CHAPTER 2
U.S. Trade in Processed Foods

The United States is among the world leaders in both exports and imports of processed foods. Firms in the U.S. processed foods sector buy and sell in a near-trillion dollar worldwide market. The appeal of U.S. brand names, the influence of U.S. multinational firms abroad, and the leading role played by U.S. telecommunications systems help assure the United States of a leading role in processed foods trade. This section looks at the patterns and trends that developed during 1990-1994 in U.S. trade in processed foods, beginning with a few definitions and describing world trade patterns in processed foods. Then comes the USDA/ERS data set that is used in this report to analyze U.S. trade in processed foods. Finally, this section considers the trade numbers: what is traded, how much of it, and with whom.

World Trade in Processed Foods

Relatively little research has been undertaken on worldwide trade in processed foods. A paper by Dayton and Henderson provides the most detailed look at international trade in the sector. Their analysis used United Nations data over a 25-year period (1962-87) at 5-year intervals. The data were passed through a modification of the USDA/ERS concordance to transform the 360 U.N. food product categories in the U.N. data into four-digit and three-digit SIC-20 categories. The U.N. data included 232 trade-partner countries and were based on reported import values of 160 countries. The remainder of this section reviews highlights from Dayton and Henderson (1992).

As discussed in chapter 1, industrial countries are the leading importers and exporters of processed foods. The nations of Western Europe and North America, plus Japan, Australia, and New Zealand accounted for 87 percent of the $160.8 billion worldwide SIC-20 imports in 1987. These nations were less dominant on the supply side, accounting for only 57 percent of SIC-20 exports in the same

year. The United States was the leading importer, at $23.3 billion, followed by West Germany, Japan, the United Kingdom, France, and Italy, at $18.1, $17.3, $13.4, $13.2, and $12.8 billion, respectively. These six nations accounted for over 61 percent of processed food imports in 1987. The top exporting nations were the Netherlands, France, the United States, and West Germany, at $13.1, $12.1, $11.2, and $10.0 billion, respectively. These four nations supplied 29 percent of processed food exports in 1987. Lesser developed countries are more important as suppliers of processed food exports. Brazil was the fifth leading exporting nation, with China, Taiwan, and Thailand also among the top 15 exporters.

Miscellaneous food and kindred products (SIC-209), at $48.6 billion, accounted for 30 percent of the value of worldwide processed foods trade in 1987. This category includes fresh, canned, and frozen fish and seafoods, coffee, and other food preparations not listed elsewhere. Meat products (SIC-201) was the second largest product category, at 18 percent, followed by sugar and confectionery products (SIC-206) at 11 percent. Bakery products (SIC-205) and grain mill products (SIC-204) were the smallest categories, with a combined trade share of only 6.7 percent of the total.

As the world's leading importer of processed foods and beverages, the United States ranked first in 1987 value of imports in sugar and confectionery products (SIC-206), beverages (SIC-208), and miscellaneous (SIC-209); and second in preserved fruits and vegetables (SIC-205), and bakery products (SIC-203). The $10 billion in miscellaneous (SIC-209) imports amounted to 43 percent of the total U.S. processed food imports in 1987. This amount was nearly triple the value of beverage (SIC-208) imports, which was the second largest category. The United States is also the world's leading exporter in grain mill products (SIC 204), fats and oils (SIC-207), and miscellaneous (SIC-209). U.S. leadership in the first two categories is a direct result of the strength of the United States in worldwide grain and soybean production. That the United States should lead the world in both imports and exports of SIC-209

products is due primarily to a large amount of intra-industry trade (importing and exporting the same product) in fish and seafood**.**

U.S. Trade in Processed Foods

The USDA/ERS Processed Foods Trade Data Set

All goods that are traded across national boundaries are classified according to the international Harmonized System (HS). This system assigns 10-digit code numbers to products based on form and processing methods. The system was designed to replace individual nations' systems with commonly accepted nomenclature and descriptions of traded goods. The United States adopted the HS in 1989. HS codes are the basis for the Harmonized Tariff Schedule of the United States, wherein rates of duties on imports are published, and are used by the Bureau of the Census in its monthly import and export trade reports.

With respect to trade in processed foods, there are a number of features to highlight concerning this classification. First, sales from foreign affiliates of U.S. firms are not U.S. exports; data on foreign affiliate sales are discussed in chapter 3. These sales result from foreign direct investment. Likewise, products sold to U.S. citizens by foreign-owned firms operating in the United States are also excluded from trade figures. However, exports from foreign-owned plants operating in the United States are included in SIC-20 trade figures, as are imports of foreign products by U.S. and foreign-owned firms operating in the United States.

The USDA/ERS processed food trade data set is generated through a conversion of the HS product-based classification (as reported by the Census Bureau) into an SIC industry-based system. Each of the more than 2,000 HS codes for processed foods is paired through a concordance with a corresponding domestic industry among 48 SIC-20 industries designated by the SIC scheme.[3] The pairing

[3]Although the SIC lists 49 four-digit industries within the SIC-20, the USDA/ERS data set combines 2061 (cane sugar, raw) and 2062 (cane sugar, refined) into one cane sugar category and thus lists only 48 industries. See Epps and Harris (1995) for a more detailed explanation of the processed food trade concordance.

criterion matches the HS product descriptions to establishment activity and product line in the SIC system. The result of the pairing activity is a trade data set summarizing aggregate imports and exports for each of the 48 industries over each of the 200 processed foods trading partners of the United States. Because the Harmonized System was adopted in 1989, the first full year of annual data available through this concordance is 1990. Although data for prior years are available, they are not fully comparable. Thus, our analysis of patterns and trends of U.S. trade in processed foods uses five calendar years beginning with 1990.[4]

Patterns and Trends

The U.S. processed food sector in 1991 reached its first SIC-20 trade surplus. Annual deficits on the order of $5 billion in the mid-1980s had been reduced to $2 billion by the end of the decade. These decreasing deficits were being fueled mostly by rising export levels, which increased 97 percent between 1985 and 1991. Imports were also growing, but at a slower pace, increasing only 26 percent during this same time period. The group most responsible for the deficit turnaround was SIC-201 (meat products), which went from a $114 million deficit in 1985 to a $2 billion surplus in 1991. Other major contributors to the positive trade balance included SIC-204 (grain mill products) and SIC-207 (fats and oils), which averaged $2.4 and $1.7 billion trade surpluses, respectively, between 1985 and 1991.

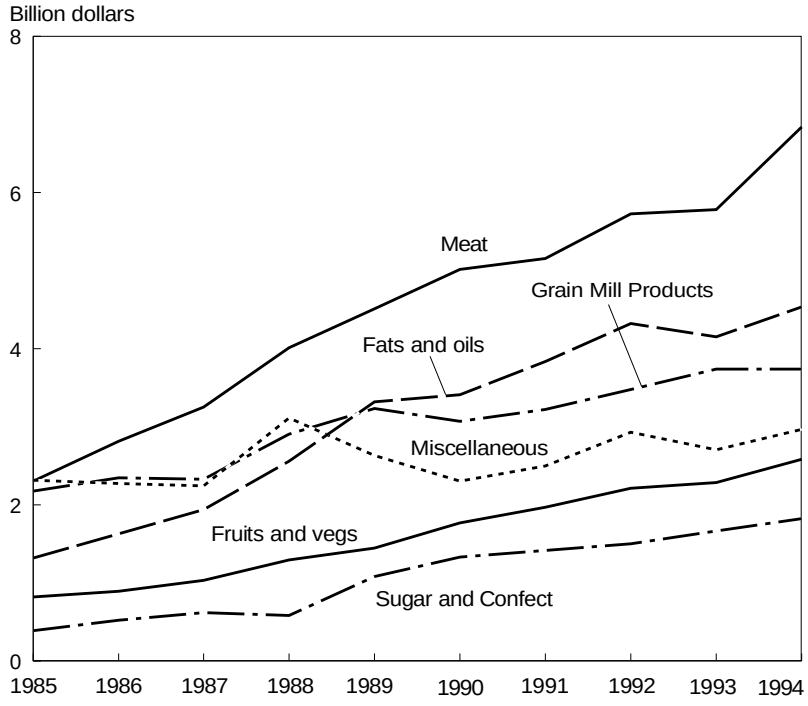
The leading three-digit export industry is meat products (SIC-201). With nearly $7 billion in exports in 1994 (figure 2), meat products constituted 26.5 percent of the total value of all SIC-20 exports. Other leading export industries included the miscellaneous category (SIC-209), with $4.5 billion, and grain mill products (SIC-204), with $3.7 billion in 1994 exports. At the four-digit level, five

