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Potential Impact on World Agricultural Markets of Policy Reform in Central and Eastern Europe and the Soviet Union

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Introduction

The recent wave of political and economic reform sweeping Central and Eastern Europe (CEE) and the Soviet Union has brought potential for dramatic change in agricultural production and trade in the region. In those countries where economic reform is most advanced, significant adjustments in agricultural supply and demand are already occurring (for example Poland, the former German Democratic Republic, and Hungary). In those countries where economic reform has thus far been limited, pre-existing imbalances in supply and demand are worsening (for example Bulgaria, Romania, and the Soviet Union). The trade regime of the Council of Mutual Economic Assistance (the Soviet Union and its client countries) countries has been dismantled, leaving individual members to find their respective roles defined by domestic and world market conditions rather than by planned fiat.

The agricultural sector's apparent inability to provide food to the population has been a source of embarrassment to these countries' governments in the eyes of both the local populace and the rest of the world. Agriculture's sizable role in the overall economy of the region and the region's important role in world agricultural trade suggest that effective reform would have significant effects on world markets (table 1).

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We use estimates of support to producers and consumers along with some assumptions on reasonable parameter values in a simulation model to analyze the potential effect of reform in the Centrally Planned Economies (CPE's) on these traditional commodities. Assuming that these economies move to market-based economies, we find that the effect of removing the previously existing planned policy environment on world prices and the final net trade position of CEE and the Soviet Union in the shorter term (4 to 5 years) depends critically upon assumptions of the demand response in the Soviet Union.

Sensitivity analysis suggests that if demand increases after reform (assuming it was heavily repressed by planners before reform and remains high after reform), world meat prices would rise and grain prices would decline, while the region would remain a net importer. However, if income declines substantially, as has happened in Poland (and, to a lesser extent, Hungary) in at least the short term, world prices for both meat and grains would fall but the region would return to net export status. Analysis over the longer term suggests that demand assumptions are less critical as world prices for meat rise slightly, grain prices decline moderately, and the region becomes a significant net exporter.

Table 1--Agriculture's role in selected economies

Item	Unit	EC	CEE	Soviet Union	United States
Total area	*Hectares*	225,420	124,597	607,044	431,382
Population	*Million*	325	137	282	246
GDP per capita[1]	*U.S. dollars*	12,510	5,744	4,538	17,500
Agriculture's share of GDP	*Percent*	3.5	18.0	20.0	3.0
Agriculture's share of labor force	*Percent of population*	2.6	13.0	19.0	.8

[1] GNP for Eastern Europe and Soviet Union. All data for 1988, except agriculture's share of labor force and U.S. data which are 1986.

Sources: U.S. Department of Agriculture, Economic Research Service; Central Intelligence Agency; and the International Monetary Fund.

Recent CEE Agriculture Policy and Performance

Much attention has been paid to the shortages of basic food products in many of these countries, and analysis of the causes of these shortages has generally focused on production shortfalls. But, production problems may not be the largest contributor to food shortages. I estimate aggregate measures of support for the East European and Soviet producers and consumers that are indicative of these countries' effective incentive prices relative to those in the rest of the world. My findings suggest that production was not deficient as much as it was a rational response of producers to a relatively unfavorable price and economic policy environment compared with the policy environment in industrial market economies. Furthermore, problems of overstimulation of demand appear to contribute more to food shortages than shortfalls in supply.

The 1980's brought increasing pressure for reforms of the agricultural sectors in Central and Eastern Europe and the Soviet Union. Overall production performance was good by international standards (table 2). But three areas of difficulties overshadowed gross production performance: production costs, food availability, and food quality.

Regional generalizations blur some of the significant distinctions between countries. Because the Soviet Union has the dominant agricultural economy in the region, its policies often overwhelm the policies of the individual or collective East European economies.

Table 2--Yield growth for selected commodities and countries, 1970-80

Country/region	Total grains	Wheat	Corn	Beef	Pork
			Percent per year		
World	2.12	2.80	1.18	0.81	2.32
CEE/Soviet Union	3.30	3.91	1.68	1.09	3.24
European Community	2.25	2.87	1.98	.74	.99
United States	1.10	.60	1.31	1.73	1.26
Other Western Europe	2.47	3.23	.77	-.46	1.27

Source: Webb and Gudmunds, 1989.

Growth was achieved only by ever larger resource commitments. Gross production growth was good, but net value added was poor (Wong, 1986). Thus, the incremental resource cost necessary to achieve output growth was high. The actual numbers on total factor productivity growth, or for that matter net value added, in agriculture probably exaggerate the sector's poor performance. Resource allocation economywide was poorly conceived and invested by planners and had relatively low productivity. Thus, the farm sector itself is not completely accountable for the poor performance. The industrial sectors also performed poorly, suggesting that the misuse of resources in the agricultural sector did not necessarily involve high domestic opportunity costs.

The 1980's represent an apparent paradox, in terms of food availability. Increasing quantities of traditional, domestically produced agricultural products were made available, but not enough to completely satisfy demand in many (but not all) of the countries. Per capita consumption in the CEE countries and the Soviet Union did not lag far behind the European Community or the United States, especially compared with the differences in per capita income levels (table 3).

Two related problems moved into sharper focus in the 1980's: poor quality food products and very limited choices. The quality issue embraces both the quality of the raw product produced on farm and the quality of the product after processing. The diversity issue includes the limited diversity of domestically produced and processed goods, and the limited diversity of imported products.

