiqued above, in more detail in a flow of funds equilibrium framework which explicitly considers wealth effects and can elsewhere be extended to the disequilibrium context. Further, we may examine the response of planners (such as changes in

controlled prices) to such disturbances.

4.1. A Simple Disturbance

Let us now consider the impact of exogenous changes in foreign and domestic prices upon: (1) the balance of trade, (2) price equalization profits (losses) and taxes (subsidies), (3) the domestic money supply (household currency and enterprise deposits), and (4) aggregate output. The balance of trade, from equation (36), may be rewritten in terms of excess demands as:

$$E^d_{ma} + wE^d_{\ell} = -\left[P_A E^d_{c_A} + P_B E^d_{c_B} + r_A E^d_{k_A} + r_B E^d_{k_B}\right] + A \qquad (38)$$

Where $E^d_{c_A} = c^d_A - c^s_A$, etc. If the excess demand for labor is zero then the excess flow demand for money balances, E^d_{ma} (which includes the flow supply resulting from a government budget deficit), is equal to the devisa value of the balance of trade (B + A), as derived in equation (37).

A change in prices (domestic prices, P_A, P_B, r_A, r_B), for any reason, has two potential channels of influence upon the balance of trade. The first is the direct (short run) change due to the change in value of a constant flow of real goods. The second is the change (longer run) in the flow of real goods (the enterprise, planners, and/or household response) which may result from the price changes.

To illustrate these two channels and the fact that only changes in domestic prices will evoke the second response (by enterprises, planners, and households), let us consider a change in the domestic currency price of A-type consumer goods, assuming for the moment an initial position of internal and external equilibrium, and that domestic authorities control these prices and for some reason desire this change. Differentiating equation (37) and writing in terms of elasticities (see Appendix 2), we see that the immediate short run effect (assuming these elasticities are zero) will be:

$$dB = - \hat{P}_A(P_A E^d_{c_A}) \tag{39}$$

That is, we have simply a change in the value of A-type consumer goods and a constant flow of those (and other) goods, since there is, as of yet, no response to the price change itself by the agents in the domestic economy.

Note that for a change in the foreign currency price of A-type consumer goods we have a similar result with respect to the foreign currency balance of trade. Since

$$B^* = - [P^*_A E^d_{c_A} + P^*_B E^d_{c_B} + r^*_A E^d_{k_A} + r^*_B E^d_{k_B}] \tag{40}$$

we have

$$dB^* = - \hat{P}^*_A(P^*_A(c^d_A - c^s_A)) \ . \tag{41}$$

Here, all of the elasticities are zero since foreign currency prices do not affect the production and consumption decisions of enterprises or households. They respond to changes in domestic prices which in this case have not changed. The foreign currency price of B-goods has not changed, by assumption, and the change in the foreign currency price of A-type goods is not permitted to influence the domestic price of A goods, because of price equalization.

The foreign currency price change, for A-type consumer goods, although it has no impact upon real trade flows, does have an impact upon profits or losses due to price discrepancies, Π_D, the level of price equalization taxes or subsidies, A, and therefore the government budget deficit.[18] Continuing with the exmaple of the foreign currency price change, $dP^*_A > 0$ say, the change in profits will be (from equation (32)):

$$d\Pi_D = RdB_A^* + dRB_A^* - dB_A \tag{42}$$

and if the exchange rate and domestic prices do not change we have:

$$d\Pi_D = RdB_A^* = dB_A' \tag{43}$$

The change in profits due to price discrepancies clearly depends upon the change in the devisa balance of trade on A-type goods (consumer goods in this case) which in turn depends on the initial balance (from equation (41)).

Since profits (losses) on price discrepancies have changed, taxes (subsidies) from (to) the FTO will change as well. The government surplus or deficit will be affected as well. (The effects may be eliminated, as Wolf (1978b) shows, if the domestic authorities take the appropriate policy actions.) Now, if we assume initially there is a hard currency deficit on A goods trade and $dP_A^* > 0$, then $dB_A' < 0$ (from equation (41) and $d\Pi_D < 0$ (from equation (43)). (This would have been the case, for example, for the import of certain foodstuffs or intermediate inputs in the early 1970s in Poland; see Fallenbuchl et al 1977.) From equation (34), the government budget deficit (or surplus) is the flow supply of enterprise deposits:

$$e^s + f^s = g^d + g_s - \tau - A. \tag{44}$$

Now as Π_D decreases A does as well and the government budget deficit (surplus) increases (decreases). There is no change in the supply of enterprise deposits available to the enterprises themselves, e^s, unless government expenditures ($g^d + g_s$) or taxes (τ) change. Since, in this case, there has been no change in real trade flows, but only a change in the value of the flow (which is taxed away at the FTO), there is no change in the domestic money supply other than f^s. The drawing down of deposits which results from the

decrease in A, f^s, is one component of the fall in deposits to pay for net imports. Specifically f^s is the additional amount of foreign exchange necessary to pay for the more expensive but constant real flow of goods from abroad. The change in A and accompanying change in f^s has no further impact upon the domestic economy unless there is an explicit policy change by the government authorities. The now greater balance of trade deficit (greater by the amount f^s) can be maintained until foreign currency reserves are depleted (or the government authorities are no longer willing to reduce reserves), or the opportunity to borrow international reserves is exhausted.