[4]These data are not fully compatible with the Dayton and Henderson (1992) data used in the previous section. The ERS data set uses Census Bureau data and the electronic concordance described in Epps and Harris (1995). Dayton and Henderson used U.N. data tapes and a modified version of the ERS concordance. For the United States, the Dayton and Henderson numbers are larger in most categories.

industries—meat products, fresh seafood, wet corn milling, soybean oil, and poultry products — each averaged over $1 billion per year in export earnings between 1990 and 1994 (table 4). Together they accounted for just over half (50.1 percent) of total U.S. exports of processed foods and beverages. Meatpacking alone, at $22.4 billion, accounted for 20.2 percent. A third of the industries constituted over 80 percent of U.S. SIC-20 exports. The four-digit industries that realized the largest growth rates over the past few years were the lower trade volume industries. Those that doubled their exports in combined calendar years (CYs) 1993-1994 as compared to their combined CYs 1990-1991 totals included frozen bakery products, potato chips and snacks, chewing gum, frozen specialties, flour mixes and dough, soft drinks and carbonated water, and ice cream and frozen desserts, with fluid milk falling just short of the mark.

Figure 2

U.S. processed food exports, 1985-94



Source: Economic Research Service, USDA.

Table 4—U.S. exports of processed foods and beverages by 4-digit industry, 1990-1994

Code	Description	1990	1991	1992	1993	1994	Average, 1990-94
				Thousand dollars			
2011	Meatpacking	4,154,300	4,120,520	4,578,670	4,479,735	5,062,587	4,479,163
2092	Fresh fish	2,396,592	2,569,968	2,860,303	2,532,852	2,585,624	2,589,068
2075	Soybean oil mills	1,457,687	1,613,570	1,836,708	1,657,729	1,706,678	1,654,474
2046	Wet corn milling	1,142,579	1,288,914	1,391,326	1,383,926	1,350,031	1,311,355
2015	Poultry dressing plants	717,365	879,078	990,854	1,156,227	1,635,756	1,075,856
2068	Salted and roasted nuts and seeds	682,770	737,563	776,439	848,821	954,197	799,958
2033	Canned fruit and vegetables	605,446	702,455	852,878	849,353	954,424	792,911
2044	Rice milling	774,368	709017	707,492	756,111	929,889	775,376
2099	Other food preparation	469,057	589,312	667,818	854,592	1,078,191	731,794
2077	Animal/marine fats and oils	544,370	577,814	77,577	637,182	745,419	636,473
2087	Flavorings, extracts, and syrups	445,056	497,036	553,738	649,810	729,598	575,048
2034	Dried fruit and vegetables	509,011	540,901	568,819	579,926	621,594	564,050
2048	Prepared animal feed	547,506	494,680	569,746	634,707	419,342	533,196
2037	Frozen fruit and vegetables	464,234	472,667	507,309	536,934	617,290	519,687
2023	Condensed and evaporated milk	228,705	379,164	498,596	629,201	522,439	451,621
2091	Processed fishery products	387,992	476,939	503,267	437,746	427,678	446,725
2041	Flour and grain mill products	277,916	313,508	334,930	392,279	386,054	340,938

Continued—

Table 4—U.S. exports of processed foods and beverages by 4-digit industry, 1990-1994—continued

Code	Description	1990	1991	1992	1993	1994	Average, 1990-94
				Thousand dollars			
2085	Distilled and blended spirits	272,546	299,729	349,796	355,693	389,729	333,498
2066	Chocolate and cocoa products	237,649	239,825	294,732	397,789	383,293	310,658
2047	Dog, cat and other pet food	168,110	213,548	256,823	315,253	386,912	268,129
2082	Malt beverages	178,329	208,014	221,017	235,671	404,815	249,569
2076	Vegetable oil mills	167,617	191,715	283,709	258,824	320,110	244,395
2062	Cane sugar	226,285	235,324	171,754	124,262	173,235	186,172
2086	Soft drinks and carbonated water	105,928	133,610	173,281	196,757	320,959	186,107
2035	Sauces and salad dressings	131,617	164,852	183,160	191,033	235,843	181,301
2051	Bread and other	120,976	142,547	179,096	207,408	233,959	176,797
2084	Wines, brandy, and brandy spirits	133,814	156,326	183,963	184,303	201,718	172,025
2013	Sausage and prepared meats	149,713	157,469	159,916	145,713	143,205	151,203
2043	Breakfast cereals	114,086	150,583	150,772	160,851	151,456	145,550
2096	Potato chips	63,069	91,013	136,958	175,453	251,619	143,622
2064	Candy and confectionery products	97,326	111,167	150,377	168,738	165,155	138,552
2021	Creamery butter	111,212	45,417	158,346	182,126	107,709	120,962
2095	Roasted coffee	76,560	88,877	117,875	122,509	142,211	109,606

Continued—

Table 4—U.S. exports of processed foods and beverages by 4-digit industry, 1990-1994—continued

Code	Description	1990	1991	1992	1993	1994	Average, 1990-94
				Thousand dollars			
2052	Cookies and crackers	55,488	72,258	98,902	107,824	106,623	88,219
2045	Blended and prepared flours	44,611	54,450	72,241	96,904	117,673	77,176
2063	Beet sugar	66,835	68,245	77,785	80,096	77,668	74,126
2079	Shortening and cooking oils	59,435	57,395	66,871	90,557	95,931	74,038
2074	Cottonseed oil mills	79,283	57,450	67,341	63,069	101,037	73,636
2032	Canned specialties	43,540	61,374	67,929	80,549	93,837	69,446
2024	Ice cream and frozen desserts	30,013	50,263	73,804	73,870	90,009	63,592
2026	Fluid milk	30,290	42,891	52,946	70,891	74,532	54,310
2022	Cheese, natural and processed	38,726	36,400	49,449	57,973	71,777	50,865
2067	Chewing gum	20,691	25,235	30,044	50,073	72,265	39,661
2038	Frozen specialties	16,697	25,600	37,182	49,308	61,250	38,008
2083	Malt	30,497	33,565	33,818	50,965	30,324	35,834
2053	Frozen bakery products, excl. bread	13,246	19,091	28,428	43,004	48,707	30,495
2098	Pasta products	13,803	22,965	30,621	29,614	39,098	27,220
2097	Manufactured ice	3,173	3,089	3,372	2,709	8,383	4,145
Total		18,706,119	20,223,390	22,838,778	23,386,921	25,827,836	22,196,608

Table 5—U.S. imports of processed foods and beverages

Code	Description	1990	1991	1992	1993	1994	Average, 1990-94
				Thousand dollars			
2092	Fresh fish	4,269,855	4,540,766	4,624,363	4,838,358	5,504,833	4,755,635
2011	Meatpacking	3,024,323	2,976,639	2,766,975	2,927,054	2,821,000	2,903,198
2033	Canned fruit and vegetables	1,179,846	1,330,048	1,471,238	1,276,996	1,348,176	1,321,261
2085	Distilled and blended spirits	1,305,472	1,130,651	1,295,098	1,274,658	1,328,013	1,266,778
2084	Wines, brandy, and brandy spirits	1,129,384	1,093,382	1,345,413	1,150,797	1,270,163	1,197,828
2091	Processed fishery products	898,874	1,062,554	993,192	921,651	1,036,379	982,530
2082	Malt beverages	939,169	840,786	880,671	960,300	1,072,447	938,675
2076	Vegetable oil mills	657,628	713,595	959,464	841,790	1,025,898	839,675
2062	Cane sugar	867,606	733,522	720,142	682,731	707,029	742,206
2099	Other food preparation	598,300	688,232	735,724	653,709	869,424	709,078
2037	Frozen fruit and vegetables	951,505	618,496	637,309	615,727	671,559	698,919
2066	Chocolate and cocoa products	704,471	661,541	675,529	657,866	650,462	669,974
2022	Cheese, natural and processed	439,222	419,598	433,710	464,366	490,841	449,548
2068	Salted and roasted nuts and seeds	352,420	371,995	395,690	414,729	421,382	391,243
2023	Condensed and evaporated milk	327,104	273,915	340,270	295,098	354,202	318,118
2051	Bread and other	253,838	268,934	302,953	309,429	343,201	295,671

