Food, Processed

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GLOBALIZATION OF THE U.S. FOOD PROCESSING SECTOR

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GLOBALIZATION OF THE US FOOD PROCESSING SECTOR

The level of processing involved in agricultural exports is currently a popular topic (Evans). Increased exports of processed food products will not only stimulate farm income, but also provide manufacturing jobs. The General Accounting Office (G.A.O.) recently charged that the U.S. Department of Agriculture (U.S.D.A.) must rethink its priorities if it is to help increase the exports of processed foods. In particular, G.A.O. insists that the U.S.D.A. must engage in more strategic marketing in cooperation with the private sector.

The Foreign Agricultural Service (F.A.S.) of the U.S.D.A. classifies agricultural exports based on how close they are to their final consumer form. There are three categorizations: bulk (which are free from processing), intermediate (which are principally semi-processed) and consumer-oriented (products which require little additional processing). In 1990, the U.S. exported 53.8 percent of its agricultural products in bulk form, 22.7 percent in intermediate form and 23.5 percent in consumer-oriented form (F.A.S., 1991). This pattern is reversed for most European Community (E.C.) countries, where consumer-oriented food products dominate their exports.

The problem is exacerbated by the fact that world trade in consumer-oriented food products grew at a 4 percent annual rate, compared to 1 percent for bulk and intermediate products (F.A.S., 1990). Hence, as incomes across the world increase, there will likely be increased export opportunities for consumer-oriented food products. A vital question is how can the U.S. agricultural industry take the best advantage of these growing markets?

This paper deals with globalization of one part of the agricultural industry -- the food manufacturing sector[1]. The food processing industry is extremely important for the U.S. In 1987, it accounted for $330 billion in sales (or 13.3% of the $2.476 trillion manufacturing segment of the

[1]For this paper, the food manufacturing industry is Standard Industry Class 20, which is food and kindred products. It does not include tobacco products, textiles or wood products.

U.S. economy), $18 billion in exports and 1.45 million jobs (Bureau of Census)[2]. Obviously, small changes in this huge industry can have significant ramifications on the entire U.S. economy. However, foreign sales from affiliates of U.S. food manufacturing firms in 1987 totalled $41 billion -- more than double their direct and indirect exports. An analysis of why firms invest in food processing facilities overseas is certainly needed to guide policymakers and government agencies.

This manuscript begins with a review of literature concerning the motivations behind foreign direct investment and what it indicates about the investing and receiving countries. Next, the operation of U.S. food manufacturing parents and their affiliates is compared with the operations of other U.S. manufacturing affiliates[3]. Finally, the operations of U.S. foreign affiliates are analyzed.

Review of Literature

The classical theory of comparative advantage is goods-oriented in that free, unrestricted trade is assumed and countries export goods in which they have comparatively low production costs and import goods in which they have comparatively high production costs. Each country gains from trade as long as markets are perfectly competitive and there are differences in production possibilities between countries. The only reason for trade in goods is because some factors of production (such as land and labor) cannot be moved across national boundaries.

When technology and capital are mobile, or trade barriers on goods are introduced, some scarce factors of production may move instead of the goods. Direct investments or productive capital are examples of factor flows which will substitute for good flows. Foreign investment allows the country receiving capital to capture some of the gains from the other country's superiority in production of goods, without having to import the goods themselves. However, the capital

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[2]The base year for this study is 1987 for most information because it is the last year when foreign investment data and U.S. manufacturing data were available.

[3]The parent is the home base of the firm which is investing in foreign processing facilities. Those foreign processing facilities are affiliates of the parent.

investment flow will not totally compensate for the potential gains from free trade (Ethier). Yet, the investment-receiving country has increased employment while increasing the variety or reducing the price of the goods it imports.

The decision on foreign direct investment (FDI) is a firm-level decision. There are generally five reasons for firms to operate in a foreign country: 1) ownership advantages of the firm (e.g., patent, technological or managerial capabilities). The firm can capitalize on special advantages that it has in more markets; 2) locational considerations (e.g., high transportation costs, trade barriers, or lower production costs). These barriers are overcome through direct investment as long as foreign-owned firms receive national treatment; 3) establishment of processing facilities in anticipation of future trade restrictions (Bhagwati, et al.) -- some argue this is why the Japanese automakers have invested in the U.S.; 4) reduction of exchange rate risks for larger markets (Cushman). Foreign exchange risk is lowered because much of the processing costs are denominated in the currency where the facility is located. Thus, only potential repatriated earnings will fluctuate in value (in the investing firm's currency); and 5) tailoring of the product to local tastes when consumer needs for the product differ significantly or product specifications vary. A local processing facility will allow this to occur.

