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Polish Agriculture in Transition: Does it Hurt to be Slapped by an Invisible Hand?

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Abstract

Polish economic data is assembled in order to assess the impact on the agricultural sector of the recent reforms. Evidence of recovery in this sector is slight, but the decline seems to have halted. Policy issues for agricultural reform are discussed, emphasizing regulation of the monopolistic input and processing sectors. The evidence for the existence and nature of these monopolies is reviewed. The goals of the chief regulatory body in Poland, the Antimonopoly Office, are summarized. A selection of recent models in industrial organization, dealing with entry, horizontal mergers, and vertical control, are used to provide a basis for assessing the direction of Polish regulatory policy.

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Nontechnical Summary

This paper provides a basis for a broader study of the transformation of Polish agriculture. The issues involved in this transformation are similar to those of other sectors and other East European (EE) countries: How can a sector dominated by state-controlled enterprises with significant market power be converted to a competitive, (largely) privately owned set of firms, without subjecting the nation to intolerable adjustment costs? The existence of a large number of small, privately owned farms distinguishes Polish agriculture from that of other EE countries; however, the input and processing/distribution sectors are monopolistic and inefficient, and these are the greatest challenge within agriculture.

We begin by describing the current state of Polish agriculture, emphasizing the changes since the major agricultural reform of 1989. This reform, and the subsequent decontrol of most non-agricultural prices led to an increase in unemployment and inflation. There has been a substantial decrease in production employment in state-owned farms, but employment in the processing/distribution sector has remained roughly constant. Wages in the latter sector kept pace with average wages for the general economy, while relative wages of state farm production workers fell. Private farms continue to be the dominant supplier of agricultural products, and account for

approximately three quarters of agricultural land.

The price increases of cereal products and sugar were much greater than the general price increase in the first quarter of 1990, but by the first quarter of 1991 cereal products and sugar returned to pre-reform levels. After the price liberalization of 1990:I real income fell dramatically; the real income of farmer households fell nearly 50%. Although real incomes increased steadily over the last three quarters of 1990, the 1990:IV income levels were below those of 1989:I-II for all households but pensioners'. The real income of pensioners -- the economy's most vulnerable group -- appears to have been protected quickly, with 1990:IV income climbing to the 1989:I level. Other households' income fell 20 - 25% compared to the first half of 1989. Households spent over 50% (well over 60% for pensioners) of their incomes on food during most of 1990. This compares to average household expenditures on food of 39% in 1989.

Poland was a net importer of agricultural products for most of the 1980's. The poor USSR harvest and a relatively generous import quota from the EC contributed towards Poland's positive net exports of agricultural and food products during 1990. However, exports of agricultural products in 1991:I were only 64% of the 1990:I level, and Poland returned to being a net agricultural importer. It appears unlikely that export demand will provide the catalyst for growth of Polish agriculture.

The economic situation has stabilized, and improved to some extent since the reforms; however, the improvement has been slight,

and may not provide a strong economic underpinning for sustained reform.

The next section of the paper discusses the importance of regulating the monopolistic input and processing sectors, and considers the relationship between regulatory policy and privatization and trade policy. Privatization will provide an important incentive for economic development, but simply transferring ownership of monopolized sectors from public to private hands is insufficient. There is the danger that those in charge of selling public assets will have an incentive to maintain the monopolistic structure, in order to increase the market value.

A liberal trade policy provides a source of market discipline, but it is unlikely to be a substitute for active regulation. Empirical evidence provides limited support for the view that trade is and effective method of disciplining domestic oligopolists. In addition, it may be extremely difficult to sustain a liberal trade policy in the face of opposition from special interest groups. The liberal trade regime in Poland has come under increasing attack from domestic groups. Opponents of free trade often argue for gradual reform, pointing to the existence of adjustment costs. We discuss the weakness of this argument; adjustment costs do not necessarily imply that reform should be gradual.

We review the evidence of the extent and nature of market power in the agricultural sector. This evidence is descriptive and anecdotal, rather than based on statistical models which have a theoretical foundation.

The subsequent section describes the Polish regulatory agency, the Antimonopoly Office. This office is independent of agencies working on privatization issues. This separation is important, in view of the potential conflict between the goals of regulating monopolistic practices and selling state assets.

Current regulatory practices are consistent with standard neoclassical theories of industrial organization and welfare economics. We review a number of recent theoretical contributions, including: (i) models of entry into imperfectly competitive industries, (ii) models of the effects of horizontal mergers, and (iii) models which study vertical control and vertical mergers.

Our review of these models emphasizes counterintuitive possibilities. We explain why free entry into an oligopolistic sector may lead to excessive entry. A tolerant attitude toward horizontal mergers may encourage investment and lead to a fall in price in spite of an increase in market power. Even when investment is not affected, mergers may increase social welfare; the likelihood of this is greater if the merger involves small, "fringe" firms. The welfare effects of vertical controls and vertical mergers are particularly difficult to determine, and it is noteworthy that some of the practices proscribed by regulatory authorities are, in certain circumstances, welfare improving.

The purpose of this review is to provide a basis for evaluating current regulatory practice in Poland. The choice is between judging each case of suspected anticompetitive behaviour on its own merits, or, alternatively, developing simple regulatory rules. The

review of recent industrial organization (IO) models emphasizes that there exist plausible circumstances where rules, based on common sense and the intuition from standard neoclassical theory, lead to incorrect decisions. Thus, the review provides examples which suggest a series of arguments against the use of rules. However, the disadvantages associated with discretionary policy, especially the great uncertainty and the incentives for rent seeking, seem to outweigh the disadvantages associated with rules. Our opinion, therefore, is that although recent work in IO provides important caveats to the use of simple rules, such rules nevertheless offer the soundest basis for regulatory policy in Poland.

I. Introduction

This paper is intended to serve as background for a broader study of the transformation of Polish [and ultimately of Eastern European (EE)] agriculture. The issues involved in this transformation are similar to those of other sectors and other EE countries: How can a sector dominated by state-controlled enterprises with significant market power be converted to a competitive, (largely) privately owned set of firms, without subjecting the nation to intolerable adjustment costs? The existence of a large number of small, privately owned farms distinguishes Polish agriculture from that of other EE countries; however, the input and processing/distribution sectors are monopolistic and inefficient, and these are the greatest challenge within agriculture.

The objective here is to provide a basis for policy discussion, rather than to offer a set of policy guidelines. To this end, we begin by describing the current state of Polish agriculture, emphasizing the changes since the major agricultural reform of 1989. The economic situation has stabilized, and improved to some extent since the reforms; however, the improvement has been slight, and may not provide a strong economic underpinning for sustained reform.

The next section discusses the broader issues of regulating the monopolistic input and processing sectors. Problems of privatization and of trade policy are mentioned insofar as they relate directly to regulatory issues. Questions involving privatization have been amply discussed by Borensztein and Kumar (1991), Blanchard et al. (1991), and Grosfeld and Hare (1991); the

slight progress on privatization does not warrant reassessing those discussions. In addition, there seems little point at this time in advancing detailed conjectures on trade policy. However, there is an active regulatory process, and it is worth understanding the challenges facing this process in the agricultural sector. To this end, we review the evidence of the extent and nature of market power in that sector.

The subsequent section describes the Polish regulatory agency, the Antimonopoly Office. The goals of this institution are informed by neoclassical theories of industrial organization. We review a number of recent contributions to this theory, in order to provide the basis for assessing current regulatory policy in Poland. This material is not specific to agriculture, since regulatory practice has not identified agriculture as requiring special treatment. This section mentions several recent regulatory decisions, in order to provide concrete examples of the process. A concluding section provides a brief summary.

II. Description of Polish Agriculture

Moves to liberalize the Polish economy began in 1981, but until 1989 the reforms were made in a piecemeal manner. One of the last acts of the communist regime was to authorize full liberalization of agricultural markets starting August 1, 1989. Quotas and official prices were abolished and the state monopoly in grain and meat marketing was formally liquidated. The benefits of the liberalization of agricultural markets were seen as early as December 1989. Market-determined prices at harvest 1989 and

increased export demand from the USSR resulted in higher domestic farm incomes. At the same time subsidies were reduced. However, this immediate increase in farm income was short-lived.

Until 1989 farm incomes were maintained by manipulating agricultural prices. This policy, initiated in 1983, was designed to achieve parity between agricultural and non-agricultural sector incomes. At the beginning of 1990, 14% of all prices were still directly set by the state. These included principally the prices of energy, transportation, housing, medicine and some milk and bread products (Adamowicz, 1991). However, with the full economic liberalization of January 1, 1990, the demand for agricultural products decreased dramatically.

Inflation in Poland ranged from 115-160% a year over 1985-1988. By 1989, the acceleration in prices hit crisis proportions with the increase in consumer prices in 1989 more than doubling the 1988 increase; the percentage increase in 1990 was double that of 1989.

Percentage Increases in Consumer Prices

1985	1986	1987	1988	1989	1990
115.1	117.7	125.2	160.2	351.1	684.7

Source: Statistical Bulletin, Central Statistical Office, Vol XXXV, Table 1.

Nominal interest rates started to increase in 1989 with the first two quarters of 1989 posting an annual rate of 44% and a third quarter rate of 51.6%. Rates in the fourth quarter of 1989 rose to 104.4%. With full price liberalization in January 1990, nominal

interest rates first skyrocketed but fell to pre-1990 levels by the third quarter. However, the real interest rate was typically negative, particularly for the third and fourth quarters of 1990 (Table 1).

The lack of investment funds is seen as a major impediment to modernizing the agricultural sector, and there have been calls to subsidize agricultural credit as a means of encouraging investment and protecting producers. The data does not suggest that investment has been discouraged because of the level of interest rates, so credit subsidies seem like an unlikely policy option. However, this data gives no indication of the extent of credit rationing, which may be significant; in addition, the tremendous uncertainty which is associated with high inflation discourages investment. Nevertheless, credit subsidies are not the appropriate instrument to address these problems. Instead, efforts must be made to develop a banking system and to improve the investment climate. It is important to maintain a positive real interest rate in order to encourage saving.[1]

The large private family farming population in Poland appears to favour the production agriculture sector in its move towards a free market economy. However, state monopoly in inputs and state monopsony in the processing/distribution sector imposes virtual state control on the production sector as well. Before January 1,

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[1] Poland, in common with other EE countries, was faced with the problem of having made long term housing loans at low fixed interest rates (roughly 3%), resulting in an implicit credit subsidy, and exacerbating the problem of bank solvency. A parliamentary decision was made to rewrite these subsidized loan contracts to make them yield market rates. (Long and Sagari, 1991)

1990, farms had to satisfy budget constraints but had a secure market for their products. The state bought all that could be produced. Some agricultural commodities had somewhat freer markets -- in particular horticultural products.

Structure of Production

Polish agriculture is composed of private, state, cooperative and 'agricultural circle' farms. The state and cooperative farms engage in food processing as well as nonagricultural production. Table 2 presents the average land holdings of these different farms.

Private farms have persisted as the dominant supplier of agricultural products. Tables 3 and 4 illustrate the importance of the private sector in the production of livestock and field crops in 1990. The private sector accounts for 80 percent of cattle production and 70 percent of swine production. However, the average private farm is 6 hectares and has 5 cows and 16 pigs. Private farms account for 80 percent of the cereal and over 90 percent of the potato and the vegetable area planted. The size distribution of private farms is important. Only 28 percent of the private farms are between 5 to 10 hectares and 1 percent of these farms exceed 10 hectares. Over half of the private farms are less than the average farm size [World Bank - EC - Poland Task Force Report (1990) hereafter, the "Task Force Report"].