Continued—

Table 5—U.S. imports of processed foods and beverages—continued

Code	Description	1990	1991	1992	1993	1994	Average, 1990-94
				Thousand dollars			
2064	Candy and confectionery products	207,556	235,819	296,753	261,864	298,011	260,000
2086	Soft drinks and carbonated water	191,201	219,587	227,772	249,929	320,106	241,719
2034	Dried fruit and vegetables	236,505	223,653	239,266	240,655	255,489	239,114
2035	Sauces and salad dressings	191,811	201,394	236,479	237,298	269,796	227,356
2046	Wet corn milling	204,244	198,686	239,844	234,924	255,996	226,739
2098	Pasta products	141,908	163,001	178,793	189,794	237,936	182,286
2095	Roasted coffee	149,725	126,828	142,326	144,792	216,852	156,105
2013	Sausage and prepared meats	133,244	147,973	149,127	138,607	154,847	144,760
2052	Cookies and crackers	97,537	108,838	118,604	145,726	170,880	128,317
2048	Prepared animal feed	98,639	102,560	100,194	122,121	157,635	116,230
2077	Animal/marine fats and oils	72,881	68,730	86,675	161,274	139,548	105,822
2044	Rice milling	73,872	84,050	95,129	110,662	134,401	99,623
2047	Dog, cat and other pet food	68,341	74,154	73,879	76,545	84,015	75,387
2043	Breakfast cereals	43,918	61,644	73,014	77,314	89,873	69,153
2087	Flavorings, extracts, and syrups	56,473	54,704	62,026	55,478	81,704	62,077

Continued—

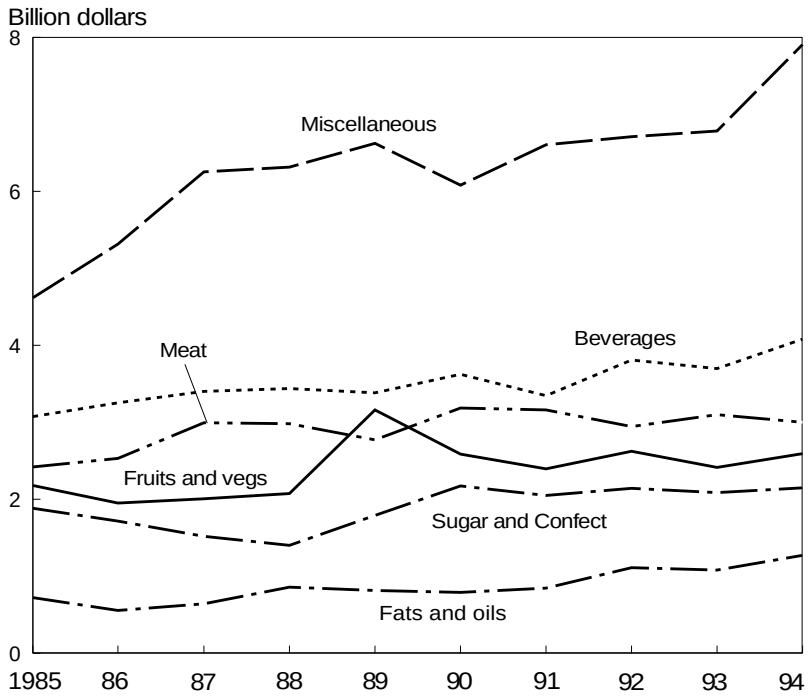
Table 5—U.S. imports of processed foods and beverages—Continued

Code	Description	1990	1991	1992	1993	1994	Average, 1990-94
				Thousand dollars			
2067	Chewing gum	41,095	44,204	55,289	68,956	71,150	56,139
2041	Flour and grain mill products	34,260	33,297	43,631	56,391	88,720	51,260
2079	Shortening and cooking oils	25,772	35,602	33,677	37,260	48,695	36,201
2075	Soybean oil mills	26,757	26,900	29,599	36,453	52,455	34,433
2032	Canned specialties	25,871	24,919	35,205	39,287	46,582	34,373
2015	Poultry dressing plants	29,674	35,528	25,705	29,889	25,426	29,244
2053	Frozen bakery products, excl. bread	10,668	15,868	23,414	37,946	43,512	26,281
2096	Potato chips	14,335	18,169	22,862	22,857	25,197	20,684
2045	Blended and prepared flours	10,105	10,517	16,858	21,292	27,633	17,281
2097	Manufactured ice	10,776	8,175	12,039	15,892	15,923	12,561
2026	Fluid milk	12,359	6,325	5,115	4,446	6,760	7,001
2083	Malt	6,414	4,672	3,012	8,348	12,557	7,000
2074	Cottonseed oil mills	6,828	678	4,541	7,440	7,970	5,492
2038	Frozen specialties	2,630	2,669	3,186	3,498	4,063	3,209
2021	Creamery butter	3,753	1,729	1,564	2,497	2,092	2,327
2063	Beet sugar	301	1,207	1,263	375	1,080	845
2024	Ice cream and frozen desserts	100	196	742	1,153	1,350	708
Total		20,128,570	20,066,926	21,215,326	21,126,222	23,263,264	21,160,061

On the import side, the leading three-digit industry is the miscellaneous category (SIC-209), with over $7.9 billion in 1994 imports (figure 3), over one-third of total 1994 U.S. processed food imports. Other leading import groups include beverages (SIC-208) and meat products (SIC-201), with $4.1 and $3.0 billion in imports in 1994, respectively. Five of the four-digit industries imported an average of $1 billion or more during 1990-94: fresh and frozen fish; meat packing; canned fruits and vegetables; distilled and blended spirits; and wines and brandy (table 5). Together these five constituted 54 percent of total U.S. processed food imports in 1994, with fresh fish alone accounting for 22.5 percent of the U.S. total. The top 12 four-digit industries accounted for more than 80 percent of all U.S. processed food imports. Lower trade volume industries were also the fastest growing on the import side. Those that more than doubled their imports during 1993-94 over 1990-91 included

Figure 3

U.S. processed food imports, 1985-94, largest 3-digit categories



Source: Economic Research Service, USDA.

ice cream and frozen desserts; frozen bakery products; flour mixes and doughs; flour and grain mill products; animal and marine fats and oils; and cottonseed oil.

The United States exports processed foods and beverages to nearly every country in the world. However, a relatively few countries account for the bulk of the business. During 1990-94, the United States exported an average of $22 billion in SIC-20 goods to 224 countries, including the 15 nations of the former Soviet Union.[5] Four countries bought an average of more than $1 billion per year in processed foods from the United States: Japan, Canada, Mexico, and South Korea (table 6). These four accounted for an average of 55 percent of total U.S. exports of processed foods and beverages during this period. Japan, at $5.9 billion annually, bought 26.7 percent of all U.S. SIC-20 exports. Nearly two-thirds of U.S. exports of processed foods to Japan during 1990-94 were from two industries, meatpacking at $2.0 billion and frozen fish at $1.8

[5]The 15 republics of the former Soviet Union have been listed as separate countries in the United Nations data since 1992, but were listed as one nation during 1990-92. Hence, the discussion of relative country export and import rankings during 1990-94 in this section combines the 15 nations into one "Former Soviet Union" (FSU) category.

