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INTERNATIONAL COMMERCE IN PROCESSED FOODS: PATTERNS AND CURIOSITIES

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Introduction

Contrary to common perception, the value of global commerce in processed foods exceeds that of basic agricultural commodities by several magnitudes. Furthermore, global commerce in processed foods does not just entail international trade in goods. It also encompasses activities such as production abroad by foreign affiliates and a wide variety of cross-border contractual relationships between firms.

The purpose of this paper is to characterize patterns of international market organization and behavior, as a means of providing an empirical framework for subsequent papers which address specific research and policy issues relating to the global processed food market. This paper is organized into four sections: in Section 1, a definition is given for what is meant by the global market for processed foods; the structure of international trade in processed foods is depicted in Section 2, while Section 3 describes other means by which international transactions are carried out. Some challenges for research and policy analysis are lifted up in Section 4.

1. The Global Food Marketing System

The global market for processed food involves several distinct stages in a vertical chain, including the farm input industries, farmers, food manufacturers and distributors, and consumers.

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In the developed world, input suppliers and farmers account for a relatively small share of the processed food system. For example, in the US, combined they contribute about 22 percent of total value added in the food chain. While these stages may not be participating directly in international commerce of processed foods, they are affected by activities elsewhere in the marketing chain. Through derived demand, both input suppliers and agricultural producers are affected by exports and imports of processed foods. Further, changes in the supply of farm commodities affect the cost of processed foods.

Down stream from farmers in the marketing chain are food manufacturing enterprises, which make up one of the largest stages of the chain. In the US, food manufacturing accounts for about 25 percent of the system's total value-added. Globalization of processed food markets affects food manufacturers in two ways: on the one hand they benefit from gains in exports and the development of foreign operations, while on the other they are subject to increased competition from foreign producers and imported products.

The economic importance of the food manufacturing industries in developed countries can be observed in Table 1. In terms of gross value of processed food output, the US has the largest food manufacturing sector ($384 billion), ahead of Japan ($281 billion). Germany, France, the UK, Canada, and Australia also have major food manufacturing sectors. In terms of relative importance, food manufacturing as a share of all manufacturing in these countries ranges from 9.8 percent in Japan to 20.8 percent in Australia. Employment in food manufacturing ranges from 188,000 in Australia to 1.6 million in the US, and the value of output per employee ranges from $137 thousand in Australia to $237 thousand in the US.

In order to define more precisely what constitutes the food manufacturing industries, the Standard Industrial Classification (SIC) system developed by the US Department of Commerce is

adopted. Under the SIC protocol, the sector is defined as *Food and Kindred Products* (SIC-20). At a 3-digit SIC level, nine industry groups come under this definition. These are shown in Table 2, along with the corresponding levels of US production and export shares. Because of national differences in reporting protocols, comparable industry-level data are not readily available for most other countries.

In order to give a sense of who the key players are in the food manufacturing sector, the world's 50 largest food manufacturing firms are identified (Table 3). It is evident that firms with headquarters in the US, Japan, and Western Europe dominate the sector. Eight of the world's 12 largest food manufacturing firms, and 21 of the 50 largest, have their headquarters in the US. The UK is second with 11 of the 50 largest firms, followed by Japan with ten. In 1993, Philip Morris/Kraft was second to Nestlé in terms of processed food sales ($36.3 billion), but had the highest total corporate sales at $50.6 billion. Combined, these 50 firms account for about 40 percent of the gross output of manufactured foods in the associated countries.

Downstream from food manufacturing, the next stage of marketing chain is food distribution. Firms at this stage are responsible for the wholesale and retail distribution of processed foods in both domestic and international markets. In the case of the US, food wholesalers and retailers together account for about 32 percent of total value-added in the system.

Through globalization, wholesalers generate increased volume while retailers gain access to a wider variety of products and consumers. For example, US-based wholesalers sold about $16 billion worth of goods abroad in 1993, an increase of 156 percent since 1982, while non-US food wholesalers had 1993 sales of nearly $22 billion in the US, up from $7 billion 11 years earlier (US Department of Commerce, BEA). Among firms throughout the chain, food wholesalers appear to be more heavily involved in international joint ventures. For example, Wal-Mart has joined with

the Hong Kong firm, Ek Chor Distribution System Company, to develop wholesale food operations in China, and with the Brazilian firm Lojas Americana to operate a wholesale distribution system in Argentina. Fleming, the leading US food wholesaling firm, has formed a joint venture with Davids Holdings, the largest Australian wholesale firm, to establish distribution facilities throughout Asia.

Food retailing has experienced a great deal of foreign direct investment as firms have attempted to extend their store formats and merchandising systems to foreign markets. US food retailers have been less aggressive in doing so than have non-US firms. Foreign-owned firms accounted for more than $50 million in retail food sales in the US in 1993, claiming nearly 15 percent of the market. At the same time, foreign operations of US food retailers generated less than $12 billion in direct retail sales (ERS forthcoming).

A smaller but growing link in the chain is the food service industry (eating places and related services), which in the US accounts for about 21 percent of total value-added. Globalization affects this stage primarily through foreign direct investment by food service chains and the use of international contractual arrangements such as franchising. McDonald's is the leading US firm with foreign operations, generating foreign sales exceeding $11 billion in 1994, followed by KFC at $3.6 billion and PepsiCo's Pizza Hut with $1.9 billion. The UK firm, Grand Metropolitan, tallied sales exceeding $7 billion in the US, followed by the Canadian firm, Imasco, with $3.5 billion in US sales (ERS forthcoming).

The food service industry has been affected by globalization in a relatively unique manner. Although firms in the industry export a range of intermediate goods for use in overseas outlets, the dominant characteristic of trade at this stage has been the export of things such as trademarks, logos, merchandising schemes, and quality control regimes, which are often licensed to overseas

franchisees.

2. International Trade in Processed Foods

Trade in bulk agricultural commodities has generally been the dominant focus of research in the agricultural economics literature. This follows both from the fact that bulk commodity trade has been the target of a good deal of policy interventions, and because trade in commodities would seem to be a good candidate for the Heckscher-Ohlin-Samuelson (HOS) paradigm. The evidence suggests that this focus is somewhat misplaced.

World trade in food and agricultural products has become increasingly dominated by the manufactured foods sector (Figure 1). Over the period 1972 to 1993, the value of trade in manufactured food products grew by 574 percent, while the value of bulk commodity trade grew by just 355 percent. Trade in manufactured food products now accounts for 67 percent of world trade, compared to 58 percent in 1972 (ERS forthcoming).

Neoclassical trade theory predicts that the structure of trade will be *inter-industry* in nature, countries specializing in the production and export of goods that use their abundant resources and importing goods using their scarce resources. There is evidence (e.g. McCorriston and Sheldon 1991), however, that the structure of trade in manufactured foods is, in part, of an *intra-industry* nature, i.e., the simultaneous export and import of products that are very close substitutes for each other in terms of factor inputs and consumption (Tharakan 1985). This is a phenomenon that is difficult to explain with neoclassical trade theory. A closer examination of the structure of world trade in processed foods and an understanding of the expected determinants of intra-industry trade provides a clue as to why trade in this sector does not fit neatly into the neoclassical paradigm.

