Inconvertibility, Foreign Exchange Allocation, and Agricultural Import Price Response in the Centrally Planned Economies

by

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It is observed that administered domestic prices received by producers and paid by consumers are commonly insulated from world price movements by the centrally planned economies (CPE).[1/] Accordingly, conventional wisdom holds that import response on the part of the state trading monopoly tends toward zero with respect to world price movements. Previous attempts to construct a conceptual explanation of import behavior in CPE markets have been painfully few and vague. This paper introduces the foreign exchange constraint to clarify how under certain assumptions exchange scarcity necessitates that import behavior be responsive to changing world prices, even if domestic prices are not varied along with such movements. By incorporating a foreign exchange constraint into a trade model the effective import demand function is distinguished from a true excess demand function. Alternative policy options are reviewed in the framework of this model to clarify the interrelationships between domestic pricing strategies (including varying implicit prices via queueing), foreign exchange allocation decisions, and import decisions. Empirical results of an attempt to econometrically estimate feed grain import demand behavior are interpreted in the context of this model.

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A Theoretical Construction of Import Behavior in the CPE

How foreign exchange availability, domestic production and consumption forces, and government policies in the centrally planned economies interact with world price movements is explored conceptually in this section of the paper. A foreign exchange allocation function is introduced into a standard comparative static excess demand trade model to reflect the circumstances that typify import decisions in the centrally planned economies (see figure 1). The focus is on grain and oilseed imports which comprise the majority of U.S. exports to these economies. Prices paid domestically by consumers and received by producers are set by the state and may or may not reflect movements in international prices. Furthermore it is explicitly recognized that inconvertibility of the countries' currencies prevails in international transactions. The vertical axes of both quadrants are scaled the same and represent conceptually the official hard currency equivalent (expressed in terms of U.S. dollars) of the domestic price.[2/]

In quadrant 2 a rectangular hyperbola FD is introduced to depict a given foreign currency allocation provided to the foreign trade organization that acquires imports. This curve conveniently portrays how inconvertibility explicitly introduces a need to allocate hard foreign currency to importers. Imports do not confront a predetermined hard currency constraint when convertibility prevails since the foreign exchange will be purchased with domestic currency. However, in the centrally planned economies inconvertibility results in a situation where end users or the specific foreign trade organization (FTO) that transacts foreign purchases must be allotted foreign exchange.[3/] It is this allotment that sets the position of FD. The curve takes the form of a rectangular hyperbola