In sum, although the CEE countries and the Soviet Union continued to demonstrate relatively successful production growth during the 1980's, this did not translate into successful agricultural sector performance. At least part of the problem, the imbalance of supply and demand for traditional agricultural commodities, was the direct result of producer and consumer price policies combined with restrictive planned economic systems.

My results are based on conservative estimates of the potential positive supply and negative demand effects. I did not examine the effects of possibly overvalued exchange rates. I was not able to examine other factors such as the possible effect of imperfect (monopoly-dominated) markets resulting from reform. Still, on net, I think my results define more of a lower than an upper bound on the changes in agricultural potential for the region.

Table 3--Per capita consumption of agricultural products, 1987/88

Country/region	Milk	Cereals	Vegetables	Fruit	Meat	Income
			Kilograms			*Dollars*
EC	97	111	116	106	106	12,510
CEE	92	174	117	61	102	5,744
Soviet Union	89	166	97	45	86	4,538
United States	131	100	105	128	125	17,500
			Percent of EC			
CEE	94	157	101	57	97	46
Soviet Union	91	150	84	42	81	36
United States	134	90	91	121	118	140

Source: Per capita consumption data calculated from FAO SUA tables. Per capita income, table 1.

Historical Trade Patterns

Before World War II, the region encompassing the CEE's and the Soviet Union was known as the breadbasket of Europe. During 1925-33, the CEE's and the Soviet Union were, on average, net exporters of grains, meat, butter, and cheese (table 4). On the other hand, the West European countries were sizable importers of all these commodities. However, despite their reputation as a "breadbasket," the CEE's and the Soviet Union were hardly in a position to feed all of Europe; only about 20 percent of West European import needs could be met by CEE and Soviet exports.

After World War II, the CEE and Soviet Union lost their status as net agricultural exporters and, in particular, began to import increasing amounts of grain. Although there has not been a reversal of roles between East and West in the last 20 years, there has been a strong tendency towards just that. The European CPE's are now large net importers of grains, though still exporters of meat. The meat exports of the CEE and Soviet Union appear to come at the cost of expensive grain imports. The EC on the other hand was historically a significant net grain and meat importer and now is a net exporter of both.

Table 4--Net export data for selected commodities and regions

Country/region	1925-33[1]	1985-89[2]
	Thousand metric tons	
Grain:		
CEE	3,262	-4,276
Soviet Union	1,935	-32,333
EC	-23,192	19,062
United States	4,514	87,122
Meat:		
EE	43	1,266
Soviet Union	3	-599
EC	-1,696	767
United States	7	-810
Butter:		
EE	8	47
Soviet Union	28	-300
EC	-128	283
United States	-.2	48
Cheese:		
EE	6	56
Soviet Union	.3	-9
EC	-60	244
United States	33	-104

[1] Excludes live animal trade and poultry from meat statistics. -
[2] Excludes live animal trade and mutton and lamb from meat statistics.
  Sources: Data for 1925-1933, International Institute of Agriculture, 1934. Data for 1985-89, USDA-ERS.

The Effect of CPE Policies on Agricultural Supply and Demand

Agricultural performance in the countries with industrial market economies, the CEE, and the Soviet Union have obviously taken divergent paths since World War II. At the root of these divergent paths is the interaction of the price (and, in the CEE and the Soviet Union, income) policies pursued and the economic systems chosen in each region. The recent reform movements in the planned economies suggest a need to conduct basic supply and demand analysis.

Estimates of the CPE's effective price of policies in terms of relative incentives to produce and consume have been attempted (Webb and others, 1990; Cook and others, 1991; and Cochrane, 1990). As policy

reform is undertaken, knowing the nature and extent of the distortions underlying the planned economy would be useful, so that reform efforts can be focused productively on those areas deemed most damaging.

East and West Europe: Similar Goals, Different Outcomes

Agricultural policies in East and West Europe (in general, we will focus on the EC when discussing Western Europe) since World War II have worked towards roughly similar stated goals--increased "food security" or agricultural self-sufficiency. Despite the similar goals, however, the two regions have used dramatically different economic systems to try and reach these goals. The EC, using market capitalism, has successfully transformed itself from a major net importer of meat and grains to a major net exporter. The countries under central planning lost their prewar status as net exporters of both meat and grains, becoming significant net importers of grains and apparently maintaining meat exports only through grain and oilseed imports (mainly though not solely due to the Soviet Union's import positions).

My discussion on price policy and systemic interaction will focus on the fundamental supply and demand conditions underlying each region; however, only the European CPE's will be discussed in detail because these countries operated under economic systems that are less familiar to the reader and much less transparent than the EC's. Knowledge of the underlying supply and demand conditions existing under central planning in the CEE and the Soviet Union proves useful in analyzing the effect of region's recent reform efforts. In a later section, I briefly describe the EC's underlying market conditions in the same framework to highlight the basic differences between regions.

Agricultural Price Policies in Centrally Planned Economies

European CPE price policy apparently provided heavy incentives to consume and relatively minor, perhaps negative, incentives to produce (depending on whether one chooses an official or shadow exchange rate in the estimation of support; see note to table 5).[1] West European policy provided heavy incentives to produce, and negative incentives to consume. Table 5 provides summary PSE's and CSE's for EC and provides European CPE's.[2] These support estimates capture only

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[1] My discussion focuses on basic agricultural commodities such as grains and meats. Fruits and vegetables, which in a general sense operated in a less planned environment than grains and meats, are not included.