All of these advantages must be balanced against the major disadvantage with respect to foreign investment -- scale economies. It is well recognized within the economics literature that scale economies exist for most manufacturing enterprises. In fact, from a conceptual basis, the existence of scale economies and imperfect competition are the major reason for intra-industry trade (Helpman and Krugman)[4].

There are generally two types of foreign direct investment: vertical investment and horizontal investment. Vertical investment involves a firm investing in foreign facilities to produce successive stages of the production process. An example would be if a confectionery firm had

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[4]Intra-industry trade is defined as exporting and importing the same S.I.C. classification of goods at the three-digit level.

their chocolate made in Europe and exported the chocolate to the U.S. for final processing into a candy bar. The second type is horizontal investment where a firm invests in the same type of processing in more than one country. Vertical investment is usually undertaken because of cost differences while horizontal investment is usually aimed at overcoming locational disadvantages.

Porter takes a more comprehensive view of international trade (and the theory of comparative advantage) which he labels as the theory of competitive advantage. His theory focuses on explaining the large increase in intra-industry trade in recent years and the fact that most developed countries trade with each other. His theory also helps explain why there tends to be clusters of closely related industries which are globally competitive within a country. In Porter's framework, a particular country's industry is competitive if it exports a high proportion of its output and if its firms have a significant amount of outbound foreign investment.

His framework works best in explaining vertical investment, where firms spin-off lower-order processing activities to countries with lower wages and other costs. In this sense, foreign investment and international trade are complementary because much trade takes place between a parent firm and its foreign subsidiaries (affiliates). The parent will focus on sophisticated, high technology enterprises in order to keep pace with its constantly upgrading labor force, and rely on its affiliates to provide components.

Vernon's product life cycle is an alternative view of foreign direct investment which is similar to Porter's. During this life cycle, there are changes in production and marketing characteristics as the product matures. A key element in the model is the slow diffusion of technology or product characteristics. This dynamic model specifies four stages within a product's life cycle. The first stage is when the product or process is invented and the country (or firm) is a monopolist. As information and technology diffuse, foreign production develops and increases, restricting the markets for the initial innovator (stage two). Soon, foreign-produced goods are competitive not only in their home markets, but also in third-country markets (stage three). As the life cycle reaches maturation in stage four, foreign-produced goods are actually imported by the

innovating country. Within the life cycle, firms in the innovating country can decide to invest in foreign facilities during stage two of the cycle. However, the foreign markets must be large enough to overcome scale economies.

U.S. Food Manufacturing Compared to Other Manufacturing Industries

For the purpose of this study, manufacturing is divided into fifteen industries -- all are at the two-digit SIC level (table 1). The Bureau of Economic Analysis classifies twenty different two-digit SIC industries, but the data on U.S. direct investment overseas is combined for some industries (textiles and apparel, SIC 22 and 23, are combined; lumber and furniture, SIC 24 and 25, are combined; and primary metals and fabricated metals, SIC 33 and 34, are combined). Leather goods are included in the "other" category for U.S. direct investment data, and this category was excluded from the analysis.

In 1987, the $330 billion in food manufacturing sales was the second largest in terms of sales (only $3 billion behind transportation equipment) and its 1.45 million jobs ranked sixth largest in terms of employment (table 2). The food manufacturing industry is a relatively capital-intensive industry. Its output per worker was $228,000, which was the fourth highest industry (table 3) -- behind petroleum, tobacco, and chemicals.

More precise measures of the food industry's capital-intensity is available at the 4-digit SIC level[5]. A random assessment of capital-intensity for some segments of food and non-food industries was made using the following ratios: book value per dollar spent on wages, average hourly earnings of production workers, and value added per production worker hour. A higher value for each of these ratios would imply higher capital intensity. Soybean mills were consistently ranked as one of the most capital intensive segments, along with cereal/breakfast food manufacturing. Other capital-intensive industries were pharmaceutical, fertilizers and steel mills.

[5]Unfortunately 2-digit and 3-digit measures are not yet available from the 1987 Census of Manufacturers.

Automobile manufacturing and most machinery manufacturing sectors had low book values per dollar spent on wages, despite having high wages in some cases. Their value added per worker hour was in the $30-50 range, whereas it was above $60 for flour, breakfast food, baked goods, candy and soybean mills. The meat processing segment, though, had relatively low book values per dollar of wages, wages and value added per worker hour.

The food manufacturing industry exports a very low percentage of its output from the U.S. (table 3). In 1987, it exported only 5.4% of its output, which placed it second to the last among the fifteen industries -- only the printing industry was lower. The industry with the highest proportion of exports was electrical machinery, where 32% of U.S. shipments were exported.

Instead of exporting, many food processing firms have chosen to invest in foreign processing facilities (table 3). In 1988, U.S. food manufacturing parents held at least 10% equity in 661 foreign affiliates with total sales of $60.26 billion (Bureau of Economic Analysis). If only those affiliates which are majority-owned by U.S. parents are included, sales of affiliates totalled $49.15 billion in 1988.

