The Reconfiguration of Post-Soviet Food Industries: Evidence from Ukraine and Moldova

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ABSTRACT

The 1990s witnessed widespread changes in the nature of food supply chain actors, government policies and markets in the successor states of the Soviet Union. These changes have resulted in a more differentiated set of actors but there is relatively little empirical knowledge on the reconfiguration of food processors and their relationships with agricultural processors. This paper attempts to deal with this gap by researching structures and procurement relationships in Ukraine and Moldova. Enterprise level survey data on the food-processing sector in Moldova and Ukraine reveals a diverse set of actors. Cluster analysis is employed to better characterize these different groups of processors. A three-cluster solution is adopted and the main characteristics, supply patterns and dynamics of each cluster are further analyzed.

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1. INTRODUCTION

While the restructuring of the agricultural sector in post-Soviet states has received relatively high attention, there has been comparatively little research on the food processing industry. Research to date on the food industries has identified important changes in managerial practices since the Soviet period (Ioffe and Nefedova, 2001), attempted to understand patterns of foreign direct investment (Jansik, 2001) and taken an interest in firms that have adapted best to the problems of transition (Gow and Swinnen, 2001). Food enterprises have also been studied within wider studies of enterprise restructuring (Estrin and Rosevear, 1999). However these studies have tended to lack a sectoral wide perspective or systematically analyzed the linkages between agriculture and the food industry. The aim of this paper is to identify groups of food processing enterprises with common characteristics, paying attention to the main problems faced by different groups of enterprises and the nature of the procurement practices employed.

The paper is divided into five sections. The next section describes the key features of the food-processing sector in Moldova and Ukraine. While general market characteristics can be identified there is a need to map the diversity of actors operating in the sector and this is accomplished using factor and cluster analysis. The methodology employed in paper is described in Section 3. Section 4 outlines the key features of the clusters identified, discussing their size, main problems faced and procurement practices. Conclusions are drawn in Section 5.

2. CHARACTERISTICS OF THE FOOD PROCESSING SECTOR IN UKRAINE AND MOLDOVA

The food-processing sectors in both countries can be categorized according its enterprise structure, changes in output and relationships with suppliers. These are discussed in turn.

Enterprise Structure

During the Soviet period food processing was increasingly concentrated in large combined factories (*combinats*). These *combinats* have for the most part lbeen privatized apart from some larger 'strategic enterprises' (principally tobacco and wine in Moldova). In both countries, the initial privatization process favored insiders (existing managers and employees) (Filatotchev *et al.* 1996) which saw state owned companies re-established as private joint-stock companies. Moldova initially favored a privatization process based on the distribution of patrimonial bonds (vouchers) to citizens with shares in food processing companies also allocated to suppliers, the former large collective (*kolkhozi)* and state (*sovkhozi*) farms. However, from the mid-1990s Moldova moved to more privatization for cash deals, although neither approach has led to the level of investment nor restructuring envisaged (Orlova and Ronnås. 1999). While the privatization process in both countries led to more 'insider dominated' private firms than many would have wished for, the former *combinats* have faced new entrants. These new entrants have included investments from domestically owned, large private traders; a few joint ventures with foreign investors and small-scale *de novo* firms (typically sole traders or with two to three owners). The former *combinats* have thus faced a diverse range of new competitors with different management backgrounds and access to capital.

Output

Food industry output in both countries fell during the 1990s as real incomes and subsidies on food declined in an environment of worsening terms of trade and reduced agricultural output. Agricultural production has more than halved during transition after stagnating in the late Soviet period. This pattern of stagnation and decline during transition is typical of other CEECs (Figure 1) and like other CEECs the fall in livestock output has been greater than for arable production. However, while most CEECs witnessed a sizeable decline in the early 1990s, a degree of stabilization occurred in most states from the mid to late 1990s onwards. In contrast, output has continued to fall in Ukraine and Moldova, and the size of the contractions in both countries has been greater far than the average for the CEECs (Macours and Swinnen, 2002).

As real incomes fell and the late payment of wages became more widespread, the relative importance of subsidiary or non-marketed farming has grown. While subsidence output accounts for a greater share of total food production, productivity is low and quality is erratic (ARA, 2001). Both countries have also struggled to build a national consensus on the future direction of state - agri-food industry relationships and this reflects a wider lack of consensus on economic policy. Disagreements between the President and parliament have been a constant feature of the Ukrainian and Moldovan political systems. In this divided system, informal clans based on regional and sectoral ties have come to play an unusually influential role in politics and business (EBRD, 2000).

Relationships with Suppliers

As part of the Soviet Union, *kolkhozi* and *sovkhozi* farms dominated agricultural land use in both Ukraine and Moldova. In Moldova there were approximately 850 large agricultural enterprises, of which 470 were *sovkhozi*. The average size of the *sovkhozi was* about 2,000 hectares (ha) while the *kolkhozi* tended to be larger (3,000 ha on average). By the mid-1980s Ukraine, had about 2,500 state farms and 7,500 collective farms. The average size of *sovkhozi* and *kolkhozi* was approximately 4,000 ha in Ukraine. Prior to 1990 private agriculture consisted only of the household plots of *sovkhoz*i and *kolkhozi* members and garden plots allocated to urban workers. These private plots ranged typically between 0.25 and 1 ha in size. They were not private in the sense that the land was privately owned but rather the output produced on them was essentially outside of state control (Wegren, 1991). Every collective and state farm received procurement orders specifying the deliveries that should be made to given processors (Melyukhina and Serova, 1995). In general there was no competition between processing plants for agricultural raw materials but rather one processing plant existed (mill, meat processor, dairy etc.) for each official procurement zone, which typically coincided with *oblast* boundaries (Wegren, 1996).