Table 6—Largest export destination for U.S. processed foods, 1990-94

Country	1990	1991	1992	1993	1994	Average, 1990-94
			Thousand dollars			
Japan	5,247,278	5,259,828	6,218,628	6,145,694	6,712,943	5,916,874
Canada	2,689,903	3,116,331	3,334,836	3,635,962	3,916,290	3,338,665
Mexico	1,123,326	1,586,802	1,940,463	1,985,539	2,374,371	1,802,100
Korea, Rep.	1,180,713	1,186,436	1,229,843	1,130,194	1,285,969	1,202,631
Netherlands	787,330	806,396	802,769	732,919	785,204	782,923
Former Soviet Union	558,335	671,246	665,249	677,457	769,752	668,408
United Kingdom	459,092	530,805	675,225	667,385	673,947	601,291
Germany	475,343	507,360	527,312	549,810	531,599	518,285
Taiwan	370,348	454,996	472,348	527,380	666,500	498,314
Hong Kong	287,219	395,499	461,180	544,883	772,511	492,259
France	403,878	435,988	478,688	472,907	353,820	429,056
Saudi Arabia	266,350	280,138	307,590	315,257	320,815	298,030

billion. Canada, at $3.3 billion, was the second leading destination for U.S. processed foods. Like Japan, meatpacking and frozen and prepared fish, at $0.5 billion and $0.3 billion, respectively, were the leading export industries into Canada. However, these two industries constituted only 22 percent of total U.S. processed food exports to Canada. The top 10 countries accounted for more than 70 percent of total U.S. processed food exports. Three of the top 10 destination countries were newly industrialized countries in East Asia: South Korea, Taiwan, and Hong Kong.

Many of the fastest growing destinations for U.S. processed food exports are smaller, less-developed countries. Among all nations to which the United States exported at least $1 million in calendar

Table 7—Top five destination countries for U.S. processed foods exports, by 3-digit SIC code

Code	Country	Average, 1990-94	Percent	Cumulative percent
		$1,000		
201	Japan	2,236,974	39.2	39.2
201	South Korea	815,881	14.3	53.5
201	Mexico	696,703	12.2	65.7
201	Canada	653,804	1.5	77.2
201	Hong Kong	207,259	3.6	80.8
202	Mexico	156,857	21.2	21.2
202	Former Soviet Union	82,819	11.2	32.3
202	Japan	57,476	7.8	40.1
202	China (Taiwan)	54,951	7.4	47.5
202	Canada	54,476	7.3	54.8
203	Canada	559,786	25.9	25.9
203	Japan	493,862	22.8	48.7
203	United Kingdom	108,389	5.0	53.7
203	Mexico	91,425	4.2	57.9
203	Netherlands	87,187	4.0	61.9
204	Canada	467,576	13.5	13.5
204	Netherlands	411,970	11.9	25.5
204	Japan	174,697	10.9	36.3
204	Mexico	224,605	6.5	42.8
204	Saudi Arabia	142,280	4.1	47.0

Continued—

years 1990 and 1991 combined, the value more than doubled to 15 of them by 1993-1994. In order of percentage increases, these countries were: Albania, China, Somalia, Hungary, Argentina, Sudan, Poland, Tunisia, Kenya, Colombia, Guyana, Paraguay, Kuwait, Yemen, and Costa Rica. Albania went from $2.9 million in 1990-91 imports to $23.1 million in 1993-94, a 692-percent increase, while China increased 473 percent, from $63.3 million in 1990-91 to $362.7 million in 1993-94.

Table 7—Top five destination countries for U.S. processed foods exports, by 3-digit SIC code—continued

Code	Country	Average, 1990-94	Percent	Cumulative percent
		$1,000		
205	Canada	7,544	56.7	56.7
205	Mexico	28,555	9.7	66.4
205	Bermuda	575	6.3	72.6
205	Japan	10,422	3.5	76.2
205	United Kingdom	8,496	2.9	79.0
206	Canada	302,295	19.5	19.5
206	Japan	197,040	12.7	32.2
206	Germany	167,527	10.8	43.0
206	Mexico	136,427	8.8	51.9
206	Netherlands	76,938	5.0	56.8
207	Former Soviet Union	330,258	12.3	12.3
207	Mexico	273,488	10.2	22.5
207	Canada	261,002	9.7	32.2
207	Algeria	143,347	5.3	37.6
207	Japan	132,952	5.0	42.5
208	Japan	374,805	24.1	24.1
208	Canada	209,582	13.5	37.7
208	Australia	109,255	7.0	44.7
208	Mexico	106,231	6.8	51.5
208	United Kingdom	80,096	5.2	56.7
209	Japan	2,038,647	50.3	50.3
209	Canada	662,600	16.4	66.7
209	Korea, Rep.	162,169	4.0	70.7
209	United Kingdom	139,124	3.4	74.1
209	France	114,904	2.8	76.9

U.S. exports in a number of categories are heavily concentrated in a few countries (table 7). Within SIC-20 three-digit categories, the top five destination countries during 1990-94 accounted for 81 percent of SIC-201, meat products (Japan alone had 39 percent); 79 percent of SIC-205, bakery products (Canada had 57 percent); 77 percent of SIC-209, the miscellaneous category (with Japan at 50 percent); 62 percent of SIC-203, preserved fruits and vegetables (Canada and Japan combined had 49 percent); 57 percent of SIC-206, sugar and confectionaries; 57 percent of SIC-208, beverages; and 55 percent of SIC-202, dairy products. Canada was the leading destination in four three-digit categories, Japan led in three categories, and Mexico and the nations of the former Soviet Union each led in one category. Both Canada and Japan were

Table 8—Largest import sources of U.S. processed foods, 1990-94

Country	1990	1991	1992	1993	1994	Average, 1990-94
			Thousand dollars			
Canada	3,462,885	3,578,811	3,839,077	4,104,222	4,641,142	3,925,227
Thailand	881,111	1,203,613	1,324,563	1,391,886	1,713,373	1,302,909
Mexico	1,026,768	1,025,392	1,030,081	1,134,494	1,290,687	1,101,484
Australia	1,175,069	1,135,144	1,077,893	1,018,888	902,051	1,061,809
France	969,230	914,554	1,094,504	966,555	1,095,143	1,007,997
Brazil	1,164,426	757,348	827,747	804,045	763,982	863,510
New Zealand	829,174	874,499	840,528	808,159	778,545	826,181
Italy	741,239	758,878	885,041	804,588	933,193	824,588
United Kingdom	665,718	625,835	681,755	705,469	733,935	682,542
Netherlands	634,411	546,787	578,033	615,918	706,213	616,272
China	544,115	460,092	629,337	539,908	520,265	538,743
Germany	506,364	527,841	583,321	521,180	530,659	533,873
Philippines	481,476	492,704	625,558	500,301	503,912	520,790
Ecuador	393,693	469,972	467,831	477,065	589,981	479,709
Denmark	537,235	509,538	410,213	397,912	438,174	458,615
Spain	421,261	401,728	447,396	365,527	422,241	411,631
Argentina	390,413	510,360	440,922	341,478	348,365	406,308
Japan	352,190	343,305	343,966	351,681	379,132	354,055
India	268,978	277,518	282,746	372,765	492,613	338,924
Indonesia	223,759	289,596	342,547	285,657	363,761	301,064
Chile	229,563	263,733	300,022	313,325	372,361	295,801
Taiwan	311,407	300,013	285,836	281,652	294,492	294,680
Ireland	266,945	240,046	313,815	290,011	283,369	278,837

among the top five destinations in all nine three-digit categories, with Mexico in the top five in eight of the nine categories.

U.S. imports of processed foods are much more widely sourced (table 8). Canada, by far the leading origin of SIC-20 goods coming to the United States, commanded an 18.6-percent market share during 1990-1994, but Thailand, the second largest source for U.S. processed foods, had only a 6.2 -percent share. The top 10 source countries supplied 58 percent of U.S. imports. Three less developed countries were among the 10 leading U.S. import sources (Thailand, Mexico, and Brazil). The United States imported an average of $1 billion per year in processed foods during 1990-94 from 5 countries: Canada, Thailand, Mexico, Australia, and France.