[2] See Cook and others (1991) and Cochrane (1990) for more detailed discussions of PSE/CSE estimates in the European CPE's. See USDA (1987) and OECD (1988) for a more general discussion of PSE's and CSE's.

financial support provided by government policies in 1986.[3] Despite both regions' claims of self-sufficiency as a policy goal only, EC support estimates work together in this direction (with the East European countries of Yugoslavia, Czechoslovakia, and Hungary apparent exceptions to this general statement).

Producer price policies in the CEE countries and the Soviet Union included very complicated producer price schemes that often varied the price producers received from one region, or even farm, to the next. Producer prices generally changed infrequently. Producer price changes were usually unrelated to existing supply and demand conditions. Still, changes in producer prices were most often designed to carry some incentive effect. The term "some" is used because European CPE farmers faced many nonmarket constraints and nonprofit maximizing elements in their objective functions that probably blunted price incentive effects. Producer price policy was also affected by prices for inputs and services, neither of which were market determined. Many farm inputs are of industrial origin, and industrial prices were "revised" frequently for what were often imaginary quality improvements or increased production costs. Industrial input prices generally increased more often than did agricultural output prices. Thus, CEE and Soviet farmers were often caught in a classic scissors crisis, a change in the domestic terms of trade in favor of industrial goods. This input price policy and the monopoly position of input providers resulted in low quality, high priced inputs (although these prices were often "subsidized" to be below the inputs' production costs) which farms had no real choice in the selection or disposal of. Input quality was often so poor that farmers could actually only use, for example, one out of three units delivered (despite paying for all three), and would use the remaining two units for parts. If the problem was as widescale as anecdotal evidence suggests, then the effective price per utilized input was greater than the reported price per unit. However, because of data limitations, measuring this effect is difficult.

In terms of consumer price policy, prices were set at low levels and held constant over many years. Retail price changes were rare, especially in the Soviet Union. A general CEE objective was to provide cheap food to consumers as one of the benefits of socialism. Food prices in state retail networks were unaffected by changes in supply and demand conditions, nor by changes in the availability and prices of other, nonfood goods.

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[3] Adjustments will be made to these "financial" support estimates below. These adjustments are attempts to capture some of the more obvious "nonfinancial" distortions generated by the planned environment.

Table 5--PSE and CSE estimates for selected countries for 1986

Commodity	United States	EC	Soviet Union[1]	Poland[1]	Yugo-slavia[1]	Hungary[1]	Czech-oslovakia[1]
			Percent				
PSE's:							
Beef	12	36	32	24	58	56	58
Pork	8	27	20	17	20	1	-12
Poultry	14	34	46	24	49	-24	-2
Milk	62	65	1	-44	45	-30	-43
Wheat	61	58	-31	52	38	-49	-151
Corn	48	62	56	14	20	23	40
Soybeans	12	44	15	--	47	--	--
Cotton	--	--	23	--	--	--	--
Sugar	73	46	55	23	53	-13	46
Overall[2]	36	48	26	15	34	-9	8
CSE's:							
Beef	-1	-12	82	0	1	58	14
Pork	--	-8	21	9	-64	12	38
Poultry	-3	-17	-28	29	--	25	1
Milk	-30	-26	-29	181	-44	84	119
Butter	-40	-44	58	--	--	20	-38
Wheat	-10	-49	66	-14	-33	29	79
Corn	--	-52	-13	--	28	--	--
Soybeans	--	--	110	--	--	--	--
Cotton	--	--	24	--	--	--	--
Sugar	-52	-59	-38	-4	-67	--	--
Overall[2]	34	-11	-19	50	-44	-25	-65

--=No estimate presented.
[1] For the Soviet Union, Poland, Yugoslavia, Hungary, and Czechoslovakia, adjusted exchange rates were used in support estimates. The official exchange rate was likely substantially overvalued; thus PSE's calculated using the official exchange rate are overstated and CSE's understated. The author used the following adjusted exchange rates in the calculations (numbers in parenthesis are the official rates), Soviet Union 1.91 (0.61). Poland 223.19 (175.29), Yugoslavia 504.70 (379.22), Hungary 61.01 (45.83), Czechoslovakia 19.97 (15.00). For a description of the exchange rate adjustment methodology, contact the author.
[2] Covers all commodities for which support was estimated, not just those reported in this table.
Source: For Soviet Union, Liefert and others (1992); for United states, Webb and others (1990); for Poland, Yugoslavia, Hungary, and Czechoslovakia, author's calculations based on information provided by Nancy Cochrane and Mark Lundell, Econ. Res. Serv., USDA.

The complete insulation of food prices from market pressures made them little more than accounting prices, and they played practically no allocative role. Rapid income growth (far exceeding labor productivity

growth) combined with limited diversity of substitutable goods put increasing pressures on available supplies whether the harvest was good or not.

Because retail prices were set by planners and food prices in general were insulated from market pressures, very little incentive existed for increased product processing or development. Low, fixed prices translated into basic, noninnovative products of poor quality. Little emphasis was placed on convenience or service; thus, to some extent, the low consumer prices existing in CEE countries and the Soviet Union reflect the lack of value added from these attributes.

