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UP- AND DOWNSTREAM RESTRUCTURING, FOREIGN DIRECT INVESTMENT, AND HOLD-UP PROBLEMS IN AGRICULTURAL TRANSITION

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ABSTRACT

Reform in the transitional economies can be characterized by large falls in agricultural output and by strong decapitalization of the agricultural production system. A key factor has been the disruption caused by the breakup of the pre-reform, vertically integrated, centrally planned, contracting system within the agri-food supply chain. This paper analyses how restructuring in the up- and downstream levels of the agri-food chain is affecting the production level, particularly the impacts of hold-up problems usually seen as excessively long delays in the payment for delivered product. Standard institutional solutions used to overcome hold-up problems, including supply contracting, cooperatives and vertical integration, have problems as short-to-medium term solutions. Empirical evidence indicates that FDI in the processing level can solve these hold-up problems, as well as produce important positive spillover effects within the sector and across adjacent sectors. Empirical observations indicate strong output, yield, and investment responses when hold-up problems are solved. This suggests that solving these problems should be a priority for stimulating growth, efficiency and profitability in Central and Eastern European agriculture.

JEL Classifications: D23, L14, L22, O13, Q13

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UP- AND DOWNSTREAM RESTRUCTURING, FOREIGN DIRECT INVESTMENT, AND HOLD-UP PROBLEMS IN AGRICULTURAL TRANSITION

1. Introduction

Reform in the transition countries has caused a decline of agricultural output and decapitalization of the agricultural production system. Table 1 shows the dramatic decline in output and input use in Central and East European (CEE) agriculture. The causes are a combination of: (a) declining terms of trade for agricultural producers, (b) financing problems due to a reduced supply of agricultural credit, (c) market uncertainty with high inflation, (d) disruptions caused by farm restructuring, privatization and land reforms, (e) the weather, and (f) the disruption of traditional exchange systems within the agri-food chain with restructuring of the up- and downstream sectors (Jackson and Swinnen, 1995).

It is important to recognize that many of these changes in agricultural input use, resource reallocation, and output were inevitable, as economic reform has removed many of the allocative distortions from the previous system, inducing desirable structural adjustment. However, at times, these structural adjustments have produced undesirable outcomes, as input and output changes have shifted beyond the desired long-term equilibrium.

A key factor is the break-up of the pre-reform system of contracting in the agri-food chain which was strongly vertically integrated and centrally planned. The disruption of traditional exchange systems within the agri-food chain coupled with restructuring of the up- and downstream sectors have been mentioned by many studies on agricultural transition as important, but, quite remarkably, has not received much formal analysis. The standard arguments are that the (lack of) restructuring in the up- and downstream industries has worsened the bargaining position of producers, who still face monopolistic enterprises in up- and downstream sectors industry. These conclusions are based primarily on ad hoc observations and economic intuition. Obviously, if the problem is as important as argued, it requires more thorough analysis to identify the precise mechanism and to find solutions. However, the problem cannot be addressed with traditional neo-classical models, assuming perfect information, well functioning markets, and ignoring contracting problems.

Therefore, we focus on contracting problems in analyzing how restructuring in the up- and downstream sectors affect agricultural production with imperfectly developed market and legal institutions. In the absence of credible and enforceable contractual arrangements, the opportunity exists for one of the transacting parties to extract the appropriable quasi-rents accruing to the relationship-specific investment by ex-post renegotiating the contractual terms, that is holding-up the transaction (Klein et al., 1978; Williamson, 1985). These “hold-up” problems cause under-investment in relationship-specific investments (Klein et al., 1978) and are especially important in transition agriculture, due to a combination of characteristics of agriculture and specific transition problems. Our analysis is related to two recent studies arguing that aggregate output fall are caused by decreases in relation-specific investment (Blanchard, 1997) or search frictions (Roland and Verdier, 1997) during transition.¹

We discuss why several institutional arrangements such as contracting, cooperatives and vertical integration have problems as short-to-medium term solutions to transition hold-up problems. We explain how foreign direct investment (FDI) in the processing industry can provide a successful short to medium term solution. A case study provides empirical evidence. The benefits from FDI are usually discussed as effects on the sector in which FDI takes place. However, our study indicates that FDI in the processing sectors has many positive spillover effects on production, both within and across adjacent commodity sectors.

2. Incomplete Contracts, Hold-Up Problems and Under-Investment

2.1 Incomplete contracts, moral hazard, and hold-up problems

Incomplete contracts result from agents finding it difficult and costly to foresee and plan for all possible contingencies, or to enforce these contracts, e.g. as outcomes are unobservable or not verifiable to third parties. Thus in a costly and uncertain contracting world transacting parties will attempt to insert incentives into the contract that cover most contingencies, but deliberately exclude other contingencies due to cost (Hart, 1995). As a result contracts are naturally incomplete, exposing transacting parties to two potential *ex post* problems: moral hazard and hold-up problems.

¹ Both Blanchard (1997) and Roland and Verdier (1997) use this argument to argue that a more gradual reform approach - such as the Chinese reforms - may have resulted in less output falls in CEECs, a view disputed by e.g. Sachs and Woo (1994) (See Swinnen (1998b) for an overview)

Moral hazard problems occur when one party is subjected to the hazard that the other party will engage in activities that are undesirable from their perspective, such as shirking, cost cutting or debasing quality. The perpetrating party attempts to gain advantage *within* the present terms of the contractual arrangements, (often due to lack of specification or enforceability of the contract) (Masten, 1996).