2.1 Structure of World Trade in Processed Foods

Global trade in processed or manufactured foods is concentrated among a few countries, 24 countries accounting for 80 percent of shipments in 1990, compared to 68 percent in 1962 (United Nations, 1990). In an analysis of 1990 United Nations trade data for processed food products, Handy and Henderson (1994) established that the countries comprising Western Europe, North America, Australasia, plus Japan, accounted for 63 percent of total exports and 84 percent of imports. Breaking this down further, the top five exporters accounted for 38 percent of manufactured food exports (Table 4), while the top five importers accounted for 53 percent of all imports (Table 5).

It is interesting to note that France, Germany, the US and the UK are among both the top five importing and exporting countries. Leading importing and exporting countries often trade with each other. For example, Canada is by far the dominant exporter to the US with a total value of $3.5 billion (1990) and a 17 percent share of the US import market. At the same time Canada is the second largest importer of US processed food products, $2.7 billion in 1990, accounting for 14 percent of US exports.

2.2 Intra-Industry Trade

Empirical work on the evolution of the European Economic Community (Verdoorn 1960, Balassa 1965), and later work by Grubel and Lloyd (1975) indicates that much of the post-WWII growth in world trade has been between developing countries and has been of an intra-industry nature. Linder (1961), an early observer of this phenomenon, contended that while export potential may exist on the basis of comparative advantage, such potential can only be realized where substantial domestic demand for the product exists and also where trade between two countries is

limited to goods for which markets exist in both countries. Upon the assumption that income levels determine taste patterns, Linder predicted that trade in similar but differentiated products will take place between countries having similar per capita income levels.

That world trade in processed foods tends to be dominated by developed countries with relatively similar levels of GDP per capita should, therefore, come as no surprise. As incomes have risen in these countries, consumers have allocated expenditures towards more highly processed and differentiated food products as their basic subsistence needs have been satisfied. In addition, demographic characteristics of developed countries, such as increased participation of women in the workforce, have tended to reinforce trends toward purchase of highly processed foods.

A priori, it might also be expected that a portion of trade in the food and agricultural sector will be intra-industry in nature. Interestingly, most empirical work on intra-industry trade has focused almost entirely on other manufactured goods. Balassa and Bauwens (1987), for example, explicitly excluded food products from their sample. However, there is now a reasonable amount of empirical evidence indicating that trade in processed foods between developed countries is partly intra-industry (e.g., McCorriston and Sheldon 1991, Christodoulou 1992, Hartman *et al.* 1993, and Hirschberg *et al.* 1994).

The study by McCorriston and Sheldon, using export and import data at the 3-digit SITC level, estimated the commonly used Grubel and Lloyd index of intra-industry trade for the US, the EC-9, and the remainder of the OECD for a sample of processed foods in 1986. Their results suggest that the food manufacturing sector in the US exhibited lower levels of intra-industry trade than in the EC, although the higher levels of intra-industry trade for the EC were influenced by intra-Community trade (Table 6). More recent estimates for the US processed foods sector, based on 1994 4-digit SIC data, provide a detailed picture of intra-industry trade in the sector (Table 7), the

average level of the Grubel and Lloyd index across the 48 industries being 0.57. Estimates of the Grubel and Lloyd index for US trade with specific sets of trading partners are shown in Table 8. Not surprisingly, US intra-industry trade tends to be higher with trade partners in NAFTA than for other trading blocs.

The latter point suggests that certain country characteristics are likely to affect the extent of intra-industry trade. Based on hypotheses advanced by Helpman and Krugman (1985), Hirschberg *et al.* analyzed the determinants of intra-industry trade in food manufacturing for a 30-country sample over the period 1964-1985, using 4-digit SIC data. Their results suggest that intra-industry trade in food manufacturing, as measured by the Grubel and Lloyd index, is a positive function of a country's GDP per capita and equality of per capita GDP between countries. In addition, they found that intra-industry trade is strongly influenced by distance between trading partners, membership in customs unions or free trade areas, and exchange rate volatility. Their results also show a general increase in intra-industry trade in processed foods over time.

As well as country characteristics, much of the literature on intra-industry trade in recent years appeals to industry-level characteristics to explain its occurrence. This has emphasized imperfect market structures, economies of scale, and product differentiation. Probably the best known models are those that assume an industry structure of monopolistic competition, Helpman and Krugman having synthesized most of the earlier work of Krugman (1980), Lancaster (1981), and Helpman (1981). Assuming consumers have an aggregate demand for variety, where the number of varieties produced in a country is limited by economies of scale and two trading countries are similar in size, these models predict that the structure of trade will be intra-industry. In essence, each country produces, consumes, and exports part of a range of differentiated products and imports the rest.

These types of model have resulted in a number of empirical studies that have attempted to establish the industry determinants of intra-industry trade using cross-sectional econometric methods (see Greenaway and Milner 1986 for a survey). While there are serious measurement problems with respect to crucial explanatory variables such as product differentiation, the bulk of the studies gives fairly robust and consistent support for market structure, product differentiation, and economies of scale as factors affecting cross-industry variation in intra-industry trade. Some validation of these explanatory variables for intra-industry trade in processed foods was found in a cross-section study using 1987 4-digit SIC data for the US food manufacturing sector (Hartman *et al.* 1993).

3. Foreign Production

Even more so than in product trade, the international character of the processed foods sector is reflected in the direct foreign activities of food processing and distribution firms. These are dominated by firms' operation of foreign affiliates, that is, processing and distribution facilities located in other countries. Known as foreign direct investment (FDI), in essence this is how many firms "export" their home market strategies to markets abroad.

In 1994, sales from foreign affiliates of US processed food firms exceeded $100 billion, more than four times the total value of US exports of processed foods. Nearly all of these sales are in foreign markets; on average 79 percent of the sales by foreign affiliates of US firms is in the host country and just two percent is shipped to the US. At the same time, affiliates of foreign firms located in the US sold more than $45 billion in processed foods, exceeding twice the level of US imports. In addition to direct investment in foreign operations, firms engage in a variety of foreign contract operations, mostly licensing, franchising, and joint-venture arrangements.

3.1. Foreign Direct Investment

For purposes herein, foreign direct investment (FDI) refers to investment in a foreign affiliate. The term *foreign affiliate* is used to identify a foreign entity in which a parent firm holds a substantial, but not necessarily majority, ownership. Parent firms are referred to as multinational firms (MNFs). Hereafter, investment by home-country firms in production facilities in other countries is referred to as outbound FDI, while investment by foreign firms in facilities located in a host country is called inbound FDI.