Although in general U.S. imports are widely sourced, a number of three-digit categories are heavily concentrated with respect to sources (table 9). In 1994, the top five origin countries accounted for 82 percent of meat products (Australia and Canada combined had 51 percent); 82 percent of grain mill products (with Canada at 48 percent); 73 percent of fats and oils (Canada, Italy, and the Philippines combined had 60 percent); 71 percent of beverages (with France, Canada, and UK combined at 53 percent); 69 percent of bakery goods (with Canada at 40 percent); and 62 percent of dairy products. Canada was the leading nation in four categories and was among the top five sources of U.S. imports in three other categories. No other country led in more than one category; no other country was among the top five origins in more than three categories; and no less than 22 countries appeared as a top-five source in at least one three-digit category.

Intra-Industry Trade

The evaluation of U.S. exports and imports of processed foods indicates that the United States plays a major role in the global market as both an exporter and importer of processed foods. Examining each of the 48 industries classified by 4-digit SIC shows that the simultaneous export and import of processed foods, or intra-industry trade (IIT), also occurs at further levels of disaggregation (table 10). In 1994, Grubel-Lloyd (GL) indices

exceeded 0.5 for 26 industries.[6] A rough translation of this is, more than 50 percent of the U.S. trade in these 26 industries can be classified as intra-industry. Given that the volume of U.S. trade for 23 of these 26 industries exceeds $100 million a year, this phenomenon is present in a substantial portion of U.S. processed food trade. Across all 48 industries, the trade-weighted average of intra-industry trade in processed foods was 57 percent for 1994.

[6]The Grubel-Lloyd index is defined as: [(X+M) - |(X-M)|] / (X+M) where X = exports and M = imports of similar products. Therefore, GL = 1 implies pure intra-industry trade (or total overlap between exports and imports); GL = 0 implies no intra-industry trade (Grubel and Lloyd, 1975).

Table 9—Top five source countries for U.S. processed foods imports, by 3-digit SIC code

SIC code	Country	Average, 1990-94	Percent	Cumulative percent
		$1,000		
201	Australia	783,573	25.5	25.5
201	Canada	778,246	25.3	50.8
201	New Zealand	527,616	17.1	67.9
201	Denmark	266,492	8.7	76.6
201	Argentina	157,458	5.1	81.7
202	New Zealand	133,603	17.2	17.2
202	Ireland	124,018	15.9	33.1
202	Italy	104,377	13.4	46.5
202	France	74,015	9.5	56.1
202	Denmark	43,732	5.6	61.7
203	Mexico	326,439	12.9	12.9
203	Brazil	307,178	12.2	25.1
203	Spain	228,227	9.0	34.1
203	Thailand	210,498	8.3	42.5
203	Canada	158,549	6.3	48.8
204	Canada	314,989	48.0	48.0
204	Thailand	108,686	16.6	64.6
204	Germany	50,073	7.6	72.3
204	Netherlands	35,844	5.5	77.7
204	Australia	26,536	4.0	81.8
205	Canada	183,025	40.6	40.6
205	Denmark	48,917	10.9	51.5
205	Mexico	30,266	6.7	58.2

Continued—

The large amount of intra-industry trade found in 4-digit SIC processed foods industries suggests that U.S. trade in these goods is not based solely on differences in resource endowments. Trade based on differences in resource endowments results in countries exporting goods produced with resources that are relatively abundant, while importing goods that are produced using relatively scarce resources. Thus, countries would not simultaneously export and import within the same industry.

Despite this evidence to the contrary, discussions of agricultural trade often emphasize the role of U.S. endowments—land, labor, capital—in determining trade. For example, trade in agricultural products is often attributed to the abundant, fertile land, the climate, and a favorable farm structure in the United States. Such an

Table 9—Top five source countries for U.S. processed foods imports, by 3-digit SIC code —continued

SIC code	Country	Average, 1990-94	Percent	Cumulative percent
		$1,000		
205	United Kingdom	23,090	5.1	63.4
205	Germany	22,564	5.0	68.4
206	Brazil	312,007	14.7	14.7
206	Canada	251,768	11.9	26.6
206	India	133,813	6.3	32.9
206	Philippines	117,998	5.6	38.5
206	Dominican Rep.	105,513	5.0	43.4
207	Canada	279,194	27.3	27.3
207	Italy	178,979	17.5	44.8
207	Philippines	165,823	16.2	61.1
207	Malaysia	98,511	9.6	70.7
207	Peru	35,212	3.4	74.2
208	France	811,845	21.9	21.9
208	Canada	608,487	16.4	38.2
208	United Kingdom	520,195	14.0	52.2
208	Netherlands	356,594	9.6	61.8
208	Italy	344,714	9.3	71.1
209	Canada	1,331,094	19.5	19.5
209	Thailand	940,063	13.8	33.3
209	Ecuador	432,694	6.3	39.7
209	China (Mainland)	377,516	5.5	45.2
209	Mexico	347,341	5.1	50.3

explanation of trade misses the important differences between raw agricultural products and processed foods and the effect of these differences on trade.

Processed foods are different from raw agricultural products. Technology, highly differentiated foods branded and made convenient for consumers, and the market structure of many of the industries add dimensions that are not captured by focusing solely on a nation's natural endowments. In general, processing an agricultural product provides opportunities to differentiate products. Higher levels of processing provide greater opportunities for differentiation. For example, there are fewer distinctions to be made between brands of flour than among brands of bread.

Table 10—Intra-industry trade in processed foods (1994)

SIC category	Imports	Exports	Grubel-Lloyd index
	- - - Million dollars - - -		
Soft drinks and carbonated water	320.11	320.96	.9987
Chewing gum	71.15	72.26	.9922
Sausage and prepared meats	154.85	143.20	.9609
Frozen fruits and vegetables	671.56	617.29	.9579
Frozen bakery goods, exc. bread	43.51	48.71	.9437
Sauces and salad dressings	269.80	235.84	.9329
Other food preparations	869.42	1078.19	.8928
Canned fruits and vegetables	1348.18	954.42	.8290
Bread and other bakery goods	343.20	233.96	.8107
Condensed/evaporated milk	354.20	522.44	.8081
Roasted coffee	216.85	142.21	.7921
Cookies and crackers	170.88	106.62	.7684
Breakfast cereals	89.87	151.46	.7448
Chocolate and cocoa products	650.46	383.29	.7416
Meat packing	2821.00	5062.59	.7157
Candy and confectionery goods	298.01	165.15	.7132
Manufactured ice	15.92	8.38	.6898
Shortening and cooking oils	48.70	95.93	.6734
Canned specialties	46.58	93.84	.6635
Prepared fresh or frozen fish	5504.83	2585.62	.6392
Salted/roasted nuts and seeds	421.38	954.20	.6127
Malt	12.56	30.32	.5857
Processed fish products	1036.38	427.68	.5842
Dried fruits and vegetables	255.49	621.59	.5826

Continued—

The factors that distinguish processed foods from raw agricultural products also may explain the level of intra-industry trade. Intra-industry trade is more likely to occur when product differentiation, consumer demand for variety, imperfect competition, economies of scale in processing, or similarity in tastes among consumers in different countries exist (see, for example, Krugman, 1979, Helpman, 1981, and Helpman and Krugman, 1985).