Figure 1

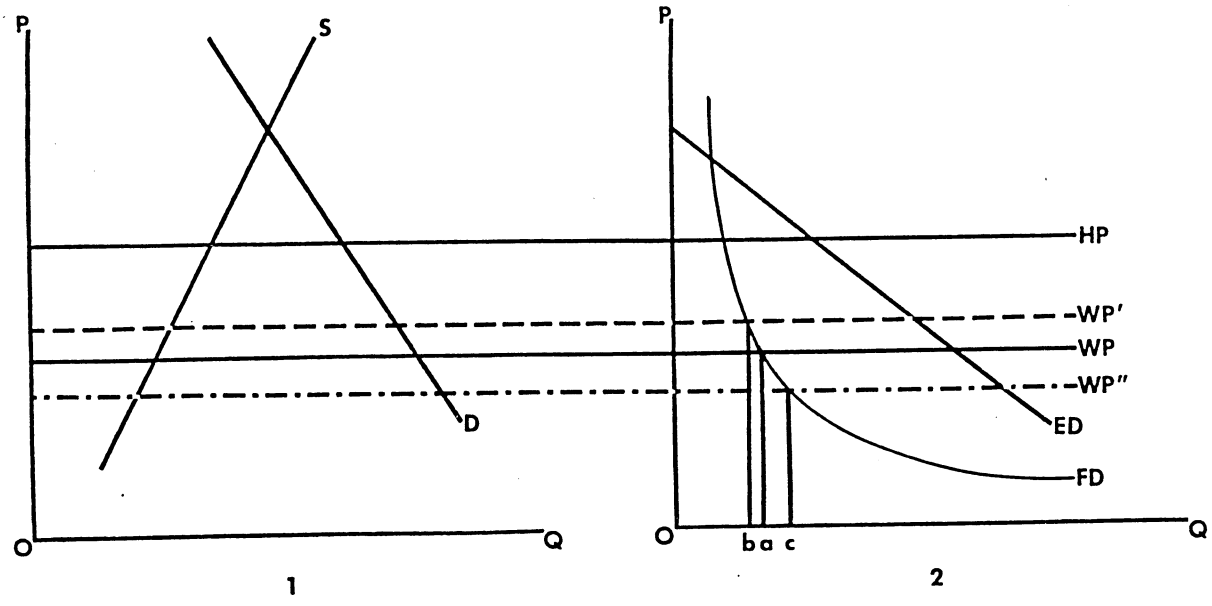
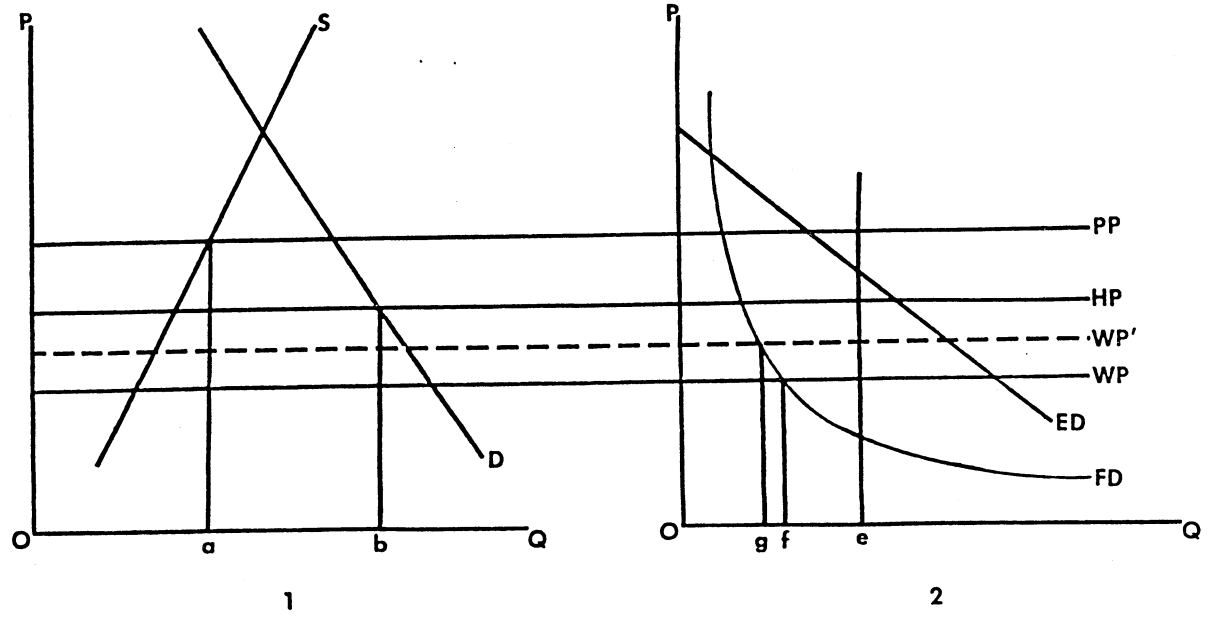


Figure 2



because the total value of expenditures on imports that can be acquired from this allotment is constant. The foreign currency allocation is assumed to be authorized by a higher level organization such as the state planning commission, the ministry of finance, or the foreign trade bank. Cases exist where end using enterprises may use their own hard currency earnings to import, but no example of this is known to apply to major agricultural imports and this possibility is ignored in this analysis.

A notable characteristic of the model is that actual or "effective" import demand at the FTO level is a function directly of the foreign currency allocation rather than the difference between domestic supply and demand at any given price whenever the allocation constraint is less than excess demand, ED, in the relevant price range. If for the moment we ignore wedges between import, producer, and end user prices, ID is the "true" demand curve in the sense that, given official exchange rates and domestic purchasing power, end users would be willing to buy the quantities of imports lying along the function for alternative prices. However, acutal imports are constrained by the state monopoly buyer's level of available hard currency appropriations along FD, which is the "effective" demand curve.