After initial reluctance, Moldova embarked on a process of radical decollectivization. The National Land Programme (NLP) was formally launched in March 1998 to distribute all the physical assets and land of the *sovkhozi* and *kolkhozi*. As part of the NLP, some 989 large enterprises (96 per cent of the total) were broken-up. Over 1 million land beneficiaries were established (out of a total population of just over 4.4 million for the Republic of Moldova in 2001), with the average size of a land share being about 1.4 ha. It was not uncommon for a person to receive their land share as five or even more spatially separated plots.

To overcome the problems of excessive fragmentation in Moldova, attempts have been made to stimulate land markets (sales and rental contracts). Many of the new landowners are inactive because of their age or health problems and others do not have the capacity to farm effectively. As a result, the majority of land distributed under the NLP is rented to 'leaders'. A survey conducted by the *Centrul de Investigatii Strategice si Reforme* (2001), that covered 464 lessees and 1,467 leasers, found that 88 per cent of lessees operate with land plots of over 100 ha. While the activities of leaders has led to some consolidation it should be noted that dealing with such a large number of landowners means that they face high transactions costs and uncertainty in investment. Agricultural reform has thus dramatically increased the number of landowners and this has meant that the food industry which previously relied on a small number of large farms for supplies must procure from a structurally very different and fragmented agricultural base.

Ukraine, in contrast, has been slower to embark on decollectivization, although endeavors were made to reform the *sovkhozi* and *kolkhozi*, with the majority transformed into Collective Agricultural Enterprises (CAEs). Most of these CAEs took the form of closed joint stock companies in which assets were divided amongst members according to their labor contributions. Whilst in theory, collective members are free to buy and sell their land shares, there has been little trading or development of individual farming. This can be attributed primarily to resistance to change by collective farm managers in an environment in which the profitability of agriculture has been low and the insecurity and risk associated with farming privately has been greater than that offered by the collective. If a member chose to withdraw from the CAE there was a danger that the plot allocated to them would be too small create a viable farm or impractically located. In addition, they would not receive access to any of the subsidized inputs of the CAE.

In an attempt to overcome some of the barriers to individual farming, in December 1999, the Ukrainian President signed a decree calling for a reorganization of the CAEs[1] and this was followed by a new land code in 2001.[2] The 1999 decree specified that CAEs could be transformed into a number of entities, including private family farms, private-lease enterprises, economic associations, and agricultural co-operatives (Pugachov with van Atta, 2000). As a result of the decree, land has been distributed to individuals for family farming, or, more commonly, members lease individual land shares to the collective enterprise. By May 2000, more than 6,258,000 (96.8 percent) citizens entitled to a land share had received share certificates.[3] By the same date, over 5.3 million agreements for leasing land shares and 3.5 million agreements on property leasing had been concluded. The majority of the leasing agreements were agreed for over three years and include a provision for automatically extending leasing agreements for a new term (Pugachov with van Atta, 2000). While at first glance this may be perceived as stimulate private farming, it should be noted that relatively few have chosen to farm independently and there has not been significant division of the CAEs into new enterprises or the introduction of new investors.

Reviewing the literature it is apparent that structural change has occurred at both the farm and processing level in Moldova and Ukraine. At the processing level, the former *combinats* have faced new entrants. These new entrants encompass a range of legal forms and management types.

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[1] Decree No. 1529/99, on 'Urgent Measures to Accelerate the Reform of the Agrarian Sector of the Economy'.

[2] The Land Code was approved by the *Verkhovna Rada* (Ukrainian Parliament*)* in October 2001 and came into force on January 1st 2002. The Code outlines much greater freedom for individuals and legal entities to own, use and dispose of land but includes a set of transitional provisions. These provisions postpone or limit the application of several key aspects of the Land Code until a future date. The most important transitional provision is that agricultural land may not be re-sold by individuals or legal entities until January 1st 2005.

The relationships between food processors and agricultural producers have also changed in that farms now are no longer tightly linked to any single buyer and have greater freedom in forming contracts with buyers. However there is some anecdotal evidence from the region that many farms have not effectively exploited these new freedoms (through lack of marketing skills or access to capital) or regional and local monopolies have persisted so that some food processes have retained their local monopsonistic status (Ioffe and Nefedova, 2001). There is thus a need to try to understand the types of processing enterprises and the nature of relationships between processors and producers.

3. METHODOLOGY

To investigate the issues identified in Section 2, an enterprise level survey was conducted between September 2000 and April 2001, as part of an EU INTAS research project on agri-food industry relationships. The survey sought to obtain information on the performance of individual food processing enterprises, the structure of supply chain relationships, contractual relations, terms and conditions of business and perceptions of the business environment.