The state farms (the PGRs) were established in 1950 with the goal of introducing modern technologies into Polish agriculture. After 1956, the role of the state farms shifted to production dictated by state planning objectives (e.g., increased livestock

production for both domestic and export markets). The state financed all investments on these farms and absorbed all their operating losses. The reforms in the early 1980s mandated that these farms reorganize their production activities to maximize profits. According to Kowalaski (1989), this led to a drop in livestock density and an improvement in efficiency.

Polish cooperative farms were formed in the years following World War II. The political unrest of 1956 resulted in 80% of the cooperatives being divested or transferred back into private family farms. Economic incentives implemented in the 1970s were designed to discourage disbanding of cooperatives. Subsidized investment encouraged private farms to form into cooperatives and to acquire new equipment and technologies. However, cooperatives tended to disband after three to four years of (apparent) cooperative farming. At the end of the 1980s, approximately 50% of the cooperatives survived no longer than 4 years.

The agricultural circle farms employ hired labour. These farms, which are fragmented and consist of poor quality state land, were formed to prevent agricultural land from reverting to private farming. One third of the circle farms terminated operation between 1981-85 (Kowalski, 1989).

At the time of the major reforms of January 1, 1990 the composition of the 18.7 million hectares of land used in agricultural production was:

- 76% of agricultural land in the private sector
- 24% of agricultural land in the 'public' sector (includes

government, communal and cooperative properties)

- 19% of the land owned by the state farms, 3.8% owned by cooperatives and .3% owned by firms servicing agriculture.

There are 2.1 million individual, private farms with more than 1 hectare and another 1.7 million farms with less than 1 hectare. There are 1,200 PGR farms with an average farms size of 3,300 hectares. In addition there are smaller farming units that support public social units such as hospitals and schools. These farms average 170 hectares. There are also 2,000 agricultural cooperatives with an average of 290 hectares.

Employment

There are 4.5 million people employed in private and public production agriculture in full-time equivalents, out of a total work force of about 17 million. Some PGRs produce non-agricultural goods as well. Of the 4.5 million, 960,000 work in the public sector and 3.5 million are in the private production agricultural sector.

The legal definition of a farmer is someone with more than 1 hectare of land, regardless of how much time is spent working the land. The farmer-household is one where at least 1 member of the family is working only on the farm (1 million). The employee/farmer-household is one where work time is split between the farm and a non-agricultural activity (1.2 million). These two groups account for 2.1 million farms with 27% of the rural population. If a farm has less than 1 hectare but the income comes primarily from agricultural activity (e.g., green house operation)

it is placed in the farmer-household category. Agricultural activity is viewed as employment of last resort. If someone holds 1 hectare of land he/she is not counted as unemployed. The small and inefficient farms provide insurance, guaranteeing some production for home consumption and some cash income. These farms are not expected to respond to market incentives and are not targets of agricultural policy.

Public sector employment in production agriculture and the food processing and distribution industry exhibit different trends (see Table 5). While food processing/distribution industry employment is relatively constant between the first quarters of 1990 and 1991, employment in the public agricultural production sector declined by nearly 20% over the same period. There are state employees on the public sector farms (PGRs, cooperatives and circle farms) whose duties are not directly related to agricultural production. State enterprises (in both the agricultural and non-agricultural sectors) provided many of the social services in the local community. The change in government in Fall 1989 led to the reclassification of many positions from agricultural employment to non-agricultural categories. Hence, the dramatic decline in the state agricultural work force is attributed in part to this reclassification.

The food processing firms are state owned. The reforms appear to have increased the influence of workers in the management of these firms, and this may have increased the reluctance of the firms to fire workers. However, this is also true of the non-agricultural state sector. It is noteworthy that while total employment has

decreased by 9% from 1990:I to 1991:I, employment in the food sector increased by 3%. It would be misleading to conclude that this relative change in employment reflects an efficient reallocation of workers, however.

Agricultural Marketing

Approximately 85% of final agricultural production is marketed either to public institutions (e.g., state food processors and distributors, state managed factories, schools, hospitals) or directly to the public by the farmers. The remainder is held in stocks and consumed by the production units. Considering only the marketed portion of farm production in the private sector, the direct marketing of agricultural production doubled in the 3 years from 1988-90:

Marketed for:	1988	1990
public consumption	84.2%	66.8%
private consumption	15.3%	33.0%

Source: Central Statistical Office.

This provides evidence of the extent to which farmers have taken advantage of market liberalization. On the evidence of Western economies, there appear to be considerable (potential) economies of scale in agricultural marketing; the replacement of large state marketing services by smaller, direct methods, is an indication of the inefficiency of the state sector.

Agricultural Income.

From 1982-88 farm incomes were less than 100% of those in the non-agricultural sector. In 1989 agricultural income reached 120% of non-agricultural incomes (Central Statistical Office). The ratio of the value of output to the value of purchased inputs exceeded 100% in 1987-1989 for private farms (Table 6).[2] The value of purchased inputs includes tractors, machinery, buildings, and the amortization of quasi-fixed factors, but excludes land. However, this ratio drops to 50% in 1990. In 1989, the value of output rose 350% over the previous year but the ratio of the value of output to value of purchased inputs was 107%.

Purchased real input prices remained constant in 1988 and 1989 and fell 20% in 1990 (Central Statistical Office). In 1990 the value of the goods sold increased by 278% over 1989 but the value of purchased inputs increased 654%. Consumer prices in general increased 684% in 1990.

At present, on-farm consumption of production is valued at the price the farmer can sell the production (the wholesale prices) rather than the consumer prices. This tends to underestimate farm income. Real agricultural wages fell precipitously in the first quarter of 1990 but rebounded by the second quarter and remained

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[2] When Oscar Wilde noted that economists knew the price of everything but the value of nothing he may have had in mind the sort of data problems we encountered here. In private conversations with officials at the statistical agency responsible for the information in Table 6 we were assured that the numbers referred to value rather than price. In either case, it is clear that the terms of trade moved against agricultural producers in 1990.

constant thereafter (Table 7). Real wages in the food processing/distribution industry remained constant while the wages of state agricultural and forestry workers increased by 18% and 27%, respectively from 1990:1 to 1991:1. Compared to the average wages over all sectors of the economy, wages for state employed agricultural workers were 6.5% less in the fourth quarter of 1989 and 14% less by the first quarter of 1991.[3] Food processing/distribution industry wages kept pace with average wages for the general economy.

Agricultural and Food Prices

Table 8 presents the real price indices for selected consumer foodstuffs. The prices of cereal products, sugar and condiments increased much faster than the general prices in the first quarter of 1990, but by the first quarter of 1991 cereal products and sugar returned to pre-reform levels. The hoarding of storable foodstuffs is reflected in the prices of sugar in 1990:I and the condiments and other foodstuffs category which initially increased 35 percent in January 1990 and fell to December 1989 levels by March 1991.

Within 15 months of price liberalization, most food prices were well below those of January 1, 1990 in real terms. Potatoes, vegetables and fruits, and fats and sugar were at 50-60% of the January 1, 1990, while meat products and tea/coffee were 15% below the levels of January 1, 1990 in real terms. Only bread and fish

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[3] Comparing information presented in tables 5 and 10 involves comparing wages of public sector agricultural production workers with private sector agricultural household incomes. The direct comparison may not be very informative.

and fish products posted increases over the January 1, 1990 levels of 10% and 6%, respectively. Dairy product and egg prices returned to the January 1, 1990 levels by the end of 1990. Butter prices began to rise in late 1990 after falling dramatically through the first three quarters of 1990 but remained well below the levels of January 1, 1990 in real terms.

Table 9 presents price information for the food processing/distribution industry. Direct market prices refer to the prices farmers receive from private sales while procurement prices are the prices paid by the government for farm production. Farmers consistently received better prices (ignoring marketing costs such as transportation) by directly marketing wheat and pigs. However, the government procurement price for cattle exceeds the free market price. Poland was allowed to export 1 million head of livestock to the EC in 1990, but this quota was cut by half for 1991, with the EC claiming that Poland's 1990 exports disrupted the EC livestock market.

While the quality of pigs produced in Poland is typically high and can compete on international markets, the quality of cattle production is more variable and of lower average quality. Table 10 illustrates that from 1985-1989, the government procurement price exceeded the free market price for cattle and wheat but not for pigs. With price liberalization the government procurement price still exceeds the free market price. It is not clear why the government continues to subsidize cattle production.

The volume of government procurement of cattle fell 40% between

1990:1 and 1991:1, while procurement of pigs shows a drop of around 10% (Table 11). Both the procurement price and the quantity for wheat also fell dramatically (the January 1991 price is half of the January 1990 price). The fall in price may be partially attributed to the government's stated goals of removing subsidies to all industries, of restraining budget deficits, and of encouraging competition from private enterprises (e.g., grain traders).

Real incomes exhibit little change during the last two quarters of 1989 (Table 12). During this period pensioners' incomes fell 7%, employee and employee/farmer households fell 4-5% and farmer household incomes rose 3%. After the price liberalization of 1990:I real income fell dramatically; the real income of farmer households fell nearly 50%. Although real incomes increased steadily over the last three quarters of 1990, the 1990:IV income levels were below those of 1989:I-II for all households but pensioners'. The real income of pensioners -- the economy's most vulnerable group -- appears to have been protected quickly, with 1990:IV income climbing to the 1989:I level. Other households' income fell 20 - 25% compared to the first half of 1989.

Food as a percentage of total expenditures increased for all households between December 1989 and January 1990 (Table 13). Households spent over 50% (well over 60% for pensioners) of their incomes on food during most of 1990. This compares to average household expenditures on food of 39% in 1989 (Task Force Report). However, by early 1991 the percentage of employees', employees-farmers' and pensioners' households spending on food fell 12 - 14%

from early 1990; farmers' households spending fell only 2% over the same period. General inflation and in particular food prices had begun to stabilize within a year of implementing price liberalization, but food as a percentage of total expenditures remain 10 - 15% higher than the 1989 levels.

Food consumption dropped dramatically between December 1989 and January 1990 for all four household categories (Statistical Bulletin, Table 59). The foodstuffs exhibiting the most dramatic decreases are fish (65 - 74%), sugar (29 - 41%), meat (27 - 31%), fruits (15 - 23%) and vegetables (11 - 20%). More modest declines in consumption of butter (6%) and eggs (8 - 16%) are reported. Bread and milk consumption remained unchanged.

Trade

Poland's pursuit of an association agreement (leading to full member status) with the EC contradicts their liberal position in the GATT negotiations. Moving towards membership in the EC may require the adoption of the EC's restrictive trade policies. Poland's current negotiating position with the EC places products into three categories upon signing the association agreement:

1) least sensitive; products with barriers removed immediately;
2) less sensitive; products with barriers gradually removed over 5 years; and,
3) most sensitive; products with barriers removed over 10 years.

The EC's reluctance to advance negotiations is not surprising. Poland is a significant producer of agricultural and food products,

steel and textile -- the three the most highly subsidized products produced in the EC.