Supply and Demand Curves Under Central Planning

The supply curves faced by producers under central planning probably differ from those in a market economy in two general ways. First, supply curves under central planning are probably less elastic than they would be in a market environment. Producers under central planning are less responsive to changes in prices. Second, supply curves under central planning are probably located to the left of supply curves that would exist in a market economy. This leftward location of the curves reflects the various institutional rigidities that raise per unit costs or lower productivity or both.[4]

Thus, a prereform planned economy's supply curve at time t might be depicted as Sp in figure 1, and a market economy supply curve under similar conditions might be denoted as Sm. Demand curves under the planned system were also relatively unresponsive to small price changes (again steep) and lay further to the right than those that would have existed under market conditions. Planners restricted the availability and diversity of many consumer goods, especially, but not exclusively nonessential goods. Prices on basic consumer items such as food, medical, and housing services were set very low and kept stable for many years. Retail prices on basic commodities were actually revised far less often than producer prices. Thus, consumer demand curves under central planning were probably steep because of very limited substitution

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[4] For a more detailed discussion of these issues, see Koopman (1991). The role of inputs in determining the underlying cost structure of farming appears strongly in favor of higher costs for any given level of production than would have existed in a market environment. From a productivity standpoint and per unit input cost, agricultural supply curves for CEE countries and the Soviet Union likely lie to the left of where they would in a market environment.

possibilities, and shifted out rapidly from a high income elasticity as consumer income growth had to be concentrated on relatively few, low-priced commodities (or alternatively, savings). We depict a consumer demand curve under these conditions at time t as Dp in figure 2. Dm represents a market economy demand curve.

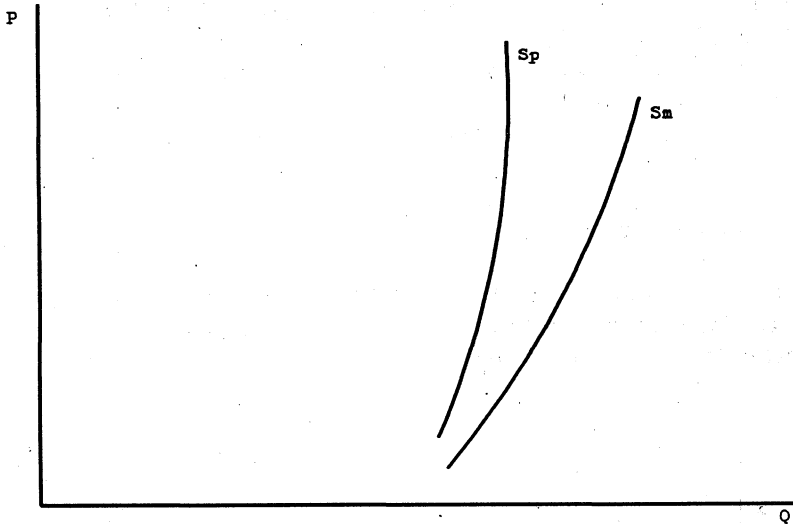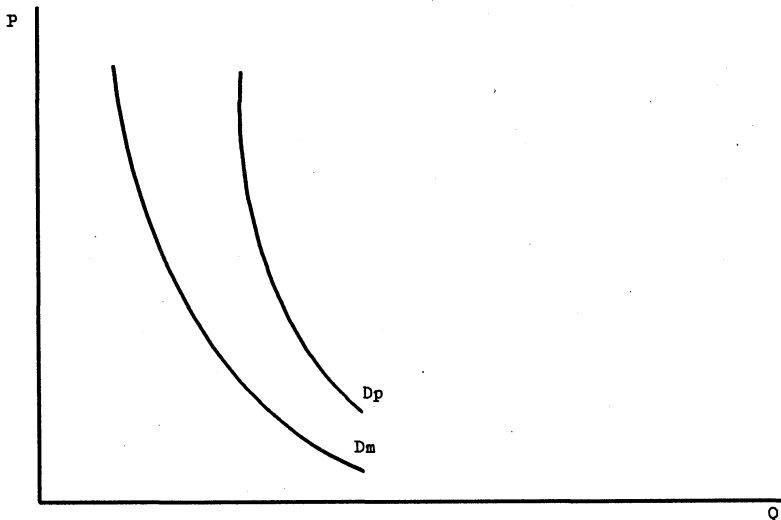Figure 1. Pre Reform CPE Supply Curve.

Figure 2. Pre Reform CPE Supply Curve.

Equilibrium under central planning seems almost a contradiction in terms. But from a planner's perspective, and in terms of economic relations with the rest of the world, CPE's can be thought to be in an equilibrium in the following sense: Planners distribute production plans to producers, who, given their systemic constraints and price Pp, produce at Qs in figure 3. Consumers face price Pc and demand Qd, which would require imports equal to Qd-Qs to equilibrate domestic consumer demand with total supply. But planners only import Qm while maintaining consumer price Pc. Hence, consumer demand remains unsatisfied by Qd-Qm, but planners are "satisfied." Because CPE's generally have closed borders, the unsatisfied demand of consumers Qd-Qm remains internalized. In an external sense then, the CPE depicted in figure 3 is in a planner's equilibrium at prices Pp, Pc, and imports of Qm-Qs.