Hold-up problems are “the general business problem in which each party to a contract worries about being forced to accept disadvantageous terms later, after it has sunk as investment, or worries that its investment may be devalued by others...” (Milgrom and Roberts, 1992). That is, hold-up problems occur when one of the parties has incentives to initiate *ex post* renegotiations of the contractual terms in an attempt to extract a greater proportion of the quasi-rents accruing to the relationship-specific investment.

2.2 Asset Specificity, Quasi-Rents and Hold-Ups

The degree to which a relationship-specific assets can be redeployed to alternative uses and by alternative users without sacrifice of productive value is referred to as the level of asset specificity. Williamson (1985) and Pirrong (1993) identify five attributes of asset specificity that are of concern to this analysis:

- *Site or location specificity*: to minimize transportation costs, assets are located in an area that makes it useful only to a small number of buyers or suppliers, e.g. the locating of a dairy farm close to a dairy processor.
- *Physical-asset specificity*: investment in specialist products or equipment that make them useful to only a small number of buyers, e.g. the investment in a milking parlor.
- *Human-asset specificity*: the transaction or product requires specialized knowledge, e.g. specific livestock health knowledge to identify and treat livestock diseases.
- *Dedicated assets*: facilities used only by some buyers; substantial excess capacity results if purchases were discontinued, e.g. specialist barn facilities used for livestock shelter.
- *Temporal specificity*: timely performance is critical; delay is a strategy for exacting quasi-rents, e.g. daily milk collection.

As the level of asset specificity deepens, a “fundamental transformation” occurs: the market structure moves from *ex ante* competition between many agents to *ex post* bargaining between the contracting partners. Thus relationship-specific investments often isolate the trading partners from other exchange opportunities through creating a condition of bilateral dependency (Williamson, 1985; 1991). This situation creates appropriable quasi-rents, whose distribution may be contended by the trading partners.

Quasi-rents are the difference between an asset's value in the relationship-specific use relative to its value in the next best alternative use (Milgrom and Roberts, 1992). Increasing asset specificity leads to increasing amounts of appropriable quasi-rents, and greater incentives for trading partners to hold-up the transaction to gain a larger proportion of these quasi-rents (Masten, 1996)². Also, the expectation of *ex post* bargaining can lead to inefficient *ex ante* prepositioning by trading partners as they attempt to extract a larger share of the quasi-rents (Grossman and Hart, 1986).

Hold-ups can be costly as they consume scarce resources and as trading partners fail to realize potential gains from trade because of their inability to negotiate suitable trading agreements. To the extent that institutional arrangements can minimize the probability or cost of these conflicts, the surplus from trading will increase with the adoption of the appropriate institutional arrangement (Masten, 1996).

2.3 Incentives, Institutional Arrangements and Investment

Transacting partners that *ex ante* recognize the potential occurrence of these contractual hazards - due to asset specificity and bilateral dependency - will attempt to use a combination of incentives, institutional arrangements, and readjusted investments to minimize potential hazard costs and impacts. In relation to investment, “more durable assets will be supplanted by less-durable assets. Non-mobile assets will be supplanted by more-mobile assets. Conspicuous assets will give away to those that can be sequestered.

² Deininger (1993) provides following example of quasi-rent extraction: “Suppose a farmer has the opportunity to establish a fruit orchard by investing an amount equivalent (over the expected life of the orchard) to an annual rental value of \$300,000 but that, once established, the (annualized) resale value of the orchard is only \$100,000.” That is, the value of the orchard in its next best alternative use or to an alternative user, once the relationship-specific investment is sunk, is only \$100,000. “Assuming annual variable costs of \$100,000, he could enter a contract (e.g., with a processor) to deliver his total annual production for a price of \$500,000 and expect to make a [return] of \$100,000 each year, [after variable costs and depreciation of the capital expenditures]. Once the investment is made, however, the processor would have an incentive to offer only \$200,001, imposing a net loss of \$199,999 on the farmer which would still make him strictly better off than if he were to sell the orchard.”

And assets may flee by relocating in more secure jurisdictions. More generally, non-redeployable investments ... that would be made in a secure investment regime will be supplanted by more redeployable assets and by capital flight and asset concealment” (Williamson, 1995: 181). Thus under-investment and sub-optimal contracts result, causing productivity and efficiency losses.³

If contracts can be enforced by a court of law, incentives can be inserted into contracts to correct for potential hold-ups, specifying appropriate damages in the event of non-performance. However, legal dispute mechanisms may not be economically viable due to litigation costs, ineffective contract law, poor third party verifiability, and the loss of suitable trading partners. This forces trading partners to look for other institutional arrangements to solve these problems.

The most extreme institutional arrangement to counter hold-ups is complete vertical integration. By internalizing the transaction via vertical integration, the other trading partner is eliminated, thus internalizing distribution of quasi-rents accruing to relationship-specific assets. However, many hybrid forms exist between the extremes of autonomous spot markets (“markets”) and complete vertical integration (“hierarchy”). These include supply and distribution contracts, leasing, franchising, strategic alliances, cooperatives, and others.

The relative efficiency of these arrangements depends on the characteristics of the transaction, such as asset specificity, contractual complexity and uncertainty, measurement costs, coordination problems, reputation, and externalities. Williamson (1985) argues that asset specificity is the transaction attribute that most determines the mode of economic organization: more hierarchical forms of organization are more efficient with higher levels of asset specificity. Figure 1 illustrates Williamson’s (1991) argument. As asset specificity increases the likelihood that agents adopt hierarchical institutions increases, as it eliminates the opportunity for hold ups by internalizing the exchange. Also, as the frequency of disturbances within the economy increases, hybrid forms will become non-viable, as these arrangements become more precarious under increased uncertainty and contractual incompleteness.

