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**The Exchange Rate and
the Price Level in Socialist Economies**

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Abstract

The paper examines how the evolution from a classical centrally planned economy to a more market-oriented system will enhance the linkage between the exchange rate and the domestic price level. However, during the transition--as the economy continues to be predominantly state-owned, the inherited production structure is only gradually modified, capital and labor mobility are still relatively low and financial discipline is less-than-complete--the elasticity of the domestic price level with respect to a change in the exchange rate, or, to a change in world market prices, may still be lower than in an otherwise comparable market economy.

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Summary

This paper considers the systemic environment that determines the link between the exchange rate and the price level. It focuses on how the evolution from a classical centrally planned economy--in which the exchange rate is intended to affect neither domestic prices nor resource allocation--to a more market-oriented system may be expected to enhance the elasticity of the domestic price level with respect to a change in the exchange rate ("the pass-through elasticity").

The paper distinguishes between a modified planned economy (MPE)--in which enterprise autonomy and profit-orientation are enhanced and some linkage between domestic and world market prices is created--and a market-oriented socialist economy (MOSE) in which the role of the market in resource allocation is made preeminent, but the majority of enterprises continue, at least in the transition, to be owned by the state.

In the MPE, which may be viewed as a stylized version of the Hungarian economy beginning in 1968 and the Polish economy in the 1980s, the pass-through elasticity was also very sensitive to the various pricing rules embedded in the partially reformed economic system.

The pass-through elasticity is no longer "administered" in the MOSE, and the paper shows that its value is a function of several standard trade model parameters. The magnitude of these parameters, however, may differ between the transitional MOSE and the otherwise comparable market economy characterized by predominantly private ownership. In particular, the paper suggests that the proportion of expenditure accounted for by true tradables--on convertible currency markets--and the elasticities of substitution in demand and supply may be lower in the MOSE, owing to the inherited production structure, relatively low capital and labor mobility, and less-than-complete financial discipline. As a result, during the transition the exchange rate pass-through elasticity could be expected to be lower in the MOSE than in the usual, stylized market economy.

I. Introduction

The impact of a change in the exchange rate on the price level in planned economies has long been a controversial subject. As these economies undertake market-oriented reforms, including reforms of the exchange rate and price systems, this issue takes on even greater significance. The paper focuses on the effect that such reforms have on the role of the exchange rate as a transmission belt to the domestic market of inflation in world markets, and on the impact that changes in the exchange rate may be expected to have on domestic prices. The paper is therefore concerned with the systemic environment that determines the link between the exchange rate and the price level, rather than with the price level effects of different exchange rate policies that might be carried out within a given economic system.

The second section of the paper very briefly summarizes the linkage, or the lack thereof, between the exchange rate and domestic prices in the classical centrally planned economy (CPE). Until quite recently, the majority of the member countries of the Council for Mutual Economic Assistance (CMEA) 1/ can be said to have been, practically speaking, CPEs.

Section III discusses the role of the exchange rate in influencing domestic prices in the modified planned economy (MPE), in which the exchange rate takes on an economic rather than just an accounting function and economic activity is partially decentralized. The MPE may be viewed as a stylized version of the Hungarian economy beginning in 1968 and the Polish economy after 1981 and, in certain respects, even in the 1970s.

In Section IV, the paper addresses the relationship between the exchange rate and the price level in economies that have increased their degree of market orientation beyond that to be found in MPEs and are in the process of moving from virtually total state ownership of the means of production to a more mixed ownership system. Such economies will be denoted as market-oriented socialist economies (MOSEs); virtually all members of the CMEA now appear to be moving towards an economy of this type. As viewed in this paper, the MOSE is market-oriented but not yet a full-blown market economy (ME) in the sense of warranting stylization in terms of perfect competition, unimpeded factor mobility and complete enterprise financial discipline. As will be seen, these differences may cause the exchange rate to have less of an impact on the price level in a MOSE than in the stylized ME. Some concluding remarks are contained in Section V.

1/ The member countries of the CMEA are Bulgaria, Cuba, Czechoslovakia, the German Democratic Republic, Hungary, Mongolia, Poland, Romania, the Soviet Union and Vietnam.

II. The Centrally Planned Economy

Close observers of the CPEs are certainly well aware that the official or "external" exchange rate under classical central planning had almost exclusively an accounting function and played little or no economic role. The CPE was characterized by strict separation of more or less fixed administered domestic prices from the foreign currency prices for tradables. These foreign currency prices were converted into so-called valuta or devisa values at an external exchange rate typically based on an obsolete gold parity. The profits and losses of the state-owned, monopolistic foreign trade organizations (FTOs), which were determined by the differences between the valuta prices in foreign trade and the structure of administered domestic producer prices, were effectively neutralized by the system of automatic price equalization taxes and subsidies. ^{1/} One of the main objectives of the system was to insulate the economy from external disturbances, and the price-equalization mechanism served this function quite well insofar as the domestic price system was concerned. Moreover, domestic producers were indifferent between selling their output domestically or for export because the price they received in local currency was the same in either case. A change in the external exchange rate generally was not intended to affect the domestic price level and in practice influenced simply the budgetary fiscal position vis-à-vis the FTOs--through its effect on the net outcome of the price equalization operations--rather than the volume of trade or the prices at which tradables were sold domestically. ^{2/}

III. The Modified Planned Economy

The official exchange rate only began to acquire an economic function in the context of reforms that were intended, inter alia, to expand enterprise autonomy vis-à-vis the planners, including through the elimination of detailed central planning of inputs, outputs and foreign trade; to make enterprise profitability rather than plan fulfillment the main evaluation criterion and incentive; and to liberalize many prices and link others at least more closely, through the exchange rate, to world market prices. Although these and other modifications went in the direction of increasing the market orientation of these economies, the role of the central authorities remained dominant, with much of the economy still subject to an array of direct controls--including administered and indirectly controlled prices--and with virtually the entire enterprise sector engaged in a complex system of bargaining with the governmental bureaucracy over a range of financial instruments, including subsidies, tax reliefs and preferential credits. In this

^{1/} For further detail, see Pryor (1963), Holzman (1974) and Wolf (1980a, 1985).