The food manufacturing industry had the second-highest ratio of foreign affiliate sales to U.S. exports (the investment/export ratio) with a value of 2.33 (table 3) -- the highest ratio was for the petroleum industry where foreign affiliate sales were over twelve times U.S. petroleum exports. Data from the Economic Research Service indicate that the largest food processing companies tend to have an even higher investment/export ratio of foreign affiliate sales to exports. For the sixty-four largest food processing firms, sales of their foreign affiliates were $40.43, while their exports equalled $3.82 billion in 1988 -- a ratio of 10.58. Only one of the top twenty food processing firms had no foreign affiliate sales and these top twenty firms accounted for $36.28 billion in foreign affiliate sales, but only $2.47 billion in exports from U.S. operations -- a ratio of 14.69.

A measure of the importance of the foreign market can be obtained by adding exports from the U.S. to sales of foreign affiliates and dividing by U.S. shipments (this is called the international

ratio). This ratio gives an indication of how important the international market is for the U.S. parent[6]. Food processing companies rank 12th out of the 15 industries for the international ratio, with a value of 17.8 (table 3). The industries which rank below food processing are printing, lumber and textiles. The highest ratios were for petroleum (138.9), industrial machinery (60.7), and chemicals (52.1).

The international market is less important for most food manufacturing firms than for other manufacturing firms, and exports from food manufacturing firms are also relatively minor. Examining the pattern of U.S. investment in foreign food manufacturing will give an indication why this is so and provide other clues regarding foreign investment decisions.

U.S. Food Manufacturing and Foreign Affiliates

The information on the operation of foreign affiliates of U.S. food manufacturing parents is aggregated to the two-digit SIC level, in part to preserve the identity of individual firms when some of the cross-tabulations are reported. Of particular interest will be to analyze foreign operations to investigate whether they indicate potential reasons behind their existence.

If U.S. foreign investments in food processing are vertically integrated, then the facilities should be in areas of the world with lower wages than in the U.S. This would be consistent with Porter's idea of upgrading skills within a country and pushing lower grade skills to foreign countries. However, most foreign affiliate sales are in Europe and Canada. In 1987, foreign affiliate sales in the European Community totalled $25.13 billion or over 60% of foreign affiliate sales (table 4). Canada accounted for another 13% of affiliate sales, or $5.43 billion, and other developed countries had sales of $4.21 billion. Affiliates in developing countries sold $6.46 billion in processed foods, most of that was in Brazil, Mexico and Argentina.

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[6]This will overstate the importance a bit because of shipments from foreign affiliates to the U.S. parent. This later activity is covered in the next section.

Significant vertical linkages in foreign investment would also imply that a large percentage of the sales of affiliates would flow to the U.S. parent or other foreign affiliates. This is not borne out in the data for food processing (table 5). Eighty percent of the foreign affiliate sales are in the local country ($33.02 billion of the $41.23 billion in sales). Most of those local sales are to unaffiliated locals. Shipments to the U.S. were small ($707 million), though most (71%) of the U.S. shipments were to the U.S. parent. The remaining $7.46 billion in sales were to other foreign countries with 51% going to affiliates.

European Community countries receive most of the shipments from foreign affiliates (Bureau of Economic Analysis). In 1987, affiliate exports to the EC totalled $6.34 billion, or 77% of the foreign affiliate exports to "other countries." Developing countries were more prominent in receiving food products from foreign affiliates than as a location for processing -- receiving $804 million in 1987. Foreign affiliates export a much higher percentage of their output (19.9% versus 5.4% for U.S. parents), but much of that trade seems to be intra-EC where trade barriers are lower.

Finally, foreign affiliate trade of processed food with their U.S. parents is very small -- only $707 million was shipped from foreign affiliates to the U.S. and only $1.27 billion was shipped from U.S. parents to their foreign affiliates. If vertical strategies were prominent, one would expect more fluid trade between affiliates and parents. Further, vertical investment would imply that more of shipments to the U.S. would come from Latin America or other developing areas. However, most of the affiliate shipments to the U.S. come from Europe (45%) and Canada (22%). Developing countries accounted for $232 million in affiliate shipments to the U.S.

Conclusions and Implications

An obvious conclusion of this analysis is that most foreign investment by U.S. food processors is horizontal -- the same type of processing is performed in the foreign affiliate as in the U.S. parent. This conclusion comes about because trade between U.S. parents and their affiliates is small and most affiliate production occurs in developed countries. Horizontal investment is feasible in developed countries where plants can reach sufficient scale to operate efficiently. Lower wages are not a significant concern because of the need for significant capital outlays per worker. Further, trade barriers on higher processed products could be prohibitive.