Sales by foreign affiliates is one indicator of FDI. This facilitates comparison of FDI and international trade in goods as alternative strategies for gaining access to foreign markets. The magnitudes of US outbound and inbound FDI in the processed food sectors are shown in Tables 9 and 10. Sales from outbound FDI were slightly higher than sales from inbound FDI throughout the 1982-1993 period. Sales of all US food marketing affiliates abroad totaled $132.5 billion in 1993, while sales of foreign-owned food marketing affiliates in the US were $124.3 billion.

Foreign direct investment is distinctly different from foreign portfolio investment. Portfolio investment is characterized by a passive management role and does not seek control over decisionmaking. Foreign direct investment, by contrast, is defined as the ownership of assets in an affiliate by a foreign firm for the purpose of exercising control over the use of those assets. Until the First World War (WWI), nearly all international investment was portfolio; the United Kingdom supplied about half of the world's total, followed by France and Germany. Younger, rapidly expanding economies, primarily the US, Canada, Australia, and Latin America, were the main recipients.

Yet, even before WWI, outbound American investment was getting underway. From the outset, US investment was different. To quote Södersten and Reed, "American investors seem to

have been of a more dynamic type, not content to reap a fairly small interest-rate differential. Even before the First World War a dominant share of US capital exports consisted of direct investments." (1994, p. 468). In short, from the beginning, Americans investing abroad have shown a propensity to transfer know-how (or intellectual capital), more so than financial capital.

Following WWII, the US became the primary supplier of international finance, first in the form of official loans and gifts, and second in the form of FDI as American firms made major contributions to post-war industrial rebuilding. By 1960 the US was supplying about two-thirds of all international investment. By the 1980s, other countries--principally those of the European Union and Japan--observing US industrial success throughout much of the free world, became more aggressive in exporting their management technology through FDI. Much of this landed in the US. By the 1990s, FDI has become the main instrument for global industrialization. As the 20th Century ends, the nationality of multinational firms--the organizational result of FDI--has blurred in many cases to the point of being indistinguishable.

FDI in the processed food industries appears to be motivated by the potential to earn profits by exercising managerial control over international operations. Data from a worldwide sample of 144 food processing firms was used to compare profitability based on extent of sales from foreign affiliates (Table 11). For this sample of firms, sales from foreign affiliates exceeded exports from their home country by a ratio of 5 to 1. A profitability threshold was found at a level of foreign affiliate sales equal to 40 percent of total sales. Net income as a percent of assets for firms above this threshold averaged nearly twice that for the firms below.

In aggregate, foreign affiliate sales appear to be significantly more important that processed food exports. However, firm-level data for the 50 US food manufacturers with the largest foreign sales show that their relative importance varies widely (Table 12). All of these firms export, and

39 also supply processed food through their foreign affiliates. For these 39, the ratio of foreign affiliate sales to exports ranges from less than 1 (Dean Foods) to more than 60 (CPC International).

3.2. Contract Production

Multinational food manufacturers also supply foreign markets through contract arrangements. There are, however, few publicly-available sources of information on contract operations. Perhaps the most is known about international brand licensing. In a survey of 120 of the world's largest publicly-held food manufacturing firms, Henderson and Sheldon (1992) found that at least half mentioned involvement in some form of international product or brand-name licensing. Based on anecdotal evidence, they suggest that the total value of international sales of licensed food products exceeds that of direct product trade. US and non-US MNFs appear to be equally aggressive in brand-name licensing (Tables 13 and 14).

Licenses are often linked to product-specific technology, for example, the production of caramelized chocolate bars or cold-filtered draft beer. This is a way for the product developer (licensor) to maintain an equity position in the product once the licensee masters the technology. Further, licenses sometimes provide for the supply of critical ingredients by the licensor, such as cola syrup or chocolate paste, thus facilitating trade in intermediate products.

Some MNFs extend their operations internationally through joint ventures. The formation of Cereal Products Worldwide, a joint venture by General Mills and Nestlé to produce and market ready-to-eat breakfast cereals in Western Europe and other non-US markets in direct competition with market leader Kellogg, has renewed interest in this phenomenon. Yet, few examples of long-standing joint ventures in the food sector can be found. A study of joint ventures across all industries involving US firms found that their average life is just 3.5 years (Harrigan 1988). A study

of joint ventures in the Canadian food processing sector found that of 110 such entities in existence sometime between 1981 and 1988, 33 percent were created and 38 percent were dissolved during that period (Geringer 1990).

3.3. International Vertical Ties

Foreign direct investment and contract operations can be classified as horizontal or vertical. Horizontal refers to activities that are similar to those conducted by a firm in its home market (e.g. a US food manufacturing firm engaging in food manufacturing abroad). Vertical organization refers to involvement in foreign operations in successive stages of production, upstream (away from final consumption) and/or downstream (toward final consumption) from the home-country operations (e.g. a US food manufacturer with foreign commodity production or food wholesaling operations).

Unfortunately, few data are available to describe the extent to which foreign operations are horizontal or vertical. This is particularly so for contracts. General observation suggests that most international contracts are horizontal. In foodservice, for example, most foreign operations of US firms are franchises. In food retailing, IGA is licensing its product procurement, branding, and merchandising procedures to foreign retailers. Circle K has joint venture and franchise agreements with convenience store operators in 19 countries (ERS, forthcoming). Most of the licensing agreements of food manufacturers uncovered by Henderson and Sheldon (1992) were primarily horizontal market extensions of brand names.

However, there is some evidence of vertical contracts. For example, some product licenses require a foreign licensee to acquire selected ingredients from the licensor. Given considerable evidence of increasing use of vertical contracts in domestic food systems (e.g. O'Brien 1994), it may be conjectured that many international contracts have similar vertical functions. But, we are unable

to offer much documentation at this point.

The situation is somewhat clearer for FDI (Figure 2), where anecdotal information suggests that most is horizontal. The largest share of US outbound FDI (72 percent) is in food processing, with just 12, 9, and 7 percent, respectively, involved in food wholesaling, retailing, and eating places (foodservice). Food manufacturers appear to originate at least a comparable share of all US outbound FDI.

US inbound FDI is more heavily oriented to food retailing (42 percent), followed by food manufacturing (37 percent), wholesaling (17 percent), and foodservice (4 percent). Food retailing firms appear to be the largest originators of US inbound FDI. For example, Theo Albrecht (Germany) holds the fourth largest retail market share in the US through its Albertson's chain, followed by Tengelmann of Germany (A&P and others), Delhaize of Belgium (Food Lion), and Ahold of the Netherlands with the 7th, 8th, and 9th positions, respectively. Food manufacturers are also large originators of US inbound FDI, led by Nestlé (Switzerland), Unilever (Netherlands/UK), and Grand Metropolitan (UK).

Thus, both outbound and inbound US FDI appear to be primarily horizontal. An interesting question can be raised, however, regarding the markedly different composition of inbound and outbound operations.