In 1990, 25% of Poland's exports to the EC were agricultural products ($1.5 billion of $6.4 billion). This was an exceptional year with agricultural share of exports historically ranging from 15-26% during the 1980's. In 1990, Poland's agricultural imports from the EC accounted for 14% of all imports from the EC. During the 1980's the EC share of agricultural imports ranged from 12-35% of total EC imports (35% in 1984) but usually stayed in the range of 16-17% (Institute for Food and Agriculture).

Agricultural products comprised 3-4 percent of total exports and 4-5 percent of total imports between 1985-1989. Poland was a net importer of agricultural products for most of the 1980's (Table 14). The poor USSR harvest leading to increased export demand for Polish agricultural products in the latter part of 1989 contributed towards Poland's positive net exports. Poland was a net exporter of agricultural and food products during 1990 in real terms (Table 15). However, exports of agricultural products in 1991:I were only 64% of the 1990:I level, and Poland returned to being a net agricultural importer.

The export of meat products declined sharply at the beginning of 1991 when the EC reduced the 1990 quota by half (Table 16). In addition, the first quarter of 1991 found a dramatic increase in meat imports. This is explained by unusually large exports from Germany, regarded in Poland as dumping; it does not indicate the beginning of a trend. As a result of this perceived dumping, cattle

and hog imports must be personally approved by the Minister of Agriculture.

Table 17 illustrates the decline in the importance of the USSR in Polish foreign trade during the 1980s. By 1990, the CMEA nations account for only 23.7 percent of total Polish exports and 27.5 percent of total imports. The bulk of the CMEA trading activity is with the USSR. In 1990, 15.4 percent of Poland's exports are to the USSR while 20 percent of Poland's imports originate in the USSR. Electro-engineering products account for 65 percent of Poland's total exports to the USSR. USSR energy imports alone account for 70 percent of total imports from the USSR (or 14 percent of total Polish exports). The other CMEA nations account for 8.3 and 7.4 percent of Poland's total exports and imports, respectively, in 1990 (Statistical Bulletin).

Agricultural exports to the USSR have steadily declined since 1988. The percent of total agricultural exports to the USSR amounted to 11.6 percent in 1988 and 5.0 percent in 1989 of total agricultural exports. Table 18 indicates the decreasing importance of the USSR to Polish agriculture with 2.6 percent of the total agricultural exports in 1990. In that year the EC was Poland's most important export market and source of imported food and agricultural products. While the continued dependence on EC processed food products is likely to continue, the reduction in the EC import quota for Polish agriculture will be likely to have a serious impact on the export of agricultural and food products. Since combined agricultural and food exports accounted for 14% of the value of

exports in 1990, this will have a serious effect on Poland's trade balance.

The trade flows of 1990 were the result of exceptional circumstances and do not provide a reliable basis for speculating on future trading patterns. Poland gained access to the EC market in 1990 but this was curtailed in 1991; in addition, the USSR continued to deteriorate as a market for Polish exports. However, exports will be important in the development of the agricultural sector. Poland has historically produced high quality agricultural products (pork and horticultural products, in particular) that can compete on international markets. With a decline in domestic demand, the expansion into international markets can fuel agricultural and food processing activities. The decline in trading with the USSR and some of the other former CMEA nations is forcing Poland into barter arrangements with her neighbors, but the extent of these cannot be determined from the data.

III. The Debate on Transforming Agriculture

Studies of Polish agriculture have emphasized the need to promote competition. This section: discusses the relation between the twin goals of competition and privatization, and the role of trade policy; reviews evidence of the extent of anticompetitive behaviour in the agricultural sector in Poland, and of attempts to mitigate these practices; discusses institutional features which increase the difficulty of modeling imperfectly competitive behaviour; and draws a distinction between two incentives to promote competition.

Privatization and a Liberal Trade Policy

Privatization will provide an important incentive for economic development, but simply transferring ownership of monopolized sectors from public to private hands is insufficient. Indeed, discussions of privatization methods (cited above) recognize that those charged with carrying out the privatization will have an incentive to keep intact the monopolistic power of the industries they sell, so that the sales price will reflect future monopoly rent. In order to counter this incentive, it is necessary to have an independent agency whose goal is to promote competition and regulate monopolies. Although the two problems of privatization and regulation of the resulting market structure can not be considered independently, neither is it realistic to hope that they can be solved simultaneously. It is worth considering the extent to which the two problems are linked, as a prelude to a more detailed discussion of the regulatory issues.

In the initial enthusiasm for privatization, there was some hope that regulating anti-competitive behaviour would not present major problems. The basis for this belief was that since the EE countries are small in terms of world markets, those markets would provide the necessary discipline if EE governments adopted liberal trade policies. The importance of this possibility may have been overstated. International trade has two shortcomings as a source of competitive discipline.[4] The first of these is that even those

[4] The empirical evidence on the role of trade as a competitive discipline is mixed. Salinger (1990), using aggregate US data, finds evidence that increased imports were associated with

products which are traded are typically imperfect substitutes for foreign goods.[5] In these cases, domestic market power can still result in substantial welfare loss.

The second problem is that it may be very difficult to sustain a liberal trade policy. The appeal of interventionist trade policy is based both on fiscal and political-economic considerations. As a practical matter, it is often easier for governments to raise revenue by means of trade taxes than by less distortionary instruments; this may become an important consideration if fiscal deficits continue to rise. To the extent that border taxes insulate the domestic economy from world markets, they diminish the ability of international trade to discipline domestic oligopolists. The existence of special interest lobbies may exacerbate this tendency. Experience in the OECD countries provides examples where both oligopolists (e.g. automobile manufactures) and competitive producers (e.g. farmers) have influenced trade policy, so it is not a foregone conclusion that less competitive market structures are more likely to be associated with political lobbying that leads to inefficient trade policy. However, since the cost of organizing industry lobbies tends to be smaller where the industry is more

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higher marketing margins. Levinson (1991), using Turkish firm-level data, finds some evidence that imports disciplne doemstic oligopolists.

[5] In the last decade Polish exports have been roughly 23% of GNP, approximately the same as that of Spain, which has a similar size of population. However, 40% of those exports were directed to CMEA countries, and were not valued at world prices. Thus, the ratio of exports to GNP probably overstates the extent of openness of the Polish economy. Lipton and Sachs (1990) discuss the problems of using Polish GNP data.

concentrated, proponents of liberal trade are likely to be in a weaker position when their adversaries are oligopolists.

For these reasons international trade is an insufficient remedy against domestic oligopoly. Poland adopted an extremely liberal trade regime in the early stages of reform. This policy has come under attack as the costs of economic adjustment have become apparent. Opinion in government and academic circles in Poland is divided between those who favour the continuation of the liberal trade policy and those who advocate a protectionist policy. The former group advances arguments based on neo-classical welfare economics, and tends to view the opposition as being nostalgic for the days of state control of the economy. The latter group argue that liberal trade is damaging the most progressive sectors of Polish agriculture: these are the farms which rely on the market, and which face the likelihood of bankruptcy as relative prices turn against them. Small farms, which tend to be inefficient and which market only a portion of their production, also suffer a decline in their standard of living; this causes them to rely less on the market, but not to leave farming. Thus, the argument runs, the cold winds of international competition kill off the potentially healthy, but exposed farmers, and reinforce the non-progressive behaviour of remaining farmers. Advocates of protectionism tend to view the free-traders as ideologues who are unable to distinguish the theoretical benefits of a policy from the actual harm that it causes. They propose a gradual move toward free trade, and short-term protection.

The existence of adjustment costs does not imply the desirability of gradual reform [see, e.g., Pindyck (1982)]; a welfare reducing distortion, such as a trade restriction, should be removed immediately, even if adjustment costs cause producers and consumers to move slowly toward the new equilibrium. This policy recommendation is consistent with the possibility that social welfare (a flow) is lower during part of the adjustment phase than at the initial (distorted) equilibrium. This observation lends support to the free-traders. However, the models on which it is based assume that capital markets function relatively well, so that individuals are able to discount future benefits at an appropriate rate. Consequently, their short-term liquidity constraints are not the result of market failure. In periods of very high inflation and great uncertainty, and particularly in a situation where financial intermediaries are inexperienced and thin on the ground, capital market distortions are likely to be severe. In this case there is an argument for government intervention based on insurance and informational grounds. The rash of bankruptcies that was predicted has not yet occurred, but this is further evidence for the lack of a properly functioning banking system. Advocates of the use of trade policy to cushion adjustment costs (e.g., Blanchard et al. 1991) have emphasized that the scale of the necessary adjustment creates pressures that can not be coped with using other policies.

The protectionist camp has a prima facie case based on the theory of the second best, but it is dangerous to rely on these type of arguments for policy making. The direction of second best

arguments is seldom unambiguous; when there are many distortions and market imperfections, as is certainly the case in Poland, it is difficult to determine where the balance lies. A second reason for being reluctant to base policy on these arguments is that focusing attention on ways of adapting to distortions distracts attention from efforts to remove the distortions; the creation of "remedial distortions" also has a tendency to generate other, ostensibly offsetting distortions. Also, second best arguments should be distrusted because their superficial plausibility makes them attractive to political lobbyists. It is particularly important, during the transitional period, to reduce the incentives for rent seeking, and to design policy with long term objectives in mind. The Polish transformation involves radical rather than marginal changes. These considerations militate in favour of a liberal trade policy.

Just as the (eventual) success of privatization will not eliminate the need for subsequent regulation, neither does the postponement of privatization reduce the need for interim regulation. Vickers and Yarrow (1991) review empirical evidence which suggests that the degree of competition is a more important determinant of productivity than is the form of ownership. It is necessary to promote competition even before there is widespread success in privatization.

The privatization process is moving slowly in Poland -- as in the rest of EE. This is especially the case for the larger state-owned enterprises. There is speculation that many of these will not

be privatized in the short- to medium-term, due to popular discontent with the social costs of moving towards a market economy. Many of the state monopolies/monopsonies exist for political reasons and have little or no technological and economic advantage over entering firms. New private firms competing with the state-owned enterprises will impose substantial market discipline, even if privatization occurs slowly.

Market Power in Agriculture

The Polish government's reorganization of the state grain processing and trading agency illustrates their attempt to encourage competition prior to transferring ownership. This agency was separated into 41 independent departments (the PZZ), organized on geographical lines (by voivodship), which are free to compete. There may be considerable returns to scale in grain trading and processing; if this is the case, efforts to promote competition by creating a number of small traders causes the industry to lose both rents from market power and the benefits of economies of scale. This is the classic tradeoff faced in regulating oligopolies. Informal collusion might still exist amongst the members of the PZZ, but their legal dissolution has at least eliminated explicit collusion. The Task Force Report states that there is considerable geographic dispersion of prices received by farmers. This suggests that arbitrage is expensive; to the extent that the various trading companies operate in separate markets, the lack of even informal collusion may not be a serious impediment to the exercise of market power. The Polish Antimonopoly Office (discussed in the next

section) charged the PZZ in Biakystok with raising the price of rapeseed by restricting its sale, despite adequate stocks. Thus, there is evidence that traditional monopoly practices remain in the grain marketing sector.