If the authorities are obsessed with a balanced budget (in the past, evidence has suggested that balancing the government budget is an important policy target[19]) and there are adequate foreign exchange reserves (to finance the external imbalance), one option the authorities may choose to balance the budget is to increase taxes, rather than decrease expenditures, change domestic prices, or change the exchange rate. (Note that changing the exchange rate may easily eliminate the price equalization subsidies (taxes) but it now has an impact on the domestic price level through B goods prices. Changes in the exchange rate now introduce further price distortions and therefore it may be less likely that the exchange rate is used as a policy tool in the MCPE. Thus if the authorities desire both price level stability and a balanced budget without decreasing expenditures, then they must increase taxes.) If the government then increases taxes, τ, in its attempt to balance the budget, the first impact is to decrease the flow demand for money balances, m^d, and the level of wealth Ω. In the closed economy, as household wealth decreases households demand less consumer goods and offer more labor services. This results in excess supply in both markets. Equilibrium is achieved only after both prices and wages decrease equiproportionately (remaining at the equilibrium real wage) increasing real wealth, and thus offsetting the decrease in wealth caused by the increase in taxes. Here, in the open economy case, the domestic excess supply of A consumer goods reduces

the inflow of imported A consumer goods without affecting their price or the price of B consumer goods, since these prices are determined by the world market. The excess supply of labor would force the wage rate down, but since there is no change in prices the level of real wealth does not increase in the open economy as it would in the closed economy model.

Since the level of wealth has fallen (due to the increase in taxes) the demand for A consumer goods falls and the level of imports (the excess demand met by foreign sources) falls even though there is no change in domestic prices. The balance of payments (both foreign currency and domestic) improves as a result and profits (losses) on price discrepancies increase (decrease) (assuming, of course, not all of the decrease in consumption due to the decrease in wealth is A consumer goods). The entire economy may return to internal equilibrium (all domestic markets clear, assuming full employment is maintained, and no government budget deficit) and to the original balance of trade position (we assumed an initial A-goods deficit, above) only under certain conditions.

The exact size of the tax increase which balances the budget can be found by differentiating equation (44) (ignoring the effect of the potential change in the labor supply, wage rates and therefore the demand for capital services) and solving for $d\tau$:

$$d\tau = \frac{-dA}{1+\left[(P_{c_A} - P^*_{c_A} R)\,\frac{\partial c^d_A}{\partial \Omega} \cdot \frac{\partial \Omega}{\partial \tau}\right]} \tag{45}$$

Since we are considering the case in which $\Pi_D < 0$, $P_{c_A} < P^*_{c_A} R$, the denominator is greater than one (the bracketed term takes into account the increase (decrease) in profits (losses) on price equalization and therefore the decrease (increase) in subsidies (taxes) to (from) the FTO). That is, the increase in taxes causes a reduction in real wealth and therefore a decrease

in demand for consumer goods. To the extent that some of these consumer goods are imported A consumer goods there will be a decrease (increase) in price equalization subsidies (taxes). Thus there is a multiplier affect and the increase in taxes required to balance the budget will only be some fraction of the increase in price equalization subsidies.

Note that as a result of the change in taxes the balance of trade changes as well. The economy will return to the original balance of trade position if:

$$dB^* = - [P_A^* \frac{\partial c_A^d}{\partial \Omega} + P_B^* \frac{\partial c_B^d}{\partial \Omega}] \, d\tau, \tag{46}$$

where dB^* is the change in the foreign currency balance of trade due to the change in the foreign currency price of A-type consumer goods (also equal to the original dA and f^s) and the right hand side is the change in the balance of trade which occurs due to the change in wealth caused by the change in taxes. That is, if the resulting wealth effect generates a decrease in the import of consumer goods exactly equal to the initial change in the foreign currency balance of trade we will return to the original balance of trade position without further adjustment. Substituting for dB^* and solving for $d\tau$ we have:

$$d\tau = \frac{\hat{P}_A^*(P_A^*(c_A^d - c_A^s))}{(P_A^* \frac{\partial c_A^d}{\partial \Omega} + P_B^* \frac{\partial c_B^d}{\partial \Omega})}, \tag{47}$$

as the change in taxes that returns the economy to the original external position.

This is not, however, the final impact of the change in taxes. The impact of the decrease in wealth upon the labor supply (as mentioned above)

reinforces these primary effects. As the labor supply increases (due to the decrease in wealth), enterprises, to the extent possible, will substitute labor for capital services, some of which may be imported. The decrease in demand for capital services, given no trade controls and the small country assumptions, will result in a decrease in imports (or an increase in exports) of capital goods. This also improves the balance of trade and, to the extent that some of these capital services are A goods, will increase profits due to price discrepancies by the FTO and reduce the level of subsidies and the government budget deficit.

There is no completely automatic mechanism which moves the economy to equilibrium because prices do not change. (Due to the small-country assumptions, domestic prices for B goods are set on the world market. The domestic prices of A goods are set by the central planners. These may of course be continuously adjusted to correspond to world market prices but this does not occur automatically.) Furthermore, while changing taxes (or expenditures) is a useful policy tool for achieving either internal or external balance, equation (45) will only coincidentally be equal to equation (46) (indicating a return to both internal equilibrium and the initial balance of trade position), and it is unlikely that the domestic authorities would ever attempt to use one policy variable to attain both targets.