3.4. Trade in Intellectual Property

Patterns of international commerce in processed foods are vested in part in the behavior of firms. Firm behavior is in part a product of environment, part a product of initiative by the people who make up the firms. This includes their intellectual productivity in terms of such things as devising new products, creating and promoting brand names, and developing sourcing, processing,

merchandising, and distribution systems. Much of this intellectual effort creates unique, firm-specific assets, for example, technical production and merchandising knowledge, product formulations, brands, trademarks, copyrights, patents, and special relationships with suppliers and customers. These firm-specific assets can be thought of as a firm's intellectual property. In essence, intellectual property refers to those special skills and holdings that enable a firm to differentiate itself from its rivals.

Contemporary economic thought regarding multinational firms recognizes firm-specific intellectual property as a principal factor encouraging firms to develop foreign markets (see, for example, Dunning 1981, and Markusen 1995). In essence, the rationale is that firms are motivated to expand the geographical boundary of their markets in order to spread their investment in firm-specific assets over a larger volume. Firm-specific assets, generally considered to be intangible assets, can be substantial, averaging nearly 20 percent of all assets for leading processed food MNFs (Table 15). Moving beyond their home market offers these firms the possibility of generating greater earnings from their investments in research, product development, brand names, and other intellectual property.

A number of empirical studies of food manufacturers have demonstrated linkages between intellectual property and sales in foreign markets. For example, Connor (1983), using US food manufacturing industry data, documented positive impacts of expenditures on advertising and research and development (R&D) on sales by foreign affiliates. Handy and MacDonald (1989), using similar data for 32 food manufacturing industries, and Henderson and Frank (1990), with data from 42 food industries, both report positive relationships between R&D expenditures and home-country exports. Using pooled cross section-time series data for 628 food manufacturing firms with headquarters in 16 countries, Henderson *et al.* (1996) found intangible assets and product

differentiation positively associated with foreign affiliate sales.

The foodservice industry provides one of the clearest examples of US firms advancing their firm-specific advantages in foreign markets. Much of what foodservice firms export is intangible; trademarks, logos, merchandising schemes, menu selections, quick service techniques, product formulation, quality control regimes, and the like. Indeed, from a US perspective, foodservice stands as an example of commercial success in merchandising "Americana." Few other US industries have accomplished so much in terms of selling American ideas and know-how abroad.

Perhaps the most distinct commercial transaction in intellectual property is the international licensing of brand names. Such a license is a contract by a firm who owns a brand name that is well established in one country with a firm in another country for the latter to manufacture and sell the branded product in its home market and/or in third countries. Here, it is mainly *image* that a firm is selling. In addition to the brand name, the seller often provides technical production assistance, a quality control regime, a product formula or recipe, and merchandising ideas. Firms originating international brand licensing have substantial investments in developing and promoting their brands. One measure is the book value of their licensed brand names. Henderson, Sheldon and Thomas (1994) found the average value of licensed food brand names to exceed 12 percent of the originating firm's total assets. A study reported by Ourusoff (1992) placed the average value of 12 leading internationally-licensed food brands at just over $7 billion.

Not only are firms exploiting intellectual property by creating global markets for their products, they are developing global sourcing networks for product formulation and design, ingredients, engineering and plant construction, food processing equipment, and packaging systems. Specialized ingredient firms such as Pfizer, Genecor, Rhone Poulenc, Quest International, and Haarman and Reimer are forging long-term alliances with food processors to formulate new

products and production and distribution techniques. Likewise, firms such as Calgene, Celltech, DeKalb Genetics, Genentech, and Monsanto are forging new relationships with agricultural producers to grow new varieties of crops and animals, often the products of biogenetic engineering, that provide basic feedstock for these innovative products and processes.

An example illustrates how quickly intellectual property can be transferred to a firm and country that have little or no production history. In this case, a producer of wine and soft drinks in Malta decided to enter the brewing business. The firm had extensive marketing and distribution know-how, but no experience as a brewer. The solution was to develop an alliance with Löwenbrau International. This resulted in a new state-of-the-art brewery incorporating the latest brewing and packaging technology gathered from around the world. The plant received *Food Engineering*'s International Plant-of the-Year award in 1991. This plant now supplies not only Malta, but provides import competition to southern Europe.

4. Challenges for Research and Policy Analysis

In summary, the preceding discussion points up some key characteristics of international commerce in processed foods. Measured in terms of value of products sold in the marketplace, at least for the developed world, processed foods outweigh basic agricultural commodities by several magnitudes. This relative importance carries over into international commerce. Global trade in the food and agricultural sector is dominated by processed foods by a ratio of 2 to 1, compared to basic commodities. What is more, measuring international commerce in food on the basis of international trade in goods misses what accounts for the biggest share of such commerce; foreign direct and contract production. A relatively small number of large, multinational firms are the main players.

Global commerce in processed foods is principally played out among the developed

countries. These countries account for most of the trade in goods, as both buyers and sellers, and for most of the trade in direct investment capital and related corporate services, both as originators and as destinations. Of the international trade in goods, an important share is intra-industry. Of the international trade in direct investment capital, an important share is intellectual property. In short, there is little about global commerce in processed foods that resembles conditions that underlie neoclassical concepts of international trade; concepts that have been the springboard for truly extraordinary advances in liberalization of agricultural trade.

This situation presents a number of challenges to those conducting international trade research and policy analysis. Important issues to be worked out by **researchers** include:

- What are the relevant theories for explaining and predicting actual patterns of international commerce in processed foods?
- Is there a general theory that can rationalize foreign direct and contract production in the processed foods sector? Or, is international firm behavior in this sector so idiosyncratic as to limit meaningful analysis to case studies?
- How does the occurrence of foreign direct and contract production affect our understanding of patterns of international trade? Does it matter if foreign affiliation is horizontal or vertical?
- What data are needed for empirical studies, and what reporting protocols need to be established to obtain these data in an accurate and timely manner?

For **policy analysts**, relevant issues include:

- In the presence of intra-industry trade and foreign direct and contract production in the global processed food market, should trade policy prescriptions vary from those based on neoclassical trade theory?

- How can the impacts of trade policies be accurately predicted given the prevalence of intra-industry trade and foreign direct and contract production in processed food markets?
- How can the economic and social impacts of international trade in intellectual property be evaluated and assessed relative to those associated with trade in goods?
- How useful are trade policy prescriptions based on analysis of patterns of international commerce at upstream stages of the processed food chain in the absence of well-modeled linkages to downstream stages and a comprehensive understanding of downstream patterns of international commerce?

It is toward resolving these and related issues that we anticipate the subsequent papers in this symposium.