There are two other means by which the Polish government is attempting to promote competition in grain trading, prior to privatization. First, the state monopoly in international grain trading has been eliminated, removing the legal barrier to entry into this activity. Second, the Agency for Agricultural Marketing (ARR) has been created, and is intended to serve (among its other functions) as a counterweight to the PZZ. As of Spring 1991, the ARR intended to buy approximately 100,000 metric tons of grain for sale to Soviets; they expected to subsidize 50% of transport costs. They intended to buy from producers and private storers, rather than the PZZ. This policy was viewed as a means of assisting producers and private storers; the implication was that the PZZ tends to capture much of the rent from transactions in the grain market.

Despite this apparently widely held view that the PZZ wields market power, it is not obvious from its behaviour that it does so in a manner usually associated with oligopolists. The 1990 grain harvest was high and much of the excess production was purchased by the PZZ at prices which (in retrospect) were too high. As a consequence, they were unable to cover costs with sales, and in Spring of 1991 (prior to harvest) an unseasonably large percentage of PZZ storage capacity was used. This action may simply have been the result of an unfortunate (for the PZZ) judgment, but informed

commentators suggested that it was likely that the purchases were undertaken with a view to supporting producer prices in 1990, and at government urging.

The PZZ provides an example of the difficulty of modeling non-competitive behaviour in EE, because the objectives and constraints of the supposed oligopolists are so uncertain. This problem exists to a much lesser extent in western economies, where the assumption of profit maximization is often reasonable. The ambiguity in EE arises in large part because of the temporary (and ill-defined) ownership of assets. Even if it is true that economic efficiency depends more on the degree of competition than on the form of ownership, it necessary to understand the institutional details of ownership in order to assess the degree of competition. This is particularly important if the objective is to design regulation to promote competition.

It is widely agreed that market power in the upstream (agricultural inputs) and downstream (processing and distribution) stages of agriculture form a major impediment to the sector's development, in spite of the absence of reliable indices of this power. Hughes and Hare (1991) provide indirect evidence. Their study of the Polish economy, based on 1987-88 data, indicates that significant parts of the agricultural sector had negative value-added, and were among the least productive parts of the Polish economy. They attribute this in part to monopolistic practices in that sector, and they point out that labour productivity was particularly low in the sectors with negative value added. Of course, monopolies are not typically

associated with negative value added; the added feature here is the willingness of the previous government to provide subsidies.

It is difficult to obtain a clear description of the supposed goals and the means of the exercise of market power in EE in general, and Polish agriculture in particular. The standard description (e.g. Schaffer, 1991) of market power in Polish industry (including agro-industry) maintains that the goal has been to extract rent which is distributed in the form of wages and social benefits for workers employed in the monopolistic sectors.[6] Although, the evidence is inconclusive,[7] there does seem to be a broad consensus that the Polish agro-industrial sector is rife with elements of both monopoly (restricted supply and/or poor quality[8]) and of labour managed firms (insufficient investment). These practices were exacerbated when the government was willing to underwrite the inefficiencies by providing subsidies.

The dairy sector fits this description. Processing is done by cooperatives, and the raw milk is provided by producers with small

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[6] This description also applies to some monopolistic sectors in Western and developing countries, e.g. the state petroleum company in Mexico, Pemex: high salaries and the provision of extensive social benefits, high cost, low productivity and low investment. The Mexican attempt to reform Pemex may have interesting implications for reform in EE.

[7] Lehman and Schaffer (1991) conclude from enterprise level data on Polish industry in 80's that the marginal product of labour typically exceeded unit wage costs.

[8] It is not true in general that monopolists under-provide quality relative to the social optimum - this turns on the importance of quality to the marginal relative to the average (inframarginal) consumer. However, Polish agricultural processing is widely accused of providing poor quality.

herds (often only one or two cows). The milk supplied by these small farms is produced and stored under poor sanitary conditions. However, the dairy cooperatives rarely enforce quality standards (which are below Western European levels). Small producers, who do not receive quality bonuses, are not encouraged to upgrade milk production and storage standards (which necessarily involves expanding the scale of operation and land consolidation). The cooperatives escaped producer control and appear to have operated as local monopsonists with respect to their ostensible owners. (The legal issues regarding ownership of milk cooperatives is discussed in the Task Force Report, annex 21.)

Data on wholesale-retail price margins provides some indirect evidence of market power in Polish agricultural processing. Annex 4 of the Task Force Report views this as plausible evidence of market power; a more extensive discussion by Schaffer (1991) finds the evidence less compelling. The reduction of consumer subsidies, liberalization of import restrictions, and relaxation of government control of price setting, led in many cases to producer prices falling by a greater extent than the price received by agricultural processors. One interpretation is that government price policy had previously acted as a brake on the monopsonistic behaviour of processors; the introduction of foreign competition was not sufficient to offset the removal of this brake. This explanation is consistent with the belief that prior to price liberalization, the processors' dominant position was exploited in the political market place, by influencing subsidies and the allocation of quotas, and

that after liberalization, power has been used in the traditional market, by directly setting prices. There is no reason to suppose that an agent can exploit power more successfully in the political rather than the economic arena, so there is no a priori reason to expect liberalization to lead to an increase in marketing margins, or other indices of market power.

The relaxation of trade restrictions and the elimination of consumer subsidies both decrease the effective demand facing the processors. One would expect that such a decrease would lead processors to decrease their margins if they are price takers in the output market and oligopsonists in the input market (which is how processors are usually described).[9] However, in more complicated oligopoly models, the equilibrium response to tax and subsidy changes is ambiguous. For example, the introduction of a tax of t% can lead to an increase in the equilibrium price of more than t% (i.e., the tax incidence on consumers is more than 100%). This depends on market details which are very hard to measure. The same conclusion applies to a decrease in a subsidy. Similarly, an inward shift of the residual demand due to imports can lead to an increase or decrease in domestic oligopoly margins.

The presumption is even stronger that a competitive industry would reduce margins after a reduction in effective demand, but

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[9] In this situation processors face a flat demand curve and an upward sloping supply curve. A downward shift in the demand curve causes an oligopolist to move to a lower point on its marginal cost curve, which is steeper than the supply curve; thus, the fall in the processor' marginal cost is greater than the reduction in the price paid to the producers, leading to a reduction in the marketing margin.

again there are circumstances where the opposite can occur. As a result of increased uncertainty in output prices, caused by liberalization, firms may decide to decrease production in order to decrease their risk; this tendency is reinforced if the increase in risk is associated with a decrease in expected price. If the risk faced by processors throughout the economy is positively correlated, as is certainly the case in Poland, it would not be surprising to observe an outcome where margins had risen on average. This explanation also applies to imperfectly competitive firms.

Thus, the data on price margins is consistent with the exercise of market power, although it certainly does not imply such behaviour. Interpretations other than standard oligopoly, e.g., some variant of labour-managed oligopoly, and consideration of risk averse behaviour, may provide a more plausible basis for describing industry response to price liberalization. However, it is not realistic to expect that better data will lead to the identification of market structure. Salinger's (1990) survey of the empirical literature on margins shows how difficult this problem is, even with U.S. data.

Dynamic and Static Monopoly Effects

Despite the lack of any reliable measure for the extent of market power, it is widely viewed as being significant. Arguments for limiting this power can be advanced on the grounds of social- and self-interest. It may be possible to compel beneficiaries to sacrifice their market power, or to convince them that their sacrifice is part of a general reform which will be to their

advantage. This incentive for demonopolization turns on standard welfare analysis, which describes the effects of short term decisions, such as output level or product quality. These "static welfare effects" of market power involve gains for some groups, but net social losses. There are also situations where an agent's ability to exercise market power affects the decisions of others in such a way that the overall effect is to harm the agent who appears to have the power. This can occur where the monopolist's ability to make commitments about future behaviour is incomplete. This situation involves dynamic welfare effects of monopoly. The dynamic effects can reinforce or run counter to the static effects. Models that illustrate "disadvantageous market power" are described in the next section.[10] In such cases the monopolist (or more generally, the agent with market power) would like to forswear the use of that power, but given a limited ability of commit (or a limited understanding of his true position) this may not be possible.

Symptoms of market power in Polish agriculture include high labour costs and inefficiency (as managers and workers in the monopolized sectors exploit their privileged position) rather than huge profits. The possibility of disadvantageous market power exists here, even though the "monopolist's" objective is not to maximize profits. This is not merely a theoretical peculiarity, but is likely to be an important feature of Polish agriculture. For

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[10] The first example (that we are aware of) that market power can be disadvantageous for reasons of this sort was provided by Maskin and Newbery in the late 70's, eventually published in 1990.

example, the Task Force report (pg 5) states "The gross inefficiency [of the food processing sector] means that there is no incentive for farmers to improve their quality or productivity since these gains are likely to be confiscated by subsequent processing." The farmers' lack of incentive to improve quality or productivity may harm the processing sector more than that sector is benefited by its market power.

It is useful to make this distinction between situations where market power yields private benefits and social costs, and the situation where it entails costs even for the apparent beneficiaries. In both cases social welfare increases if market power is eliminated. However, in the former case the regulator's role is coercive, while in the latter the regulator provides a mechanism for credible commitment not to expropriate the returns to investment.

IV. Current Practices and Theoretical Considerations

This section reviews the current practices and goals of regulatory activity in Poland, using unpublished documents provided by the Antimonopoly Office. We then discuss models taken from the industrial organization literature,[11] in an attempt to draw lessons that are relevant to the Polish experience. The models are used to study the effects of free entry, of horizontal mergers, and the incentives for vertical integration and the use of vertical restraints. These issues are all central to regulating the

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[11] In addition to the papers cited below, we have relied heavily on summaries provided by Carleton and Perloff (1990), Perry (1989), and Tirole (1989).

agricultural input and processing sectors. However, we do not restrict attention to the regulation of agricultural industries since we have no evidence that there are plans to regulate agriculture differently than other sectors.[12]

The models we discuss assume that agents maximize profits, or the expected utility of profits.[13] In view of the uncertain nature of firms' objectives, and the liklihood that these involve wages and perquisites rather than simply profits, it is reasonable to ask how relevant the models we describe are to Poland (and more generally, EE); in all cases discussed below, the central insights are quite general and appear robust to changes in objectives. It is impractical to attempt to model every conceivable objective; in the absence of institutional detail for concrete cases, it is more efficient to draw lessons from existing models. As greater detail becomes available, it will be interesting to re-examine the applicability of those models and revise them for particular settings.

Current Regulatory Practices

The principal regulatory body in Poland is the Antimonopoly

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[12] There are of course important differences between the agriculture and industrial sectors, not the least being the large percentage of agricultural assets which are privately owned. However, a substantial percentage of marketed surplus is produced on the state farms, where the regulatory issues are similar to those in the rest of industry. Moreover, the most important regulatory issues for Polish agriculture involve the processing and distribution sector.

[13] Some of the models allow for the possibility that agents incur a disutility for "effort", but we will not emphasize this feature.

Office. This was created in April 1990 by the Department for the Prevention of Monopolization of the National Economy, which had been set up in 1988 (i.e., prior to the major reforms) in recognition of the need to regulate large state enterprises. (In the state sector 70% of the output was produced by 25% of the firms during the 80's.) Given the possible incentives of privatization authorities to retain the monopolistic structure of industry, in order to increase the price obtained when selling firms, it is worth noting that the regulatory agency preceded and is independent of privatization efforts. With a staff of just over 100, including economists and lawyers, the Office has considered approximately 1800 cases between its formation and February 1991; of these, it issued decisions in 346 cases.