4.2. An Application to the Polish Economy

Let us now consider a more comprehensive example. The example above considered only a change in the price of A-type consumer goods ($dP_A^* > 0$) when these goods are imported. Let us consider the CPE which is importing c_A, c_B, and k_B and exporting k_A. This is closer to the actual situation for Poland, e.g., in its hard currency trade during the early 1970s.[20] Equation (40) expresses the foreign currency balance of trade in terms of excess demands. Assuming government demand is constant and differentiating with respect to foreign trade prices and rewriting in terms of elasticities, we have:

$$
\begin{aligned}
dB^* = &-[dP_A^* E_{c_A}^d + dr_A^* E_{k_A}^d + dP_B^* E_{c_B}^d + dr_B^* E_{k_B}^d] \\
&+ \frac{P_A^*}{R}[\hat{P}_B^{*\,(-)}(c_A^s \varepsilon_{P_B}^{c_A} - c_A^d \zeta_{P_B}^{c_A}) + \hat{r}_B^{*\,(-)}(c_A^s \varepsilon_{r_B}^{c_A})] + \frac{r_A^*}{R}[\hat{P}_B^{*\,(-)}(k_A^s \varepsilon_{P_B}^{k_A} \\
&- k_A^d \zeta_{P_B}^{k_A}) + \hat{r}_B^{*\,(-\text{ or }+)}(k_A^s \varepsilon_{r_B}^{k_A} - k_A^d \zeta_{r_B}^{k_A})] + \frac{P_B^*}{R}[\hat{P}_B^{*\,(+)}(c_B^s \varepsilon_{P_B}^{c_B} - c_B^d \zeta_{P_B}^{c_B}) \\
&+ \hat{r}_B^{*\,(-)}(c_B^s \varepsilon_{r_B}^{c_B})] + \frac{r_B^*}{R}[\hat{P}_B^{*\,(-)}(k_B^s \varepsilon_{P_B}^{k_B} - k_B^d \zeta_{P_B}^{k_B}) \\
&+ \hat{r}_B^{*\,(+)}(k_B^s \varepsilon_{r_B}^{k_B} - k_B^d \zeta_{r_B}^{k_B}]
\end{aligned}
\tag{48}
$$

This expression, it must be emphasized, represents the change in the balance of trade which results from external price changes only. We are assuming that the central planners have not changed the basic plan, i.e., they have not changed the plan parameters, g_s, g_p, or τ (and therefore no change in the domestic money supply as a policy change) or the price of A-goods. Enterprises react only to the change in the domestic price of B-goods during the period under consideration.

There are three distinct cases analogous to the Polish situation in the first half of the 1970s which may now be considered. (1) World inflation with no change in the terms of trade ($\hat{P}_A^* = \hat{P}_B^* = \hat{r}_A^* = \hat{r}_B^* = \theta$). This is roughly analogous to the Polish situation in 1975. (2) World inflation with an improvement in the terms of trade (in which we assume for simplicity that the prices of all imports increase at the same rate: $\hat{P}_A^* = \hat{P}_B^* = \hat{r}_B^* = \theta_m > \hat{r}_A^* = \theta_x$). This corresponds to the Polish situation in 1971 and 1972. And (3), world inflation with a deterioration in terms of trade (again assuming that the prices of all imports increase at the same rate: $\hat{P}_A^* = \hat{P}_B^* = \hat{r}_A^* = \theta_m < \hat{r}_A^* = \theta_x$). This situation prevailed in 1973 and 1974.[21] Let us consider the details of each case in turn.

For the first case, in which there is no change in the terms of trade, we can write $\hat{P}_A^* = \hat{P}_A^* = \hat{r}_A^* = \hat{r}_B^* = \theta$, and

$$dB^* = -\theta[r_A^* E_{k_A}^d + p_A^* E_{c_B}^d + r_B^* E_{k_B}^d]$$
$$+ \frac{\theta}{R}[P_A^*(\Gamma_{P_B}^{\bar{c}_A} + \Gamma_{r_B}^{\bar{c}_A}) + r_A^*(\Gamma_{P_B}^{\bar{k}_A} + \Gamma_{r_B}^{\bar{k}_A}) + P_B^*(\Gamma_{P_B}^{+c_B} + \Gamma_{r_B}^{\bar{c}_B})$$
$$+ r_B^*(\Gamma_{P_B}^{\bar{k}_B} + \Gamma_{r_B}^{+k_B})] \qquad (49)$$

where the Γ's represent the weighted differences in elasticities, e.g. $\Gamma_{P_B}^{c_A} = c_A^s \varepsilon_{P_B}^{c_A} - c_A^d \zeta_{P_B}^{c_A}$ and may be thought of as a net import demand elasticity. The first term of (49) is the short-run change in the balance of trade, the changed value of a constant real flow. The second term is the longer-run effect, when the real flows change in response to the domestic price changes. That is, there is a relative price distortion introduced in the domestic economy since the domestic price of B goods is allowed to change with changes in world market prices, but the domestic price of A goods remains fixed. We can see that the impact upon B^* depends upon: (1) the initial balance of trade (the bracketed expression in the first term), (2) the exchange rate, and (3) the relevant own and cross price elasticities. We would normally expect $\Gamma_{P_B}^{c_A}$, $\Gamma_{r_B}^{c_A}$, $\Gamma_{P_B}^{k_A}$, $\Gamma_{r_B}^{k_A}$, $\Gamma_{r_B}^{c_B}$, $\Gamma_{P_B}^{k_B} < 0$ and $\Gamma_{P_B}^{c_B}$, $\Gamma_{r_B}^{k_B} > 0$. If the MCPE is initially running a balance of trade deficit and foreign currency prices increase, the first bracketed expression of (49) indicates the immediate short term impact will be a deterioration in the balance of trade. When real trade flows respond to the change in the domestic price of B goods the second bracketed term indicates that A goods trade will deteriorate and B goods trade may either improve the balance or worsen it. First, with respect to A goods trade the increase in P_B indicates more A-type consumer goods will be demanded ($\zeta_{P_B}^{c_A} > 0$) and fewer will be produced ($\varepsilon_{P_B}^{c_A} < 0$). Therefore the increase in the level of excess demand will be met by imports ($\Gamma_{P_B}^{c_A} < 0$). Similarly the