Figure 1. World Trade in Food and Agricultural Commodities

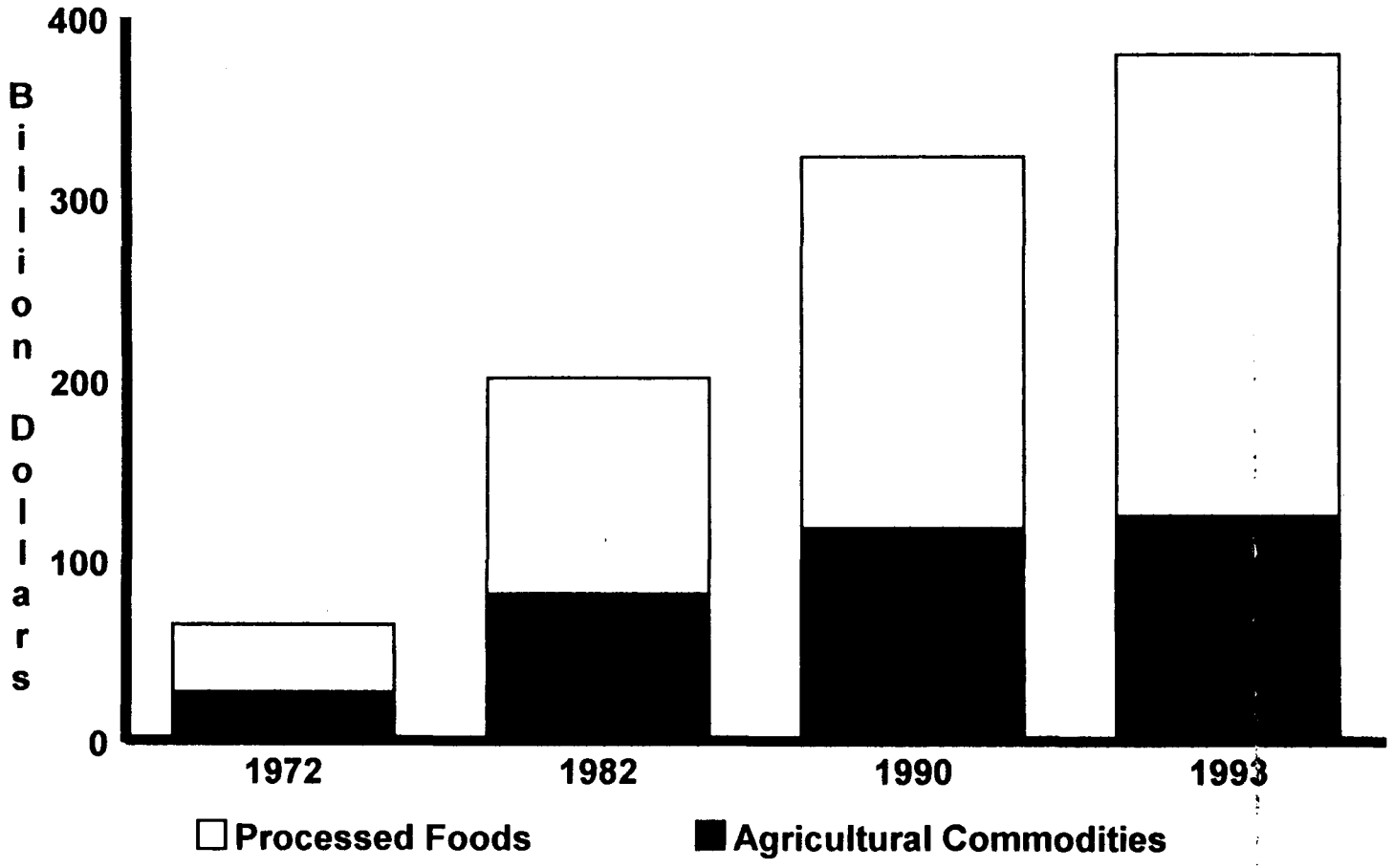

Figure 2. Food Operations of Foreign Affiliates (1993)

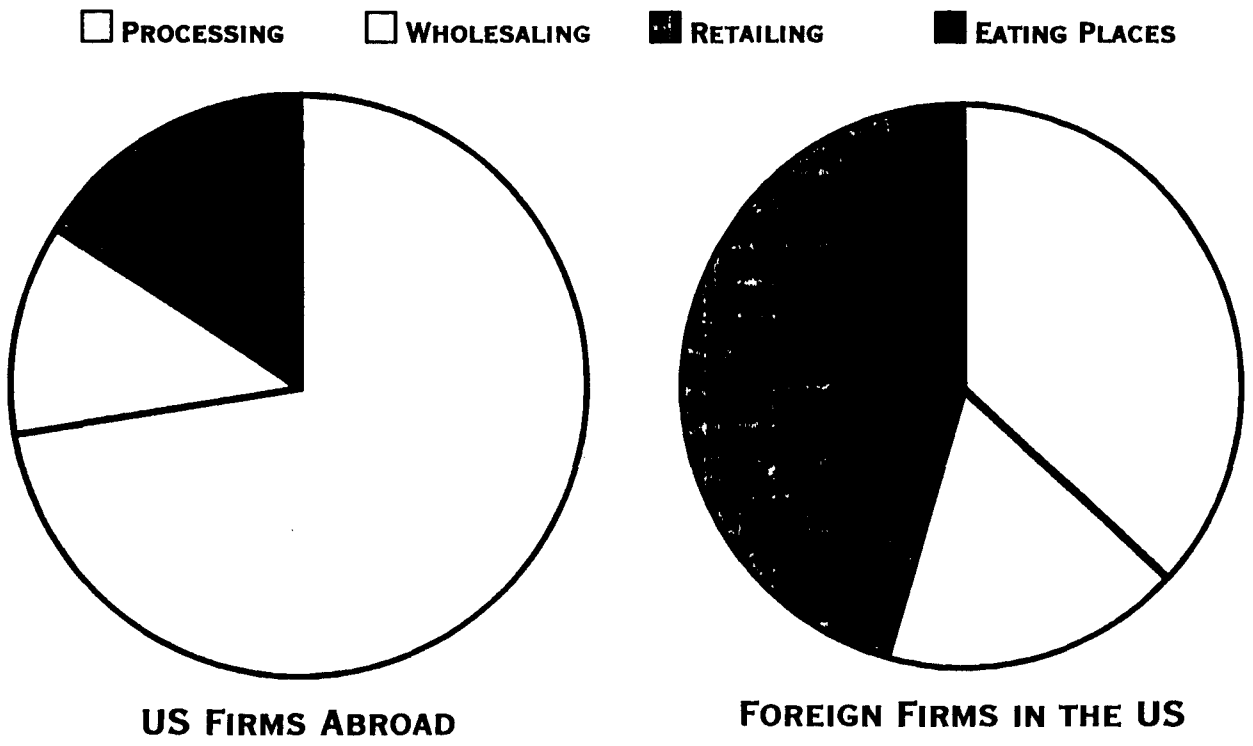

Table 1. Output and Employment in Food Manufacturing, Selected Countries 1990.

	Gross Output ($billion)	Share of Total Manufacturing (percent)	Total Employment (1,000)	Gross Output per Employee ($1000)
United States	384	13.5	1,615	237.7
Japan	281	9.8	1,772	158.8
Germany	155	11.3	841	184.0
France	118	16.7	561	210.1
United Kingdom	93	16.3	559	165.6
Canada	39	14.8	223	177.1
Australia	26	20.8	188	137.3

Source: ERS (forthcoming).