^{2/} This is not to say that various shadow price approaches to exchange rate calculation necessarily had little economic significance (see the survey in Wolf (1985)), but certainly such approaches had little influence on the price level.

sense, these economies represented modified planned economies (MPEs) rather than mainly market-oriented societies. 1/

In the MPE, the exchange rate system was typically fundamentally reformed. Usually, a single commercial exchange rate (for each currency area) was established which was intended to reflect to some extent the average domestic cost of earning one unit of foreign exchange through exporting. 2/ This commercial rate was used to calculate so-called transaction prices for traded goods which were meant to be the prices, in terms of domestic currency, which exporters and importers respectively received and paid. In principle, the price equalization mechanism--which effectively meant that each commodity carried its own implicit exchange rate--was to be abandoned in the MPE with the establishment of a unified commercial rate, but as a practical matter it continued, although with a generally reduced scope. 3/

The analysis of the relationship between the exchange rate and inflation in such an economy has typically proceeded along two, somewhat different lines. The first approach, favored until now by many East European economists, has stressed input-output relationships and the fundamentally administered nature of the linkage between the exchange rate and the price level. The second approach tends to be more stylized and emphasizes enterprise behavior, the possibility of variable proportions and short-term substitution, the demand side and the financial policy stance of the authorities.

Before describing these two approaches, it will be useful to distinguish analytically among three composite goods: products that actually enter into foreign trade, denoted in this paper as "traded goods" (T goods); tradables that happen not to enter foreign trade--"nontraded tradables" (NT goods); and nontradables in the usual sense

1/ For a fuller discussion of the modified planned economy, see Wolf (1988c). See also Böhm (1986).

2/ In some cases, such as in Hungary in 1981 and Poland in 1982, the commercial and noncommercial exchange rates for convertible currency transactions were unified. There have been intermediate exchange rate systems, as well, including the use of differential valuta coefficients or differential "internal" exchange rates. See Wolf (1985).

3/ In Poland, the operation during 1987-89 of several officially-sanctioned foreign currency auctions--alongside the system of central allocation of foreign exchange at the official exchange rate combined with partial retention accounts for exporters--proved to be a transitional step towards unification of the exchange rate for most commercial transactions in a so-called principal market for foreign exchange at the beginning of 1990. To the extent that enterprises using foreign exchange obtained through auctions were able to sell imported goods on the domestic market at prices reflecting the generally more depreciated auction exchange rates, an upward nudge would have been given to the price level that was unrelated to movements in the official exchange rate.

(N goods). In the small stylized market economy the categories collapse to two--tradables and nontradables--because of the assumed existence of international commodity arbitrage for all tradables.

1. The input-output, administered elasticity approach

This approach, as outlined in considerable detail in Piotrowski (1989), visualizes the economy in the context of an input-output framework and assumes that elasticities of substitution among commodities are essentially zero. The exchange rate passthrough elasticity (i.e., the elasticity of the domestic price level with respect to a change in the exchange rate) is viewed as being determined by four main factors. ^{1/} In general, the passthrough elasticity is said to be larger: (1) the greater the allowed scope for genuine transaction pricing of imports when sold on the domestic market; ^{2/} (2) the greater the extent to which the prices of nontraded tradables are affected by transaction prices on traded goods; (3) the broader the scope for enterprises to raise their prices due to cost increases beyond their control (e.g., due to higher costs of their inputs, whether imported directly or produced in turn at least partly on the basis of imported inputs); and (4) the greater the extent to which the authorities set administered prices as a (usually lagged) function of changes in transaction prices for imports.

The proponents of this approach typically stress not only the importance of various pricing conventions in the MPE, but also the strongly interventionist role that may be played by the authorities. Thus, while the value of the passthrough elasticity is very much determined by production relations quantified in these countries' input-output tables and strong assumptions as to the elasticities of substitution, it is also an administered elasticity given the active role of the price controllers. The estimated passthrough elasticity appears to be quite sensitive to the authors' assumptions regarding the extent to which the prices of nontraded tradables (the NT goods) may move with the transaction prices of traded goods. Not surprisingly, the passthrough elasticities estimated by Hungarian researchers for the 1980s (in the range of 0.40 to 0.65) ^{3/} tended to exceed those calculated by Polish economists (0.15 to 0.30). ^{4/} This reflected the

^{1/} Also see Ledworowski, et al (1984), Tarafas and Szabo (1985) and Simon (1987).

^{2/} Recall that the transaction price is simply defined as the foreign currency price times the commercial exchange rate. Whether the import is sold domestically at this price (plus some mark-up) or is subject to price equalization is quite another matter.

The transaction prices of actual exports, while presumably affecting the GDP (NMP) deflator, would not directly affect the price level faced on domestic markets by domestic agents, at least if there is a clear distinction between T and NT goods--see point (2) and Section IV.

^{3/} Tarafas and Szabo (1985) and Simon (1987).