increase in r_B implies a decrease in the supply of A-type consumer goods ($\varepsilon_{r_B}^{c_A} < 0$), no change in the demand for A-type consumer goods ($\zeta_{r_B}^{c_A} = 0$), and thus an increase in imports of $c_A(\Gamma_{r_B}^{c_A} < 0)$. Imports of A-type consumer goods increase as a result of the increase in P_B and r_B and the trade balance with respect to A-type consumer goods deteriorates. The effects of the increase in B goods prices upon k_A are similar. The increase in P_B decreases the supply of A-type capital services (if enterprises produce either consumer goods or capital services then $\varepsilon_{P_B}^{k_A} < 0$) and increases the demand for A-type capital services $\zeta_{P_B}^{k_A} > 0$ thus increasing the excess demand for A-type capital services which may be imported ($\Gamma_{P_B}^{k_A} < 0$). The increase in r_B causes a decrease in the supply of A-type capital services (if B-type capital services are used in the production of A-type capital services, $\varepsilon_{r_B}^{k_A} < 0$) and an increase in demand for A-type capital services (if A- and B-type capital services are substitutes, $\zeta_{r_B}^{k_A} > 0$). As a result the excess demand for A-type capital services increases and this may be met by imports ($\Gamma_{r_B}^{k_A} < 0$). The net result is that there is an increase in the level of imports of A-type goods ($P_A^*(\Gamma_{P_B}^{c_A} + \Gamma_{r_B}^{c_A}) + r_A^*(\Gamma_{P_B}^{k_A} + \Gamma_{r_B}^{k_A}) < 0$).

With respect to B-goods trade the impact of the price changes are less clear. Similar arguments to those above may be made for each of the individual elasticities and we find that $\Gamma_{P_B}^{c_B}, \Gamma_{r_B}^{k_B} > 0$ and $\Gamma_{r_B}^{c_B}, \Gamma_{P_B}^{k_B} < 0$. As a result the B goods balance of trade may either improve or deteriorate ($P_B^*(\Gamma_{P_B}^{c_B} + \Gamma_{r_B}^{c_B}) + r_B^*(\Gamma_{P_B}^{k_B} + \Gamma_{r_B}^{k_B} \gtrless 0$), depending on the relative size of each term.

We would expect that the first bracketed term of (46), reflecting the deterioration due to the price changes alone, and the first term of the second bracketed expression, reflecting the deterioration in A-goods, to outweigh the second term of the bracketed expression, reflecting the change in B-goods trade (which may be negative or positive), and therefore the total trade balance would deteriorate. This roughly corresponds to the Polish situation in 1975. The terms of trade were approximately constant (they actually

increased slightly,) as foreign currency prices increased 14.2% for exports and 14.0% for imports. Poland was running a balance of trade deficit of -7,198 million zloty and was a net importer of food, beverages, tobacco (c_A, c_B), raw materials, machinery and equipment (k_B for the most part but some k_A) and other manufacturers (c_B, k_B), and a net exporter of fuels, electric power and chemicals (k_A for the most part but some k_B) (all S.I.T.C. Classifications for total trade in current prices). Further, the balance of trade deteriorated as indicated by equation (46), but only slightly, 292 million zlotys or 4%.[22]

The second and third cases, in which there is world inflation and a change in the terms of trade can now be considered as well. Letting $\theta_M = \hat{P}_A^* = \hat{P}_B^* = \hat{r}_B^*$ and $\theta_X = \hat{r}_A^*$ we can write equation (48) as:

$$dB^* = -[\theta_X r_A^* E_{k_A}^d + \theta_M(P_A^* E_{c_A}^d + P_B^* E_{c_B}^d + r_B^* E_{k_B}^d)] + \theta_M[P_A^*(\Gamma_{P_B}^{c_A} + \Gamma_{r_B}^{c_A}) + r_A^*(\Gamma_{P_B}^{k_A} + \Gamma_{r_B}^{k_A}) + P_B^*(\Gamma_{P_B}^{c_B} + \Gamma_{r_B}^{c_B}) + r_B^*(\Gamma_{r_B}^{k_B} + \Gamma_{r_B}^{k_B})] \quad (50)$$

Now defining $t = \theta_M/\theta_X$, and $d^* = V_m^*/V_x^*$ where $V_x^* = r_A^* E_{k_A}^d$ and $V_M^* = (P_A^* E_{c_A}^d + P_B^* E_{c_B}^d + r_B^* E_{k_B}^d)$ we have

$$dB^* = \theta_m - (V_x^*(\frac{1}{\epsilon} + d^*) + \frac{1}{R}[P_A^*(\Gamma_{P_B}^{c_A} + \Gamma_{r_B}^{c_A}) + r_A^*(\Gamma_{P_B}^{k_A} + \Gamma_{r_B}^{k_A}) + P_B^*(\Gamma_{P_B}^{c_B} + \Gamma_{r_B}^{c_B}) + r_B^*(\Gamma_{P_B}^{k_B} + \Gamma_{r_B}^{k_B})].[23] \quad (51)$$

We can now see more clearly that the change in the foreign currency balance of trade depends upon the terms of trade, t, the initial balance of trade, d^*, and the relevant elasticities.