In choosing a method for sampling in both Ukraine and Moldova, researchers are frustrated by the lack of representative sampling frames. In fact given that up to 60 percent of economic activity in Ukraine has been estimated to be in the shadow economy (International Finance Corporation, 2000), the notion of a complete understanding of the population's characteristics from which a random sample can be drawn is problematic. Recognizing the problem of representativeness a different approach was taken, relying on purposeful sampling (Guba and Lincoln, 1989). This

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[3] The possession of a land-share certificate entitles an individual to receive a land plot of an 'average size, average quality, and disposed in an average location.' The physical identification and demarcation of a land plot is accompanied by the issuing of a state (title) deed.

procedure aims at capturing the central characteristics that cut across the food industry (e.g. including cases that reflect the spectrum of different firm sizes and sectors) so that a broad overview can be drawn (Patton, 1990). This approach has been successfully applied in instances where the characteristics of the overall population are not known and researchers have sought to obtain the broadest range of information and perspectives on the topic under consideration (Flynn et al. 1990). Companies were interviewed via face-to-face meetings. Other avenues (postal, telephone interviews) have not yielded good response rates in Eastern Europe when applied by academic researchers (Marinov *et al.* 1994).

Contacts with companies were made through business directories, visits to local business exhibitions, and the personal contacts of the research teams. Given the closed nature of much of the food industry in Ukraine and Moldova, which has been suspicious of researchers and doubted the preservation of anonymity, the latter proved to the most fruitful means of entry. All firms were surveyed face-to-face through the use of structured interviews. Data collection in the Ukraine was concentrated in the Dnepropetrovsk region given the local links of the Ukrainian research team. While Ukraine is a comparatively large country with regional variations, the results for the Dnepropetrovsk region are thought to provide a good insight into the basic features of Ukrainian food supply chains. In both countries firms in a set of core food industry branches were surveyed (milling, baking, meat processing, and dairy). In Moldova, firms in branches of particular local importance (wine, fruit and vegetable processing and sugar) augmented this core. The Ukrainian sample recognizes the importance of oilseeds and arable production in the region. Overall useable data was obtained from 108 food industry enterprises (50 in Ukraine and 58 in Moldova) (Table 1).

4. DATA ANALYSIS

In order to identify groups of enterprises with common characteristics, cluster analysis was employed. This is appropriate for defining groups of food enterprises with the maximum homogeneity within the groups while having maximum heterogeneity between the groups (Hair *et al.,* 1998). In identifying the variables for the cluster formation, factor analysis with orthogonal rotation was applied. Factor analysis is applied to identify the dimensions that underlie the state of a particular firm. The factor analysis assumes that the observable variables are generated by a set of non-observable common factors and unique factors (Hair *et al*., 1998). Furthermore, the variance-covariance structure of the data is explained by the factor structure, with variances being explained less than perfectly and covariance being explained exactly. The resultant uncorrelated factor scores for each observation was used as the basis for clustering.

Table 2 records the variables included in the factor analysis. These variables can be grouped into three dimensions for profiling firms:

a) *structure* (number of employees, turnover),

b) *constraints* (the main problems as ranked by the firm on a 1 to 5 scale with 1 indicating no problem and 5 their most important problem),

c) *procurement practices* (number of suppliers and degree of fragmentation in the supply base).

From the variables included in Table 2, a six factor solution was adopted, choosing the factors that presented an eigenvalue greater than 1.[4] The Kaiser-Meyer-Olkim measure of sampling adequacy is 0.63 indicating that the data matrix has sufficient correlation to justify the application of factor analysis. Bartlett's test of sphericity accounts for the significance of the correlation matrix. In this case it is large and statistically significant at the 1 per cent level, so that the hypothesis that the analyzed matrix is the identity matrix can be rejected. Thus, the factorial analysis is meaningful (Table 3). The method of principal component analysis with varimax rotation was adopted. This method assures that the obtained factors are orthogonal. This solution explains 75.6 per cent of the total variance in the data set, which is satisfactory. The cut-off for interpretation purposes is factor loadings greater or equal to 0.5 on at least one factor. With this criteria it is possible to see that the first factor is related with the firm level cash-flow constraints measured by the rating of the potential problems of high debt, late payment, enforcement of bankruptcy and problems procuring raw materials (Table 4). The second factor concerns employment as measured by current full-time equivalent jobs and employment three years ago. Factor 3 is related to the problem of macroeconomic stability (inflation and exchange rate). The variable 'late-payment' also has a positive loading of 0.5 on this factor. This reflects how late payment becomes a much more severe problem in an environment of high inflation and a depreciating domestic currency (Peel *et al.* 2000). Factor 4 is concerned with turnover (current turnover and turnover per employee). Factor 5 can be labeled credit problems and is concerned with the rating of access to credit and interest rate constraints. The final factor, 6, relates to the agricultural supply base (total number of

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[4] The initial analysis employed another constraint variable ('importance of taxation as a problem'). However, the communality for this variable was judged to be too low (< 0.50) indicating that the set of derived factors explained a low proportion of the variance of this variable. Consequently it was excluded from subsequent analysis.

suppliers and the measure of fragmentation of the supply base - number of suppliers per employee).

The factors formed the basis of the cluster analysis following a two-stage hierarchical approach. First, a hierarchical technique was used to identify outliers and the number of clusters. Then, the observations were clustered by a non-hierarchical method with the cluster centers from the hierarchical results as the initial seed points. This combined procedure allows one to benefit from the advantages associated with hierarchical and non-hierarchical methods, while at the same time minimizing the drawbacks (Punj and Stewart, 1983). The algorithm used in the hierarchical technique was Ward's method based on squared Euclidean distances.[5] Ten enterprises (outliers and missing data) were removed from the analysis.