^{4/} Ledworowski, et al (1984) and Piotrowski (1989).

various price rules of the Hungarian economy in that period which were meant to link a very broad range of domestic prices to foreign currency prices. ^{1/} The first and second factors mentioned above were thought to be particularly strong in the Hungarian case under the so-called "competitive" system and later modifications to this system in the mid-1980s. ^{2/}

A key assumption of this approach, namely, that the elasticities of substitution in demand and supply are zero or at best negligible, leads to the conclusion that whatever the magnitude of the passthrough elasticity, the trade balance impact of a devaluation will also be zero or negligible. As a result, many East European economists have emphasized the inflationary impact of a devaluation, in some cases virtually to the exclusion of its trade balance effects.

2. A tradable-nontradable approach

An alternative approach to the issue of exchange rate passthrough assumes that for some set of products international commodity arbitrage--or the simulation of its results, as in much of the Hungarian price system in the 1980s--could reasonably be postulated. In effect, this set of goods becomes, in terms of formal modeling, a composite tradable, while all other goods are lumped together as either a fixed-price composite or a composite good the price of which is administratively manipulated or, in some other way, closely controlled. At the same time, elasticities of substitution on both the demand and supply sides are assumed to be, in general, non-negligible, thereby permitting real output, expenditure and foreign trade responses to the changes in relative prices caused by a change in the commercial exchange rate. At the same time, specific assumptions are made about the policy stance of the fiscal and monetary authorities and the level and the structure of final demand at different relative prices; the possibility of initial excess demand pressures is also taken into account.

Such an approach is broadly in the spirit of the basic tradable-nontradable models of the 1970s which sought explicitly to integrate the macro- and microeconomics of devaluation analysis, typically in a real balance framework. ^{3/} To the extent that macroeconomic policies are non-accommodative of the price level effects of devaluation, this modified tradable-nontradable model demonstrates that devaluation could indeed have an impact on foreign trade volumes and the trade balance, if

^{1/} See Wolf (1988a). It should be noted, however, that Simon and Veress (1984), in a cross-section study of the Hungarian economy for the period 1981-83, found no evidence of a systematic correlation between foreign trade and domestic prices for similar products.

^{2/} For descriptions and analyses of the Hungarian and Polish price and exchange rate systems in this period, see International Monetary Fund (1989a, 1989b).

^{3/} See Dornbusch (1973) and Krueger (1974). An early application of this type of model to the MPE appears in Wolf (1978).

enterprises could be reasonably assumed to be sensitive to changes in relative prices. It also shows, however, that the trade balance effects--in terms of the balance denominated in foreign currency--could be perverse if the devaluation (or, alternatively, inflation on world markets) causes a widening distortion between the domestic and world market price structures and this in effect is financed by a growing net price equalization subsidy. Such an outcome is possible due to the assumption that only a subset of goods would be subject to actual or simulated international commodity arbitrage, and at least in the 1970s and 1980s in both Hungary and Poland, this type of outcome was more than just a theoretical possibility. 1/

Given the assumption that substitution elasticities are generally non-zero, this approach tends to emphasize the quantity responses to a devaluation (or, alternatively, to a change in the structure and level of prices caused by world market price movements) rather than the inflationary consequences. One study, however, set out explicitly the assumptions that would have to be made to yield the predominantly inflationary effect that some East European economists 2/ have assumed would arise from devaluation. In particular, it was shown that the price level effects of a devaluation in a stylized MPE depend critically on (1) the extent to which domestic prices of nontraded tradables are automatically or at least economically linked to the prices of traded goods; (2) the degree to which monetary policy accommodates the initial price level effects of the devaluation; (3) the response of enterprises and consumers to changes in domestic relative prices; and (4) the extent to which the economy is a price-taker on world markets (Wolf (1988b)). Clearly, if a country faces a downward sloping rest-of-the world demand curve for its exports, the ceteris paribus impact on the domestic price level of a devaluation will be less than if it is a price taker on international markets.

In addition to examining the direct impact of exchange rate changes on the price level in an MPE, studies of this genre have addressed as well the implications of devaluation for the degree of repressed inflation in these economies. Given the assumption that a more than negligible share of prices--for both nontraded tradables as well as nontradables--remains fixed in the MPE or at least is not fully liberalized, this approach notes that less than full passthrough of the price effects of a devaluation may cause or exacerbate existing excess demand pressures on the domestic market. As discussed in Wolf (1990), heightened excess demand in this case could be expected for at least three reasons: (1) the devaluation would increase the profits of exporting enterprises and thus the level of wages they could afford to

1/ Wolf (1980b). This study also showed, for example, that in a MPE a deterioration in the external terms of trade could easily be translated into an improvement in the internal terms of trade and perverse, by world market standards, shifts in domestic production and consumption.

2/ For example, see Tarafas and Szabo (1985).

pay, and the higher level of these money incomes would generally not be offset in the MPE by lower money incomes in other sectors or by a higher price level; (2) excess demand for those goods actually exported would increase as suppliers divert products from the domestic market while the domestic relative price of these goods, the price level and therefore the demand for these goods, remain relatively unchanged; and (3) to the extent that the increased incentive to export actually causes a shift in output toward exports, the supply of other goods available to domestic users, at unchanged relative prices, would also decline. This excess demand problem would, of course, be lessened to the extent that transaction pricing were effectively expanded to all nontraded tradables.