Let us consider, as an example, the case of Poland in 1971 and 1972. In 1971 Poland faced a balance of trade deficit of -622 million zloty, with

imports of 16,151 million zloty and exports of 15,489 million. By 1972 export prices had increased 1.4 percent and import prices fell 0.4 percent, clearly improving the terms of trade.[24] Using this information to compute the first term in equation (51) ($1/t = -3.5$, $d^* = 1.043$, $V_x^* = 15,489/R$, $\theta_m = -0.004$), we find that the balance of trade should improve in the short run when there are no changes in real trade flows. We have

$$dB^* = (-.004)(\frac{15,489}{R})(-3.5 + 1.043)$$

$$RdB^* = +152.23 \text{ million zlotys.}$$

However, the second term of (51), which allows for changes in trade flows in response to price changes may offset this. If we assume that the own price effects dominate the cross effects, then $P_B^*(\Gamma_{P_B}^{c_B} + \Gamma_{r_B}^{c_B}$ and $r_B^*(\Gamma_{P_B}^{k_B} + \Gamma_{r_B}^{k_B})$ are positive. Since θ_m is negative the alance of trade as a whole will deteriorate in this case if

$$\frac{1}{R}\,(P_B^*(\Gamma_{P_B}^{c_B}+\Gamma_{r_B}^{c_B})+r_B^*(\Gamma_{P_B}^{k_B}+\Gamma_{r_B}^{k_B})]>[-V_x^*(\frac{1}{t}+d^*)+\frac{1}{R}(P_A^*(\Gamma_{P_B}^{c_A}+\Gamma_{r_B}^{c_A})+r_A^*(\Gamma_{P_B}^{k_A}+\Gamma_{r_B}^{k_A})].$$

In fact, the balance of trade in 1972 deteriorated as the deficit increased from 662 million zloty to 1,479 million. For the balance of trade to deteriorate by this large amount, equation (51) suggests that not only would B goods have to be a large portion of total trade but also that the supply and demand for B goods would have to be much more sensitive to B goods price changes (than the supply and demand for A goods).

The expression above reflects the change in the balance of trade resulting from the change in foreign currency prices which is eventually manifested as a change in the domestic price of B goods. It is clear, however, that this was not the only development which occurred during this period. Vanous (1977) notes that during the early 1970s the relative-price developments on world

markets contributed to the growth of trade deficits of East European countries as a group but this was not the case of Poland. We see above that between 1971 and 1972 the terms of trade effect would have improved the balance of trade by 152.23 million zlotys when in fact the balance of trade deteriorated. This was for the most part due to "the ambitious Polish development program, based on heavy imports of Western technology and rapid growth of industrial production."[25] The impact of the development program clearly outweighs the terms-of-trade effect for this period and is even more pronounced in the later periods.[26]

In 1973 and 1974, the deterioration in the balance of trade as a result of the development program is compounded by the terms-of-trade effect. This is an example of the third case mentioned above as Poland, with a balance of trade deficit, was again faced with world inflation and the terms of trade turned against her. In 1973 prices increased 5.7% for exports, 8.8% for imports and the terms of trade deteriorated by 2.9%. The initial balance of trade deficit was 1,479 million zloty in 1972 as a result of exports of 18,133 million zloty and imports of 19,612 million. Equation (51) indicates that the initial impact of the change in the terms of trade alone would be a deterioration in the balance of trade. Substituting $\theta_m = .088$, $V_x^* = 18,133$, $t = 1.54$ and $d^* = 1.08$ we have: $RdB^* = -2,758.97$ million zloty. The second term in equation (51), again, may either reinforce this or offset the deterioration (as it likely offset the improvement in the case in which the terms of trade improved above). The balance of trade actually deteriorated by much more than the 2,758.97 million zloty which would have resulted from the change in the terms of trade alone. The emphasis on imported technology as a result of the new development plan outweighed any possible price effects which would serve to imporve the trade balance as the balance deteriorated by 3,269 million zloty for a trade deficit in 1973 of 4,748 million zloty. It is clear as Wolf (1978) notes "that we cannot draw simple conclusions about changes in the trade balance based solely on terms of trade trends."[27] We must consider

not only the price elasticities and the initial trade balance but also for the MCPE the central planners' response (in terms of other plan parameters) which may induce further changes in the supply of exports and demand for imports.

Since in all of the cases above the foreign currency balance of trade, and the devisa balance, change (even without a change in real trade flows) the profits (or losses) on price discrepancies will change as well. Then the problems central planners face with respect to changes in price equalization subsidies and potential changes in the domestic money supply, as outlined above for changes in the price of A-type consumer goods, will be encountered as well. The central planners may take actions to counter these developments similar to those described earlier.

5. SUMMARY

This paper extensively examines the impact of exogenous disturbances upon the CPE and MCPE. It provides a critique of earlier work in this area with two specific goals in mind. First, that the traditional methodology for the analysis of balance of payments disturbances for MTEs could be utilized for the CPE and MCPE cases (as demonstrated by the work of Wolf (1977b, 1980, inter alia). Second, that the work to date has generally been oversimplified and there have been errors in the analysis. This work also develops a comprehensive model from microfoundations with emphasis on explicitly tracing the monetary flows. The model is then utilized to illustrate the role of wealth effects generally neglected in earlier analyses.

The fourth section illustrates the impact of several exogenous disturbances upon the balance of payments and the domestic economy of the CPE and MCPE. For the MCPE in the simple case of an increase in the foreign currency price of A-type consumer goods, the foreign currency balance of trade deteriorates and profits (losses in this case) on price discrepancies decrease (increase) if there is initially a balance of trade deficit on these goods. As a result, the government budget surplus (deficit) decreases (increases) as price

equalization subsidies (taxes) increase (fall). There is not necessarily a change in the flow supply of money. However, when foreign currency reserves are depleted, or there is no longer an opportunity to borrow reserves, the authorities must decrease expenditures, increase taxes or finally allow domestic prices to change. Changing the level of taxes, an example considered, is an effective policy tool for influencing the government budget surplus (or deficit) as indicated in equation (47) and for influencing the balance of trade as indicated in equation (44). The change in taxes which returns the balance of trade to equilibrium will only coincidentally be equal to the change in taxes which returns the government deficit to zero. Thus alternative policy tools must be used to achieve both targets simultaneously.