Table 2. Food Manufacturing Industries: SIC 3-Digit Definitions, and Value of US Output and Exports, 1990.

SIC	Definition	Value of Gross Output ($million)	Percent Exported
201	Meat Products	90,776	5.3
202	Dairy Products	50,962	0.8
203	Preserved Fruit and Vegetables	44,494	4.0
204	Grain and Mill Products	46,538	6.6
205	Bakery Products	26,121	0.7
206	Sugar and Confections	21,040	6.3
207	Fats and Oils	19,499	11.7
208	Beverages	52,198	2.2
209	Miscellaneous Foods	32,374	11.0
20	All Food and Kindred Products	384,009	4.8

Source: US Department of Commerce, Bureau of Economic Analysis: Annual Survey of Manufactures, Selected Issues.

Table 3. Country of Headquarters and Sales of the World's 50 Largest Food Processing Firms, 1993.

Company	Head-quarters	Processed food sales	Total company sales
		---Billion dollars---	
1. Nestle S.A.	SWITZERLAND	36.3	39.1
2. Philip Morris/Kraft Foods	USA	33.8	50.6
3. Unilever	UK/NETHERLANDS	21.6	41.9
4. ConAgra	USA	18.7	23.5
5. Cargill	USA	16.7	47.1
6. Pepsi Co	USA	15.7	25.0
7. Coca Cola	USA	13.9	14.0
8. Danone S.A.	FRANCE	12.3	12.3
9. Kirin Brewery	JAPAN	12.1	12.1
10. IBP, Inc.	USA	11.2	11.7
11. Mars, Inc.	USA	11.1	12.0
12. Anheuser-Busch	USA	10.8	11.5
13. Montedison/Feruzzi/Eridania	ITALY	9.9	12.3
14. Grand Metropolitan	UK	9.9	11.2
15. Archer Daniels Midland Co.	USA	8.9	11.4
16. Sara Lee	USA	7.6	15.5
17. Allied Domecq Plc	UK	7.2	7.2
18. RJR Nabisco	USA	7.0	15.1
19. Guinness Plc	UK	7.0	7.0
20. H.J. Heinz	USA	6.8	7.0
21. Asahi Breweries	JAPAN	6.8	6.8
22. CPC International	USA	6.7	6.7
23. Dalgety	UK	6.7	6.7
24. Campbell Soup	USA	6.6	6.6
25. Bass Plc	UK	6.6	6.6
26. Suntory Ltd.	JAPAN	6.6	6.6
27. Associated British Foods Plc	UK	6.5	6.5
28. Kellogg Company	USA	6.3	6.3
29. Hillsdown Plc	UK	5.8	6.0
30. Quaker Oats	USA	5.7	5.7
31. General Mills	USA	5.6	8.5
32. Tate & Lyle Plc	UK	5.6	5.6
33. Cadbury Schweppes	UK	5.6	5.6
34. Coca Cola Enterprises	USA	5.5	5.5
35. Seagram	CANADA	5.2	5.2
36. Sapporo Breweries Ltd.	JAPAN	5.1	5.1
37. Borden, Inc.	USA	4.8	6.7
38. Nippon Meat Packers	JAPAN	4.8	4.8
39. Yamazaki Baking	JAPAN	4.8	4.8
40. Tyson Foods Inc.	USA	4.6	4.7
41. Heineken	NETHERLANDS	4.6	4.6
42. United Biscuits	UK	4.5	4.5
43. Fosters Brewing Group LTD	AUSTRALIA	4.4	4.4
44. Ajinomoto Co., Inc.	JAPAN	4.3	5.2
45. Snow Brand Milk	JAPAN	4.3	4.8
46. LVMH Moet Hennessy	FRANCE	4.2	4.2
47. Besnier S.A.	FRANCE	4.1	4.1
48. Itoham Foods Inc.	JAPAN	3.9	3.9
49. Meiji Milk Products	JAPAN	3.9	3.9
50. Hershey Foods Corp.	USA	3.5	3.5

Source: Compiled by ERS from company reports and public records.

Table 4. Leading Exporters of Manufactured Foods, 1990

Country	Share of World Total (%)
France	9.8
Netherlands	8.9
United States	8.5
Germany	6.7
United Kingdom	4.3
Belgium/Luxembourg	4.1
Denmark	3.9
Brazil	3.5
Italy	3.5
Canada	2.8

Source: Handy and Henderson, 1994.

Table 5. Leading Importers of Manufactured Foods, 1990

Country	Share of World Total (%)
Japan	12.0
Germany	11.8
United States	11.7
France	8.6
United Kingdom	8.6
Italy	8.1
Netherlands	5.2
Belgium/Luxembourg	4.0
Spain	3.5
Canada	2.6

Source: Handy and Henderson, 1994.

Table 6. Intra-Industry Trade in Processed Foods, 1986 Grubel and Lloyd Indices [1]

Product	US	EC-9	EC-9 External Trade	Rest of OECD
Processed Meat	0.25	0.97	0.75	0.64
Cheese Products	0.21	0.97	0.70	0.92
Cereal Preparations	0.94	0.85	0.31	0.76
Processed Fruit	0.73	0.79	0.45	0.26
Processed Vegetables	0.53	0.95	0.74	0.79
Sugar Products	0.36	0.82	0.41	0.81
Chocolate Products	0.54	0.93	0.43	0.88
Non-Alcoholic Beverages	0.45	0.86	0.32	0.96
Alcoholic Beverages	0.17	0.73	0.14	0.54

[1]As value tends to 1, this indicates intra-industry trade.

Source: McCorriston and Sheldon, 1991.

Table 7. US Intra-industry Trade in Processed Foods, 1994

SIC Category	Grubel and Lloyd Index
Soft Drinks and Carbonated Water	0.999
Chewing Gum	0.992
Sausage and Prepared Meats	0.961
Frozen Fruits and Vegetables	0.958
Frozen Bakery Goods, exc. Bread	0.914
Sauces and Salad Dressings	0.933
Other Food Preparations	0.893
Canned Fruits and Vegetables	0.829
Bread and Other Bakery Goods	0.811
Condensed/Evaporated Milk	0.808
Roasted Coffee	0.792
Cookies and Crackers	0.768
Breakfast Cereals	0.745
Chocolate and Cocoa Products	0.742
Meat Packing	0.716
Candy and Confectionery Goods	0.713
Manufactured Ice	0.690
Shortening and cooking oils	0.673
Canned Specialties	0.664
Prepared Fresh or Frozen Fish	0.639
Salted/Roasted Nuts and Seeds	0.613
Malt	0.586
Processed Fish Products	0.584
Dried Fruits and Vegetables	0.583
Malt Beverages	0.548
Prepared Animal Feed	0.546
Vegetable Oil	0.476
Distilled and Blended Spirits	0.454
Refined Cane Sugar	0.394
Blended and Prepared Flours	0.381
Flour and Grain Mill Products	0.374
Dog, Cat and Other Pet Food	0.357
Wet Corn Milling	0.319
Animal/Marine Fats and Oils	0.315
Dry Pasta	0.282
Wines, Brandy, Brandy Spirits	0.274
Cheese	0.255
Rice Milling	0.253
Flavorings, Extracts, and Syrups	0.201
Potato or Corn Chips and Similar	0.182
Fluid Milk	0.166
Cottonseed Oil	0.146
Frozen Specialties	0.124
Soybean Oil	0.060
Creamery Butter	0.038
Poultry	0.031
Ice Cream/Frozen Desserts	0.030
Beet Sugar	0.027

Source: ERS (forthcoming).