From the hierarchical results, the average values of the six factor scores for each cluster were used as seed points for the non-hierarchical *k*-means technique. To determine the number of clusters the pseudo-T^2 statistic was evaluated. This statistic is a ratio of the sum of squared errors when the merging clusters remain separate to the sum of squared errors when the merging clusters are joined. The pseudo-T^2 statistic indicates a cluster solution when the value of the statistic falls or has a trough. In this case, the pseudo-T^2 statistic indicated that a three-cluster solution was most appropriate. The procedure of using the hierarchical cluster means as seeds for the *k*-means algorithm is equivalent to accepting the hierarchical clustering variable means conditional on

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[5] The three-cluster solution produced by Ward's method identified three clusters of roughly equal size. However, because hierarchical methods only make one pass through the data, they are often criticised (Ketchen and Shook, 1996; Gloy and Akridge, 1999). To compensate for this weakness, the hierarchical results from the entire sample were used as a starting point for the *k*-means clustering procedure.

cluster membership as the prior belief for the final conditional cluster means (Aldenderfer and Blashfield. 1984). The main characteristics of the three clusters derived are detailed in Table 5. The first part of Table 5 indicates the means for each cluster for the variables included in the factor analysis. The second section indicates the means for variables not included in deriving the clusters. The main characteristics of each cluster are discussed below.

Cluster 1 has the largest mean number of employees and the vast majority of enterprises in this group are former *combinats*. Their turnover ranges from 300,000 to 9.5 million USD, with an average of just over 1 million USD. These firms rate cash-flow problems as being more important than the other two clusters with higher ratings for debt, late payment and problems surrounding the procurement of raw materials. The break-up of the large collective farms has hurt these firms most as their large integrated supply chains have been disrupted and many operate at a fraction of their productive capacity. This has been a particular problem in Moldova and cluster 1 is biased toward Moldovan enterprises.

Overall employment in this set of firms has decreased (Table 6). Many, but far from all, have found it difficult to adjust to the loss of guaranteed supply and politically controlled exchange relationships with other actors in the chain. They have the highest mean number of suppliers and written contracts predominate. Firms in Cluster 1 would prefer to rely on a small number of key agricultural suppliers but as output has fallen, they also currently source from small-scale producers. This can lead to high transaction costs - for example, one dairy in Moldova reported dealing with 8,000 milk producers. While written contacts prevail, they do not stipulate a fixed price and the breaking of contracts by agricultural producers to obtain a higher price is common. Contracts also rarely include bonuses or penalties to stimulate improvements in food quality,

except in the more export oriented oilseeds market. In dealing with this fragmented production base many processors suffer from not having sufficient equipment with which to accurately measure the dimensions of food quality at the point of purchase. For example, milk from small-scale producers with 1 or 2 cows is usually procured through village collecting stations. The collecting stations are typically only equipped to purchase milk based on volume or fat content. This has led to problems of farmers adding water or lard to their milk to increase payments. Access to credit and inflation are also rated as greater problems by Cluster 1 than by the other two groups. Most of their credit comes from banks and four firms in the cluster identified that they received finance from government. They offer and receive better credit terms to and from buyers and suppliers. This group is the only group that has any received foreign investment albeit fairly minor. In this regard, Ukraine and Moldova are very different from the former communist countries of Central Europe, such as Poland and Hungary, where foreign investment has been significant (Walkenhorst, 2001)

Cluster 2 is comprised of mainly medium sized firms (in terms of turnover and employment) relative to clusters 1 and 3. They have a mean turnover of 118,000 USD per annum albeit with quite a wide range (from 3,000 to 2 million USD). While their mean employment is not so much greater than cluster 3, they perform much better in terms of turnover per employee. As a group these firms have increased their employment over the last three years (Table 6) and have the most concentrated supply base when measured both in terms of number of suppliers and number of suppliers per employee. Some of these enterprises are profitable parts of former *combinats* that were separated from the parent enterprise (leaving the *combinat* with the residual debts) or more entrepreneurial managers acquired their assets. Some have emerged from investments by private

traders and all are domestically owned and overwhelmingly serve home markets. It is not possible always to identify their linkages to other companies and groups and there is a predominance of Ukrainian firms in this group.

A slightly greater proportion of firms in this set owns or rents land and / or has livestock than clusters 1 or 3. On average they rate access to credit, interest rate, inflation, high debt, late payment and bankruptcy problems as less important than the other 2 clusters. This group contains a number of dynamic SMEs with a good supply base. In an environment of high contract breakage and market failure due to asymmetric information between agricultural producers and food industry buyers, internalized agricultural production is seen as desirable. However, where procurement from external actors occurs, quality premia are again rarely used and there is far less provision throughout the whole industry for quality control than in Western Europe or North America. Taxation is seen to be their biggest problem but overall they rate all potential problems as less important than the other two clusters. Both the tax load and the amount of effort required to fulfil tax law requirements are seen to be particularly onerous in Ukraine. For example, in a recent survey of Ukrainian small businesses, 29 per cent stated that the total amount of taxes paid (exclusive of VAT) amounted to between 21 and 30 per cent of gross sales and 48 per cent estimated that their tax load exceeded 30 per cent of gross sales. Regarding administrative effort, 61 per cent of the small enterprises stated that they have to employ one person to deal exclusively with taxes (Internal Finance Corporation, 2000).

Cluster 3 contains the smallest firms and has the lowest mean turnover per employee. They have an average turnover of 75,000 USD per annum, with a range of between 3 and 55 employees.