This paper argues that this distinction between "true" demand and "effective" demand is integral to explaining import behavior in a centrally planned economy, especially when hard currency shortages force rationing of foreign exchange to importers. Initially concentrate on import and end user prices in figure 1. The CIF world price of the commodity is shown as WP.[4/] The other price of interest is HP which is the price that is paid by domestic users of the commodity. Inland transportation costs,

foreign trade organization commission charges, storage, and other marketing charges are ignored for the sake of simplicity. Prices paid to domestic producers are also implicitly treated as being the same as prices paid by consumers, but this assumption will be relaxed later.

Given the world price WP and the foreign currency allotment FD, imports under the above assumptions would obtain at *oa*. Now we can turn to the argument often made that because the foreign price is divorced from domestic price, movements in world prices will not involve variations in import levels in centrally planned economies. Investigation of quadrant 2 of figure 1 reveals that this cannot be the case when the "foreign currency demand constraint" will not allow purchases at the level desired by end users. Upward price movements to WP' force curtailment of imports and downward movements, (i.e.) to WP", permit expansion of imports even though the domestic price paid by end users is perhaps the same as before. Indeed if these conditions prevail and the foreign exchange allocation is not varied the import elasticity of demand would be unitary since the total value of import expenditures would be constant regardless of the level of price. Obviously the response to world price movements depends on whether the foreign currency constraint prevails.

An Empirical Attempt to Measure Import Response

Data limitations and other problems plague attempts to empirically measure import behavior in the centrally planned economies from a uniform model. Bearing this in mind, this section of the discussion will nevertheless report on the results of an effort to estimate import behavior for feed grains along lines that at least approximate the emphasis of the above model in that it includes a proxy variable for hard currency

reserves. The model was estimated by individual countries in the general form shown below from data for the observation period 1960-1978 using the two stage least squares estimation procedure.[5/]

$$(1)\quad MC^*_t = \alpha_{10} + \beta_{12}DF^*_t + \beta_{13}WL^*_t + \gamma_{11}TB_{t-1} + \gamma_{12}PC_t + \xi_1$$

$$(2)\quad MF^*_t = \alpha_{20} + \beta_{21}DC^*_t + \beta_{23}WL^*_t + \gamma_{21}TB_{t-1} + \gamma_{22}PB_t + \xi_2$$

$$(3)\quad WL^*_t = \alpha_{30} + \gamma_{33}PO_{t-1} + \gamma_{34}PI_{t-1} + \gamma_{35}DO_{t-1} + \xi_3$$

$$(4)\quad DC^*_t = DO_{t-1} + MC^*_t$$

$$(5)\quad DF^*_t = DO_{t-1} + MF^*_t$$

Imports of corn (MC) were estimated as a separate equation from imports of other feed grains (MF) in an attempt to capture substitution among feed grains. Moreover, corn comprises the majority of U.S. feed grain exports to most of the countries in question. During the period 1970-1979 imports of corn by the U.S.S.R. and Eastern Europe grew at an annual rate of 30.62 percent (Food and Agricultural Organization, p. 153). Imports of feed grains are specified as a function of corn and other feed grain prices (PC,PB) with the price of barley representing the price of other feed grains, domestic availability (DC,DF) which is comprised of domestic output (DO) plus imports of alternative grains (see equations 4 and 5), demand shifters which include livestock inventories weighted by relative consumption of feed grains by each class (WL), per capita product indices (PI), population (PO) and accumulated trade balances with the Industrial West (TB) lagged one year which is a proxy for foreign exchange reserves. Estimated structural coefficients for equations (1) and (2) are summarized in

table 1.[6/] Price import elasticities estimated at the mean value of price and import observations are given adjacent to the price coefficients.

An interpretation of behavior regarding feed grain imports from the results of this empirical effort requires considerable caution and judgment. The empirical model is not specified in a manner sufficiently in accordance with the theoretical model above. Complete information to support such a specification was lacking so specification errors were unavoidable. With regard to the domestic demand component of the model presented in figure 1, information regarding domestic prices paid by end users is needed to determine the true demand but these data were not available. Moreover, much of the shift in domestic demand to the right during the observation period was due to the adoption of modern commercial feeding practices that include heavier feeding of feed grain concentrates in livestock rations. No suitable data were available to capture this shift. On the domestic supply side of the graphical model, data regarding prices received by producers for feed grains and prices paid by producers for inputs were only obtainable for some of the countries analyzed. Also stock data were not available. Finally, no data on the actual foreign exchange allocation available for purchases of imports were forthcoming. The variable, accumulated trade balances with the Industrial West, was selected as a proxy to capture this effect. This variable provides a very incomplete measure of the hard currency effect in that hard currency available for purchases can be augmented by selling gold, borrowing in international fianacial markets, or by shifting allocations away from, or to, other hard currency imports in any given year.