Another case in which the hypothetical MCPE imports c_A, c_B, and k_B while it exports k_A was also considered. Here, when all foreign currency prices increase, the effect upon the balance of trade is more complicated. There is an immediate impact due to the change in value of a constant flow of real goods. If the terms of trade improve, this effect tends to improve the balance of trade. If the terms of trade deteriorate, then the balance of trade does also. The second impact is a slightly longer-run effect in which households and enterprises react to the price changes. It may either improve or worsen the balance of trade but the most likely effect would be to worsen the balance. These effects outline only the impact of foreign currency price changes, assuming the central planners do not intervene and change other planning parameters. If the central planners do change the planning parameters, perhaps emphasizing the import of machinery as in the case of Poland in the early 1970s, they may have an impact upon the balance of trade which outweighs the impact of the changes in foreign currency prices. This appears to have been the case in 1972 and 1973 when the changes in foreign currency prices indicated the potential for a deterioration in the balance of trade. In fact the deterioration was tremendous due not only to the price changes but also to the increased emphasis on imported equipment by the

central planners.

In any case the important point to be emphasized is that CPEs and MCPEs may insulate the domestic economy from world price changes but there is little automaticity to the process and the price-equalization mechanism alone is not adequate.

APPENDIX I:
DERIVATION OF THE FTO'S DEMAND FOR MONEY BALANCES

The FTO's domestic revenues are equal to the amount of expenditures on imported goods by enterprises and households. That is, domestic revenues are:

$$DR = P_A c^d_{A,FT} + P_B c^d_{B,FT} + r_A k^d_{A,FT} + r_B \cdot k^d_{B,FT}, \tag{52}$$

where FT denotes the amount of each good purchased via (or by) the FTO. The FTO's domestic expenditures are equal to the amount it pays enterprises for goods to be exported by the FTO:

$$DE = P_A c^s_{A,FT} + r_A k^s_{A,FT} + P_B c^S_{B,FT} + r_B k^s_{B,FT} \quad . \tag{53}$$

(Note that $c^d_{A,FT} = E^d_{c_A} = c^s_A - c^d_A - g^d_{c_A}$ in the expression for DR and $c^s_{A,FT} = 0$ in the expression for DE when $c^d_A + g^d_{c_A} > c^s_A$. Similarly $c^s_{A,FT} = E^d_{c_A} = c^s_A - c^d_A - g^d_{c_A}$ in the expression for DE and $c^d_{A,FT} = 0$ in the expression for DE when $c^d_A + g^d_{c_A} < c^s_A$. We are assuming that c_A is either exported or imported, but not both. Similarly for c_B, k_A, and k_B in each of these expressions and for the case in which the trade flows are evaluated in foreign currency prices below.) Then the demand for domestic currency deposits before price equalization taxes or subsidies is the difference between the FTO's domestic revenues and expenditures:

$$e^d_{FTO} = P_A E^d_{c_A} + r_A E^d_{k_A} + P_B E^d_{c_B} + r_B E^d_{k_B}, \tag{54}$$

where $E^d_{c_A} = c^s_A - c^d_A$, and $E^d_{c_A} = c^d_{A,FT}$ if $c^s_A - c^d_A < 0$ and $E^d_{c_A} = c^s_{A,FT}$ if $c^s_A - c^d_A > 0$ (similarly for $E^d_{c_B}$, $E^d_{k_A}$, $E^d_{k_B}$). e^d_{FTO} then, is the demand for enterprise deposits which results from the FTO's purchases and sales of A- and B-type goods on domestic markets.

The FTO's foreign revenues are equal to the foreign currency value of the exports which it sells abroad:

$$FR = P_A^* c_{A,FT}^s + P_B^* c_{B,FT}^s + r_A^* k_{A,FT}^s + r_B^* k_{B,FT}^s \cdot \tag{55}$$

For FTO's foreign expenditures are equal to the foreign currency value of the imports which it purchases for domestic users:

$$FE = P_A^* c_{A,FT}^d + r_A^* k_{A,FT}^d + P_B^* c_{B,FT}^d + r_B^* k_{B,FT}^d \cdot \tag{56}$$

The demand for foreign currency holdings before price equalization subsidies or taxes is:

$$f_{FTO}^{d*} = P_A^* E_{c_A}^d + r_A^* E_{k_A}^d + P_B^* E_{c_B}^d + r_B^* E_{k_B}^d \tag{57}$$

where f_{FTO}^{d*} is the demand for enterprise deposits which arise as a result of the FTO's transactions on world markets. The devisa value of these holdings is

$$f_{FTO}^{d'} = R f_{FTO}^{d*} \cdot \tag{58}$$

APPENDIX II:
THE IMPACT OF dP_A UPON THE BALANCE OF PAYMENTS

Differentiating equation (36) of the text and rewriting in terms of elasticities, we have:

$$dB = -\hat{P}_A[P_A(c^d(\zeta_{P_A}^{c_A} + 1) - c_A^s(\varepsilon_{P_A}^{c_A} + 1)) + P_B(c_B^d\zeta_{P_A}^{c_B} - c^s\varepsilon_{P_A}^{c_B}) + r_A(k_A^d\zeta_{P_A}^{k_A} - k_A^s\varepsilon_{P_A}^{k_A}) + r_B(k_B^d\zeta_{P_A}^{k_B} - k_B^s\varepsilon_{P_A}^{k_B})] \quad (59)$$

This expression clearly shows that a change in the domestic price of A-type consumer goods has an impact upon every other commodity and the exact impact upon the domestic currency balance of trade depends upon the relevant supply and demand elasticities. The supply elasticities embody the familiar Holzman-type bottleneck multipliers. See Holzman (1974).

FOOTNOTES

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[1]Holzman (1974).