Nevertheless net employment in this group has increased in the last three years. They have a comparatively fragmented supply base and a number act as service processors for peasant producers. Others have grown out of individual farming operations that have wanted to capture greater value added. Family and friends are an important source of finance and they almost exclusively serve local markets. Some are local monopolies but many of these firms, when interviewed, found it difficult to estimate their market share. Enterprises in this group operate largely without written contracts and as a consequence, they do not record any cases of contract failure by buyers or suppliers. They extend very little or no credit to buyers who purchase predominately through barter or cash on delivery and rate problems of high debt and bankruptcy enforcement as of low significance. However they do feel vulnerable to macroeconomic instability (exchange rate changes and inflation) and the issue of taxation. Most of the firms in this group can be labeled as small, local processors.

5. CONCLUSIONS

Food processing enterprises have faced a well-documented set of problems in the post-Soviet era including declining consumer incomes, decreasing agricultural supply and the disintegration of traditional markets. However, while these problems have been very evident, new entrants have emerged and restructuring occurred with some firms coping and adapting to changing market environments much better. The food industries in Moldova and Ukraine are thus characterized by a more diverse set of actors than at the end of the Soviet period.

Cluster analysis has been employed to try to capture the characteristics of similar types of firms, their constraints and dynamics within the sector. While overall the sampled firms have reduced employment and output, there is a considerable degree of variation between the clusters and the characteristics of each group are summarized in Table 7. In outlining the summary characteristics it is also possible to discuss future strategies for each cluster.

Grunert *et al.* (1997) identify that there are three main sets of core competencies (product, process and market) that can be related to developing a competitive advantage in the food industries. They argue that a firm should develop a successful orientation (product, process or market orientation) relating to one of the sets of core competencies and meet basic standards with respect to the other two criteria. For cluster 1, the main market challenge relates to process efficiency as they are high-volume, commodity processors. These firms are mainly former *combinats* that have suffered from the loss of their monopoly status and guaranteed supply from large collectivized farms. Many of these firms are operating far below productive capacity, are typified by high debts and severe cash-flow problems and have seen net job losses. In the future, some are likely to go bankrupt although others have been more successful in their restructuring and they may be able to exploit economies of scale in combination with more market-oriented management. Many of these *combinats* are first-stage processors with limited or no contact with final consumers (e.g. the milling of wheat and oilseeds). For these firms, process innovation is important, where firms can identify ways of improving efficiency within cost-driven markets (Traill and Meulenberg, 2002). A key element for this cluster will thus be reduction of costs and further shedding of labor is likely to occur.

Cluster 2 rates all potential problems as being of lower importance and as a group is coping much better with transition. These firms have a diverse set of backgrounds, some are profitable parts of the *combinats* that were siphoned off, others are integrated farm - processing units that have

emerged from investments by domestic business groups. They have tended to have greater operational freedom from political pressures than the *combinats* but their ownership structure is often difficult to discern. These enterprises gained an advantage in early part of transition through product innovation, offering a more desirable range of goods than the conservative *combinats*. However, as the *combinats* are restructured with only the better managed surviving and as foreign competitors enter the market, this group may face more intensive competition in the future. These enterprises need to continue to innovate in their product range. As Traill notes (2002), this product orientation is different from the usually negative connotations attached to 'product-led' marketing strategies. Rather it implies that firms should be creative in refining their product range and emphasize product quality and trust. More sophisticated contracting, incorporating enforceable quality premia and penalties should be developed.

The final cluster contains the smallest firms that serve local markets. This group has also witnessed a net gain in jobs as firms operate as service processors to peasant producers or have stable local markets. Much of their economic activity is informal with little or no credit extended, no recourse to contracts and a high preponderance of cash on delivery or barter transactions. This group is linked to small-scale agriculture and informal systems of production. These firms are likely to continue to survive serving local niches, as long as economic problems remain severe in the former Soviet Union and the level of foreign investment and distribution systems remain poor. Evidence from China suggests that where economic growth is rapid, fairly rapid shifts out of small-scale food production can occur (Murphy, 1999). If this were to happen, some peasant processors may find survival linked to having a good local reputation as a speciality producer (exploitation of a market niche).

Finally, all three clusters reported problems in procuring agricultural produce from small-scale peasant producers due to the level of transaction costs and market failure, the latter stemming from asymmetric information where quality cannot be adequately measured (contracts enforced) at the point of purchase (e.g. milk sold at collecting stations). As a result backward integration is seen as desirable, in Moldova mainly because of the very fragmented land structure and in Ukraine to gain greater control over the quality of output. A mixture of legal impediments, inherited debts and shortage of capital have however limited this.

REFERENCES

Aldenderfer, M. S., and Blashfield, R.K. (1984), *Cluster Analysis.* Newberry Park, CA: Sage Publications, Inc.

ARA (2001), *Present State of the Agricultural Sector*. Agentia Pentru Restructurarea Agriculturii: Chisinau

Centrul de Investigatii Strategice si Reforme (2001), *Land Lease Survey*. Chisinau

EBRD (2000), *Strategy for Ukraine*, London: European Bank for Reconstruction and Development

Estrin, S. and Rosevear, A. (1999), 'Enterprise performance and ownership: The case of Ukraine', *European Economic Review*, Vol.43, pp.1125-1136

FAOSTAT (2001), *Statistical indicators database*, Rome: FAO

Filatotchev, I., Buck, T., Wright, M., and Van Frausum, Y. (1996), Privatization and industrial restructuring in Ukraine, *Communist Economies and Economic Transformation,* Vol. 8, No.2, pp.185–203.