3. Hold-Up Problems in the Agri-food Chain of Transition Countries

Prior to the reforms, the agri-food chain was centrally planned and vertically integrated from initial input supplier to final retailer and consumer. Decision making, control and enforcement were overseen by a centralized higher authority. Disputes were adjudicated over by this higher authority with decisions being final, binding and abided to by the disputing parties. This limited the scope for contractual transgressions and provided a credible and enforceable contractual dispute mechanism.⁴

The reform of the centrally planned system and the introduction of markets broke the vertically integrated agri-food chain into separate enterprises, although informal contracting between previous trading partners continued. As transition economies are characterized by developing contractual dispute and enforcement mechanisms and legislation, such reforms cause hold-up problems (Williamson, 1995; Stiglitz 1993, Hart 1995). Indeed, in the agri-food chain of transition countries, where reforms have disrupted the previous exchange system, hold-ups are widespread.

An important hold-up problem for agricultural producers is delayed payments by processors coupled with high inflation. Recent surveys show that in 1994 and 1995 the average delay in payments for delivered products (“collection period for accounts receivable”) for agricultural producers in Slovakia was 94 days, varying between 77 days for commercial farms and more than 100 days for state farms (Slovak Ministry of Agriculture, 1996). By extending the repayment period, processors effectively captured quasi-rents under the form of interest free loans in a high inflation environment.

The main effects of these hold-up problems are cash flow and profitability problems for producers, an overall reduction of relation-specific investment, a shift towards sectors with lower asset specificity, and efficiency losses.

Late payments and related hold-up problems reinforce the decline in the terms of trade, and create cash flow and profitability problems for producers. Farm incomes have fallen in all the CEECs as input prices have increased relative to output prices, thereby causing what is referred to as the “price scissors effect” (see figure 2). The negative

³ Notice that the capture of quasi-rents need not entail efficiency losses, merely redistribute income.

⁴ This made influence - the right connections and lobbying power - not market power often the most critical factor driving transactions and the outcome of arbitration. Hence, *influence costs* were the main transaction costs in these systems. “Influence costs arise first because individuals and groups within the organization expend time, effort, and ingenuity in attempting to affect others’ decisions to their benefit and secondly because inefficient decisions result either directly from these influence activities or, less

evolution of the terms of trade is partially caused by the price and trade liberalization and the cut in food subsidies (Jackson and Swinnen, 1995). It is easy to understand that the hold-up problems can reinforce to the price scissors effect, as producers are “squeezed” between the up- and downstream sectors. Much ad hoc information supports this argument (see also section 6) but available data do not allow to separate the impact of the hold-up problem vis-à-vis the effect of food subsidy cuts and price liberalization.

The negative impact of hold-up problems on producers’ cash flow and profitability also constrain their access to investment and working capital, as it constraints their repayment capacity (Pederson et al. 1997). If producers’ cash flows are insufficient to meet their repayment requirements, financial institutions will not lend to farmers unless these loans are supported by third party guarantees, now commonly provided by most CEE governments (Swinnen and Gow, 1997). This implies that government programs such as credit subsidies, loan guarantees, etc., will unlikely provide a sustainable solution to the credit problem unless the hold-up problem is addressed simultaneously.

In the short run, farms have few alternatives. They either accept the delay and the consequent effective price reductions, which can be very costly under high inflation, or they may sell the outstanding accounts receivable at a discount to the government. (Several CEEC governments have provided relief and support funds to repurchase these outstanding accounts receivable, usually at 70-80% of actual value (OECD, 1996)). Producers are often unwilling to enforce their judicial and legal rights against processors, especially if the processor has an effective monopsony as purchaser of the produce.

If producers view these hold-up problems as temporary, they might continue their production activities in the medium run, and try to get cash payment. Their alternatives are to produce other commodities with less hold-up problems, or to stop production completely. All these choices are observed in CEE agriculture. In general, producers have reduced investment in relationship-specific assets, thereby reducing their reliance upon bilateral dependencies, and shifted scarce resources into commodity sectors with lower asset specificity. Hold-up problems therefore induce a decline of durable relationship-specific assets through depreciation without reinvestment (e.g. livestock and machinery). Investment is limited to generic assets (e.g. fertilizer) required

directly, from attempts to prevent or control them.” (Milgram and Roberts, 1990)

for production of commodities with low asset specificity (e.g. field crops such as wheat). Net investments in livestock and machinery have been negative since 1989 (Table 2). Expenditures on fertilizer, while having strongly declined, have been positive throughout the 1990-1995 period. Again, hold-ups are not the only reason for the observed reallocation of resources, but may have contributed importantly to this process.

4. Possible Institutional Solutions to Hold-up Problems in CEEC Agriculture

Efficient agricultural production often requires substantial investment in durable, relationship-specific assets and increasingly so with the advanced and specialized capital-intensive production technology, or temporal specificity requirements, such as product quality. Institutional arrangements used to overcome potential hold-up problems include spot markets, supply and distribution contracts, cooperatives, and vertical integration (Cook, 1995; Masten, 1996). Can these institutional arrangements provide short to medium term solutions to the hold-up problems during transition?