While permitting the adjustment process in MPEs to be analyzed in a macroeconomic and trade theoretic context consistent with mainstream western economics, this modified tradable-nontradable model has not been without its detractors, especially in Eastern Europe. In effect, the approach has been criticized not for lacking some useful analytical insights, but for providing a basically oversimplified and "premature" view of the workings of markets in MPEs. 1/ While retaining the institutional features of widespread price control and de facto price equalization, this approach has generally assumed a degree of enterprise financial discipline, implicit factor mobility and, possibly, financial market integration which has heretofore generally been lacking in Eastern Europe. It has also tended to take the price system as a given, and has tended to ignore the strongly interventionist role of the price and foreign trade authorities so often emphasized by East European observers. To the extent that these criticisms are valid, this approach indeed may be more relevant to the next stage of evolution of planned economies, namely, to genuinely market-oriented socialist economies, to which the next section is devoted. 2/

IV. The Market-Oriented Socialist Economy

Recent months have witnessed an acceleration in market-oriented reforms in many planned economies, and some countries would appear to be moving into a new phase in the evolution away from classical planning. While the target system remains only vaguely defined in most instances, the next stage would seem likely to involve substantial further price and foreign exchange liberalization, significant steps toward development of integrated capital and labor markets, expanded enterprise autonomy--including in foreign trade--and increasing privatization of

1/ For example, Tardos (1980), Michalski (1987), and Piotrowski (1989).

2/ Some East European observers, it should be noted, have explicitly rejected the extrapolation of the alleged past ineffectiveness of an active exchange rate policy of MPEs to a stabilization program setting in which enterprises are subject to financial discipline. For example, see Botos and Riecke (1985), Oblath (1987) and Csoor (1988).

the economy. Although the latter development could progress quite rapidly in some countries, each of the heretofore planned economies is likely to have a predominantly state-owned enterprise sector for some time to come. Such an economy might therefore be characterized as a market-oriented socialist economy (MOSE), in which markets increasingly come to dominate the process of resource allocation but which during some transition period may not be as efficient as in the stylized market economy.

Evaluation of the likely impact of a change in the exchange rate on the price level in the MOSE can usefully begin from a similar analysis for the stylized market economy. Presented in Appendix I is an expression for the passthrough elasticity for a fully employed, "small" market economy characterized by two composite goods--a tradable and nontradable--and one financial asset, money. The expression was derived on the assumption that a devaluation will in general cause a decline in real money balances, which in turn will stimulate a cutback in real expenditure to generate a trade surplus in order to build back nominal and real balances (Wolf (1988a)).

In Appendix I the sensitivity of the passthrough elasticity (i.e., the responsiveness of the price level to a change in the exchange rate) to *ceteris paribus* changes in various factors is derived; these results are summarized in Table 1. First, this elasticity will be greater, the larger (smaller) the weight of tradables (nontradables) in domestic expenditure. This is because in the small open economy, with efficient markets, the domestic prices of tradables will--within a reasonable time period--rise proportionately with an increase in the exchange rate. At the same time, due to the increase in the relative price of tradables, excess demand for the nontradables will be generated which will put upward pressure on their prices. The rise in the overall price level, however, will reduce the real value of money balances, which will lead consumers to cut back their real demand for goods and their real spending. This reduction in aggregate demand will offset part of the excess demand for nontradables induced by the fall in their relative price, and will effectively keep their price from rising proportionately to that for tradables. 1/ Consequently, the larger the weight of tradables in the overall expenditure basket, the greater the increase in the overall price level, *ceteris paribus*, with a devaluation.

Second, the passthrough elasticity will be greater, the larger the elasticities of substitution, in both demand and supply, between the tradables and nontradables with respect to changes in their relative price. 2/ This is because the greater are these elasticities, the larger the initial excess demand for the nontradable induced by a fall in its relative price with devaluation, and therefore the larger the

1/ This, of course, is the standard result described in Dornbusch (1973) and Krueger (1974).

2/ Technically speaking, it is the absolute and not the algebraic value of the elasticity of demand that is being referred to here.

Table 1. Sensitivity of the Exchange Rate Passthrough Elasticity to Changes in Various Factors

<u>Factor</u>	<u>Ceteris paribus direction of change in exchange rate passthrough elasticity</u>
Weight of tradables in domestic expenditure <u>1/</u>	+
Elasticity of substitution in demand (absolute value) between tradables and nontradables, with respect to a change in their relative price <u>2/</u>	+
Elasticity of substitution in supply between tradables and nontradables, with respect to a change in their relative price <u>2/</u>	+
Elasticity of real expenditure on nontradables with respect to a change in aggregate real expenditure	-
Rate of adjustment of saving over time to an imbalance between desired and actual real money balances	-
Rate of accommodation of the monetary authorities to an increase in the price level	+
Elasticity of demand for money with respect to a change in the price level	-

1/ The sign for the weight of nontradables in expenditure would, correspondingly, be negative.

2/ Strictly speaking, in terms of expression (1) in Appendix I, the elasticity of domestic demand for (supply of) the tradable with respect to a change in its relative price.

induced rise in the nominal price of this good. ^{1/} Similarly, the passthrough elasticity will be smaller, the greater the elasticity of real expenditure on nontradables with respect to a change in aggregate real expenditure. In other words, the more responsive the demand for (and expenditure on) the nontradable is to changes in overall spending, the greater the offset of the expenditure-reducing effect on emerging excess demand for the nontradable and therefore the less upward pressure on its nominal price.

A fourth factor is the rate, within a given period, at which economic agents adjust their saving to the decline in their real money balances initially associated with a devaluation. The faster agents attempt to rebuild their savings, the greater will be the near-term decline in aggregate real expenditure, the smaller will be the magnitude of excess demand for the nontradable, and again the less the upward pressure on its price.