Flynn, B.B., Sakakibara, S., Schroeder, R.G., Bates, K.A., Flynn, E.J., (1990). 'Empirical research methods in operations management', *Journal of Operations Management*, Vol.9, No.2, pp.250–284.

Gloy, B.A. and Akridge, J.T. (1999), 'Segmenting the Commercial Producer Marketplace for Agricultural Inputs', *International Food and Agribusiness Management Review*, Vol.2, No.2, pp.145–163

Gow, H. and Swinnen, J.F.M. (2001), 'Private enforcement capital and contract enforcement in transitional economies, *American Journal of Agricultural Economics*, Vol.83, No.3, pp.686-690

Grunert, K. G., Harmsen, H., Meulenberg, M., Kuiper, E., Ottowitz, T., Declerck, F., Traill, B. and Goransson, G. (1997), A framework for analysing innovation in the food sector. In: W.B. Taill and K.G. Grunert (eds.), *Product and Process Innovation in the Food Industry*. London: Chapman and Hall, pp.1-37.

Guba, E.G. and Lincoln Y. S. (1989), *Fourth Generation Evaluation*. California: Sage

Hair, J. F., Anderson, R. E., Tatham, R.L and Black. W. C. (1998), *Multivariate Data Analysis – 5th Edition,* Upper Saddle River, NJ: Prentice Hall International.

International Finance Corporation (2000), *The State of Small Businesses in Ukraine. An IFC Survey of Ukrainian Small Enterprises*, Kiev, June

Ioffe, G. and Nefedova, T. (2001), 'Russian Agriculture and Food Processing: Vertical Cooperation and Spatial Dynamics', *Europe - Asia Studies*, Vol.53, No.3, pp.389–418

Jansik, C. (2001), *Foreign Direct Investment in the Food Processing of the Baltic Countries*, Agrifood Research Finland, Tutkimuksia No.50

Ketchen, D.J. and Shook, C.L. (1996), The application of cluster analysis in strategic management research: an analysis and critique, *Strategic Management Journal*, Vol.17, pp.441-458.

Macours, K. and Swinnen, J.F.M. (2002), 'Patterns of Agrarian Transition', *Economic Development and Cultural Change*, Volume 50, Number 2, pp.365-394

Marinov M., Cox, A.J., Avlonitis, G and Kouremos, T. (1994), 'Marketing approaches in Bulgaria', *European Journal of Marketing*, Vol.27, no.1, pp.35-46

Melyukhina, O. and Serova, E. (1995), 'K probleme monopolizma v sfere pererabotk i sel'skokhozyaistvenno i produktsii ', *Voprosy ekonomik*i, 1995, 1, pp. 66–75.

Murphy, R. (1999), Return migrant entrepreneurs and economic diversification in two counties in south Jiangxi, China, *Journal of International Development*, Vol.11, No.4, pp.661-672

Orlova, N. and Ronnås P. (1999), *The Crippling Cost of an Incomplete Transformation: The Case of Moldov*a, Paper presented at the Conference 'Recent Developments and Problems in the Transition Economies', Skopje, 25th-27th March

Patton, M.Q. (1990), *Qualitative Evaluation Methods*, London: Sage

Peel, M., Wilson, N. and Howorth, C. (2000), Late Payment and Credit Management in the Small Firms Sector: Some Empirical Evidence, *International Small Business Journal*, Vol.18, No.2, pp.17-37.

Pugachov, M. with Van Atta, D. (2000), 'Reorganization of Agricultural Enterprises in Ukraine in 2000: A research note', *Post-Soviet Geography and Economics*, Vol.41, No.7, pp.527-540

Punj, G. and Stewart, D. W. (1983), Cluster analysis in Marketing Research: Review and Suggestions for Application, *Journal of Marketing Research,* Vol. 20, No. 2, pp. 134-148.

Traill, W.B and Meulenberg, M. (2002), Innovation in the Food Industry, *Agribusiness: An International Journal*, Vol.18, No.1, pp.1-22

Walkenhorst, P. (2001), 'Determinants of foreign direct investment in the food industry: The case of Poland', *Agribusiness: An International Journal*, Vol.17, No.3, pp.383-395

Wegren, S.K. (1991), 'Regional differences in private plot production and marketing: Central Asia and the Baltics', *Journal of Soviet Nationalities*, Vol.2, No.1, pp.118-138

Wegren, S.K. (1996), 'From Farm to Table: the Food System in Post-Communist Russia', *Communist Economies & Economic Transformatio*n, Vol.8, No.2, pp. 149–183.