Three possible explanations for the pattern of U.S. food processing investment overseas are 1) to escape high trade barriers on processed food products, 2) to overcome high transportation costs, and 3) to allow food products to be tailored for local conditions. Little can be said about transportation costs because of the aggregated analysis (however, it seems that exporting bulk products would be less efficient than transporting processed products and bulk trade in agriculture is substantial). There is no question that tariff escalation is prevalent for processed foods, but it is difficult to quantify the effect of these tariffs with such aggregated statistics. However, the predominant position of the EC in receipt of foreign affiliate exports indicates that intra-EC shipments may account for a large percentage of these exports. There is still a great deal of cultural diversity between EC countries, so product tailoring might not be an important reason.

The U.S. food processing industry does not seem to be extremely competitive in the Porter sense -- its international ratio is not particularly high. There could be institutional factors which cause this -- trade barriers in foreign countries coupled with small markets which make foreign investment unprofitable. Nonetheless, there should be further analysis, possibly on a more narrow, case-study basis, to examine reasons for this phenomena.

It seems that if the U.S. is going to promote exportation of high-valued processed food products, it must concentrate on the small to medium-sized firms. The largest firms already have processing facilities overseas and are not particularly interested in exporting products. The U.S.

Department of Agriculture, or any other agency working to assist exporters, should be willing to work with small-scale companies that must export if their product is to reach international markets.

Furthermore, U.S. food affiliates do not seem to obtain a significant amount of their ingredients from the U.S. Thus, it may be much more beneficial for U.S. agricultural product markets when a foreign firm builds a plant in the U.S., than when a U.S. firm builds a foreign plant. This could be a fruitful area for future research.

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Table 1. Industries Included in this Analysis.

Food and kindred products

Tobacco products

Textile mill products/Apparel and other textile products

Lumber and wood products

Paper and allied products

Printing and publishing

Chemicals and allied products

Petroleum and coal products

Rubber and miscellaneous plastic products

Stone, clay,and glass products

Primary metal industries/Fabricated metal products

Industrial machinery and equipment

Electronic and other electric equipment

Transportation equipment

Instruments and related products

Table 2. Size of the Industries Analyzed, 1987.

Industry	Sales	Employment
	(billion dollars)	(1,000 jobs)
Food	330	1,449
Tobacco	21	45
Textiles	127	1,753
Lumber	108	1,209
Paper	109	611
Printing	136	1,494
Chemicals	230	814
Petroleum	130	126
Rubber/Plastic	87	831
Stone/Glass	61	524
Metals	267	2,159
Machinery	218	1,844
Electronics	171	1,565
Transport Equipment	333	1,817
Instruments	107	982

Source: Bureau of Census

Table 3. Measures of the Importance of the Foreign Sector by Industry, 1987.

Industry	Export Percent	Foreign Sales/Exports	Output per worker ($1000)	International Ratio
Food	5.4	2.33	227.6	17.8
Tobacco	13.8	1.73	464.4	37.7
Textiles	6.3	0.46	72.5	14.5
Lumber	7.6	0.19	88.7	9.0
Paper	14.7	0.68	178.3	24.6
Printing	4.9	0.38	91.1	6.8
Chemicals	19.1	1.73	281.9	52.1
Petroleum	10.2	12.63	1,125.2	139.1
Rubber/Plastic	14.9	1.10	104.2	30.7
Stone/Glass	7.9	1.08	117.5	16.6
Metals	20.8	0.33	123.9	27.7
Machinery	28.3	1.14	118.0	60.7
Electronics	32.0	0.55	109.5	49.6
Transport Equipment	15.2	1.75	183.2	41.9
Instruments	16.0	1.01	109.2	32.1

Source: Bureau of Census and Bureau of Economic Analysis.

Table 4. Food Manufacturing Affiliate Sales by Country, 1987

(In Billion Dollars)

European Community	$25.13
Other Europe	.77
Canada	5.43
Japan/Australia/New Zealand/South Africa[a]	3.44
Developing Countries	6.46

[a]Aggregated to avoid disclosure of individual firm performance.

Source: Bureau of Economic Analysis.

Table 5. Sales of Food Manufacturing Affiliates by Destination, 1987.

(In Billion Dollars)

Sales to Local affiliates	$1.05
Sales to Unaffiliated locals	31.97
Total local sales	33.02
Sales to U.S. parent	.54
Sales to Unaffiliated U.S. companies	.22
Total U.S. sales	.76
Sales to Other foreign affiliates	3.81
Sales to Nonaffiliated foreigners	3.64
Total Sales to other countries	7.45
Total Sales to affiliates/parents	5.40
Total Sales to unaffiliated firms	35.83
Total Sales	41.23

Source: Bureau of Economic Analysis.

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