The Antimonopoly Office, which consists of departments of Antimonopoly Assessment and Antimonopoly Policy, is responsible for promoting competition by regulating monopolistic practices, including those which affect the entry decisions of new firms. The Office is able to affect: the division and transformation (e.g., into joint stock companies) of existing firms; the formation of new firms; and the emergence of new monopolies. The regulatory functions of the Office include prohibiting: "excessive prices" (e.g., the case of the PZZ in Biakystok); the use of contracts to exercise market power (e.g., the requirement that one party fulfill an unrelated condition in order to have access to a service or a product); collusive agreements among firms.

The regulatory goals in Poland are based on standard arguments

for promoting competition and for regulating imperfectly competitive industries. Recent work in IO refines these arguments and describes circumstances when "obvious" conclusions may not be correct. A pessimistic interpretation is that these results demonstrate that the welfare effects of altering distortions are generally ambiguous, and that therefore there is no clear role for policy. This interpretation is analogous to viewing the theory of the second best, mentioned in the previous section, as a prescription against attempting to reduce distortions, and thus as an argument for passivity. An alternative assessment of the recent work in IO is that it improves intuition about the functioning of imperfectly competitive markets - it assists policy making in becoming better informed, rather than paralyzing it with second thoughts. Our review of models is divided into those which emphasize entry decisions, horizontal control, and vertical control.

Entry

The Antimonopoly Office recognizes that an important means of promoting competition is to encourage entry into imperfectly competitive sectors; this entails prohibiting an incumbent's entry-restricting behaviour. As a general statement of policy this is unexceptionable, but it is wrong to conclude that free entry is in general socially optimal when markets are imperfectly competitive. Mankiw and Whinston (1986) demonstrate this in a general setting, by showing that an entrant's private return to entry exceeds the social benefit. This implies that entry is excessive when it is unrestricted.

The key to the result is the assumption that there is a "business-stealing" effect of a firm's entry. This means that if a firm enters the industry, the incumbents' equilibrium response is to reduce output. (Aggregate output, however, does increase with entry, so consumers benefit. Social welfare is the sum of consumer surplus and industry profits, and thus can decline even when consumer welfare increases.) Although business stealing need not occur, it is a feature of many models of imperfect competition. The effect on social welfare of an increase in N, the number of firms, is the profits of the N'th firm plus the equilibrium price markup (price minus marginal costs) times the business stealing effect (the reduction in output of other firms). When entry reduces rivals' output, the social benefits of entry are less than private benefits (profits of the N'th firm).[14]

Another example of socially inefficient entry is discussed in Karp (1988) in the context of a dominant firm facing a dynamic competitive fringe. Potential entrants in the fringe base their decision whether or not to enter on the expected discounted flow of future profits. The number of potential entrants is unlimited, but due to a fixed factor entry costs increase with the rate of entry; in particular, the equilibrium flow of entry is proportional to the

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[14] This description assumes that N is a continuous variable, i.e., it ignores the integer constraint. Mankiw and Whinston show that if this constraint is imposed, free entry may, but need not be excessive, and it is at most one short of the socially optimal number. In other circumstances free entry may lead to a suboptimal level of entry; for example, where consumers value diversity, the amount of entry may be suboptimal because firms do not capture all of the increase in consumer surplus associated with their entry.

entrant's future discounted profits. The important assumption is that the incumbent (the dominant firm) can not commit to its future behaviour.[15] If each entrant has constant fixed costs c* up to an arbitrary capacity constraint, the only long run (steady state) equilibrium price is c*. In the short run the dominant firm reaps the (static) benefits of market power by restricting supply, but in the long run it looses market share (a dynamic loss); the assumption that it is unable to make commitments means that it can not choose the optimal tradeoff. The dominant firm's long run profits are always lower than in the competitive equilibrium, where it enjoys rents (due to the assumption of increasing marginal costs for the dominant firm). Its present discounted value of profits, from any initial fringe size, can also be lower than under perfect competition if entry occurs sufficiently rapidly. This provides an example where market power is disadvantageous when entry is possible.

In this model, entry always lowers the incumbent's profits, but it can also lower social welfare. There are two effects of entry: it lowers the market price, which benefits consumers and raises social welfare, but it also substitutes production by the incumbent with entrants' production. The present value of the flow of profits

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[15] This assumption is frequently made; for example, in Mankiw and Whinston's model, the incumbents can not commit to refusing to lower their aggregate output in the event of entry. Such a promise is not credible (subgame perfect). With infinite horizon models, trigger strategies enlarge the set of subgame perfect equilibria; if such strategies are admitted, the multiplicity of equilibria make the model difficulut to use for welfare evaluation.

of the latter equal entry costs, and so provide no addition to social welfare. The production-shifting effect of entry can outweigh the price-lowering effect, in which case social welfare is higher when entry is prohibited, and the incumbent is allowed to behave as a monopolist.

This example of the potential for market power to be disadvantageous illustrates another role for regulatory policy. The ability of the dominant firm to exercise market power (in the short run) attracts entrants. A first-best policy in this case is to regulate the dominant firm and to permit free entry. Regulation here involves imposing a price ceiling for the entire industry. The optimal trajectory of the price ceiling decreases over time, as entry occurs. Regulation is a substitute for a credible commitment, on the part of the dominant firm, not to behave like a monopolist. If, in the absence of regulation, monopoly power is disadvantageous, then the price regulation represents a Pareto improvement: the value of the incumbent's stream of rents is higher (because it has a higher market share, due to the discouragement of entry), and the consumers' price trajectory is lower, with regulation. Under free entry, the entrants' net benefits (profits minus entry costs) are zero with or without the price regulation. Of course, there are circumstances where price regulation improves social welfare and harms the incumbent firm. However, it is worth recognizing the possibility that regulation can be Pareto-improving; informing the regulated firm that it might receive long run benefits, in the form of a larger market share, as a result of the price ceiling, may

soften opposition.

These two models do not imply that there is as much merit in prohibiting as in promoting entry; it seems probable that entry promotion increases social welfare. The examples illustrate that private and social benefits of entry differ in imperfectly competitive markets, so there may be an argument for regulating entry. Such a policy, however, is second best. The first best policy is to regulate price in order to remove the incentive for excessive entry. It is worth interjecting a note of caution at this point. Due to imperfect and asymmetric information, and lack of insurance markets, the practical problems of determining the (approximately) optimal trajectory of the price ceiling are likely to be immense; in addition, price-setting by a regulatory agency increases opportunities for rent-seeking behaviour. On balance, then, the wiser course may be to promote entry without attempting to regulate price; this alternative seems particularly attractive in the current climate where, due to the shortage of investment capital, excessive entry is unlikely to occur.

Horizontal control

In an effort to prevent the formation of new monopolies, or the reformation of previous monopolies, the Antimonopoly Office is charged with the regulation of horizontal mergers. The analysis of mergers parallels that of entry: there are situations where mergers can be disadvantageous to the firms that undertake them, and situations where mergers are advantageous both for the firms involved and for society.

Salant, Switzer, and Reynolds (1983) note that mergers can be disadvantageous when the merger accounts for a relatively small part of the industry. This occurs when the industry is imperfectly competitive and firms' decision variables are "strategic substitutes", as is the case in a quantity setting game. The equilibrium response to the merger is for merged firms to cut output and non-merged firms to increase output. The premerger equilibrium is not credible after the merger. Mergers of this sort presumably would not occur, so there is no need for public policy here.

There is, however, a different circumstance where mergers might be disadvantageous, and which does involve public policy. Gatsios and Karp (1991) consider two variants of a two-stage game. In one variant, mergers are always permitted, and in the other they are prohibited; these extreme cases represent polar assumptions about the regulatory climate. In the first stage of (both variants of) the game firms undertake investment noncooperatively. In the second stage they play a noncooperative game with output if mergers are prohibited, and they play a cooperative game that results in a merger, if public policy permits this. (The model is constructed so that merger is always optimal, once investment has been undertaken. This means that it is not credible for firms to make a commitment, at the investment stage, not to merge at the production stage.) In both variants of the game, investment in the first stage confers a strategic benefit on the firm that invests. The extent of the strategic benefit might be quite different, and under reasonable assumptions it is greater when firms anticipate merging in the

second period; in this case investment is greater when it is known that the regulatory climate permits merger. Depending on the parameter values of the model the following situations can arise: (i) industry net profits (revenue minus production costs minus investment costs) are higher and consumer surplus lower under merger (the expected result); (ii) both industry profits and consumer surplus are lower under merger; (ii) industry profits are lower and consumer surplus is higher under merger.[16] Thus, the net effect of the influence on investment, of the regulatory climate, might be unexpected. This model illustrates the importance, when formulating merger policy, of taking into account how the policy will affect the behaviour of firms which have not yet formed, as well as of existing firms.

One of the arguments in favour of mergers is that they lead to greater efficiency in production and marketing. To the extent that these potential gains are endogenous (in the sense that they were created with a view toward eventual merger) they may not represent socially beneficial investments. In that case, there is an argument for strict merger guidelines to discourage such investments in the future, although once the investment has occurred it could be optimal to let the merger take place. It is probably more common, however, for potential efficiencies resulting from a merger to be exogenous, rather than the result of strategic behaviour. Then

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[16] This last possibility arises because the anticipation of merger increases the equilibrium level of investment to such an extent that monopoly price, with the higher level of investment, is lower than the duopoly price, with the lower level of investment.

there is no reputational argument for prohibiting a particular merger.

The efficiency argument in favour of mergers contains two strands: greater efficiency can lower prices, and thus benefit consumers; and mergers can lead to greater profits both for merged and unmerged firms. Farrell and Shapiro (1990), using a model of Cournot competition, show that merged firms must have substantially lower marginal costs than unmerged firms in order for price to fall as a result of merger. Rationalization of production, i.e. the shifting of production from one firm to another, is not enough to result in lower prices. This suggests that it would be unlikely for consumers to benefit from merger, and that a merger is socially beneficial only if the effect on industry profit is strongly positive.[17]

Thus, in the "usual" case where a merger results in a price rise, there must be a substantial offsetting increase in industry concentration in order for the merger to be welfare improving. Such an increase is more likely if the merger consists of small firms; the source of the benefit is in the reallocation of output, from the firms that merge to the non-merging firms. This reallocation is socially beneficial because the size of a firm's market share and its (price - marginal cost) markup tend to be positively related. The magnitude of a firm's markup equals the increase in social

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[17] More precisely, a merger increases social welfare if and only if the sum of the percentage change in aggregate output, plus one half the percentage change in the Herfindahl index (the sum of squares of market shares) is positive.

welfare that would result if the firm were to increase output by one unit. If small firms reduce output as a result of merger, there is a small welfare loss (because markup is small); if, at the same time, large firms (with large markups) increase output (even if this increase is not enough to offset the decreased output of merged firms), this leads to welfare gain. The conclusion is that in a Cournot oligopoly, the presence of small firms with little market power is likely to reduce welfare. These are the sort of firms that one would expect to enter an imperfectly competitive industry, so this analysis supports the suggestion that there are situations where entry results in welfare losses.