Table 8. US Intra-Industry Trade (Grubel and Lloyd Index) with Selected Regions, 1994

SIC	NAFTA[1]	European Union[2]	Asian Group[3]	South America[4]
2011 Meat Packing	0.89	0.77	0	0.12
2013 Sausage	0.52	0.64	0.56	0.20
2015 Poultry Meat	0.05	0.05	0.01	0
2021 Butter	0.04	0.35	0	0
2022 Cheese	0.38	0.01	0	0.56
2023 Dry/Condensed Dairy	0.32	0.13	0.03	0.01
2024 Ice Cream	0	0.18	0.01	0
2026 Fluid Milk	0.03	0.71	0.01	0
2032 Canned Specialties	0.69	0.28	0.30	0.26
2033 Canned Fruits and Vegetables	0.56	0.71	0.43	0.16
2034 Dried fruits and Vegetables	0.31	0.17	0.21	0.25
2035 Pickled Fruits and Vegetables	0.86	0.66	0.84	0.48
2037 Frozen Fruits and Vegetables	0.56	0.13	0.02	0.03
2038 Frozen Specialties	0.04	0.67	0.78	0
2041 Grain Mill Products	0.93	0.06	0.09	0.05
2043 Breakfast Cereals	0.89	0.75	0.15	0.15
2044 Rice milling	0.05	0.09	0	0.01
2045 Prepared flour mixes	0.60	0.17	0.02	0.01
2046 Wet corn milling	0.69	0.17	0.03	0.18
2047 Dog and Cat Food	0.50	0.02	0	0.06
2048 Prepared Animal Feeds	0.90	0.37	0.15	0.08
2051 Bread/Bakery Products	0.91	0.16	0.64	0.33
2052 Cookies and Crackers	0.96	0.14	0.50	0.95
2053 Frozen Bakery Products	0.96	0.59	0.85	0.04
2062 Cane Sugar	0.91	0.51	0.85	0.30
2063 Beet Sugar	0.50	0	0	0
2064 Candy	0.95	0.28	0.86	0.21
2066 Chocolate Products	0.99	0.13	1.00	0.16
2067 Chewing Gum	0.65	0.94	0.33	0.74
2068 Nuts and Seeds	0.39	0.05	0.24	0.04
2074 Cottonseed Oil	0	0.38	0	0.92
2075 Soybean Oil	0.14	0.19	0.06	0.06
2076 Peanut/olive/Other Oils	0.49	0.31	0.57	0.71
2077 Animal Fats and Oils	0.37	0.04	0.11	0.82
2079 Margarine	0.98	0.29	0.14	0.96
2082 Beer	0.25	0.19	0.20	0.14
2083 Malt	0.97	0.79	0.02	0
2084 Wines	0.36	0.11	0.34	0.12
2085 Distilled Liquors	0.12	0.31	0.05	0.09
2086 Soft Drinks	0.98	0.05	0.22	0.52
2087 Flavoring extracts/syrups	0.30	0.51	0.08	0.14
2091 Canned Fish/seafoods	0.76	0.44	0.98	0.05
2092 Prepared Fish/Seafoods	0.38	0.60	0.35	0.01
2095 Roasted coffee	0.83	0.15	0.05	0.02
2096 Snack Foods	0.61	0	0.07	0
2097 Manufactured Ice	0.26	0.99	0	0
2098 Pasta	0.86	0.02	0.10	0.19
2099 Other	0.63	0.83	0.40	0.58

[1] Canada and Mexico.
[2] EC-12.
[3] Japan, Taiwan, Singapore, S. Korea, Malaysia.
[4] Argentina, Brazil, Paraguay, Uruguay, Bolivia, Colombia, Ecuador, Peru, Venezuela, Chile.
Source: ERS (forthcoming).

Table 9. Sales by US-Owned Food Marketing Affiliates Abroad, 1982-1993.

Sector	1982	1987	1992	1993	Share of Total
		(million dollars)			(percent)
Food Manufacturing	39,023	50,067	89,159	95,782	72.3
Food Wholesaling	6,172	9,206	14,388	15,782	11.9
Retail Foodstores	8,691	9,674	21,169	11,930	9.0
Eating & Drinking Places				9,007	6.8
Total	53,886	68,947	124,716	132,502	100

Source: ERS (forthcoming).

Table 10. Sales by Foreign-owned Food Marketing Affiliates in the US, 1982-1993.

Sector	1982	1987	1992	1993	Share of Total
		(million dollars)			(percent)
Food Manufacturing	14,847	22,862	46,799	45,765	36.5
Food Wholesaling	7,039	13,953	18,984	21,734	17.5
Retail Foodstores	18,758	24,312	48,159	51,537	41.5
Eating & Drinking Places		498	4,904	5,236	4.2
Total	40,644	61,625	118,846	124,272	100

Source: ERS (forthcoming).

Table 11. Profitability of Food Firms with Foreign Sales (World Sample of 144 Firms, 1990).

	Net Income as a Percent of Total Assets
Foreign Affiliate Sales > 40 Percent of Total	8.1
Foreign Affiliate Sales < 40 Percent of Total	4.4

Source: ERS (forthcoming).

Table 12. Leading US Food Manufacturers with Foreign Sales (1992-93, Estimated).