A Contrast of Systems

As we observed in table 5, the European CPE countries tend to provide greater financial support to consumption than production, offsetting the effectiveness of producer support in bringing about self-sufficiency.

Figure 3. Market Disequilibrium in a Pre Reform ECPE.
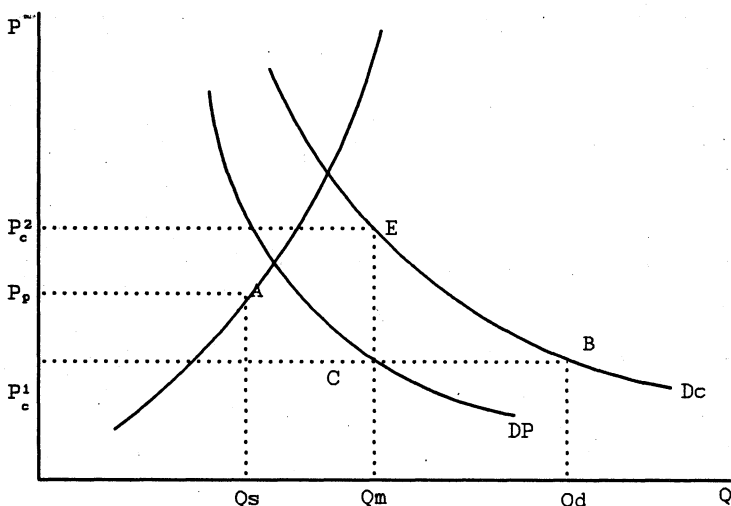
Furthermore, the level of financial support to producers is probably offset to some extent, if not more than completely, by the input price policies favoring industry and the planned system's role in holding back input productivity growth. That CEE supply curves are probably inelastic means that any "financial" incentive (or disincentive) to produce is relatively less effective at stimulating (reducing) output. Although a similar argument can be made about the lack of a stimulative effect of consumer support on demand, income growth has been very rapid (as opposed to productivity growth), shifting the underlying consumer demand curve out over time.

The EC provides an interesting contrast to the European CPE policy environment. In the EC, systemic distortions are minor, as the location of agricultural supply and demand are determined by the interaction of numerous market forces. Supply shifts over time may be affected by high support prices bringing high profits which are reinvested in new, more efficient, technology. Both supply and demand curves are relatively price responsive, reflecting numerous substitution possibilities available to producers and consumers.

EC supply curves are thought to be relatively elastic (at least compared with CPE's); thus $1 worth of support in the EC should stimulate more output than $1 worth in the CEE. Furthermore, effective EC producer support levels are higher than in the CEE. The EC's underlying supply curves are effectively market determined, and productivity growth has been rapid. Thus, the combined price policy and systemic arrangement suggests that EC policies are more effective at stimulating output than those in a European CPE.

On the demand side, the EC has relatively high negative support to consumers, which diminishes consumption. Furthermore, EC demand curves are relatively elastic, given the abundance of consumer goods. Thus, the diminishing effect of negative support can be paralleled, though in the opposite direction, with the above argument on the effect of $1 support in the EC versus $1 support in the CEE. Income growth in the EC, for the most part, has been driven by productivity growth, at least relative to the CEE. EC price policy and systemic advantages are clear. High prices in a setting of relatively elastic demand reduce quantity demanded. High income growth shifts out demand, but because income growth is mainly generated by productivity growth, supply (of some goods anyway) is simultaneously shifting outward.

In sum, we see that combined pattern of financial or "price" support to producers and consumers and the underlying supply and demand structure of the two regions have resulted in dramatically different economic

conditions at the beginning of the 1990's. The EC has a combination of price support and underlying supply and demand curves that work strongly in favor of self-sufficiency. CEE countries have a combination of price support and underlying supply and demand curves that complicate their becoming self-sufficient.

The peculiarities of a planned economic system suggest that direct comparisons of aggregate measures of support, such as PSE's and CSE's, for planned economies and industrial market economies could result in misleading conclusions regarding the effective levels of support that CEE and Soviet farmers received relative to those in the West. Much of the financial support received by CEE farmers merely offset other financial factors and systemic distortions that raised production costs. Most industrial market economy support is not required to offset domestic nonmarket distortions and, thus, has a more direct incentive effect.

Pure financial support estimates do not capture the nonfinancial, market-distorting effects of central planning. One would need to adjust PSE's and CSE's for these system distortions to provide better indicators of the net incentive effects of CEE policies for use in international comparisons with market economies.[5]

The Potential Effect of CEE and Soviet Reforms on World Markets

To examine the effect of market-style reform on the CEE countries and the Soviet Union, I use a synthetic simulation model of the world's agricultural economy. Because this model has been discussed in detail elsewhere, I will provide just a brief description here.[6] The model consists of 36 countries/regions, with up to 22 commodities per country. The model is a static, partial equilibrium, net trade model consisting of constant elasticity supply and demand curves for each commodity/country. Economic theory is used to specify cross-price relationships, joint-product specifications, and the relationships in the feed-livestock sector. The base year is 1986.

For reform in the CEE, I assume that supply and demand elasticities move from relatively inelastic planning elasticities to relatively elastic

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[5] Koopman (1991) attempts to correct for these distortions for Soviet PSE and CSE estimates resulting in a decrease in the total Soviet PSE from 26 to 12 percent. The Soviet CSE fell from 34 to 28 percent. Despite the adjustments, support for Soviet consumers remained more heavily subsidized than for producers, and this imbalance in support works against the long-stated, perhaps irrational, goal of self-sufficiency.