Because of difficulties in constructing unambiguous measures of the above factors, most researchers have sought to verify the

Table 10—Intra-industry trade in processed foods (1994)—continued

SIC category	Imports	Exports	Grubel-Lloyd index
	- - - Million dollars - - -		
Malt beverages	1072.45	404.82	.5481
Prepared animal feed	157.64	419.34	.5464
Vegetable oil	1025.90	320.11	.4756
Distilled and blended spirits	1328.01	389.73	.4538
Refined cane sugar	707.03	173.24	.3936
Blended and prepared flours	27.66	117.67	.3806
Flour and grain mill products	88.72	386.05	.3737
Dog, cat and other pet food	84.01	386.91	.3568
Wet corn milling	256.00	1350.03	.3188
Animal/marine fats and oils	139.55	745.42	.3154
Dry pasta	237.94	39.10	.2823
Wines, brandy, brandy spirits	1270.16	201.72	.2741
Cheese	490.84	71.78	.2552
Rice milling	134.40	929.89	.2526
Flavorings, extracts, and syrups	81.70	729.60	.2014
Potato or corn chips and similar	25.20	251.62	.1820
Fluid milk	6.76	74.53	.1663
Cottonseed oil	7.97	101.04	.1462
Frozen specialties	4.06	61.25	.1244
Soybean oil	52.46	1706.68	.0596
Creamery butter	2.09	107.71	.0381
Poultry	25.43	1635.76	.0306
Ice cream/frozen desserts	1.35	90.01	.0295
Beet sugar	1.08	77.67	.0274

Source: ERS processed foods trade data base and author's calculations.

determinants of intra-industry trade by focusing on more general hypotheses. Roberts (1995) summarizes several of these hypotheses as follows: 1) Intra-industry trade (IIT) will be higher in the exchange of manufactured goods than in the exchange of primary goods; 2) IIT will be greater for countries with similar resource endowments than for countries with dissimilar resource endowments; 3) IIT will be greater among developed market economies than between developed market economies and less developed countries; 4) IIT will be greater between countries in close geographical proximity than between countries separated by long distances; 5) IIT will be greater between countries that both participate in some form of integration arrangement (e.g., NAFTA or the EU) than in countries that are nonparticipants in the arrangement. A closer examination of the ERS/USDA data on processed foods provides some insight on whether these generalized theories apply to processed foods defined at the 4-digit level.

Table 10 presents the most frequently used measure of intra-industry trade, the Grubel-Lloyd index. In the current context, it measures the absolute value of the overlap between U.S. exports and imports in each 4-digit industry. It can also be used to measure intra-industry trade between the U.S. and individual countries or regions.

Interpretation of the Grubel-Lloyd index depends on correct definition of the industry and appropriate adjustments for the impact of seasonal trade. An overly broad industry definition results in the comparison of trade in products that are not similar and therefore, overstates the amount of intra-industry trade. Seasonal trade, or exporting a food product during one season and importing it during another, also overstates intra-industry trade, because export and import of the good do not occur simultaneously.

The impacts of there considerations on the Grubel-Lloyd index for 4-digit SIC processed foods cannot be ascertained directly. Several studies of intra-industry trade in processed foods have suggested that these are not of great concern when broader industry definitions are used. Therefore, the following analysis assumes the

4-digit SIC industries are generally appropriate for evaluating intra-industry trade within the processed foods sector.

Defining groups of industries according to ranges in the Grubel-Lloyd measure provides some evidence that the degree of processing is related to the level of intra-industry trade (table 11). For the most part, the group of industries with a Grubel-Lloyd index greater than 0.8 contain more industries with a greater level of processing than the group of industries with a Grubel-Lloyd index of less than 0.2. This is also true if industries with a Grubel-Lloyd index of 0.5 and above are compared with those below 0.5. For example, the Grubel-Lloyd indices for rice milling, corn milling, flour, and vegetable oil—industries that provide a relatively small amount of processing—fall below 0.5.

The prevalence of more processed products in the group with high Grubel-Lloyd indices does not imply that industries with less processed, more homogenous, products are not part of this group. For example, canned fruit and vegetable products, much of which is in institutional-size containers for further processing and/or packaging, has a Grubel-Lloyd index of 0.83. This could represent an anomaly present in intra-industry trade in processed foods or, alternatively, it could be the result of the measurement error discussed above. Without further information, it is impossible to reach a definitive conclusion on this issue.

Grouping the data into regions allows for an evaluation of the impact of regional differences on intra-industry trade. Table 12 contains calculations of the Grubel-Lloyd measure for 4-digit SIC industries for four regions: the NAFTA countries (Canada and Mexico); the European Community; South America; and a group of Asian countries (Japan, Malaysia, Singapore, Taiwan , and South Korea).

Among the regions, the level of U.S.-regional intra-industry trade can vary widely. The Grubel-Lloyd index varies by as little as 0.1 among the regions for only two industries—Poultry and Milled Rice. In three industries—Meatpacking, Cottonseed oil, and Manufactured ice—the difference in the level of intra-industry

trade among regions exceeds 0.85. For most industries, however, the fluctuations in the level of intra-industry trade are less extreme.

Looking across regions, intra-industry trade is more commonly found in U.S.-NAFTA trade. The Grubel-Lloyd index exceeds 0.5 for 28 industries in U.S.-NAFTA trade. By comparison, the Grubel-Lloyd exceeds 0.5 for 15 industries in U.S.-EU trade; 11

Table 11—Industries categorized by level of intra-industry trade

Grubel-Lloyd > 0.8	**Grubel-Lloyd < 0.6 and > 0.4**
Soft drinks and carbonated water	Malt
Chewing gum	Processed fish products
Sausage and prepared meats	Dried fruits and vegetables
Frozen fruits and vegetables	Malt beverages
Frozen bakery goods, exc. bread	Prepared animal feed
Sauces and salad dressings	Vegetable oil
Other food preparations	Distilled and blended spirits
Canned fruits and vegetables	
Bread and other bakery goods	**Grubel-Lloyd < 0.4 and > 0.2**
Condensed/evaporated milk	Refined cane sugar
	Blended and prepared flours
Grubel-Lloyd < 0.8 and > 0.6	Flour and grain mill products
Roasted coffee	Dog, cat and other pet food
Cookies and crackers	Wet corn milling
Breakfast cereals	Animal/marine fats and oils
Chocolate and cocoa products	Dry pasta
Meatpacking	Wines, brandy, brandy spirits
Candy and confectionery goods	Cheese
Manufactured ice	Rice milling
Shortening and cooking oils	Flavorings, extracts, and syrups
Canned specialties	
Prepared fresh or frozen fish	**Grubel-Lloyd < 0.2**
Salted/roasted nuts and seeds	Potato or corn chips and similar
	Fluid milk
	Cottonseed oil
	Frozen specialties
	Soybean oil
	Creamery butter
	Poultry

Source: Author's calculations; ERS processed foods trade data base.

industries in U.S.-Asian trade; and 8 industries in U.S.-South American trade. At the other end of the spectrum, the Grubel-Lloyd index is below 0.2 for only 9 industries in U.S.-NAFTA trade; 24 industries in U.S.-EU trade; 25 industries in U.S.-Asian trade; and 33 industries in U.S.-South American trade. These findings suggest that geographical proximity and/or participation in an integration arrangement (NAFTA) are positively related to intra-industry trade.

Comparison across regions also reveals that U.S. intra-industry trade in processed foods is more common in regions with similar factor endowments and/or similar economies. Excluding NAFTA, the region most similar to the United States in terms of endowments and development of its economy is the EU, followed by Asia, and finally South America. The preceding description places countries along a similar continuum according to the prevalence of intra-industry trade in the processed foods industries. Intra-industry trade is more common in U.S.-EU trade than in U.S.-Asian trade and is least common in U.S.-South American trade.

Factors Affecting the Growth in Trade of Processed Foods

U.S. exports and imports of processed foods have risen considerably over the past few years. Many factors affect the rate at which import and export levels grow. A number of fairly general factors affect trade between nations in practically any product or service. These general factors are covered first in this section. Although the presentation is general, the examples focus mostly on processed foods. Government policies also affect trade levels, either explicitly through international commercial policies or indirectly by affecting the competitive positions of domestic firms and industries. The ways in which government policies affect trade levels is the topic of the second half of this section. Private and public institutions that influence trade levels are also reviewed. Finally, factors more specifically related to trade in value-added and brand name products are also examined. Factors that affect trade levels and trade flows in these heterogeneous products are

very different from the determinants of trade in raw agricultural commodities.