Vertical Control

Vertical control affects a final goods market indirectly, by changing the incentives of an intermediary; this occurs in a variety of ways and leads to subtle policy issues. There is a plausible a priori case that horizontal mergers tend to increase market power and lower social welfare, but it is harder to make a similar argument about vertical mergers. Prior to the early 80's U.S. antitrust law was hostile to vertical mergers, on the presumption that these tended to result in diminished competition. This view was based largely on the theory of vertical foreclosure, which states that if a supplier of an input (an "upstream firm") merges with a user (a "downstream firm") the supplier will have an incentive to restrict sales to competing downstream firms, i.e., to "foreclose" on them; this decreases competition in the final goods market. The theory of vertical foreclosure has been challenged, and

current U.S. merger guidelines recognize that efficiencies can result from vertical mergers. Only if one stage is highly concentrated are the mergers likely to be challenged. Similarly, in the EC vertical mergers are not illegal per se, but it is recognized that these may provide an incentive for other practices which are illegal. (For example, vertical mergers might make it easier to monitor prices, and thus to determine whether firms are cheating on a collusive agreement.) U.S. and EC regulatory policy does not presume that vertical mergers decrease social welfare.

In Poland (and elsewhere in EE) the high degree of concentration in much of industry increases the potential for vertical merger and vertical control to be used to enhance market power. Documents describing the objectives of the Antimonopoly Office indicate that there is the presumption that vertical mergers are socially harmful.

A merger between an upstream and downstream firm may not change substantially the problems of vertical control. A merger does not necessarily reconcile the objectives of decision-makers at different stages; in the absence of a merger, contracts can be used to influence the behaviour of agents with different objectives. It is important to understand how, absent a merger, vertical control is exercised by means of contracts. The answer to this determines what sorts of contracts should be suspect. Regulators are also interested in the likely outcome of a merger. This outcome depends on how the interaction of agents within a firm differs from that of agents in separate firms, and on how the merger changes the

behaviour of other firms in the industry. Although there are no general answers these questions, some insights are available; the rest of this subsection discusses these, and their relevance to Polish regulatory policy.

We begin with what would appear to be a very straightforward issue: Suppose that an upstream and a downstream firm merge, and subsequently the merged upstream firm sells only to its downstream partner (i.e., vertical foreclosure occurs); what happens to the final goods price, and thus to consumer welfare? Salinger (1988) studies this question under the assumption that the upstream and downstream firms play a quantity-setting game with firms in their own sector, and that the downstream firms take the equilibrium input (upstream) price as given. The merger lowers the number of unmerged suppliers and demanders, which has an ambiguous effect on the intermediate good price. The transfer price for the intermediate good within the merged firm equals the marginal cost of that input: the merged (downstream) firm's costs decrease, and its output increases. This lowers the residual demand of the unmerged downstream firms, which tends to decrease their output and their demand for the input. If the net effect is to decrease the price of the input, all downstream firms find their costs have fallen as a result of the merger. In this case, output of the final good increases, and consumers benefit as price falls. Although this is a possibility, it can also happen that the net effect of the merger is to increase the input price and to increase the equilibrium price of the final good. In addition, the joint profits of the merged firms

can be lower than in the pre-merger equilibrium. Although the conclusions are ambiguous, the model is instructive since it shows that even if one assumes that a vertical merger results in vertical foreclosure, the "expected" result that the merger leads to increased market power and lower consumer welfare need not occur.

Ordover et al. (1990) construct a model which addresses the question of whether vertical foreclosure is an equilibrium outcome. The answer to this is not obvious, since it is not clear that it would be in the interests of a merged upstream supplier to refuse to sell to downstream competitors, given that there exist other sources of supply. Their model contains two upstream firms, U1 and U2, and two downstream firms, D1 and D2. The upstream firms produce identical inputs at constant costs and compete in prices, so they earn zero profits in equilibrium; downstream firms compete in prices and sell differentiated products, and earn positive profits. Suppose D1 and U1 merge, and U1 ceases to supply D2 with the input; U2 becomes a monopolist vis a vis D2 and can raise its price. The increase in D2's production costs decreases D1's competition, causing D1 to raise its price. This increases the revenue of D2, which in this model equals the sum of profits of D2 and U2. D2 is unable to buy out (merge with) U1, because this would move profits back to pre-merger equilibrium, and involve lower aggregate surplus of D2 and U2. In this case merger between U1 and D1 (and foreclosure) is an equilibrium outcome. Consumers face higher prices and lower welfare. The model also admits other equilibrium outcomes, but it is useful because it demonstrates that the theory of vertical

foreclosure does describe a reasonable possibility.

There are circumstances where vertical integration corrects an externality, and can lead to welfare improvements. One of the most widely discussed examples is the problem of "double margins" which occurs when both the upstream and the downstream firms have monopoly power. The downstream firm restricts output and increases the price of the final good; the upstream firm increases the price of the input it sells in order to capture some of the downstream firm's monopoly rent. Provided that there is some substitutability of factors of production, this causes the downstream firm to produce using an inefficient input mix, in addition to producing at an inefficient level. If the two firms merge, the transfer price of the input equals its marginal cost; in this case, costs are minimized, given the level of production, and one of the distortions (margins) is eliminated. Since the downstream firm's production costs have fallen, it is optimal for it to increase output, benefiting consumers. In this case, all parties benefit from the merger.

The problem of "double margins" is likely to be important in some sectors of the Polish economy, where there are successive stages of monopolistic or oligopolistic production. The problem may be less important in the agricultural sector, where competitive production is caught between oligopolistic input and processing sectors. The related problem of an inefficient input mix, which occurs whenever firms at one stage manipulate the prices faced by adjacent sectors, is probably more relevant to agriculture. For

example, if processors behave as price-takers in the product market, but exert monopsony power in the input market (e.g., as is alleged in the dairy sector), they restrict their input demand (for quantity or quality) and consequently reduce output. Since the collective actions of processors affect the price of the final product, consumers also lose. If producers and processors were to merge (and continue to behave as price-takers in the product market), the efficient transfer price for the input would lead to production efficiency. This increases industry rents, which can be shared by the producer and processor; however, if the greater production efficiency leads to an increase in industry output and a reduction in the price of the final good, joint industry profits might decrease.

The inefficiency caused by the failure to use the cost minimizing input mix is reduced if the monopolist is able to "tie" sales of inputs to a downstream firm. This means that the monopolist agrees to sell "input A" on the condition that the downstream firm also buy "input B" from him. This increases the monopolist's leverage, and his profits, and since it reduces the production inefficiency it also tends to increase social welfare. "Tieing" provides an example where the monopolist requires that another agent fulfill an "unrelated condition" in order to have access to a product, a practice which the Antimonopoly Office is specifically charged with preventing. It is thus worth pointing out that the practice may increase social welfare; whether this occurs depends on the reason that the monopolist insists on the condition,

and that depends on the facts of the case.[18] This provides another example of the difficulty of proposing industrial regulations that are applicable under general circumstances.

An important reason for vertical mergers is to overcome the problem of relationship-specific investments (Williamson, 1985). As mentioned in the previous section, competitive agricultural producers might lack the incentive to make investments, if monopsonistic processors are in a position to capture the rents. Vertical integration can eliminate this externality; the same outcome can be achieved if the monopsonist is somehow divested of his market power, e.g., by forcing the processor to break into competing units (as with the PZZ). If the problem of relationship-specific investment is severe, processors (and not simply producers) can have higher profits (rents) if monopsony is replaced by competition at the processing stage - another example of disadvantageous market power.

Since this possibility seems relevant to Polish agriculture, it is worth explaining the situation in a bit more detail. Suppose that processors face a perfectly elastic demand for their product, and own a (quasi-)fixed input, so that they earn (short-term) rents even under competitive behaviour. If they purchase an amount Q, their rent is R(Q), and their marginal rent (= marginal benefit) is

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[18] There have been at least two recent examples where the Antimonopoly Office has charged firms with insisting that customers fulfill "unrelated conditions" in return for sale of a good (the Building Corporation DREWBUD and the Jelcz Vehichle Factory). In both cases this involved the provision of a loan to the company as a condition for a sale. In neither case does it appear that the condition resembles "tieing" as described in the text.

R'(Q). Producers have rational expectations at the time they choose their investment. An investment of I Zlotys results in an industry cost function of C(Q,I) and an industry supply curve of $S(Q,I) \equiv \partial C/\partial Q$. Given rational expectations (perfect foresight, in this deterministic model) and price-taking on the part of producers, the equilibrium level of investment satisfies $-\partial C(Q^*,I)/\partial I = 1$, where Q^* is the (correctly) anticipated equilibrium supply.[19] This equality states that marginal cost-savings in production equals marginal investment costs, and implies a relationship between investment and anticipated output, $I = I(Q^*)$. Price is on the supply curve, so $P = S(Q^*,I)$. Processors choose Q^*, taking as given I, since investment has already been sunk at the time of production. Their demand, Q^*, satisfies the first order condition $R'(Q^*) - S(Q^*,I) = \lambda Q^*(\partial S/\partial Q^*)$, where λ is an index of market structure: $\lambda = 0 \Rightarrow$ competitive processors, $\lambda = 1 \Rightarrow$ monopolistic processors, and $0 < \lambda < 1 \Rightarrow$ some degree of oligopoly.

The processor's first order condition and the condition for equilibrium investment imply that Q^* and I are functions of λ, the market index; hence, the equilibrium level of the processor's rents can be written as the function $W(\lambda)$. It is easy to show that under reasonable conditions, $W'(1) < 0$; that is, a small movement away from monopoly in the processing sector (occasioned perhaps by the partial break-up of the state controlled processing industry)

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[19] This first order condition is based on a simple two-period model. A dynamic model with adjustment costs would yield the same insights.

increases processors' profits[20]. The reason is that a small increase in demand ($dQ^* > 0$) implied by a movement away from monopoly ($d\lambda < 0$) causes only a small (second order) direct reduction in profits; but there is an indirect affect, since the producers' anticipation of the increase in demand increases their incentive to invest, causing a non-negligible (first order) reduction in their costs, and of the price paid by the processor.

Using the terminology introduced in the previous section, the direct effect is part of the static welfare costs of imperfect competition, and the indirect (investment) effect is part of the dynamic welfare costs. Making the processing sector more competitive results in both a static and a dynamic welfare gain to society; in most cases such a change causes a static welfare loss and a dynamic welfare gain to processors. From the standpoint of social welfare, it is important to recognize the dynamic effect, since the static welfare loss of monopoly may appear to be too small to justify great political and administrative effort. For example, estimates for the US economy of static welfare losses due to monopoly have typically been in the order of a few percent of GNP (Tirole, 1989), scarcely more than the magnitude of measurement error. Given the pervasiveness of monopoly in Poland, the numbers

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[20] Unless the problem of relationship-specific investment is particularly severe, it is likely that beginning from a position of perfect competition ($\lambda = 0$), a small movement toward monopoly ($d\lambda > 0$) would increase the processor's profits: $W'(0) > 0$. In this case, processor's profits are greatest at a market structure somewhere between perfect competition and monopoly. This is consistent with the possibility that the processor's profits are higher under competition than monopoly: $W(0) > W(1)$.

would certainly be higher there, but still relatively low. The reason is that the principal static effect of market power is redistributional; although market power transfers a large amount of surplus from one agent to another, only a relatively small amount of this surplus gets lost in the shuffle. The dynamic effects, on the other hand, represent losses to both agents (producers and processors in the Polish context), rather than (largely) offsetting transfers. For the purpose of persuading processors to accept a dismantling of their market power, it is particularly important to consider the dynamic effects. These cushion, and perhaps outweigh, the short term losses processors face due to a reduction in their power.