[6] For detailed discussions of the CEE models, see Koopman and others (1989), Liefert and others (1992), and Cochrane (1990). For details on the modeling framework in general, see Roningen (1986).

market elasticities. Supply curves are shifted to account for the expected productivity gains. Demand curves are positioned to reflect consumers' demand versus planner's. PSE's and CSE's are used to capture government policy price wedges. The reform scenario effectively rebuilds previously planned economies into what we hope are reasonable approximations of market economies. Government price wedges are removed and curves shifted to approximate the effects of reforms moving from a subsidized planned economy to an unsubsidized market economy. The model's solution horizon is about 5 years. Thus, all things being equal, the model will predict the outcome expected after 5 years of adjustment to reform, but with no supply or demand growth trends. Some alternative scenarios highlight the importance of certain assumptions on the results. Among the alternative scenarios is a longer term scenario that incorporates conservative supply and demand growth trends over a 14-year period (assuming reform began in 1986 and projecting to the year 2000.)

The first scenario incorporates the supply and demand adjustments discussed above. Supply curves are shifted outward reflecting expected productivity gains at the same time their slopes are adjusted to reflect greater price responsiveness. Demand curves for the Soviet Union are shifted out to reflect excess demand while demand curves for all countries are made more elastic.

Removal of government financial support to producers and consumers is approximated by removal of PSE's and CSE's from initial producer and consumer prices.

Under the first scenario, the model predicts that world prices in general would fall nearly 3 percent, meat prices rise by slightly more than 2 percent, and grain prices fall over 7 percent (fig. 4). These price movements follow the changing CEE trade patterns resulting from reform. CEE grain imports decline from 31.5 million metric tons to 8.5 million metric tons, a decline of 73 percent, and the Soviet Union imports less grain than Eastern Europe (table 6). The region becomes a net meat importer, with Eastern Europe exporting 2.2 million metric tons but the Soviet Union importing 3.7 million metric tons.

In the CEE, production of most commodities declines (despite the productivity gains), while consumption of meats increases and grains decreases. In total, the contribution of agricultural production to gross domestic product (GDP) after reform falls 37 percent compared with prereform levels (table 7). This estimate overstates the decline because prereform production is valued at the artificially high producer prices. When prereform agricultural GDP is valued using trade prices (reflecting

world opportunity costs), the agricultural GDP decline from reform is only 14 percent.

Under this first reform scenario, the net import position of these economies increases by $7.0 billion (table 7). Eastern Europe improves its net exports from $1.0 to nearly $3.5 billion, but the Soviet Union increases imports from $6.4 to $10.5 billion.

In this first scenario, CEE agricultural GDP declines while net imports rise, suggesting that the CEE countries rely more on world markets for food products than before reform. The regional aggregation, however, hides the fact that the East European countries increase export earnings despite lower levels of production. The Soviet Union on the other hand decreases production but relies on world markets for additional imports to offset the production decline. The role of the excess demand shifts proves to be crucial to this outcome. Will consumer demand for food products increase in a postreform, freemarket Soviet economy compared with the prereform artificially priced planned economy?

Figure 4.

Relative World Price Impacts from Unilateral Policy Reforms
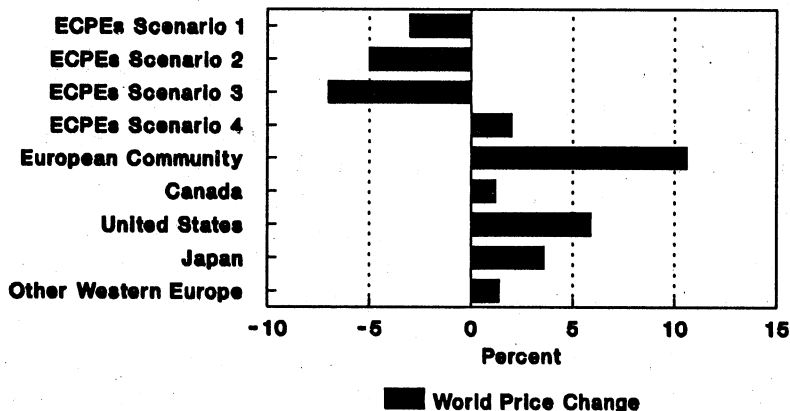
Source: CPE\ERS\USDA and Roningen and Dixit

Table 6--Net trade quantity results for selected commodities under alternative scenarios

Item	Initial	Scenario 1	Scenario 2	Scenario 3	Scenario 4
			Metric tons		
Meat:					
Soviet Union	-796	-3,702	-1,258	-741	-1,950
CEE	1,207	2,342	2,371	2,532	3,533
Total	411	-1,360	1,113	1,791	1,583
Grain:					
Soviet Union	-27,900	-2,266	-2,670	-4,345	16,367
CEE	-3,630	-6,215	-6,257	-260	-870
Total	-31,530	-8,481	-6,927	-4,605	15,497
Butter:					
Soviet Union	-178	0	-15	46	178
CEE	34	92	82	117	37
Total	-144	92	67	163	215
Cheese:					
Soviet Union	-11	0	269	310	307
CEE	56	29	26	61	43
Total	45	29	295	371	350
Sugar:					
Soviet Union	-4,855	-10,333	-8,499	-8,110	-8,293
CEE	373	-259	-434	-193	193
Total	-5,028	-10,592	-8,933	-8,303	-8,046

Source: Economic Research Service, U.S. Department Agriculture and author's calculations.