The fifth factor is essentially a policy variable, namely, the extent to which the authorities "accommodate" the increase in the price level stemming from devaluation with an increase in credit and the supply of nominal money. This factor, a type of reaction function in the framework utilized here, also subsumes the policy on wages if it is assumed that a ceteris paribus increase in nominal wages would have to be financed by increased credit to enterprises or to government (which in turn might provide fiscal reliefs to enterprises to enable them to raise wages). The greater the degree of monetary accommodation, the larger will be the passthrough elasticity, as credit creation partially or wholly offsets the decline in real money balances and nullifies the expenditure-reducing effect of devaluation.

Sixth, the passthrough elasticity will be smaller, the larger the elasticity of demand for money with respect to increases in the price level. This is because the greater the elasticity of demand for money, the more likely consumers will respond to an increase in tradable prices following devaluation by reducing expenditure on both tradables and nontradables to build back real savings, and the smaller will be the emergent net excess demand for nontradables and the upward pressure on their nominal prices.

The issue that arises is which, if any, of the above factors is likely to differ materially as between a market-oriented socialist economy and a stylized market economy. Provided that the macroeconomic policy stance of the authorities is the same under both systems, the

^{1/} Observe that in the market economy or MOSE, there is no presumption that the size of the passthrough elasticity and the magnitude of the trade balance effect of a devaluation need be inversely related. Indeed, the ceteris paribus effects of larger elasticities of substitution will be both an increased passthrough elasticity and a larger trade balance impact.

impact of the "accommodation" factor should be the same. ^{1/} Likewise, there would appear to be little reason to assume that the relative expenditure elasticity for nontradables would necessarily differ materially as between the transitional MOSE and a market economy.

With regard to the elasticity of demand for money in respect to changes in the price level, and the rate of adjustment over time of economic agents to an exogenous decline in their real money balances, however, it might be reasonable to assume that the MOSE, at least in a transitional phase, might have a narrower array of financial assets. In general, then, we might expect the elasticity of money demand of economic agents with respect to changes in both prices and income and possibly their rate of adjustment to a change in real balances, to be different in the two types of economies, although without a more complex formal model the relative size of these parameters is ambiguous. ^{2/}

Two of the factors listed in Table 1, however, may be viewed as being systemically conditioned in light of the fact that the MOSE, at least in its early stages, represents a transitional economy. One of these elements is the weight of tradables in domestic expenditure; the other is the magnitude of the elasticities of substitution between tradables and nontradables on the demand and supply sides, respectively.

Conceptualizing the economy in terms of two composite goods, tradables and nontradables, involves a strong assumption about the efficiency of domestic markets for tradables. In particular, one must assume that domestic markets are subject to the usual commodity arbitrage conditions, in that an increase in the price of traded goods relative to that of nontraded tradables, due to a devaluation, will lead to some combination of a diversion of goods toward export and a decrease in imports and price changes such that this price differential is eliminated.

It should be recognized that the MOSE is likely to inherit a production structure for which a considerable share of output--particularly of manufactures--has only low substitutability with goods exported to the convertible currency area. This would apply in general to production for the home market as well as for export to the CMEA. If tradables sold on the domestic market are poor substitutes for those exported for convertible currency and/or liberalized prices for the

^{1/} It could be argued, however, that in any economy with a large state sector, the authorities may find it difficult not to engage in some deficit financing of state enterprises. In a market economy with a large state sector, they may compensate by curbing credit to the private sector, whereas in a MOSE the scope for such compensation may still be narrow. In this view, the macroeconomic policy of the state would in general be less tight in the MOSE than in the market economy.

^{2/} Recall that the simple model utilized in this paper implicitly assumes away this particular comparison by postulating the existence of just one financial asset and no interest rate.

former are still sluggish, the assumption of full passthrough for all tradables could be ill-founded. Of course, even if substitutability were low at the final product level, the prices of nontraded tradables could still rise as exporters, faced with increased relative prices, bid for inputs to boost production for sale abroad. For a given time period, however, this indirect price effect would likely be smaller than that resulting as well from direct arbitrage, and the passthrough elasticity would be smaller than in the stylized market economy.

One approach to this problem would be explicitly to consider nontraded tradables as a third substitutable composite good, although this creates enormous analytical complexities. ^{1/} An alternative approach, followed here, is conceptually to lump some portion of nontraded tradables together with nontradables, thereby reducing the weight of the set of goods that can reasonably be considered as conforming to the properties usually attributed to tradables in the tradable-nontradable model. The implication would be that the passthrough elasticity would be smaller in the MOSE than in the market economy.

A second element of the passthrough elasticity equation which might differ in value significantly between a MOSE and a market economy is the combined elasticity of substitution between tradables and nontradables. ^{2/} On both the supply and the demand side, at the enterprise level, the elasticity of substitution might be lower in a MOSE than in an otherwise comparable market economy due to a lesser degree of capital and labor mobility during the transitional phase, and less-than-complete financial discipline, particularly in state-owned enterprises. With regard to financial discipline, it could be argued, of course, that assumed differences in the degree of financial discipline would be inconsistent with the assumption of a comparable monetary policy stance in both types of economy, inasmuch as the indiscipline at the micro level simply tends to be reflected, or validated, by indiscipline at the macro level. In the transitional phase of a MOSE, however, enterprises may not yet believe that the authorities will not accommodate--as in the past--their increased demands for credit and fiscal reliefs, and they may act relatively sluggishlessly to changes in relative prices.