The problem of relationship-specific investment discussed above could be resolved by either a vertical merger between processors and producers or by divesting the processors of monopsony power. For the example we described, the two courses of action lead to the same equilibrium level of investment and sales, and thus to the same level of social welfare, since the only distortion involved monopsony power. (The distribution of rent between the processors and producers would typically differ depending on how the distortion was removed.) However, there may be reasons for preferring one alternative to another. The possibility of economies of scale in processing favours vertical merger. However, to the extent that this gives market power to the producer-processor, it merely shifts, and probably enlarges, the monopolistic inefficiency. A policy decision between promoting vertical mergers or forcing the breakup

of monopsonistic processors requires balancing these considerations; very likely this balance differs across different sectors within agriculture.

The previous discussion assumes that producers and processors are unable to ameliorate the problem of relationship-specific investment by the use of contracts. This extreme assumption is useful as a simplification, and seems reasonable in a rapidly changing legal environment where there is great uncertainty about the validity of contracts. In that circumstance, vertical integration or government decree may be more effective than contracts in altering behaviour. Recent papers that study the form of contracts when there is relationship-specific investment include Crawford (1990) and MacLeod and Malcomson (1991).

Katz (1989) reviews various forms of contracts between upstream and downstream firms. These contracts have in common three objectives. They are a device to transfer rent from one agent to another (e.g., from a dealer to a monopolistic supplier); they serve to "align the incentives" of agents (e.g., they induce a manufacturer to use the cost-minimizing input mix, or a dealer to provide an optimal amount of service); they transfer risk, and thus have an insurance function (e.g., they make the price of an input conditional on the state of demand). Most contracts that are actually used tend to be quite simple, and involve a trade-off between these three objectives. Rey and Tirole (1986) model a monopoly manufacturer - duopoly dealer relationship, and compare three types of contracts: an exclusive territories provision for the

dealers, a retail price maintenance (i.e., a price floor), and competition. They discuss circumstances under which each of the contracts would be adopted by the manufacture.

Due to the different insitutional settinbg, th0eir conclusions are unlikely to be directly applicable to Polish industry; however, an important general point is that vertical restraints sometimes increase market efficiency, and should not be illegal per se; legality should be determined by "rule of reason". This puts a tremendous burden on regulators, but it is difficult to see how it can be avoided. In recent cases the Antimonopoly Office charged firms with "imposing a future and uncertain price" (the Jelcz Vehichle Factory), "determining the future price of houses...in an uncertain way" (the building corporation DREWBUD), and requiring that insurance claimants have car repairs done in specified shops (Polish National Insurance - PZU). In some contexts these practices would seem unexceptionable, although they were taken as evidence of monopolistic practices.[21]

It is worth making a final point about the use of contracts. Since contracts are entered into willingly, presumably all parties to them benefit; this sensible premise has led to the conclusion that contracts between buyers and sellers must serve some function other than preventing entry into the market by competing sellers. Since buyers would benefit from such entry, they would have no

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[21] Our use of these examples does not imply that they failed the "rule of reason" - the documentation available did not permit any conjecture. However, the examples are illustrate circumstances where the existence of restrictive practices does not constitute proof of wlefare-reducing behaviour.

interest in signing a contract that would discourage it. Therefore, the existence of these contracts can not be construed as barriers to entry. Aghion and Bolton (1987) explain why this conclusion is incorrect. Their explanation is important, because it illustrates a very general feature of contracts. It is obvious that a contract that benefits two parties can harm a third, and decrease social welfare, e.g. an agreement between two sellers to reduce supply. Thus, in determining whether a contract is socially harmful, it is necessary to determine whether it is being used to extract surplus from a third party. In the case of the contract between the buyer and the seller, the third party is the potential entrant. In Aghion and Bolton's model the buyer and the seller sign a contract before the potential entrant observes her costs of production, and makes the decision whether to enter. The contract specifies a price below the monopoly price (this is buyer's gain) and the buyer promises to indemnify the seller if the buyer switches to the entrant. This makes it more unlikely that the potential entrant will enter (she needs to offer a lower price to induce the buyer to switch). This reduces expected surplus to the potential entrant; some of this loss is captured by incumbent and buyer. Social welfare decreases because there are states of nature in which the potential entrant's cost is below the incumbent's, but she does not enter.

If there are several buyers, contracts between a buyer and the monopolistic seller have a negative externality not only for the potential entrant, but also for other buyers. If one buyer signs a contract, getting a lower current price in return for the promise to

indemnify the seller if he switches, this lowers the profitability (and hence the probability) of entry, which makes other buyers more willing to sign contracts.

Summary

This brief discussion of recent industrial organization models illustrates that there is ambiguity surrounding even the most commonsensical policy prescription. For example, the discrepancy between the private and social costs of entry may lead to socially excessive entry; a liberal merger policy may lead to greater investment which benefits consumers; a merger which harms consumers may nevertheless benefit society if it results in increaed concentration due to the reallocation of production toward more efficient firms; vertical contracts can reduce distortions and benefit society; other contracts, which appear innocuous, may be used to extract rent from firms which will exist only in the future. The purpose of the review is not, however, to suggest that a particular regulatory policy is as likely to be wrong as right, but rather to raise issues that might help in a critical review of policy. Even in stable economies, with relatively good data, knowledgeable observers disagree over such fundamental questions as whether the legal impediments to merger should be increased or lowered. [See, for example, the exchange between Salinger and Peltzman (1990).]

Since policy discussions involve large rather than marginal changes in Poland and elsewhere in EE, the scope for disagreement may be even greater there. There is, however, certainly a need for

a strong regulatory structure. The question is whether this should be based on rather precise rules (e.g., discouraging mergers which lead to a particular level of concentration) even though there will be situations where the rules do not improve welfare. The alternative is to rely on rather vague goals (e.g., to promote competition); the risk here is that ambiguity might make even the most necessary regulation more difficult, and that greater discretion by regulators is more likely to encourage lobbying by the regulated. Since wholesale rather than marginal change is required in Poland, we think that the safer course of action is to develop quite precise rules. The "rule of reason" must certainly not be absent, but it does not provide a strong enough base for regulatory policy in Poland.

V. Conclusions

Data on Polish agriculture was assembled in order to describe the current state of the sector. The deterioration of most indices following the liberalization seems to have stabilized, but there is not much evidence of recovery in the agricultural sector. The continued hard times increases the pressure to alter the course of reform. There are respectable arguments in favour of moderating reform, by means such as export subsidies, tariffs and direct state aid to failing industries. We think that these arguments should be resisted, but they cannot be dismissed out of hand.

More detailed analysis of industries within the agricultural sector is needed. In our view the current evidence does not justify the protection of specific industries. The risk of derailing the

reform movement and becoming mired in special pleading seems very great.

A strongly pro-competitive regulatory framework is necessary, even though this carries with it the risk of instituting well-intentioned but counter-productive policies. Given the magnitude of the reform that is needed, and the inertia of economic structures, the danger of doing too little appears greater than the danger of doing too much.

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Table 1. Credit Rates

Year	Nominal		Change in Consumer Prices	Real
	Annual	Monthly		Monthly
		(in percentage)		
1989 - 12	104.4			
1990 - 1	432	36	79.6	- 43.6
- 2	240	20	23.8	- 3.8
- 3	120	10	4.3	5.7
- 4	96	8	7.5	0.5
- 5	66	5.5	4.6	0.9
- 6	48	4	3.3	0.6
- 7	34	2.8	3.6	- 0.8
- 8	34	2.8	1.8	- 1.0
- 9	34	2.8	4.6	- 1.8
- 10	39	3.25	5.7	- 2.45
- 11	47	3.9	4.9	- 1.0
- 12	55	4.6	5.9	- 1.3
1991 - 1	55	4.6	12.7	- 8.1
- 2	72	6	6.7	- 0.7
- 3	72	6	4.5	1.5
- 4	72	6	--	

Source: Statistical Bulletin, Central Statistical Office, Vol XXXV, Table 1.

Table 2.

Average Land Holdings of Farms
(in hectares of cropland)

Year	Private	State	Cooperative	Circle
1970	5.1	1087	242	32
1975	5.2	3202	295	128
1980	5.4	4452	345	340
1985	5.6	3215	362	187

Source: Statistical Yearbook: Agriculture and Food Economy, 1986 (reported in Kowalski, 1989)

Table 3.

Livestock Production in 1990

	Cattle		Pigs		
	Total	Cows	Total	Sows	Sheep
	(in percentages)				
Public Sector:	18.5	11.3	28.3	25.7	33.1
Private Sector	81.5	88.7	71.7	74.3	66.9
	(Number of head per 100 hetares)				
Public Sector:	38.5	12.4	122.2	10.5	30.7
State	44.1	14.3	126.6	10.9	30.5
Cooperative	27.0	8.0	139.6	12.4	32.2
Circle	2.9	0.9	104.8	9.8	30.3
Private Sector	58.5	30.7	98.0	9.6	19.5

Source: Wyniki Spisu Rolniczego 1990, Uzytkowanie gruntow, powierzchnia zasiewow i zwierzeta gaopodarskie, GUS, Warszawa 1990, Tables 2/36 and 3/37.

Table 4

Selected Field Crop Production
in the Public and Private Sectors in 1990

	Total Area Planted	Cereals	Potatoes	Pasture	Vegatables
	(in thousand hectares planted)				
Public Sector:	3312.3	1660.9	145.6	659.5	19.3
State	2705.7	1285.2	125.4	591.1	16.2
Cooperative	561.4	343.0	18.6	63.8	2.9
Circle	45.2	32.7	1.6	4.6	0.2
Private Sector	10929.7	6810.9	1679.7	1358.4	235.3

Source: Wyniki Spisu Rolniczego 1990, Uzytkowanie gruntow, powierzchnia zasiewow i zwierzeta gaopodarskie, GUS, Warszawa 1990, Tables 2/11 and 3/12.

Table 5

Employment in Agriculture and the Food Industry

	Public Sector		Food	Total
	Agriculture	Forestry	Industry	Employment
	(in thousands)			
1989:IV	675	116	n.a.	11,618
1990:I	643	133	413	10,974
1991:I	524	112	431	9,999

Source: Statistical Bulletin, Central Statistical Office, Vol XXXV, Tables 8 and 39

Table 6.

Value of Products Sold and Purchased Inputs and Services by Private Farmers

	1985	1986	1987	1988	1989	1990
	(previous year = 100)					
Value of Products Sold	110.2	112.2	126.8	183.9	354.9	378.7
Plant Products	107.8	110.8	140.9	165.3	439.1	296.2
Animal Products	111.1	113.0	118.8	196.5	307.0	445.9
Value of Inputs & Services Purchased	113.4	116.8	124.7	164.5	330.7	754.3
Consumption[a]	114.8	117.9	124.3	159.8	364.3	659.8
Agric Prod'n[b]	109.2	115.1	125.9	178.5	274.0	930.0
Investment	117.3	115.1	124.2	159.3	300.0	925.0
Ratio of Value of Sales to Purchased Inputs & Services (in %)	97.2	96.1	101.7	111.8	107.3	50.2
Ratio of Value of Sales to agricultural production and investment (in %)	98.7	97.5	101.2	107.1	125.6	40.8

[a] the value of the on-farm consumption of agricultural products. [b] the value of current agricultural production as intermediate input.

Source: Potencjal Produkcyjny i Wyniki Rolnictwa w 1989, GUS, Table 36(85) and GUS.