Figure 1: Index of Gross Agricultural Output (1989-91 = 100)*
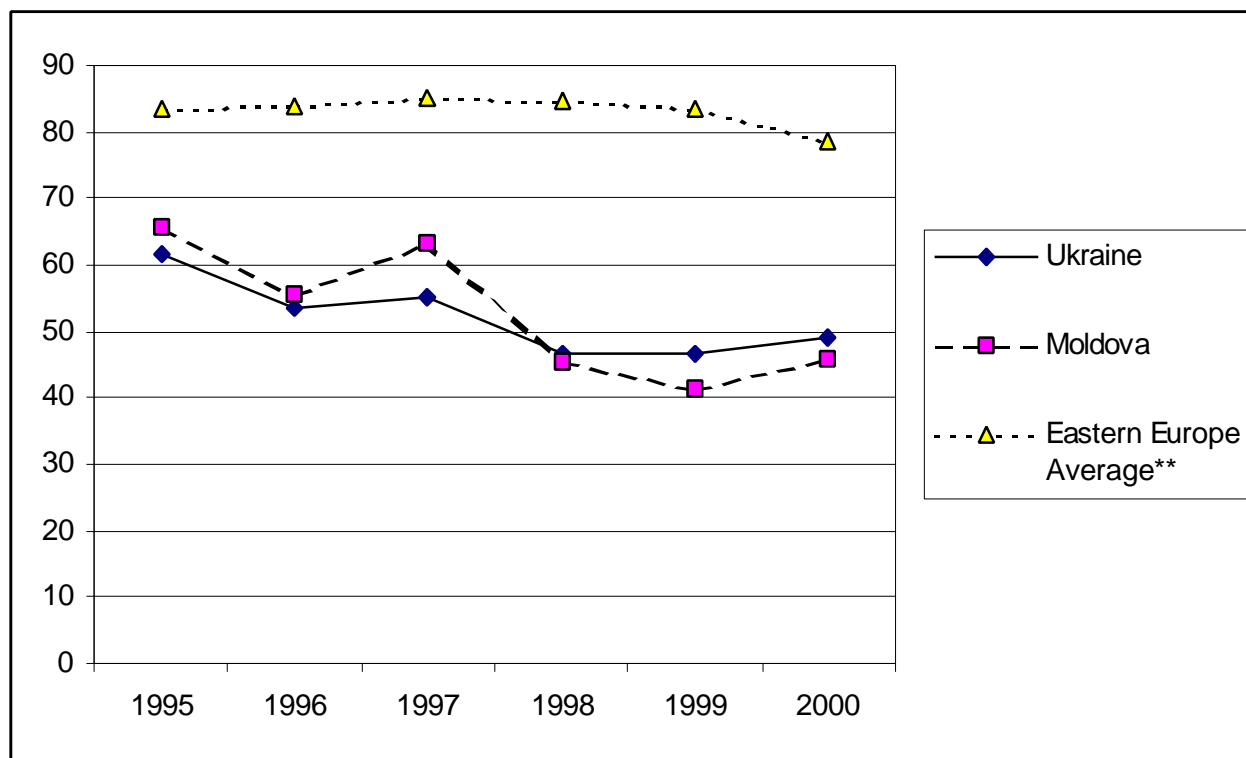
* Indices of agricultural production show the relative level of the aggregate volume of agricultural production for each year in comparison with the base period 1989-91.

** Based on data for Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Hungary, Macedonia, Poland, Romania, Slovakia, Slovenia and the Federal Republic of Yugoslavia.

Source: FAOSTAT (2001)

Table 1: Sample of Food Processors in Ukraine and Moldova

	Ukraine		Moldova		Total
	Number	% of Ukr. Sample	Number	% of Moldova sample	By sector
Flour milling	11	22	14	24	25
Bakery	16	32	9	16	25
Meat processing	5	10	2	3	7
Oilseed milling	10	20	5	9	15
Dairy	3	6	4	7	7
Wine and spirits	1	2	7	12	8
Sugar	0	0	3	5	3
Canneries	0	0	10	17	10
Misc.	4	8	4	7	8
Total	50	100	58	100	108

Table 2: Variables included in the Factor Analysis and Communalities

Type	Description	Initial	Extraction
Structural			
EMPLOY	Number of employees	1.000	.957
EMPLOY3	Number of employees 3 years ago	1.000	.945
TURNOVER	Turnover in USD for most recent completed year	1.000	.885
TURNPER1	Turnover in USD for most recent year per employee	1.000	.905
Constraints			
EXRATE	Importance of exchange rate as a problem	1.000	.634
INFLATION	Importance of inflation as a problem	1.000	.791
INTRATE	Importance of interest rate as a problem	1.000	.691
CREDIT	Importance of access to credit as a problem	1.000	.693
RAWMAT	Importance of problems procuring raw materials	1.000	.694
HIGHDEBT	Importance of your company having high debt as a problem	1.000	.658
LATEPAY	Importance of problems of late payment by customers	1.000	.622
BANKRUPT	Importance of enforcement of bankruptcy laws as a problem	1.000	.621
Procurement			
NOSUPPLY	Number of suppliers	1.000	.795
SUPEMPL	No .of suppliers per employee	1.000	.789

Table 3: Diagnostics for the Factor Analysis

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.633
Bartlett's Test of Sphericity	Approx. Chi-Square	756.270
	Df	105
	Sig.	.000