Another factor that possibly might affect the magnitude of the passthrough elasticity is the relatively monopolistic market structure, at least in the transitional stage of the MOSE, inherited from the classical CPE and MPE. Unfortunately, the simple model examined in Appendix I does not permit a fully rigorous examination of this effect. Also, when considering the effects of monopoly, it is important

^{1/} As noted in Wolf (1988a), when the number of goods is increased beyond two, the substitution elasticities become endogenous to the model and its simplicity and usefulness is limited.

^{2/} Some of the following considerations could also, of course, help to explain low substitutability between traded and nontraded tradables.

to be as precise as possible about the assumed initial position. For example, Appendix II illustrates how the existence of monopoly might affect the initial price and output response to price liberalization in a planned economy. To the extent that excess demand initially prevailed at the aggregate level, the initial freeing of prices under conditions of monopoly could lead to an increase in the price level combined with a decline in output.

Our concern, however, is with a MOSE--heretofore only a hypothetical construct 1/--for which it is assumed that virtually all prices have already been freed, initial equilibrium prevails, and the exchange rate is then increased. Assuming as well that foreign trade has been freed and exchange controls lifted on current transactions, the existence of a domestic monopoly of production in the tradable sector should have no bearing on the price and output response of that sector. 2/ If the nontradable sector is monopolized, the starting position will be different than that of an otherwise comparable economy and there is no basis for making a simple comparison of the effects of monopoly on the size of the passthrough elasticity. 3/

Taking all the foregoing considerations into account, and particularly the likely differences between the weight of tradables and the degree of substitution in the MOSE and in the otherwise comparable market economy, the passthrough elasticity could be expected to be smaller in the market-oriented socialist economy.

V. Concluding Remarks

This paper has considered the effect that the evolution, now accelerating, from the classical centrally planned economy to a market-oriented socialist economy can be expected to have on the sensitivity of the domestic price level to a change in the exchange rate or, alternatively, to a movement in world market prices. As discussed in Sections II and III, economic reform aimed at decentralizing decision-making and liberalization of markets and prices has led, at least in some MPEs and emerging market-oriented socialist economies, to a situation in which the nearly total insulation of the domestic price system under central planning has been replaced by an economic system for which the passthrough effect of exchange rate changes may be viewed as considerable. Even in the more market-oriented socialist economies,

1/ The economic system in Poland after January 1, 1990, however, is probably closer to the stylized MOSE than to the MPE.

2/ In other words, the small open economy faces a flat foreign supply curve and the monopolist, just as an industry of perfect competitors, would slide up its marginal cost curve in the event of a devaluation.

3/ Not only is the effect of monopoly in the nontradable sector on the combined elasticity of substitution ambiguous, but presumably the initial tradable-nontradable weights might also be affected by the presence of monopoly.

however, the effective weight of the tradable sector as well as the combined elasticity of substitution between tradables and nontradables is likely to be less than in the stylized market economy, at least during the transitional period in which major market-oriented reforms are still being implemented. Consequently, for some time the linkage between the exchange rate and the price level could be expected to remain less tight in the MOSE than in economies with a considerable history of predominantly market orientation. As market-oriented reforms proceed, however, the issue of the relationship between exchange rate policy--for example, the relative fixity of the rate and the basis on which it is managed--and domestic inflation will increasingly come to be couched in the same conceptual frameworks as are now used to analyze the inflationary process in market economies.

Sensitivity of the Exchange Rate Passthrough
Elasticity to Changes in Selected Parameters

$$(1) \quad \frac{1}{\epsilon_e^P} = \alpha_T + \alpha_N \Delta_1 \Delta_2^{-1} = (\text{Exchange rate passthrough elasticity}).$$

where:

$$(2) \quad \Delta_1 = \alpha_T \alpha_N^{-1} (\epsilon^d - \epsilon^s) - \epsilon_a^N (\epsilon_p^m - \phi) \alpha_T \nu^{-1}$$

$$(3) \quad \Delta_2 = \alpha_T \alpha_N^{-1} (\epsilon^d - \epsilon^s) + \epsilon_a^N (\epsilon_p^m - \phi) \alpha_N \nu^{-1}$$

and: α_T = Weight of the composite tradable in domestic expenditure.

α_N = Weight of the composite nontradable in domestic expenditure.

ϵ^d = Elasticity of domestic demand for the tradable
with respect to a change in its relative price.

ϵ^s = Elasticity of domestic supply of the tradable
with respect to a change in its relative price.

ϵ_a^N = Elasticity of real expenditure on the nontradable
with respect to a change in aggregate real domestic expenditure.

1/ Expression (1) was derived in Wolf (1988a).

λ = Coefficient of adjustment of real desired hoarding
(of money) to any imbalance between desired and actual real money
balances.

ϵ_p^M = Elasticity of the nominal supply of money (a policy
variable, independent of hoarding) with respect to a change in the
price level.

ϕ = Elasticity of the demand for nominal money balances
with respect to a change in the price level.

v = Desired income velocity of money.