[2]Wolf (1980) also shows that Ames (1965) made an error when he suggested that if $\Pi_D = 0$ then dA/dR necessarily is non-zero. Wolf writes $\Pi_D = (V_m - V_x) + r(V_x^* - V_m^*)$ from which it can be seen $d\Pi_D/dR$ depends on $B_x^* = V_m^* - V_x^*$, not Π_D itself. This verifies Pryor's (1965) earlier claims.

[3]This result is found in Wolf (1978b) and Brada (1978a) in a macroeconomic setting and in a microeconomic context in Kemme (1982).

[4]Holzman (1974), Chapter 5.

[5]See Wolf (1980) for details.

[6]Wolf (1978b), p. 41.

[7]Wolf (1978b) also examines the impact of exchange rate adjustments on the trade balance in CPEs and MTEs. He does not make the distinction between notional and effective balance though.

[8]For a detailed derivation of the partial derivatives and their signs see Kemme (1980).

[9]See Podolski (1972) for a thorough description of socialist banking in Poland and a description of the potential credit creation capabilities of enterprises.

[10]Plowiec (1972) notes that in Poland "the domestic suppliers [may]..., independently of whether they export goods through the foreign trade enterprise operating as a buyer for its own account or as a commission agent, receive for the export goods -- at a given level of the conversion factor -- transactional prices..." Here the conversion factor is analogous to the exchange rate and transactional prices are the domestic prices. These types of transactions may be even more important in Poland today.

[11]Kemme (1980) also considers the case in which exports or some portion of exports are determined exogenously.

[12]We assume for simplicity that there is only one exchange rate, R, for imports and exports and A and B goods. In practice there may be several differentiated exchange rates for different types of goods.

[13]See Teske, (1972) and Melson and Snell (1977), for evidence that in fact remittances from abroad in the case of Poland are substantial.

[14]We later substitute $E^d_{c_A}$ for $c^s_A - c^d_A - g^d_{c_A}$, etc., to represent the excess flow demand for A-type consumer goods. With no trade controls this simply flows abroad as a demand for imports or supply of exports.

[15]We assume, as is usually the case, that profits or losses on price discrepancies are completely offset. An interesting problem arises if they are not, however. If the FTO then accumulates deposits (if profits are earned) on its own account and may use them as it desires, the FTO is no longer a passive actor and the problem becomes somewhat more complex.

[16]The government budget in most CPEs and MCPEs has a "balancing fund" for just such a purpose.

[17]We maintain the distinction between f^s and e^s, and carry through the FTO's demands for money balances even though they net out when price equalization subsidies are introduced. This allows us to examine the impact upon these flows of deposits when foreign currency prices change. It is of particular interest when the FTO may be permitted to spend the balances domestically.

[18]Below we may refer to profits on price discrepancies even though they are losses. That is, Π_D is simply negative in such cases. Similarly, A, may be referred to as taxes but when negative is actually subsidies.

[19]Fallenbuchl (1977).

[20]As of 1971, Plowiec (1972), p. 62, notes that "the system of establishing prices for imports has been applied only to machinery and installations and some raw materials not produced domestically." These we consider as k_B. Although it is not true that consumer goods are not exported we assume for simplicity that both are imported only. Again Ploweic (1972), p. 17, notes that the import of certain consumer goods should be controlled. These we consider c_A. Of course the system of foreign trade has changed considerably through the 1970s and these are considered only as possible examples.

[21]The first case, world inflation with constant terms of trade is roughly analogous to the Polish situation in 1975. The terms of trade, for total trade, acutally improved but only slightly, .2%. (For trade with advanced industrial countries only they improved 5.1%.) In 1971 the terms of trade (for total trade) improved by 4.3% (13.8% for trade with the advanced industrial countries). These years are analogous to case two, world inflation with an improvement in the terms of trade. The third case, world inflation and a deterioration in the terms of trade occurred in 1973 and 1974 as the terms of trade (for total trade) deteriorated by -2.8% and -.5% respectively.

(For trade with the advanced industrial countries the terms of trade deteriorated by -8.8% in 1973 but improved 9.4% in 1974.) The terms of trade also improved in 1976 but deteriorated in 1977. See Fallenbuchl et al, (1977), p. 56, for data pertaining to 1971-1975 and Fallenbuchl (1977), p. 837 for 1976 and 1977.

[22]See Fallenbuchl, et al. (1977).

[23]This expression is similar to Wolf (1978b) expression (1) and (10b) except that we are considering the foreign currency balance of trade. Wolf considers in (1) an exogenous change in foreign currency prices and exports for the small open economy and in (10b) the same changes for the CPE. Here we are considering changes in the foreign currency prices of imports and exports, as well as the changes in imports and exports induced by those price changes. Our example assumes that households and some enterprises (particularly B-type enterprises) are free to import or export goods on their own. Changes in the flow of imports were not considered in (10b) by Wolf since they were assumed to be completely controlled by the central planners.

[24]See Fallenbuchl, et al. (1977) for further details.

[25]Vanous (1977), p. 8.

[26]In this case, when the terms of trade improve in 1972, the terms of trade effect would indicate an improvement in the balance of trade. The longer run effect, the second term in expression (51), indicates the balance of trade may deteriorate if the own price elasticities are greater than the cross price elasticities. This longer-run effect, alone, without the development program emphasizing Western imports may have been enough to cause the deterioration in the balance of trade.

[27]Wolf (1978b), pp. 7, 8.

REFERENCES

Ames, Edward, 1953. "The Exchange Rate in Soviet Type Economics." Review of Economics and Statistics, 35: 337-42.

_____. 1965. Soviet Economic Processes. Homewood, Ill.: Richard D. Irwin, Inc.

Brada, Josef C. 1977. "Foreign Trade Adjustment Mechanism in a Classical Centrally Planned Economy." Working paper #77-28, May.