4.1 Spot Markets

Spot markets provide greater flexibility for adaptation to changing market conditions, events and information. However this flexibility also increases the risk of contractual hazards. Courts are often unwilling or unable to intervene in *ex post* disputes due to a lack of concrete contractual arrangements, even if these transgressions impose large costs on one of the parties. Despite this, spot markets may still provide the most efficient solution if hold ups and transaction costs are more severe with alternative institutional arrangements (Masten, 1996). In this case, producers continue production while exchanging through autonomous spot markets at cash or near cash terms in an attempt to minimize hold-ups; or shift capital and resources into commodity sectors which is less affect by hold-ups. However, these options are unsatisfactory, as hold-ups persist and adversely affect farmers cash flows, revenues, and investment opportunities.

4.2 Credible and Enforceable Contracts

Another option is the development of long term contractual relationships, whereby the contracting parties attempt to prevent hold-up problems by inserting special clauses and incentives into their contract. These are increasingly common within developed agricultural markets, such as, the US pork and poultry sector where

producers and processors contract each stage of production process, due to the high asset specificity requirements (Lawrence et al., 1997).

The premise behind these forms of contractual arrangements is that by using private sanctions and stipulating the acceptable range of behavior, costly repetitive bargaining and opportunism is reduced. However, these contracts are rarely comprehensive, continual ex post adaptations and revisions will be required as circumstances change, thereby providing hold-up opportunities (Williamson, 1985; Hart, 1995). Hence, unless they are coupled with credible and reputable contractual commitments by the downstream processors, they will often fail. These commitments require that the correct incentives and penalties be inserted to discourage potential hold-ups on the part of both processors and producers thereby stimulating confidence and relationship-specific investment within the production sector (Lawrence et al., 1997).

However, since many of the institutions and law required for contractual enforcement are insufficiently developed, a situation which -- hopefully -- will be resolved in the long-run, such contracts do not provide a solution in the mean time.⁵

4.3 Hybrid Institutions

Cooperative arrangements are common in agriculture. They provide farmers benefits in two ways: (1) improved bargaining power relative to agricultural processors and input suppliers; (2) a mechanism to countervail opportunism and hold-ups (Sexton, 1986; 1991; Cook, 1995). Cooperatives have an incentive to maximize joint profits of the cooperative and farmer members, as well as provide a “competitive yardstick” for other contractual arrangements (Cook, 1995; Peterson and Anderson, 1996). However, once the initial hold up problem has dissipated, they usually encounter conflicts over governance structures, residual claims, and property rights, stemming from free rider, horizon, portfolio, principal-agent and influence cost problems. These conflicts severely constrain cooperative organizations as contracting for equity capital becomes problematic and debt capital is poorly suited to supporting relationship-specific

⁵ The Slovak government is presently trying to correct this problem through a law requiring that all milk and livestock produce delivered to processors must be paid for within 14 days of delivery. However, it is questionable how, and if ever, the Slovakian government can enforce this legislation.

investments, therefore they are often undercapitalized (Cook 1995).⁶ This is obviously a problem for transitional economies where farmers are already financially constrained and under-investing in their own operations, thus unable to make equity investments in cooperative institutions. This makes access to debt markets even more difficult for the cooperative. Hence, in the short to medium term, i.e. until primary producers can obtain the required financial resources, cooperatives provide little help.

A related option is the allotment or sale of ownership rights in the downstream processing firms to farmers during the privatization programs. The Czechoslovakian government unsuccessfully attempted this through the initial voucher privatization program for small and medium sized enterprises where a proportion of the shares in the downstream agri-food processing firms were earmarked for farmers at a low and affordable price. It provided farmers with an affordable scheme to purchase ownership and control rights in the downstream processing sector, thereby protecting them from future market power and hold-up problems. The scheme imitated the cooperative organizational structures commonly seen in developed countries that provide farmers a hybrid form of vertical integration and a “competitive yardstick” for comparative analyses. However, the policy generally failed as most farmers looked to reap the short-term gains through selling their shares to outside investors for prices substantially higher than initial purchase prices, often not recognizing the potential long-term benefits from retention of ownership or the adverse effects that loss of ownership and control could have upon their farms’ economic viability.

4.4 Vertical Integration

Vertical integration is defined as bringing together two or more successive stages of the vertical production and distribution chain under common ownership and management. This is an obvious option to pursue when faced with severe contractual hazards and hold ups. Integration internalizes the quasi-rent distribution within the same enterprise. Two problems are extremely pertinent to transition economies: (1) the loss

⁶ This has resulted in many cooperatives, in e.g. Australia, Canada, New Zealand and the USA, moving towards “New Generation Cooperatives” which minimize these property rights problems by restructuring along the lines of investor owned firms with either tradable shares, significant up-front equity contributions and “closed” membership plans, allowing them to acquire the equity base and governance structures to stay competitive (Cook, 1995; Harris, Stefanson, and Fulton, 1996).

of incentives coupled with management limitations often limit the economic benefits of internal organization; and (2) severe capital, human, and external financial resource constraints often make vertical integration economically non-viable. If these problems are minimal, vertical integration is often pursued. An example from CEECs is the investment in on-farm silos by large grain producers.⁷ Where entry into the next marketing level requires substantial capital investment (e.g. dairy processing) farmers often prefer to develop agricultural cooperative organizations, or long-term contractual arrangements with downstream processors given that they can provide credible commitments (Milgrom and Roberts, 1992; Masten, 1996). However, as discussed above, these options are also problematic in transition.