To highlight the importance of the excess demand shifts used in the first scenario, I ran an alternative scenario without the excess demand shifts (tables 6 and 7). The main differences are most visible in the effect on world meat prices and the value of CEE net trade. In this second scenario, world prices decline by nearly twice the amount of the first scenario, mainly because meat prices decline rather than rise. This outcome highlights the importance of the underlying Soviet demand for meat. If planners have significantly suppressed real meat demand in the Soviet Union, then a postreform Soviet Union would provide significant

Table 7--Estimated agricultural gross domestic product and net trade under alternative scenarios

Item	Initial	Scenario 1	Scenario 2	Scenario 3	Scenario 4
		Million dollars			
GDP:					
Soviet Union	95,799	81,341	76,123	99,663	91,954
CEE	64,843	57,358	53,865	72,812	82,549
Total	160,642	138,699	129,988	172,475	174,503
Net trade:					
Soviet Union	-6,375	-10,520	-3,939	2,914	5,318
CEE	1,071	3,479	2,790	4,691	6,197
Total	-5,304	-7,041	-1,149	7,605	11,515
		Percent			
Net exports/GDP	-3	-5	-1	4	7

Source: Author's calculation.

impetus to world meat prices. But if the long Soviet queues for meat reflect more a concentration of macroeconomic imbalances that will dissipate upon reform, then world meat prices will fall.

Overall in scenario 2, the CEE net import bill drops 84 percent, to $1.2 billion compared with our baseline scenario result of $7.0 billion. This scenario also highlights the importance of the potential trading relationship between Eastern Europe and the Soviet Union. Soviet import expenditures drop over $6 billion, and East European exports decline $0.7 billion as a result. (I did not model bilateral relationships in the model; therefore, the effect on Eastern Europe could be even larger if such a relationship was specified.)

In a third scenario, I examined the possible effect of a substantial income decline in the region. Recent reports from Poland (and to a lesser extent Hungary) indicate a substantial decline in per capita income and per capita disappearance of most foodstuffs because of reforms. Although the decline in per capita income may be a statistical exaggeration, the decline in per capita disappearance is probably more accurately measured. This decline in disappearance probably also includes a sizable decline in per capita human consumption. While much of the decline in consumption reflects higher food prices, there also appears to be a substantial income

effect despite the potential statistical exaggeration.[7] Real income
declines can probably be expected in all the CEE countries (reforming or
not), and in this section we test the sensitivity of our model results to a
20-percent decline in real income.[8]

The results suggest that a 20-percent decline in income (and no excess
demand shifts) would bring about even lower world prices than scenario 2
and a positive net trade balance for the region. Meat and grain prices
plummet, resulting in a world price drop of over 7 percent. The Soviet
Union remains a net importer, but has cut its import bill in half
compared with prereform purchases (tables 6 and 7). Eastern Europe's
net exports increase to $4.7 billion. To the extent that an income decline
is greater, or income elasticities are higher, these effects could understate
the positive effect of reform on food import expenditures.

In the fourth and final scenario, I examined the effect of sustained
improvement in productivity growth (though conservative estimates) and
income growth in addition to the one time shocks examined in the
baseline scenario. The scenario accounts for growth in other countries'
supply and demand (but no changes in their policies), again using an
equilibrium price determined by world markets. Assumptions of
sustainable productivity and income growth are somewhat beneficial to
world prices and very beneficial to the CEE region's net trade balance
(fig. 1 and tables 6 and 7). World prices would increase 2 percent, based
mainly on a slight rise in meat and oilseed product prices. World grain
prices fall, but by much less than their fall in the other three scenarios.
Both Eastern Europe and the Soviet Union are predicted to be net
exporters, despite the assumption of initial excess demand, moderate
productivity improvements, and sustained income growth. Net exports
are estimated at nearly $12 billion 14 years after reform, or 7 percent of
agricultural GDP. This potential outcome suggests that if market style
reform is successful, both the Soviet Union and Eastern Europe could
return to their prewar status of net agricultural exporters.

How do the world price changes generated by the CEE reform scenarios
compare with price changes generated by industrial market economy
liberalization scenarios? Figure 4 shows the expected world price changes
generated in unilateral policy liberalizations for the EC, Canada, United
States, Japan, and other Western Europe as reported in Roningen and
Dixit (1986) compared with the reform scenarios for CEE reported above.

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[7] That the CSE's discussed earlier are understated may also be due to an overvalued
exchange rate.

[8] The average income elasticity in our model for the CEE countries and the U.S.S.R. is
30 percent. A 20-percent income shock would thus translate into a 6-percent demand shift.

While most CEE scenarios result in lower world prices, the scenarios for countries with industrial market economies result in higher world prices. In terms of size of effect on world markets, CEE reform tends to have bigger effects than either Canadian or other Western European liberalization. CEE reform effects on world markets generally lie somewhere between either Japan or U.S. liberalization.