Table 1: Summary of Two Stage Least Squares Import Demand Estimates[a/]

Country and Import Category	World Price		Domestic Supply Availability	Livestock Inventory Index	Accumulated Trade Balance With the West (lagged one year)
	Coefficient	Elasticity			
Soviet Union:					
Imports of Corn	86.84 (5.57)	2.47	2.08 (4.63)	-139.50 (-1.78)	0.24[b] (1.36)
Imports of Other Feed Grains	-13.63[b] (-1.83)	-2.08	0.25 (3.86)	5.65 (0.27)	-0.03 (-0.32)
German Democratic Republic:					
Imports of Corn	11.61 (2.25)	1.40	-0.06 (-0.81)	220.00[b] (2.34)	0.39[b] (1.36)
Imports of Other Feed Grains	-0.60 (-0.10)	-0.07	-70.00[b] (-7.29)	241.40[b] (4.44)	-1.88 (-5.87)
Poland:					
Imports of Corn	-1.15 (-0.43)	-0.14	-0.07[b] (-1.70)	55.32[b] (2.30)	-0.08 (-2.45)
Imports of Other Feed Grains	-11.16[b] (-2.25)	-0.85	-0.11[b] (-2.00)	113.78[b] (3.20)	-0.00 (-0.04)
Czechoslovakia:					
Imports of Corn	4.92 (1.03)	1.03	-0.01 (-0.28)	10.66 (0.36)	-0.02 (-0.08)
Imports of Other Feed Grains	-0.60 (-0.30)	-0.19	-0.07[b] (-2.39)	17.74 (0.80)	-0.02 (-0.15)
Bulgaria:					
Imports of Corn	3.95 (6.62)	2.94	-0.04[b] (-2.03)	30.52 (0.78)	0.05[b] (1.79)
Imports of Other Feed Grains	2.39 (4.82)	2.88	-0.05[b] (-1.91)	-34.23 (-0.41)	0.02 (0.39)
Romania:					
Imports of Corn	2.62 (2.12)	1.50	-0.05[b] (-5.34)	55.69 (3.72)	0.19[b] (2.49)
Imports of Other Feed Grains	-1.05[b] (-1.01)	-1.45	-0.03[b] (-1.98)	49.87[b] (1.95)	0.15[b] (1.50)
Yugoslavia:					
Imports of Corn	-3.58[b] (-1.78)	-2.86	0.00 (0.02)	18.82 (0.96)	-0.02 (-1.16)
Imports of Other Feed Grains	-0.61[b] (-1.45)	-1.57	0.00 (0.02)	1.91 (0.40)	-0.00 (-0.17)
People's Republic[c] of China:					
Imports of Corn	19.13 (2.66)	1.41	0.00 (0.13)	8.32[b] (1.35)	0.12[b] (1.17)
Imports of Other Feed Grains	1.19 (0.42)	0.34	0.01 (0.75)	-8.66 (-2.30)	-0.06 (-1.38)

[a]The top number is the estimated coefficient value and the number underneath is the asymptotic t value accompanying that estimate.

[b]Estimated coefficient values are greater than estimated standard errors and correct with regard to expected signs.

[c]Hog numbers were used in lieu of weighted inventories of all livestock in the People's Republic of China.

Elasticities calculated from the estimated coefficients suggested that import demands for feed grains in 11 out of 16 cases were relatively unresponsive to world price movements. Results for the model were similar when the relative prices were utilized in an alternative specification (Gadur). Other reported studies have shown generally that imports are not very price responsive (Philip C. Abbott; Padma Desai; Mary E. Ryan and James P. Houck).