Under reasonable assumptions about the values of the above parameters,
 Δ_1 and Δ_2 may be shown to be negative, with $\Delta_2 < \Delta_1$. Taking the partial
derivatives of the passthrough elasticity with respect to these parameters
yields:

$$(4) \quad \partial \epsilon_e^P / \partial \alpha_T = [(\epsilon^d - \epsilon^s)(\Delta_1 + \Delta_2) - \Delta_1 \Delta_2 \alpha_T^{-1}] \Delta_2^{-2} > 0$$

$$(5) \quad \partial \epsilon_e^P / \partial (\epsilon^d - \epsilon^s) = \alpha_T (\Delta_2 - \Delta_1) \Delta_2^{-2} < 0$$

Observe that the expression $(\epsilon^d - \epsilon^s)$ will in general be less than zero since $\epsilon^d < 0$ and $\epsilon^s > 0$. An algebraic increase in $(\epsilon^d - \epsilon^s)$ is thus equivalent to a decline in elasticities, in the usual sense in which those terms are used. The negative sign for expression (5) therefore implies that the greater the elasticities, ceteris paribus, the larger the passthrough elasticity.

$$(6) \quad \partial \epsilon_e^P / \partial \epsilon_a^N = \alpha_N \lambda (\epsilon_p^M - \phi) \nu^{-1} [\alpha_N \Delta_1 - \alpha_T \Delta_2] \Delta_2^{-2} < 0$$

$$(7) \quad \partial \epsilon_e^P / \partial \lambda = \alpha_N \epsilon_a^N (\epsilon_p^M - \phi) \nu^{-1} [\alpha_N \Delta_1 - \alpha_T \Delta_2] \Delta_2^{-2} < 0$$

$$(8) \quad \partial \epsilon_e^P / \partial \epsilon_p^M = \alpha_N \lambda \epsilon_a^N \nu^{-1} [\alpha_N \Delta_1 - \alpha_T \Delta_2] \Delta_2^{-2} > 0$$

$$(9) \quad \partial \epsilon_e^P / \partial \phi = -\alpha_N \lambda \epsilon_a^N \nu^{-1} [\alpha_N \Delta_1 - \alpha_T \Delta_2] \Delta_2^{-2} < 0$$

Price Liberalization Under Conditions of Monopoly

Set forth below is a simple illustration of how the existence of monopoly might affect the initial price and output response to price liberalization in a closed modified planned economy. Assume in Figure 1 that in a representative industry the authorities have fixed the output price at P_0 and that firms, whether competitive or not, have decided to maximize profits by producing where marginal cost (MC) equals marginal revenue (MR_0). Regardless of whether the industry is monopolized, initial output would be at A' and the quantity demanded at B' , yielding excess demand--at the initial, fixed price--of $A'B'$.

Now let the authorities free prices. 1/ If the industry is perfectly competitive, the price will rise to clear the market at C , as firms move up their (aggregate) supply curve and consumers move back up their demand curve. The result is an increase in price to P_1 and an increase in output and actual consumption (from A' to C').

If the industry instead is monopolized, the profit-maximizing firm, now facing a downward sloping marginal revenue curve (MR_1), would cut back output (and possibly employment) 2/ from A' to D' and raise its price to P_2 . Viewed from afar, the supply response might appear to be perverse, even though it would be quite rational for the monopolist. 3/

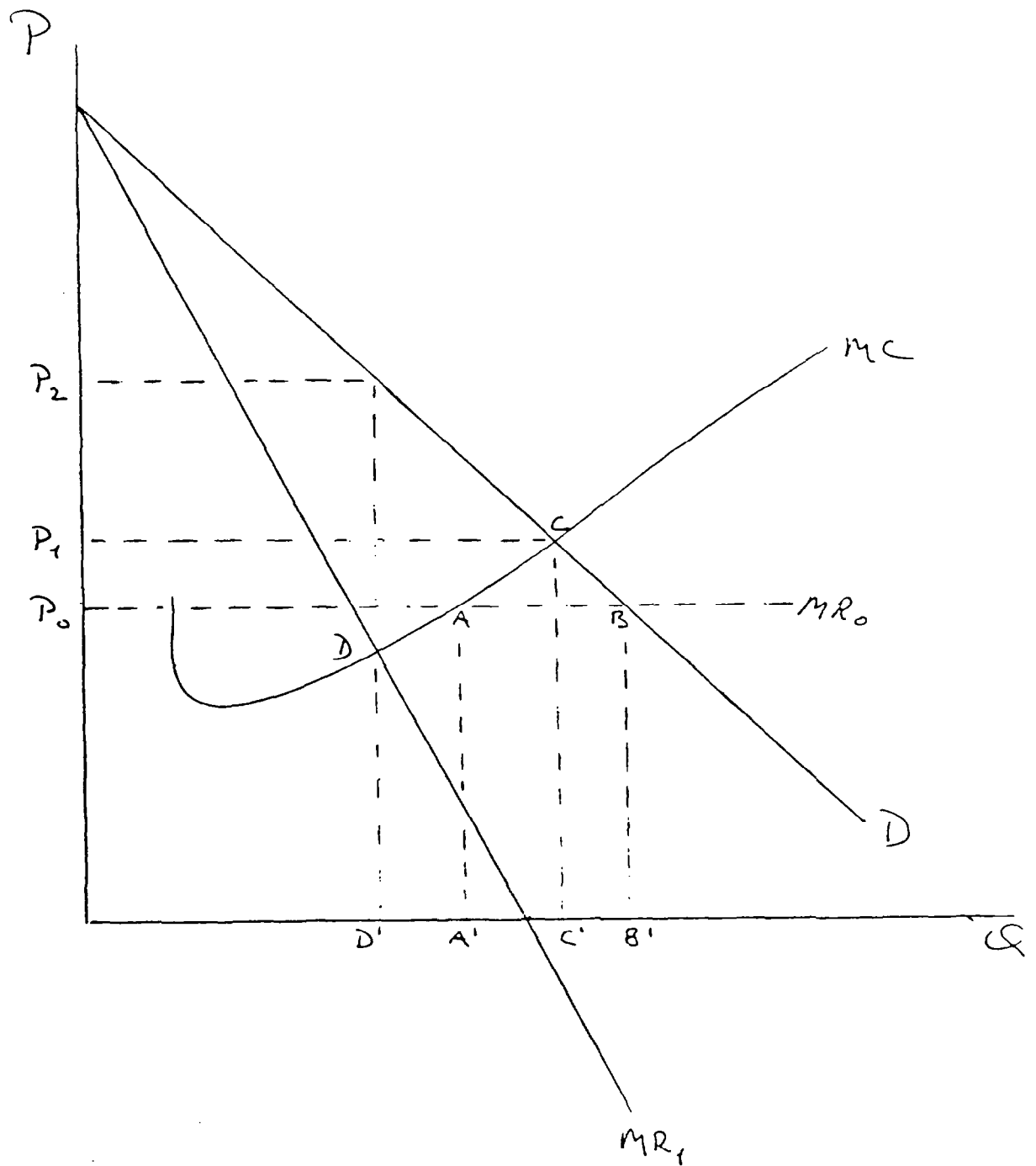
If the domestic monopolist were, however, to be exposed to foreign competition consequent upon the liberalization of imports, it would effectively face a flat marginal revenue curve and would be forced to set its price as if it faced domestic competition. In this case, given its marginal cost curve, it would sell at a domestic price no higher than the world market price converted at the official exchange rate. If it did reduce output when prices were fixed--due to an import price lower than MR_0 --its fall in output would be more than offset by an increase in imports.