Fallenbuchl, Zbigniew M., 1977. "The Polish Economy in the 1970's" in U.S. Congress, Joint Economic Committee, East European Economies Post-Heisinki. Washington, D.C.: USGPO: 816-864.

_____. 1978a. "Achieving Internal and External Equilibrium in a Centrally Planned Economy: A Macroeconomic Model for Evaluating Polish Policy Options in the 1970s and Beyond." Mimeograph.

_____. 1978b. "The Response of CMEA Countries to Exogenous Economic Disturbances, A Comment and Synthesis," in Paul Marer and J.M. Montias (eds.), East European Integration and East-West Trade. Bloomington: Indiana University Press: 111-118.

_____. 1982. "Real and Monetary Approaches to Foreign Trade Adjustment Mechanisms in Centrally Planned Economies-A Reconciliation." European Economic Review, 19: 229-244.

Fallenbuchl, Zbigniew M., Egon Neuberger, and Laura D'Andrea Tyson. 1977. "East European Reactions to International Commodity Inflation," in US Congress, Joint Economic Committee, East European Economies Post-Helsinki. Washington, D.C.: USGPO: 54-101.

Hoeffding, Oleg. 1968. "Recent Structural Changes and Balance of Payments Adjustments in Soviet Foreign Trade," in Alan A. Brown and Egon Neuberger (eds.), International Trade and Central Planning: An Analysis of Economic Interactions. Berkeley and Los Angeles: University of California Press: 312-317.

Holzman, Franklyn D. 1968. "Soviet Central Planning and Its Impact on Foreign Trade Behavior and Adjustment Mechanisms," in Alan A. Brown and Egon Neuberger (eds.), International Trade and Central Planning: An Analysis of Economic Interactions. Berkeley and Los Angeles: University of California Press: 280-305.

_____. 1974. Foreign Trade Under Central Planning. Cambridge, Mass.: Harvard University Press.

_____. 1980. "Internal and External Balance in a Centrally Planned Economy: Discussion," in Egon Neuberger and Laura D'Andrea Tyson (eds.), The Impact of International Economic Disturbances on the Soviet Union and Eastern Europe: Transmission and Response. New York: Pergamon Press: 113-118.

Kemme, David M. 1980. "A Disequilibrium Macroeconomic Model of the Modified

Centrally Planned Economy: Poland." Unpublished Ph.D. dissertation, Columbus, OH: The Ohio State University.

_____. 1982. "Microeconomic Efficiency in the Polish Enterprise During the NEM Period." Economics of Planning, 18:1: 11-21.

Melson, Kathryn, and Edwin M. Snell. 1977. "Estimating East European Indebtedness to the West," in US Congress, Joint Economic Committee, East European Economies Post-Helsinki. Washington, D.C.: USGPO: 1369-1395.

Neuberger, Egon and Laura D. Tyson. 1980. The Impact of International Economic Disturbances on the Soviet Union and Eastern Europe. New York: Pergamon Press.

Ploweic, Ursula. 1972. "Poland's Foreign Trade Control System in 1971." Problemy Handlu Zagranicynego, #4.

Podolski, T.M. 1972. Socialist Banking and Monetary Control: The Experience of Poland. Cambridge: Cambridge University Press.

Portes, Richard. 1976. "Macroeconomic Equilibrium and Disequilibrium in CPEs: A Model for Empirical Application." Discussion Paper No. 45. Birkbeek College, University of London.

_____. 1977. "The Control of Inflation: Lessons from East European Experience." Economica, 44: 109-130.

_____. 1978. "Macroeconometric Modelling of Centrally Planned Economies: Thoughts on SOVMOD-1." Harvard Institute of Economic Research: Discussion Paper Number 621, May.

_____. 1979. "Internal and External Balance in a Centrally Planned Economy." Journal of Comparative Economics, 3: 325-345.

Pryor, Frederic L. 1965. Public Expenditures in Communist and Capitalist Nations. Homewood, Ill.: Richard D. Irwin, Inc.

Teske, Gary R. 1972. "Poland's Trade with the Developed West: Performance and Prospects," in US Congress, Joint Economic Committee, East European Economics Post-Helsinki. Washington, D.C.: USGPO: 1312-1324.

Vanous, Jan. 1972. "The Determination of East-West Trade Flows and the Causes of Deficit Spending of CMEA Economies." University of Pennsylvania: Discussion Paper #376.

Wolf, Thomas. 1977a. "East-West European Trade Relations," in U.S. Congress, Joint Economic Committee, East European Economies Post-Helsinki. Washington, D.C.: USGPO: 1042-1054.

_____. 1977b. "External Inflation and Revaluation in Centrally Planned Economies." Preliminary version presented at the Ninth National Convention of AAASS, Washington, D.C., October 14.

_____. 1978a. "Exchange-Rate Adjustments in Small Market and Centrally Planned Economies." Journal of Comparative Economics, 2: 226-245.

_____. 1978b. "On the Adjustment of Centrally Planned Economies to External Economic Disturbances," in Paul Marer and J.M. Montias (eds.), East

European Integration and East-West Trade. Bloomington: Indiana University Press: 86-111.

_____. 1980. "External Inflation, the Balance of Trade and Resource Allocation in Small Centrally Planned Economies," in Egon Neuberger and Laura D'Andrea Tyson (eds.), The Impact of International Economic Disturbances on the Soviet Union and Eastern Europe. New York: Pergamon Press: 63-87.

_____. n.d. "Imported Inflation in Market and Centrally Planned Economies," Studien uber Wirtschafts--und Systemvergleiche, Band 9.

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