In cases where imports have not shown price response this could suggest that the hard currency constraint has been shifted upward by the authorities so that, even though the world price of feed grains moved upward during the study period, imports of grains have not been reduced, but have in fact actually increased. Indeed the signs and standard errors associated with the estimated trade balance coefficient lends to the credence of this conjecture. In 10 of the 16 instances the proxy for foreign exchange availability failed to show any significant direct impact on imports. Events have suggested that over the observation period, authorities have assigned high priority to feed grain imports. Consequently, even though grain prices increased through most of this period, foreign exchange allocations were apparently increased enough to offset or more than offset the negative influence of higher world prices. This could have been accomplished by allotting foreign exchange to grains from other imports, drawing down hard currency reserves, or by borrowing in international credit markets. As recent events attest borrowing has been resorted to heavily by Eastern Europe and the U.S.S.R. Net hard currency indebtedness of these countries to the West is estimated to have increased over ten fold in the Seventies from $6.0 billion to $64.7 (Central Intel-

ligence Agency, p. 7). Debt servicing problems have become extremely acute and international bankers and government lending authorities are becoming increasingly hesitant to grant additional loans.

Policy Implications for the CPE

Since there is increasing consensus that continued borrowing in international financial markets is rapidly reaching its limits for several of the centrally planned economies it is interesting to speculate on how authorities will deal with future price increases (should they occur) and pressures to import greater quantities of feed grains and food grains.

Assume initially that the price paid by end users, HP, prevails along with a price, PP, paid to producers (the difference between PP and HP is covered by state subsidies) and that the hard currency appropriation is set at FD (figure 2). At prices HP and PP a deficit in domestic availability ab (=oe) would exist. At the world price WP, imports equal to of would leave an unfulfilled demand equal to fe. If the world price increases to WP' and no corresponding action is taken to increase the foreign exchange allocation the amount of imports purchased would fall to og increasing the shortfall to be rationed from fe to ge. To avoid increased nonprice rationing, 1) the hard currency appropriation could be increased shifting FD upward and to the right; 2) prices paid by end users could be raised thereby reducing demand pressure; 3) producers prices could be increased thus increasing the quantity supplied domestically, or inputs could be made available in greater quantities shifting domestic supply; 4) or some combination of these activities could be pursued.[7/]

None of the above options are particularly palatable to the authorities. Increasing end user prices and passing them through to consumers

by the magnitudes required creates dissension, and increasing domestic production without increasing end user prices is difficult since massive subsidies already plague the state treasuries. The option of rationing excess demand for imports creates bottlenecks in the food production, supply, and distribution system. In summary the authorities are confronted with dilemmas regardless of which way they turn. This explains why they have undertaken heavy borrowing. The current consensus seems to be that this cannot continue given the current trend of events in their domestic economies and the world economy. Having exhausted their borrowing power in many cases, it seems likely that import behavior in many of the subject countries in the 1980s will exhibit greater sensitivity to upward world price movements should they occur. Also they will likely be unable to accomodate further increases in import demand for feed grains by borrowing internationally.

Footnotes

1) In this study the CPE group includes the Soviet Union, Eastern Europe, and the People's Republic of China.

2) It is important to keep in mind that this official exchange ratio generally does not reflect true relative values of foreign currencies and the home currency since inconvertibility reigns and domestic and foreign prices are not organically linked.

3) In our example we can arbitrarily think of end users as feed milling and compounding agencies or enterprises as the case may be, although the thought could be extended to livestock producers or even ultimate consumers of meat products, etc.

4) Invoking the small country assumption, this can also be viewed as the supply of exports.

5) Asterisks denote endogenous variables in the model.

6) A similar model applied by the author to soybean meal and other oilseed meal imports was estimated for selected countries in the study. The results were similar and for the sake of brevity are not reported here. Also, an alternative specification of the feed grain model using relative prices and annual net trade balances is reported elsewhere (Gadur).

7) Traditional tariff import restriction devices are rarely used in the centrally planned economies.

References

1) Abbott, Philip C., "Modeling International Grain Trade with Government Controlled Markets," Amer. J. of Agr. Econ. 61 (1979):22-31.

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6) Ryan, Mary E., and James P. Houck, Eastern Europe: A Growing Market for U.S. Feed Grains, University of Minnesota, Economic Report 76-7, May, 1976.