In conclusion, all these institutional arrangements have problems, primarily because of a combination of a lack of credible enforcement mechanisms, positive incentives for processors to extract quasi-rents, and a lack of financial resources. In the next section, we discuss how foreign direct investment has been successful in reducing hold-up problems because it addresses a sufficient part of these concerns.

5. The Effect of Foreign Direct Investment in Up- and Downstream Industries

There is very little foreign direct investment (FDI) into the agricultural production sector. In contrast, the food and agri-processing industry has attracted much FDI in many CEECs. Interestingly, FDI in agri-food processing sector has solved hold-up problems in agricultural production in several cases we studied. This effect is not typically included in the benefits of FDI. Studies on FDI effects focus primarily on the effect of FDI on the sector in which FDI takes place. Next, we explain why FDI in *processing* may have beneficial effects on *production*.

⁷ For example, when the Bulgarian government forced grain producers to sell wheat at prices below market clearing prices to public trading firms, producers invested in grain storage facilities to store the harvest until the government raised prices or they could find avenues to export it abroad for substantially higher world market price (Swinnen, 1997).

Similarly, in Slovakia, after a low potato harvest in 1994, the government set a low ceiling price for potatoes to reduce consumer prices. Farmers stored the crop instead of selling at the market, intensifying the problems that the government had tried to correct. Potatoes were sold in local markets after producers had found a way to get around the government rules. They sold the potatoes at the government-set ceiling price but charged consumers an exorbitant price for a paper bag, which they were required to purchase with the potatoes.

5.1 FDI spillovers through backward linkages

Some of the spillovers from FDI operate via the linkages between the Multi-National Corporations' (MNC) foreign affiliate and its local suppliers. Spillovers occur when local firms benefit from the MNC affiliate's superior knowledge of product or process technologies or markets, without incurring a cost that exhausts the whole gain from the improvement (Blomström and Kokko, 1997). MNCs can affect the economic welfare of input suppliers in three ways: (1) the quality of goods and services that they buy, (2) the influence they may exert on the terms of procurement, and (3) the impact they may have on the technological capability, managerial initiative, and organizational competence of their suppliers (Dunning, 1993).

Direct spillover effects come from MNCs who contribute to raising productivity and efficiency in local suppliers as they (Lall, 1980):

- help prospective suppliers set up their production;
- provide technical assistance or information to raise the quality of suppliers' products or to facilitate innovations;
- provide or assist in purchasing of raw materials and intermediaries;
- provide training and help in management and organization; and
- assist suppliers to diversify by finding additional customers.

In addition to the linkages and spillovers that are the result of cooperation between affiliates and local firms, it is also possible that there are effects that occur as suppliers are forced to meet the higher standards of quality, reliability, and speed of delivery of the MNCs (Watanabe, 1983).

A third spillover effect is when FDI induces higher efficiency throughout the processing sector because the increased competitive pressure forces the local firms to increase their managerial efforts, or to adopt some of the marketing and contracting techniques used by MNCs. Furthermore, the demonstration of new technologies increases know-how of local firms and, in combination with increased competition, forces them to operate more efficiently (Blomstrom and Kokko, 1997). This, in turn, will induce a wider and more rapid spread of spillover effects in the primary production sector than through the direct backward linkages of the MNC affiliate only.

5.2 Impact of FDI in agri-processing on agriculture in CEECs

Case studies and observations from Central and Eastern Europe indicate that FDI in agri-processing has increased efficiency in agricultural production by reducing hold-up and under-investment problems. This has occurred through the introduction of managerial improvements, of innovative contracting with producers, and the simultaneous inflow of capital in the agri-food chain.

Key factors in the success of FDI to solve hold-up problems are:

- a reputation for being fair and honest in negotiating their contracts,
- offering better prices and prompt payments for delivered products,
- information campaigns to change farmers attitudes in contracting,
- large investments in processing facilities to increase capacity and quality,
- initiation of long-term contracts with primary producers,
- programs to facilitate the adoption and investment in new technology and systems at the production level, including pre-financing of inputs (chemical, fertilizer and seeds), interest subsidies on machinery investments, technical support for technology adoption and management, R&D. These programs assist producers facing financial constraints in making relationship-specific investment to increase both the quantity and quality of products delivered under contract.

FDI spillovers include changes in management and contracting of local firms in the same sector, but also in other (related) sectors. Competing firms are being required to provide similar contracts and services, and to fulfill their contracts, in order not to lose their producer supply base. These spillovers are not confined to the initial commodity sector where the FDI occurred. Firms in related sectors have imitated these contractual relationships, especially if they compete for the same primary producers.

5.3 Case Study: Sugar Processing in Slovakia

There are a number of examples from the agricultural sectors of Central and Eastern Europe where FDI has corrected the hold up problems and related under-investment in relationship specific assets. This section summarizes insights from a case study of *Juhocukor a.s.* in Slovakia which has used innovative long-term contracts to correct the hold-up problem and facilitate investment in relationship specific assets (Gow

and Swinnen, 1998).

Juhocukor a.s. is the Slovakian subsidiary of Eastern Sugar. Eastern Sugar is a 50:50 joint venture between Tate and Lyle and General Sucrete for investing in CEEC sugar production. It presently owns operations in the Czech Republic, Hungary, and Slovakia. In 1993 they initially purchased a 51 % stake of Juhocukor a.s. from the privatization program; later this increased to 76%. Eastern Sugar committed to a four-year development program at Juhocukor including a recapitalization and stabilization of the processing facilities and an injection of working capital.