A number of economic factors affect international trade levels and flows, and these factors are discussed at two levels. The first concern is whether a particular factor makes a U.S. food manufacturer more or less competitive compared with producers in other countries. For example, it may be that the high cost of raw

Table 12—U.S. Intra-industry trade (Grubel-Lloyd index) with selected regions

SIC	NAFTA[1]	European Union[2]	Asian Group[3]	South America[4]
		Index		
2011 Meatpacking	.89	.77	0	.12
2013 Sausage	.52	.64	.56	.20
2015 Poultry meat	.05	.05	.01	0
2021 Butter	.04	.33	0	0
2022 Cheese	.38	.01	0	.56
2023 Dry/condensed dairy	.32	.13	.03	.01
2024 Ice cream	0	.18	.01	0
2026 Fluid milk	.03	.71	.01	0
2032 Canned specialties	.69	.28	.30	.26
2033 Canned fruits and vegetables	.56	.71	.43	.16
2034 Dried fruits and vegetables	.31	.17	.21	.25
2035 Pickled fruits and vegetables	.86	.66	.84	.48
2037 Frozen fruits and vegetables	.56	.13	.02	.03
2038 Frozen specialties	.04	.67	.78	0
2041 Grain mill products	.93	.06	.09	.05
2043 Breakfast cereals	.89	.75	.15	.15
2044 Rice milling	.05	.09	0	.01
2045 Prepared flour mixes	.60	.17	.02	.01
2046 Wet corn milling	.69	.17	.03	.18
2047 Dog and cat food	.50	.02	0	.06
2048Prepared animal feeds	.90	.37	.15	.08
2051 Bread/bakery products	.91	.16	.64	.33
2052 Cookies and crackers	.96	.14	.50	.95
2053 Frozen bakery products	.96	.59	.85	.04
2062 Cane sugar	.91	.51	.85	.30
2063 Beet sugar	.50	0	0	0
2064 Candy	.95	.28	.86	.21
2066 Chocolate products	.99	.13	1.00	.16

—continued

material inputs puts U.S. manufacturers at a disadvantage with respect to foreign producers. The second concern is whether a particular factor makes goods destined for foreign markets more or less expensive than identical goods consumed domestically. That is, the cost of transporting boxed beef from Iowa to Japan is greater than the cost of shipping the beef to San Francisco. Some factors will be advantageous or disadvantageous on both counts, as for example, when a low-cost exporter specializes in a product destined only for overseas markets.

Table 12—U.S. Intra-industry trade (Grubel-Lloyd index) with selected regions—continued

SIC	NAFTA[1]	European Union[2]	Asian Group[3]	South America[4]
		Index		
2067 Chewing gum	.65	.94	.33	.74
2068 Nuts and seeds	.39	.05	.24	.04
2074 Cottonseed oil	0	.38	0	.92
2075 Soybean oil	.14	.19	.06	.06
2076 Peanut/olive/other oils	.49	.31	.57	.71
2077 Animal fats and oils	.37	.04	.11	.82
2079 Margarine	.98	.29	.14	.96
2082 Beer	.25	.19	.20	.14
2083 Malt	.97	.79	.02	0
2084 Wines	.36	.11	.34	.12
2085 Distilled liquors	.12	.31	.05	.09
2086 Soft drinks	.98	.05	.22	.52
2087 Flavoring extracts/syrups	.30	.51	.08	.14
2091 Canned fish/seafoods	.76	.44	.98	.05
2092 Prepared fish/seafoods	.38	.60	.35	.01
2095 Roasted coffee	.83	.15	.05	.02
2096 Snack foods	.61	0	.07	0
2097 Manufactured ice	.26	.99	0	0
2098 Pasta	.86	.02	.10	.19
2099 Other	.63	.83	.40	.58

Source: Author's calculation; ERS processed foods trade data base.

[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.

At the most fundamental level, trade between nations occurs because consumers in one country can purchase a particular product more cheaply from abroad than from domestic producers. The relevant comparison in this case is the consumer purchase price of two very similar products, one foreign and one domestic. A number of items contribute to the purchase price, some of which affect the prices of goods going to foreign markets more than goods that are consumed domestically. These latter items are covered following a brief discussion of some general factors that affect product price levels irrespective of the market destination. Transportation costs are the topic of chapter 5, and the costs of regulatory compliance are considered in chapter 7.

Production Costs

The roots of international trade theory lie in the theory of comparative advantage, which holds that differences in relative production costs of two goods between two potential trading nations can result in advantageous trade for both nations. In two-country, two-good barter trade, one nation's relative cost of one good is the inverse of its cost of the other good. Hence, each nation will have a relative cost advantage (a "comparative" advantage) in one of the goods, unless the relative costs of the two goods are identical between the two nations. If each nation specializes in the production of the one good in which it has a comparative advantage and trades this good in exchange for the other nation's specialization, global production and consumption possibilities increase. Thus, one nation produces and exports one good and the other nation produces and exports the second good. Although the theory of comparative advantage is set forth in a two-country, two-good context, it is intuitively straightforward to extend the theory to many nations and many goods.

The theory of comparative advantage is based on production costs. The costs of production, in turn, are based on the costs of the inputs used in the production process, the available technology, and the management expertise that brings the production process together (the efficiency of the process). The focus in the rest of this section is only on input costs, since technology and management issues are

topics geared more to an industrial management context and are covered later in discussions of foreign direct investment. Economists have traditionally recognized three groupings of inputs commonly known as the "factors of production": land, labor, and capital. Each of these is covered in turn, with a focus on how the prices of these inputs affect the competitive position of the United States in processed foods.

Land

Land includes the "God-given" resource endowments that the earth provides. These endowments include land that is productive in and of itself (for timber, agricultural, or recreational uses, etc.); raw materials that are extracted from the earth and water; and land as real estate that supports factories and office buildings. Unprocessed agricultural commodities are major inputs to processed foods, so productive land is fundamental to the processed foods sector. Fertile land is abundant in the United States, and the United States is a world leader in overall agricultural production and trade.

Because U.S. farmland is so productive and because U.S. income levels are relatively high, land in the United States is relatively expensive. These high ownership costs (or "rents") paid for land and buildings also put U.S. food manufacturers at some disadvantage relative to many other food processing nations, with Japan and Western Europe being the notable exceptions. However, the contribution of land to overall costs is probably small for most food processing industries.

The net impact of the various land items on processed food production costs probably yields a strong competitive position for most U.S. food manufacturers relative to other exporters (when only land as an input is considered). This result obtains primarily from the low costs of unprocessed farm commodities, with high land rents and raw materials costs constituting a relatively small portion of land-related production costs for most food manufacturing industries.

Labor, Technology, and Productivity

Labor is a high-cost item in the United States. Wage and benefit packages in the United States are among the highest in the world. Many U.S. jobs have already been lost to Mexican, Caribbean, and East Asian workers because of lower wages elsewhere, especially in textiles, electronics, and small manufactures. A large quantity of those products comes back into the United States as imports, resulting in a great deal of public consternation about "cheap labor" imports. Food manufacturing has largely been spared the loss of jobs to external outlets because of the relatively low cost of raw commodities, as noted above.

However, U.S. food processors still must compete in a global market with producers from other nations, where relatively inexpensive labor can offset higher raw commodity prices.

One of the reasons for high labor earnings in the United States is higher productivity levels for U.S. workers than workers in many other industrialized countries. This is due primarily to a high level of technology that results in a high level of mechanization in U.S. industry. This high level of mechanization is especially evident at the farm level, where capital-intensive methods lower overall commodity costs, and in the food processing industry, where assembly line methods in factory-like settings also generate high levels of output per worker.

Labor costs are a large component of the overall value added by the U.S. food processing sector. Total U.S. consumer expenditures for food in 1993 amounted to $491 billion. Farmers received approximately 22 percent of this, $109 billion. Of the remaining $382 billion, labor accounted for over 46 percent, at $178 billion (U.S. Department of Agriculture 1994A). Because these figures include retail and food away from home, the overall labor component in food processing is not as high a percentage. However, labor still ranks as the largest cost item in U.S. food processing. Thus, to the extent that the United States is at a competitive disadvantage in a particular food export market due to high production costs, high labor cost is likely to be a major contributor.