Table 7

Average Monthly Wages and Salaries in Real Prices

(1989-12 = 100)

	Agriculture	Forestry	Food Industry[a]	Food Industry[b]	Economy Wide Total
1989:IV	409.4	421.7	--	--	437.5
1990:I	275.9	291.3	374.5	325.4	315.2
:II	329.5	282.2	--	--	336.1
:III	331.7	349.6	--	--	351.8
:IV	317.6	367.4	--	--	411.3
1991:I	325.2	370.9	383.3	335.3	377.5

Source: Statistical Bulletin, Central Statistical Office, Vol XXXV, Tables 12,13 and 39.

[a] Average monthly wage; [b] Average monthly wage less the firms' profit.

PRICE INDICES OF SELECTED CONSUMER FOODSTUFFS

Periods		cereal products, bread and pastries	bread	potatoes, vegetables fruit and products	meat, pluck and products	fish and products	edible fats	butter	dairy products and eggs	sugar, confectionary and honey	sugar	condiments and other foodstuffs	tea and coffee	consumer prices
1990	1	129.8	137.2	66.5	108.0	92.0	96.8	82.0	87.1	104.5	129.2	134.7	83.1	179.6
	2	161.8	187.5	59.0	86.2	96.1	75.7	56.7	70.8	106.8	129.8	133.3	98.1	222.5
	3	152.6	169.8	60.0	82.7	97.7	65.2	46.4	63.8	94.7	106.2	134.9	104.4	232.0
	4	141.9	155.3	62.9	100.2	101.1	62.4	43.5	72.7	84.4	88.1	132.3	101.6	249.4
	5	135.7	141.1	74.1	101.2	103.1	60.5	42.9	72.4	80.9	80.1	128.2	100.3	260.9
	6	131.5	143.4	74.3	97.7	103.7	59.4	44.0	74.3	79.3	76.4	126.2	103.2	269.8
	7	127.7	139.1	62.5	95.1	104.7	60.3	47.8	76.4	77.3	72.6	126.8	109.7	279.5
	8	127.4	137.7	55.0	94.6	107.3	59.0	43.6	78.8	76.8	71.2	125.4	113.9	284.6
	9	123.8	133.2	52.9	95.2	107.2	59.1	43.3	77.7	76.1	69.5	123.4	111.6	297.7
	10	120.4	129.8	52.8	94.9	106.8	59.1	45.0	79.3	74.7	67.2	120.6	111.4	314.6
	11	116.8	125.7	52.3	94.1	105.2	67.3	61.4	87.4	73.5	64.9	117.2	109.9	330.0
	12	112.6	126.5	51.6	92.7	104.7	74.7	75.1	98.4	70.5	61.0	113.1	106.5	349.3
1991	1	103.3	110.9	49.5	88.9	105.0	71.9	73.6	109.6	65.3	53.5	104.9	94.4	393.7
	2	101.9	110.6	48.3	86.8	105.6	65.7	65.7	103.2	62.5	50.0	101.0	88.6	420.0
	3	101.3	110.4	46.2	83.1	105.7	60.3	59.4	98.8	60.8	47.5	100.1	85.6	438.9

Note: 1989-12 = 100 for all foodstuffs and consumer price index.

Table 9.

Food Industry Prices

Period	Ratio of Direct Market to Procurement Price (%)			Food Industry Producer Price Index (1989-12 = 100)
	Cattle[a]	Pigs[a]	Wheat[b]	
1989 - 12	--	--	--	100.0
1990 - 1	--	--	--	88.1
- 2	98.5	115	104	78.4
- 3	91.7	106	105	76.4
- 4	92.6	108	113	77.1
- 5	91.2	108	115	76.7
- 6	91.9	108	113	76.6
- 7	86.8	109	103	76.0
- 8	87.5	108	104	75.4
- 9	85.4	106	104	74.1
- 10	85.5	104	107	72.2
- 11	83.6	103	107	72.0
- 12	85.6	106	108	69.5
1991 - 1	82.3	103	105	67.1
- 2	84.6	106	103	65.9
- 3	85.3	106	101	63.3
- 4	86.2	110	103	--

[a] per kilogram. [b] per 100 kilograms.

Source: Statistical Bulletin, Central Statistical Office, Vol XXXV, Tables 24, 26, 27 and 28.

Table 10.

Ratio of Direct Market Price to Procurement Price (in %)

	1980	1985	1986	1987	1988	1989
Wheat	140.5	85.6	88.9	91.0	77.9	78.9
Rye	186.6	134.6	139.7	141.3	111.7	117.5
Barley	151.9	95.1	96.9	101.7	88.0	87.6
Beef	97.0	94.0	90.7	88.6	78.1	94.2
Pigs	120.8	116.2	114.9	116.7	111.3	121.5

Source: Potencjal Produkcyjny i Wyniki Rolnictwa w 1989, GUS, Tables 34(83) and 35(84).

Table 11

Real Procurement of Cereals and Livestock

	Cattle		Pigs		Wheat	
	Average Price	Quantity	Average Price	Quantity	Average Price	Quantity
1990 - 1	-	91.0	-	109.2	-	-
- 2	1381	108.4	2513	112.3	41.3	255.0
- 3	1420	101.7	2656	107.5	35.7	120.3
- 4	1683	78.4	3258	90.2	30.2	42.6
- 5	1654	78.8	3155	105.8	28.8	46.2
- 6	1567	70.2	2956	108.6	27.2	41.3
- 7	1623	72.5	2858	104.2	27.5	341.7
- 8	1601	65.7	2862	86.2	27.8	1863.3
- 9	1607	79.0	2891	95.4	26.6	391.8
- 10	1620	76.1	2911	91.7	25.4	56.4
- 11	1639	79.4	2950	86.1	25.0	49.0
- 12	1593	63.5	2889	100.3	23.9	95.1
1991 - 1	1563	60.1	2706	92.6	21.7	46.3
- 2	1499	56.5	2554	83.0	20.9	43.2
- 3	1403	57.7	2355	94.1	20.1	54.8

Source: Statistical Bulletin, Central Statistical Office, Vol XXXV, Tables 26 and 38.

Table 12

Average Real Monthly Per Capita Income of Households[a]

Persons Period	Households			
	Employee	Employee/Farmer	Farmer	Retired & Pensioner
	(in thousands of zlotys)			
1989/I	245.3	285.9	299.6	189.5
/II	233.2	274.4	308.2	175.7
1990/I	173.3	170.8	156.2	155.5
/II	178.9	188.2	188.9	156.5
/III	180.1	209.2	219.0	173.0
/IV	196.1	219.6	225.7	182.6

[a] These incomes are in terms of December 1989 prices.
Source: Statistical Bulletin, Central Statistical Office, Vol XXXV, Table 57.

Table 13

Average Monthly Per Capita Food Expenditure of Households

Persons Period	Households			
	Employee	Employee/Farmer	Farmer	Retired & Pensioner
	(percentage of expenditure)			
1989 - 12	51.0	50.8	48.7	65.7
1990 - 1	57.4	55.5	57.1	67.8
- 2	51.3	55.0	54.1	61.0
- 3	48.5	48.8	54.1	54.9
- 4	54.0	53.7	54.0	61.9
- 5	52.9	53.9	54.8	62.4
- 6	53.0	55.7	53.3	61.2
- 7	52.5	57.3	57.2	63.9
- 8	50.9	55.3	56.5	61.4
- 9	48.2	51.4	52.4	55.4
- 10	47.7	49.7	49.8	53.8
- 11	45.8	45.8	46.2	56.1
- 12	45.7	50.1	49.0	56.6
1991 - 1	48.0	47.2	53.9	54.5
- 2	46.1	50.8	55.9	55.4

Source: Statistical Bulletin, Central Statistical Office, Vol XXXV, Table 58.

Table 14

Aggregate Agricultural Trade in Real Zlotys

	1981	1985	1986	1987	1988	1989
	(in billions of zlotys)					
Exports	16.7 (2.0)[a]	54.5 (3.2)	69.0 (3.3)	112.1 (3.5)	210.9 (3.5)	806.1 (4.1)
Imports	115.4 (12.0)[b]	73.2 (4.6)	74.6 (3.8)	130.1 (4.5)	266.4 (5.1)	678.2 (4.6)
Balance	- 98.7	- 18.7	- 5.6	- 18.0	- 55.5	127.9

[a] Percentage of total exports. [b] Percentage of total imports.

Source: Potencjal Produkcyjny i Wyniki Rolnictwa w 1989, GUS, Tables 22(146) and 23(147).

Table 15

Net Agricultural and Food Exports
(Exports - Imports) in Real Prices

Period	Food	Agricultural Products	Food, Beverages and Tobacco
		(in billions of zlotys)	
1990:I	634.5	653.9	993.1
:II	729.4	586.7	921.1
:III	634.2	385.3	699.7
:IV	407.4	395.1	678.8
1991:I	- 113.0	417.9	--

Source: Statistical Bulletin, Central Statistical Office, Vol XXXV, Tables 48 and 49.

Table 16

Period	Raw Meat Export	Raw Meat Import	Wheat[a] Import (only)	Ham and Shoulder Tins Export (only)
			(in kilo tons)	
1990:I	23673	39	18.5	6219
:II	16427	3019	1.4	4467
:III	10696	13653	12.4	4704
:IV	13797	5797	48.8	3159
1991:I	8492	30821	0	2049

[a] Wheat for both food and feed.

Source: Statistical Bulletin, Central Statistical Office, Vol XXXV, Tables 51 and 52.

Table 17

Foreign Trade with Socialist Nations

	1981	1985	1986	1987	1988	1989	1990
	(in percentages)						
Exports:							
CMEA	51.8	54.8	52.3	46.3	40.9	32.9	27.5
Other Socialist Nations	3.2	5.9	8.5	7.3	6.2	7.4	n.a.
Imports:							
CMEA	45.8	48.8	46.6	41.8	41.1	35.1	23.7
Other Socialist Nations	2.8	6.1	7.3	6.7	5.4	5.5	n.a.

Source: Potencjal Produkcyjny i Wyniki Rolnictwa w 1989, GUS, Table 21(144) and Statistical Bulletin, Central Statistical Office, Vol XXXV, Tables 54 and 55.

Table 18

*Food and Agricultural Exports and Imports to Major Countries for Calendar Year 1990

	EC	USSR	CMEA	USA	Total
	(in billions of zlotys)				
Exports					
Food	7922 (63.1)[a]	329 (2.6)	1021 (8.1)	1081 (8.6)	12561 (9.7)[b]
Agriculture	3730 (67.6)	362 (6.6)	236 (4.3)	101 (1.8)	5514 (4.3)[b]
Imports					
Food	2733 (52.2)	72 (1.3)	298 (5.7)	193 (3.7)	5231 (6.7)[c]
Agriculture	415 (37.9)	10 (1.0)	46 (4.2)	60 (5.5)	1096 (1.4)[c]
Exports - Imports					
Food	5189 (70.1)	257 (3.5)	723 (9.9)	888 (12.1)	7330
Agriculture	3315 (75.0)	352 (8.0)	190 (4.3)	41 (1.0)	4418

[a] Percentage of row total. [b] As percentage of total exports. [c] As percentage of total imports.

Source: Statistical Bulletin, Central Statistical Office, Vol XXXV, Tables 54 and 55.