The company's strategy to secure sufficient and high quality sugar beet deliveries for its factory and to stimulate farmers to invest was based on three components: first, pay contracts on time and at a price somewhat higher than the rest of the market; second, initiate a development program which included increasing processing and production productivity, availability of high quality seeds, fertilizer, and harvesters and the adoption and investment in new technology and production practices by farmers; and third, the firm initiated a two year information and media campaign directed at farmers and the agricultural community explaining exactly what their long-term contracting programs offered and how contracts would be beneficial for growers. This was important to overcome Juhocukor's reputation of late payment.

The base program for growers was a four year contract specifying guaranteed prices for minimum sugar content, with premia and penalties for quality variations. Coupled with the base contracts were programs for pre-financing of input supplies, facilitating investment in machinery, and adoption of new technology and management. The input pre-financing program for chemicals, fertilizer and seeds were done through local input suppliers with whom Juhocukor had negotiated better prices for farmers, in return for repayment guarantees for the input suppliers. In cooperation with Polnobanka (the main agricultural lender in Slovakia), Juhocukor developed a program to facilitate the financing of machinery and working capital investments. This program provided growers with a minimal subsidy on investments and Polnobanka with a repayment guarantee covering both principal and interest. Additionally, they provided agronomical and farm management services to growers free of charge and developed extensive R&D programs specific to the three sugarbeet growing regions.

In conclusion, credibility of the program came from a combination of factors, all of which signalled to producers an interest in long-run collaboration in sugarbeet

production:

- large investments in the processing enterprise,
- the offer of long-run contracts,
- the emphasis on direct payments and somewhat higher prices,
- the investment in producer supportive systems (R&D, extension, support for input purchasing, investment and technology adoption),
- the open and intensive information campaign.

The success of these programs in stimulating sugarbeet production and yields is shown in table 3. Yields have increased from 32.5 t/ha with 14 % sugar content in 1992 to an estimated 45 t/ha with 16.5 % sugar for the 1997 campaign. Contracted hectares have increased from 7,180 ha in 1992 to 13,700 ha in 1997 (and estimated 14,500 ha in 1998). The factory's daily slicing capacity has increased from 3,719 t/day to an estimated 5,200 t/day for 1997 and sugar production has increased from 24,700 ton to an estimated 75,000 ton in 1997. Importantly, these effects are not due to price changes, as terms of trade have been stable between 1993 and 1997 (see Table 3).

Figure 3 clearly shows the dramatic increase in sugar production at Juhocukor following FDI, relative to the rest of the sector. It is also important to recognise that the competing firms within the Slovakian sugarbeet sector have attempted to imitate these programs with varying success. These firms have all seen increases in sugar output, except with either a one or two year delay following the initial FDI in Juhocukor. There have been positive spillover on output and yields of all sugarbeet production in Slovakia: national yields are increasing, although they are less than those achieved by Juhocukor's contract growers. Spillovers can also be seen in other Slovakian agricultural sectors where firms (with and without other FDI support) successfully use similar contracts with their growers to solve hold-up problems.

6. Discussion and Policy Implications

Some conclusions and areas for further research follow from our analysis.

First, available data do not allow to identify the relative importance of hold-up problems in reduced agricultural profitability and in output and yield declines. Price liberalization and subsidy cuts caused a large part of these structural adjustments (on aggregate around 40% as estimated by Macours and Swinnen (1997)). However, ad hoc

information, case studies, the strong lobbying of farms for government programs to purchase bad accounts for payments receivable, and data on payment delays suggest that hold-up problems are an important constraint as well. The strongest indication of the importance of hold-up problems in agricultural transition is the dramatic positive output and yield response when hold-up problems are solved, as illustrated by the Juhocukor case study: yields increased by more than 40% and output by more than 100% in 4 years, despite a stable terms of trade.

Further empirical research is needed to see whether this conclusion holds in general or is specific to our case study, but our preliminary analyses indicate that similar effects can be observed in other countries and in other commodities. This suggests that solving the hold-up problems should be a, if not *the*, priority for stimulating growth, efficiency and profitability in CEEC agriculture. This includes policy-makers who so far have been focusing primarily on interventions such as price and trade policies, credit subsidies or government loan guarantees (Hartell and Swinnen, 1998). Our analysis suggest that they should shift the focus of their interventions to solve hold-up problems in exchanges between farms and up- and downstream firms.

The question, of course, is how to do this. In principle, solving hold-up problems comes down to better contract enforcement. This requires the implementation of contract dispute legislation and credible enforcement mechanisms. This is a necessary condition, but it will also take some time to implement such institutions and to increase its credibility. What can be done in the short run ? Our review concluded that institutions used in Western Europe and North American to solve hold-up problems in agriculture have problems for implementation in transition economies in the short run. However, by 1998 almost a decade has past since the start of the reforms and important progress has been made, making some of these options increasingly possible.

Interestingly, the intervention that empirically seems to have been most successful in solving agricultural hold-up problems is FDI in up- and downstream sectors. We have listed a series of arguments to explain this effect, and the key factors are a combination of innovative contracts, large investments in processing and support services (financial, extension, etc.) for producers, and immediate payments -- all signaling an interest for long run collaboration and joint interests in production improvements towards the producers, and providing liquidity to the system.

In theory, governments could try to create similar conditions for reducing hold-

up problems. In the long run this can be done through e.g. the implementation of credible contract dispute mechanisms, investment support and farm extension programs. However, in the short run -- and maybe even in the long run -- the implementation of such “packages” may require fine-tuning that go beyond the government’s ability and role in the economy. In practice policy implementations are severely limited by administrative constraints and conflicting incentives of bureaucrats. Furthermore in implementing such packages the government may have to take up a role which should be limited to private enterprises.