Table 4: Factor Analysis for Food Processing Enterprises in Moldova and Ukraine

	1	2	3	4	5	6
	Cash-flow	Employment	Macro	Turnover	Credit	Supply
RAWMAT	**0.80**	0.01	0.00	0.14	-0.16	-0.13
HIGHDEBT	**0.75**	0.16	0.17	0.05	0.22	-0.01
BANKRUPT	**0.73**	-0.01	0.16	0.11	0.23	0.03
LATEPAY	**0.56**	0.20	**0.50**	0.02	0.04	0.09
EMPLOY	0.08	**0.96**	-0.03	0.13	0.05	-0.01
EMPLOY3	0.09	**0.96**	-0.05	0.10	0.04	0.04
INFLATION	0.09	0.05	**0.87**	0.07	0.14	-0.06
EXRATE	0.17	-0.21	**0.74**	0.09	-0.05	-0.04
TURNPER1	0.17	-0.02	0.11	**0.93**	0.07	0.01
TURNOVER	0.14	0.41	0.09	**0.83**	0.09	-0.01
CREDIT	0.49	-0.02	0.07	0.03	**0.67**	0.00
INTRATE	0.34	0.14	0.38	-0.14	**0.62**	-0.01
NOSUPPLY	-0.08	0.18	0.10	-0.01	0.10	**0.86**
SUPEMPL	0.03	-0.16	-0.19	0.00	-0.17	**0.84**
Eiginvalue	3.93	2.26	1.50	1.37	1.15	1.21
% of variance (75.6%)	26.22	15.07	10.03	9.13	7.70	7.47

Extraction Method: Principal Component Analysis.   Rotation Method: Varimax with Kaiser

Table 5: Clusters of Food Processing Enterprises in Moldova and Ukraine

	1	2	3	Mean	F- test
N	30	34	34		
Structural					
EMPLOY	186.3	39.8	36.2	83.4	12.2
EMPLOY3	237.0	27.1	23.2	90.0	16.5
TURNOVER	1,089,030	117,815	75,746	400,531	6.7
TURNPER1	4076	3245	1614	2933	2.3
Constraints					
EXRATE	2.63	1.76	3.23	2.54	18.6
INFLATION	3.20	1.76	3.44	2.79	27.6
INTRATE	4.23	1.65	2.32	2.67	35.2
CREDIT	3.67	1.53	1.59	2.20	41.7
RAWMAT	2.83	1.91	2.24	2.31	4.8
HIGHDEBT	3.07	1.38	1.76	2.03	19.0
LATEPAY	3.07	1.32	2.53	2.28	26.8
BANKRUPT	2.57	1.15	1.18	1.59	24.9
Procurement					
NOSUPPLY	325.6	39.1	110.2	151.5	4.1
SUPEMPL	10.6	5.7	10.7	8.9	0.2

Table 5: Clusters of Food Processing Enterprises in Moldova and Ukraine (continued)

	1	2	3	Mean		
N	30	34	34			
Continuous Variables					*F-test*	*Sig.*
% of ag. supply bought using written contracts	60.4	51.1	11.6	40.2	16.10	0.00
% of ag. supply bought with oral contracts	15.7	7.7	35.5	19.8	6.65	0.00
Percentage of contracts not realised by suppliers	1.7	11.8	0	4.6	3.64	0.03
% of contracts not realised by buyers	0.83	6.9	0	2.6	2.26	0.11
Average days credit offered by suppliers	28.2	16	10.5	17.8	1.20	0.31
% of sales revenue from domestic market	83.6	98.3	97.6	93.6	4.30	0.02
Rating of taxation as a problem	3.80	2.74	3.29	3.26	5.18	0.01
Ha. of land owned /rented	122	173	31	109	1.55	0.18
% of shares foreign owned	3.9	0.0	0.0	1.2	3.00	0.05
Categorical Variables					X^2	*Sig.*
% of cluster own land / livestock	33.3	44.1	35.3	37.8	0.92	0.63
% of cluster engaged in other stage of food chain	66.7	61.8	67.6	65.3	0.29	0.86
% of cluster use bank finance	70.0	44.1	38.2	50.0	7.15	0.03
% of cluster use family / friends finance	10.0	44.1	38.2	31.6	9.63	0.00

Table 6: Employment and Turnover in Clusters of Food Processing Enterprises

	Cluster 1	Cluster 2	Cluster 3	Total
Number of Moldovan firms	26	9	13	48
Number of Ukrainian Firms	4	25	21	50
Employment				
Total Number of Employees in each cluster	5,589	1,352	1,230	8,171
Total No. of Employees 3 years ago	7,111	922	789	8,822
Net Change in Employment for cluster	-1,522	430	441	-651
Mean Employment	186	40	36	83
Minimum	51	10	3	
Maximum	680	320	55	
Turnover				
Total Turnover of cluster (million USD)	32.67	4.01	2.58	39.25
Mean turnover (USD '000)	1,089	118	75	400
Minimum (USD '000)	300	3	2	
Maximum (USD '000)	9,500	2,000	250	
Turnover Per Employee				
Mean (USD)	4,076	3,245	1,614	2,933
Minimum (USD)	1000	269	178	
Maximum (USD)	20,250	35,714	4970	

Table 7: Summary Characteristics of Clusters of Food Processing Enterprises in Moldova and Ukraine

Cluster No.	Firm size	Major Problems	Financing	Procurement of agricultural products	Labor	Output market
1.	Former *combinats,* most have turnover above 1 million USD	Cash-flow, debts and procurement	Banks and credit from suppliers, to customers	Previous integration to large collective farms. Struggle after decollect-ivization	Decreasing employment	Mainly domestic market, only cluster that exports
2.	Predominately medium sized firms	Taxation	Mainly internal	Low number of suppliers, most internalized production of any cluster	High turnover per employee. Increase in employment	Domestic market

3.	Mainly small firms	Macro instability	Family and friends. Very limited credit from suppliers or to clients	Fragmented supply, lack of written contracts	Lowest turnover per employee but growth in employment	Local (domestic) markets