Conclusions

The real incentive prices at work in the CPE's have probably worked against the stated goal of self-sufficiency. Market-style reform in the region may not necessarily result in a larger agricultural sector (at least for the commodities examined in this chapter) for the region. Eastern Europe appears to be able to increase net agricultural exports under relatively conservative reform conditions. The Soviet Union may increase net agricultural imports if there is a release of pent-up demand. If, however, the pent-up demand is offset by income declines or greater consumer price increases than assumed here, then Soviet imports will substantially decline. Over a longer period, the effect of effective market-style reform brings even the Soviet Union to a net export position.

References

Cochrane, N.J. (1990) *Trade Liberalization in Yugoslavia and Poland.* Staff report no. AGES-9058. U.S. Dept. Agr., Econ. Res. Serv.

Cochrane, N.J., and R.B. Koopman. (1990) "Eastern Europe: The Transition from Plan to Market," *World Agriculture: Situation and Outlook Report.* WAS-59-60. U.S. Dept. Agr., Econ. Res. Serv.

Cook, E.C., W.M. Liefert, and R.B. Koopman. (1991) *Government Intervention in Soviet Agriculture: Estimates of Consumer and Producer Subsidy Equivalents.* Staff report no. AGES-9146. U.S. Dept. Agr., Econ. Res. Serv.

Koopman, R.B. (1991) *"Agriculture's Role During the Transition from Plan to Market: Real Incentives and Potential Equilibrium."* Paper presented at Bureau of Labor Statistics and EUROSTAT Conference on Economic Statistics for Economies in Transition.

Koopman, R.B. (1990a) "Comparative Technical Efficiency of Soviet Agriculture: A Discussion of Some Recent Empirical Findings," *CPE Agriculture Report*, pp. 16-23.

Koopman, R.B. (1990b) "The Soviet Food Problem: A Different Perspective, The Role of Relative Prices," *CPE Agriculture Report,* 24-30.

Koopman, R.B. (1989) *Efficiency and Growth in Agriculture: A Comparative Study of the Soviet Union, United States, Canada, and Finland.* Staff report no. AGES-8954. U.S. Dept. Agr., Econ. Res. Serv.

Koopman, R.B., and N.J. Cochrane. (1990) "Trade Implications of EC 1992 for a Reforming Eastern Europe and Soviet Union." Paper presented at USDA/World Bank conference EC 1992: Implications for World Food and Agricultural Trade, Washington, DC.

Koopman, R.B., W.M. Liefert, and E.C. Cook. (1989) "The Effects of Soviet Agricultural Policy on World Markets." Paper manuscript presented at Allied Social Science Associations Meetings, Atlanta, GA.

International Institute of Agriculture. (1934) *International Yearbook of Agricultural Statistics, 1933-34.* Rome.

Liefert, W.M. (1991) "Economic Rent and Estimation of Soviet GNP Growth," *Review of Income and Wealth.* Series 37, no. 2, pp. 156-76.

Liefert, W.M., R.B. Koopman, and E.C. Cook. (1992) *The Effect of Western and Soviet Agricultural Trade Liberalization on the Soviet Union.* Unpublished manuscript. U.S. Dept. Agr., Econ. Res. Serv.

Markish, Y., and K. Gray. (1989) "Agricultural Inputs," *Soviet Union Agriculture and Trade Report: Situation and Outlook.* RS-89-1. U.S. Dept. Agr., Econ. Res. Serv.

Organization for Economic Cooperation and Development. (1989) *Agricultural Policies, Markets and Trade, Monitor, and Outlook.* Paris.

Roningen, V.O. (1986) *A Static World Policy Simulation (SWOPSIM) Modeling Framework.* Staff report no. AGES-860625. U.S. Dept. Agr., Econ. Res. Serv.

Roningen, V.O., and P. Dixit. (1986) *Economic Implications of Agricultural Policy Reforms in Industrial Market Economies.* Staff report no. AGES 89-36. U.S. Dept. Agr., Econ. Res. Serv.

Rosefielde, S., and R.W. Pfouts. (1988) "Economic Optimization and Technical Efficiency in Soviet Enterprises Jointly Regulated by Plans and Incentives," *European Economic Review*, 32:12855-99.

Wainio, J., B. Chattin, and J. Sullivan. (1988) "Methodology: PSE's as Aggregate Measures of Support," *Agriculture in the Uruguay Round: Analyses of Government Support.* Staff report no. AGES-880802. U.S. Dept. Agr., Econ. Res. Serv.

Webb, A.J., and K. Gudmunds. (1989) *PS &D View: Manual and Database.* U.S. Dept. Agr., Econ. Res. Serv.

Webb, A.J., M. Lopez, and R. Penn. (1990) *Estimates of Producer and Consumer Subsidy Equivalents: Government Intervention in Agriculture, 1982-87.* SB-803. U.S. Dept. Agr., Econ. Res. Serv.

Wong, L.F. (1986) *Agricultural Productivity in the Socialist Countries.* Boulder, CO: Westview Press.

U.S. Department of Agriculture, Economic Research Service. (1987) *Government Intervention in Agriculture: Measurement, Evaluation, and Implications for Trade Negotiations.* FAER-229.

Varga, G., E. Borszeki, L. Harza, and S. Meszaros. (1988) *Prices, Taxes and Subsidies in the Food Producing Sector.* Budapest, Hungary: Research Institute for Agricultural Economics.