From this perspective it seems that a better strategy for CEEC governments is to stimulate FDI investment and improve the conditions for spillover of the effects to other companies and other sectors. Our empirical analyses indicate that very important spillover effects occur within the sector i.e. to other companies who have to improve their offer to producers in order to stay competitive with the FDI companies. But also companies in other sectors have imitated successful contracting and support programs. An important reason for this is that companies in related sectors are competing with the FDI company for fixed farm inputs (e.g. land) needed to produce the farm products and are therefore under competitive pressure through the factor markets.

In Slovakia, the government has supported these spillover effects by subsidizing domestic sugarbeet companies who implemented similar programs. A question that needs more analysis is to what extent the introduction of liquidity into the system (investment and working capital provided by the MNCs) is a key condition, besides the other factors. This is an important issue if governments want to stimulate such FDI spillovers (or similar contracts without having to rely on FDI). If it is a necessary condition, temporary subsidies may be warranted, while otherwise they are mainly causing further distortions in the system and should be avoided.

A final question is why MNCs want to solve the hold-ups in the first place, and are not exploiting their suppliers, like the local companies? The reason is a combination of long run objectives and less financial constraints. Lower effective opportunity costs of the investment for MNCs than for local firms (because the investment is a smaller proportion to total investment and differential effects of inflation/exchange rate risks) allow MNCs to take a longer term perspective on investments in plant and in supply chains. This requires the need to ensure long-term development and viability of their suppliers.

7. Conclusions

Reform in transition countries is characterized by large falls in agricultural output and by strong decapitalization of the agricultural production system. While structural adjustment induced desirable changes in agricultural output and input use, part of the changes are beyond the long-term equilibrium. A key factor is the disruption caused by the break-up of the pre-reform system of contracting in the agri-food chain which was strongly vertically integrated and centrally planned.

This paper has analyzed how the restructuring in the up- and downstream is affecting the production sector. We argue that a crucial part of the problem is the so-called “hold-up problem” with incomplete contracts. These hold-up problems are important in transitional agriculture, because of a combination of contract problems due to typical characteristics of agriculture and of transition specific problems. A key example are late payments by processors, causing cash flow and profitability problems.

Institutional solutions to overcome the hold-up problems, including supply contracts, cooperatives and vertical integration, have problems as a short-to-medium term solution. Empirical evidence shows that FDI in the processing industry can solve the hold-up problems. We also observe important FDI spillover effects to other enterprises in the same and related sectors.

While the relative importance of hold-up problems cannot be determined based on available data, empirical observations do show strong output and yield responses when hold-up problems are solved. This suggests that solving the hold-up problems should be a priority for stimulating growth, efficiency and profitability in CEEC agriculture. The focus of government interventions should shift from price subsidies, credit subsidies or government loan guarantees to solve the hold-up problems in the exchange markets.

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**Table 1: Change in Output and Input Use in CEEC Agriculture between 1989 and 1994
(in %)**

	<i>Change in Output</i>	<i>Change in Input Use</i>				
		Arable land	Labour	Tractors	Fertilizer	Livestock
Bulgaria	-38	4	2	-31	-75	-53
Czech Rep.	-23	-3	-46	-42	-70	-31
Hungary	-30	-6	-56	-28	-85	-41
Poland	-23	-1	-15	14	-65	-19
Romania	-12	-1	14	6	-73	-37
Slovakia	-29	-2	-50	-11	-83	-35
Slovenia	-19	-5	-11	-44	-39	-14

Source: Macours and Swinnen (1997)

**Table 2: Investment in Fertilizer, Livestock and Machinery in Hungary between
1990 and 1995**

Year	Total Consumption '000 ton	Change in % Relative to Previous Year	
	<i>Fertilizer</i>	<i>Livestock</i>	<i>Tractors</i>
1990	1221	-7	-2
1991	671	-2	-9
1992	221	-18	-10
1993	179	-13	-3
1994	209	-11	-7
1995	314	-8	-15

Source: FAO Fertilizer Yearbook 1995; FAO Production Yearbook 1995

Table 3: Main Sugar Production Indicators for Juhocukor a.s., 1990-1997

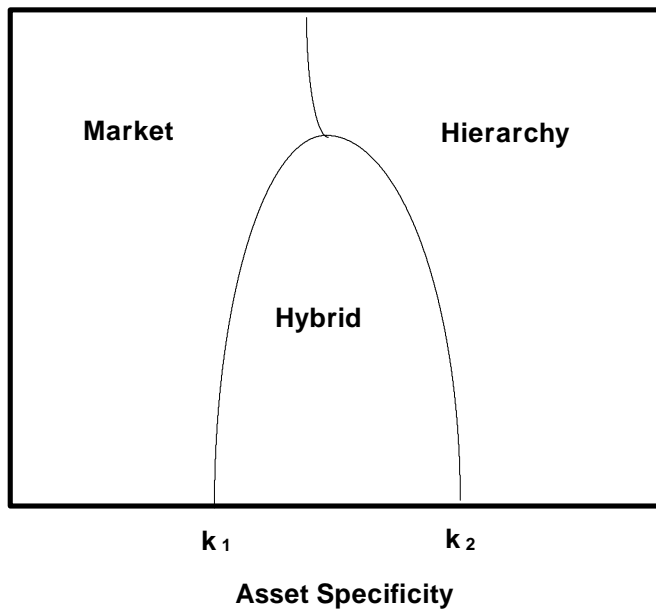
	Units	1990	1991	1992	1993	1994	1995	1996	1997*	1997/1993 (%)
Sown Area	000 ha	7.8	6.0	7.2	6.0	6.0	6.2	9.7	13.7	+128%
Sugar Percentage	%	13.9	14.3	14.0	14.4	13.7	15.2	16.1	16.5	+15%
Yield	ton/ha	32.2	33.8	32.5	36.1	36.4	38.8	42.0	45.0	+25%
Sugarbeet Processed	000 tons	315	240	234	214	270	337	455	550	+157%
Sugar Production	000 tons	32.0	25.7	24.6	24.0	28.4	40.3	58.9	75.0	+212%
Avg.. Output/Input	index	100	102	79	68	64	64	70	na	
Price Ratio	1990 = 100									