1/ For simplicity, the impact of higher costs on the supply curve is ignored, as is the possible effect of a higher price level on real income.

2/ In this case, the aggregate demand curve would remain unchanged if those transitorily unemployed were compensated one-for-one with transfers.

3/ This example says nothing about what effects, if any, the existence of monopoly would have on the subsequent rate of inflation.

Figure 1.



References

- Böhm, E. Wechselkurspolitik in der Planwirtschaft (Hamburg: Verlag Weltarchiv, 1986).
- Botos, K. and Riecke, W. "Einige Fragen der ungarischen Wechselkurspolitik," Osteuropa Wirtschaft, 30(3), 1985, pp. 181-188.
- Csoor, K. "Active Exchange Rate Policy--Financial Policy," Manuscript, 1988.
- Dornbusch, R. "Devaluation, Money and Nontraded Goods," American Economic Review, 63(5), December 1973, pp. 871-80.
- Holzman, F.D. Foreign Trade Under Central Planning (Cambridge, Mass.: Harvard University Press, 1974).
- International Monetary Fund, "Economic Reforms in Hungary Since 1968," SM/89/203, October 1989a.
- International Monetary Fund, "Economic Reforms in Poland Since 1981," SM/89/204, October 1988b.
- Krueger, A. O. "The Role of Home Goods and Money in Exchange Rate Adjustment," in W. Sillekaerts (ed.) International Trade and Finance (New York: International Arts and Sciences Press, 1974).
- Ledworowski, D., R. Michalski and Z. Piotrowski "Kurs zlotego a koszty i ceny wewnetrzne," Handel zagraniczny, No. 3, 1984.
- Michalski, R. "Równowaga wewnetrzna i zewnetrzna w gospodarce socjalistycznej", (Warsaw: Instytut Koniunktur i Cen Handlu Zagranicznego, 1987).
- Oblath, G. "The Role of Currency Exchange Rate Policy in the Reform Package", manuscript, 1987.
- Piotrowski, Z. Wplyw zmian kursu walutowego na ceny krajowe (Warsaw: Instytut Koniunktur i Cen Handlu Zagranicznego, 1989).
- Pryor F. L. The Communist Foreign Trade System (Cambridge, Mass.: MIT Press, 1963).
- Simon, A. "An Input-Output Analysis of Prices in the Hungarian Economy Between 1981-1985," Acta Oeconomica, 38(1-2), 1987, pp. 17-33.
- Simon A. and M. Veress, "A kompetitiv arkepes es a tenyarek 1981-83-ban," manuscript, 1984.

Tarafas, I. and J. Szabo, "Hungary's Exchange Rate Policy in the 1980s," Acta Oeconomica, 35(1-2), 1985, pp. 53-79.10

Tardos, M. "The Role of Money: Economic Relations Between the State and the Enterprises in Hungary," Acta Oeconomica 25, (1-2), 1980, pp. 19-35.

Wolf, T. A. "Exchange Rate Changes in Small Market and Centrally Planned Economies," Journal of Comparative Economics, Vol. 2, No. 3, 1978, pp. 226-245.

_____, "On the Adjustment of Centrally Planned Economies to External Economic Disturbances," in P. Marer and J. M. Montias (eds.), East European Integration and East-West Trade (Bloomington, Ind.: Indiana University Press, 1980a), pp. 86-111.

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

_____, "Exchange Rate Systems and Adjustment in Planned Economies," Staff Papers, International Monetary Fund, Vol. 32, No. 2, 1985, pp. 211-247.

_____, "Devaluation in Modified Planned Economies: A Preliminary Model for Hungary," in J. C. Brada, E. A. Hewett, and T. A. Wolf (eds.), Economic Adjustment and Reform in Eastern Europe and the Soviet Union: Essays in Honor of Franklyn D. Holzman (Durham, N.C.: Duke University Press, 1988a), pp. 39-71.

_____, "The Simultaneity of the Effects of Devaluation: Implications for Modified Planned Economies," Acta Oeconomica, Vol. 39, Nos. 3-4, 1988b, pp. 303-324.

_____, Foreign Trade in the Centrally Planned Economy (London: Harwood Academic Publishers, 1988c).

_____, "Market-Oriented Reforms of Foreign Trade in Planned Economies," in O. Bogomolov (ed.), Market Forces in Planned Economies (London: MacMillan, forthcoming 1990).