Company	Exports (Million Dollars)	Foreign Affiliate Sales (Million Dollars)	FDI Sales/Exports
Ag Processing Inc.	98.0	170.6	1.7
American Brands	44.0	417.6	9.5
Anheuser Busch Cos. Inc.	608.4	968.9	1.6
Archer Daniels Midland Co.	937.5	2,232.1	2.4
Blue Diamond Growers	63.2	0	0
Borden Inc.	64.5	930.4	14.4
Bristol Myers Squibb	98.0	153.0	1.6
Brown-Forman Corp.	65.5	47.4	0.7
Campbell Soup	94.0	1,930.5	20.5
Chiquita Brands International Inc.	57.6	1,381.0	24.0
Clorox	3.1	80.7	26.1
Coca-Cola Co.	207.0	9,351.0	45.2
Colgate-Palmolive	64.0	0	0
ConAgra Inc.	1,328.9	1,310.9	1.0
Coors	114.5	0	0
CPC International Inc.	70.9	4,325.7	61.0
Curtis-Burns Inc.	15.2	46.6	3.1
Dean Foods Co.	144.7	5.0	0.1
Dole Foods Co.	66.2	1,657.0	25.0
General Mills Inc.	175.0	415.2	2.4
Gerber Products Co.	44.0	126.0	2.9
Grace (W.R.) & Co.	8.8	297.8	33.8
Heinz (H.J.) Co.	105.3	3,053.5	29.0
Hershey Foods Corp.	197.5	407.9	2.1
Hormel (Geo. A.) & Co.	106.2	0	0
IBP Inc.	1,388.9	0	0
International Flavors & Fragrance Inc.	6.4	293.6	46.2
Kellogg Co.	97.3	2,511.5	25.8
Land O'Lakes Inc.	106.0	0	0
McCormick & Co. Inc.	76.2	217.9	2.9
MM/Mars	120.0	4,000.0	33.3
Multifoods	28.4	556.1	19.6
Monsanto	70.5	0	0
Ocean Spray	98.0	0	0
PepsiCo Inc.	247.8	5,381.6	21.7
Pet Inc.	26.4	261.9	9.9
Philip Morris Cos. Inc.	1,340.0	11,945.0	8.9
Proctor & Gamble	101.0	329.0	3.3
Quaker Oats Co.	120.4	2,024.9	16.8
Ralston Purina	149.2	1,576.7	10.6
Riceland Foods Inc.	232.1	0	0
RJR Nabisco	243.0	1,540.0	6.3
Sara Lee Corp.	184.0	2,344.0	12.7
Seaboard Corp.	21.9	72.2	3.3
Smucker (J.M.) Co.	20.5	57.6	2.8
Sun-Diamond Growers of California	142.7	0	0
Tyson Foods Inc.	352.0	0	0
Universal Foods Corp.	45.0	139.2	3.1
Warner-Lambert Inc.	16.3	801.0	49.1
Wrigley (Wm. Jr.) Co.	34.5	634.7	18.4

Source: ERS (forthcoming).

Table 13. US Examples of International Food and Beverage Licenses.

Licensor	Brand Name	Licensee
Anheuser-Busch (US)	*Budweiser*	Labatt (Canada)
		United Breweries (Denmark)
		Guiness (Ireland)
		Suntory (Japan)
		Oriental Brewery (Korea)
		Grand Metropolitan (UK)
	Bud Light	Labatt (Canada)
Hershey Foods (US)	*Hershey's*	Fujiya Confectionery (Japan)
CPC International (US)	*Knorr*	Ajinomoto (Japan)
Geo. A. Hormel (US)	*Spam*	Newforge Foods (UK)
		K.R. Darling Downs (Australia)
	Hormel	Lee Tan Farm Industries (Taiwan)
		Blue Ribbon Products (Panama)
	Bacon Bits	K.R. Darling Downs (Australia)
Adolph Coors (US)	*Coors*	Molson (Canada)
Kraft General Foods (US)	*Kraft*	Epic Oil Mills (S. Africa)
Miller Brewing (US)	*High Life*	Molson (Canada)
	Miller Lite	Molson (Canada)
		Courage (UK)
Kellogg's (US)	*Kellogg's*	Ajinomoto (Japan)
Ocean Spray (US)	*Ocean Spray*	Pernod Ricard (France)
		Ranks Hovis McDougall (UK)
		Cadbury Schweppes (Canada)
		Pokka (Japan)
Sunkist Growers (US)	*Sunkist*	Morinaga (Japan)
		Haitai Beverages (S. Korea)
		Rickertson (Germany)
		Cadbury Schweppes (UK)
Welch Foods (US)	*Welch's*	Cadbury Schweppes (Canada)
RJR Nabisco (US)	*Planters*	Britannia Brands (Singapore)
Cadbury Schweppes (UK)	*Cadbury*	Hershey Foods (US)
	Peter Paul Mounds	Hershey Foods (US)
	Almond Joy	Hershey Foods (US)
Rowntree Mackintosh (UK)	*Rolos*	Hershey Foods (US)
	Kit Kat	Hershey Foods (US)
Haute Brasserie (France)	*Killian's Red*	Adolph Coors (US)
Sodima (France)	*Yoplait*	Yoplait Foods (US)
Löwenbrau (Germany)	*Löwenbrau Pils*	Miller Brewing (US)

Source: Henderson, Sheldon and Thomas 1994.

Table 14. Non-US Examples of International Food and Beverage Licenses.

Licensor	Brand Name	Licensee
Arla (Sweden)	*L - L*	Morinaga (Japan)
Bond (Australia)	*Castlemaine XXXX*	Allied Lyons (UK)
	Swan Premium	Allied Lyons (UK)
Brasserie Artois (Belgium)	*Stella Artois*	Whitbread (UK)
BSN (France)	*Kronenbourg*	Courage (UK)
Elders (Australia)	*Fosters*	Beamish & Crawford (Ireland)
		Pripps (Sweden)
Guinness (Ireland)	*Guinness Stout*	Elders (Australia)
Lutz (Germany)	*Lutz*	Nichieri (Japan)
Morinaga (Japan)	*Bifidus Yogurt*	St. Herbert (France)
		Südmilch (Germany)
	Morinaga	P.T. Enseval (Indonesia)
Unilever (Netherlands)	*Lipton*	Morinaga (Japan)
United Breweries (Denmark)	*Carlsberg*	Photos Photiades (Cyprus)
		Beamish & Crawford (Ireland)
		Suntory (Japan)
	Tuborg	Frydenlund Ringes (Norway)
		Unicer (Portugal)
Cerveceria Modelo (Mexico)	*Corona*	Molson (Canada)
Kirin (Japan)	*Kirin*	Molson (Canada)
		San Miguel (Hong Kong)
Labatt (Canada)	*Labatt*	Vaux Brewery (UK)
Löwenbrau (Germany)	*Löwenbrau Pils*	Allied Lyons (UK)
		Molson (Canada)
		Asahi (Japan)
		San Miguel (Hong Kong)
	Löwenbrau Strong	Allied Lyons (UK)
Jacob Suchard (Switzerland)	*Sugus*	Nestlé Produtos Alimentaros (Portugal)
		Beacon Sweets (S. Africa)
		Sanborn Hermanos (Mexico)
	Toblerone	Sanborn Hermanos (Mexico)
	Milka	Sanborn Hermanos (Mexico)
	Suchard	Sanborn Hermanos (Mexico)
		Tong Yang Confectionery (S. Korea)
		Nestlé Produtos Alimentaros (Portugal)
	Van Houten	Chocolate Products (Malaysia)
		General Food Industries (Indonesia)
		Sunshine Allied (Singapore)

Source: Henderson, Sheldon and Thomas 1994.

Table 15. Intellectual Property of Leading Multinational Food Manufacturing Firms (Means for a World Sample of 30 Firms, Circa 1990).

	Non-US Based	US-Based	All
Intangible Asset as a Percent of Total Assets	23.1	16.9	19.1
Number of Food Brands	38.2	29.8	32.7
Number of Brands per 4-digit SIC Food Industry	7.5	4.5	5.5

Source: Handy and Henderson, 1994.

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