Source: Juhocukor a.s.

* estimate

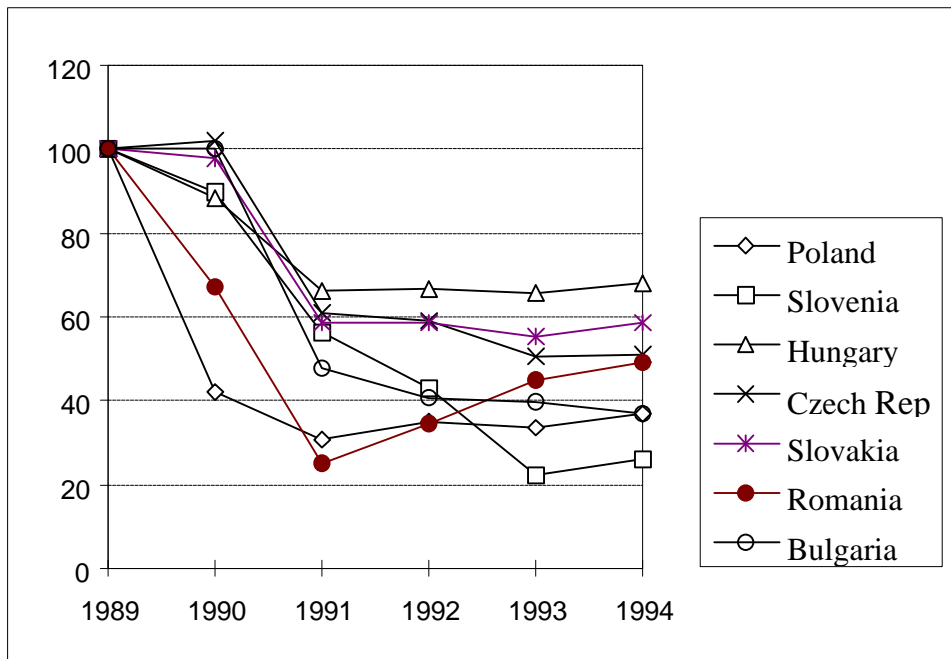
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Figure 1. Institutional Arrangement Responses to Changes in Asset Specificity (zero-complete) and Frequency of Disturbances (high-low)



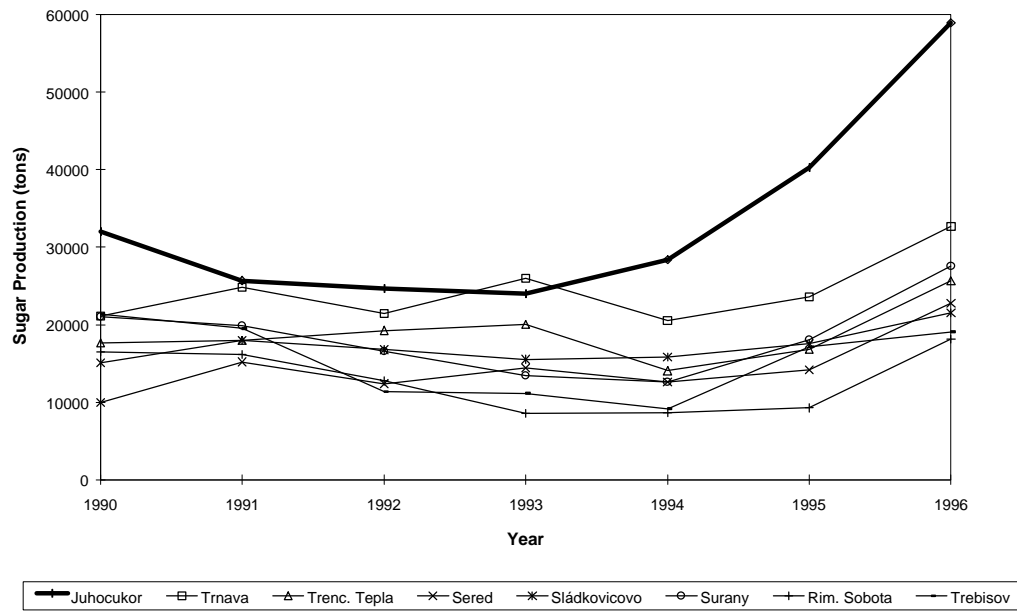
Source: Williamson (1991)

Figure 2: Agricultural Product Prices Relative to Agricultural Input Prices



Source: Bojnec-Swinnen (1996), OECD (1996), European Commission (1995a)

Figure 3. Slovakian Sugar Production



Source: Slovakian Sugar Producers Association