Capital

The United States is a capital-abundant country, both in terms of physical capital (plant and equipment) and financial capital. U.S. citizens hold a great amount of wealth invested in a variety of assets. In addition, foreign citizens are also quite willing (even aggressive) to hold their wealth in dollar-denominated assets. On the demand side, U.S. manufacturers in general, and food processors in particular, are constantly looking to mechanize their operations, so as to substitute away from high-cost labor and to reduce personnel problems. In spite of a large demand for investment capital by U.S. corporations, the large supply of willing investors helps keep rates of interest in the United States at low to moderate levels. Thus the overall cost of capital, including depreciation and interest, as a component of value added in the U.S. food processing industry, is quite small, amounting to only 7.5 percent of the total cost of food. As with land, low capital costs likely contribute to a strong competitive position for U.S. food manufacturers compared with those in other countries.

Market Assessment and Information Costs

It is typically more difficult to do business in a foreign country than in one's home country, especially in the early stages when a firm is considering either physical investment in or product expansion to another country. Expansion planning requires an in-depth knowledge of existing market channels and suppliers, of consumer preferences and current purchase behavior, and of domestic and foreign rules and regulations. Language and cultural barriers present considerable challenges, as well as institutional differences among countries.

In a survey of Texas agricultural exporting firms, Hollon (1989) found that, from a firm management perspective, the initial entry into export markets was significantly more difficult than either the handling of ongoing export activities or the consideration of expansion to new export product lines or markets. From a list of 38 items in three categories (knowledge gaps, marketing aspects, and financial aspects) over three time horizons (start-up, ongoing, and

expansion), the three problems rated most difficult were all start-up phase marketing items: (1) poor knowledge of emerging markets or lack of information on potentially profitable markets; (2) foreign market entry problems and overseas product promotion and distribution; and (3) complexity of the export transaction, including documentation and "red tape." Two of these items, market entry and transaction complexity, remained problematic in ongoing operations and in new product/market expansion. Import restrictions and export competition became more problematic in later phases, while financial problems were pervasive at all phases of the export operation.

Information and communication (even beyond the language barrier) may present obstacles to a firm, not only when it is considering entry into a new market, but also in its ongoing operations. Product markets operate in a dynamic economic environment. Economic conditions change, tastes and preferences change, political and cultural attitudes change: exporting firms needs to stay abreast of conditions that affect their particular products. This is especially true for exporters of processed foods. Markets for processed foods are particularly prone to change. New competition, new products, and even new packaging for old products are ongoing occurrences. Export firms find it necessary to have dependable company representation on hand in every import market in which they operate. Partly for this reason, many firms find it advantageous to set up foreign subsidiaries to market, and often to manufacture, their products. As noted in the introduction, U.S. foreign direct investment levels (both inbound and outbound) has grown substantially over the past decade. This topic is covered in greater detail in Chapter 3.

Market assessment (in the early stages) and information gathering (throughout) constitute major costs for a firm doing business in a foreign country, costs that are often lower for the same firm considering the same options in a domestic market. Because these costs result in higher prices that a firm must charge to remain viable in a foreign market, they leave export firms at an inherent disadvantage in overseas markets. That disadvantage must be

overcome by other means, such as lower production costs, more efficient distribution methods, or more innovative products.

Economic Conditions in Importing Nations

A major determinant of a country's export level is one over which domestic producers can exert very little influence: economic conditions in importing nations. Demand for a product is defined by both the willingness and the ability of consumers to buy the product. The "willingness" aspect of the definition has to do with consumer preferences. Ability to buy a product reflects a budget decision: given that a consumer wants to purchase a product, does s/he currently have the available resources to pay for it, or have access to future income so as to finance the purchase? Current income levels and/or expected future income growth levels enter into product purchase decisions. Asset liquidity is a third element that reflects a consumer's ability to buy a product.

Just as domestic demand for a product is in part determined by the aggregate ability of consumers to pay for the product, income, growth, and liquidity also affect the level of product demand by importing nations. Per capita income levels are fundamental to a nation's import activity. The world's wealthier nations constitute the bulk of worldwide trade in processed foods and beverages. United Nations data reveal that each of the top 10 importers of manufactured foods and beverages in 1990 was an OECD member country (Handy and Henderson 1994). Together these 10 accounted for 76 percent of worldwide trade in processed foods. The combined total share of the OECD countries and the newly industrialized countries of the Far East (Hong Kong, South Korea, Malaysia, Singapore and Taiwan) amounted to more than 90 percent of worldwide imports of processed foods in 1987 (Dayton and Henderson 1992).

Although lesser-developed countries do not yet make up a large percentage of global imports of processed foods, their combined imports are substantial and they constitute future growth markets for processed foods. A number of less-developed countries and newly industrialized countries are very important to U.S. food

processors. In 1994, Mexico and South Korea ranked third and forth (behind Japan and Canada) as destinations for U.S. exports of processed foods. Hong Kong and Taiwan were also top 10 importers. These four countries accounted for nearly 20 percent of 1994 U.S. processed food exports. Rapid growth in a middle-income country almost invariably turns that country into a significant importer of processed foods.

Another aspect of income growth is the role of income dynamics in importing nations. Although income growth varies year to year in every country, economic growth levels, both booms and recessions, can be transmitted across national borders. Unfortunately, this linking of economic activity tends to exacerbate the original situation. Thus it is not uncommon for global booms and busts to linger over a period of several years.

Because of the need to convert from one currency to another, international transactions add a new dimension to liquidity constraints. At times a country may experience a lack of foreign currency, or a lack of financial reserves with which to buy foreign exchange. This problem was front-page financial news during the late-1980's in the former Soviet Union, for example, and is fairly common in less-developed countries. Possible options available to a government facing a strong foreign exchange demand by its citizens include (1) using government reserves to buy foreign currencies on international markets, (2) changing the currency exchange rate (making foreign exchange more expensive), (3) placing quantity restrictions on imports, and (4) rationing foreign currency purchases. Each of these last three measures will lower an importing country's demand for imported products, even though income and growth may be strong in the country.

International trade in processed foods, however, appears to be less subject to changes in currency exchange rates than is trade in unprocessed farm commodities. This is attributable to imperfect competition in the processed foods market, which allows firms some degree of market power in setting prices. As demonstrated by Feenstra (1989) and others, firms typically use this market power to

set prices in foreign markets in a manner that moderates, or offsets, the impact of changes in exchange rates.

Market Structure

Firms with domestic market power may use that market power to help establish themselves in export markets. This is most obvious where firms separate the international market from the domestic market. Market segmentation can lead firms to increase revenues by restricting quantities sold at home and selling additional quantities overseas at lower prices. This can also result in charges of dumping, in the sense of selling at a price that is below the cost of production. Dumping is difficult to prove, however, in part because of the complexities in dividing fixed or joint costs between two markets.

A related issue is the sale of joint products, one in the domestic market and another in a foreign market. An example in a U.S. processed food industry arises from the trend toward the sale of chicken parts rather than whole birds. U.S. consumers have demonstrated a preference for chicken breasts, often skinless and boneless, that accounts for a large share of the value of the chicken. Some other chicken parts, necks and backs, for example, are byproducts in the U.S. market. If the byproducts draw higher prices abroad, but prices lower than prevailing in the foreign market—as happened with some U.S. chicken parts sold into Asian markets—the importing nation may attempt to prove that dumping or cross-subsidization has occurred.

Government Policy

The previous section considered economic factors that explain why trade occurs. This section explains how governments for their own reasons intervene in food and agricultural markets in ways that directly or indirectly affect trade in processed foods. Policies affecting international investment are discussed in the chapter 3. The implications of recent trade agreements appear in part II.

Comparative advantage in food and agricultural markets is impinged upon by government interventions to assist domestic producers, which may be done directly by commodity support programs or indirectly through restricting imports or boosting exports. This section is organized according to the type of policy or institution that affects trade.

Countries have three basic motivations for trade intervention: support domestic industry, generate revenue, and provide for consumer protection, each of which can take a number of forms and reflects social and political influences as well as economic forces. Support of domestic industry through export assistance or import protection may be a long-term strategy designed to overcome lower costs of production in another country. It could be a short-term measure to stabilize supplies. Trade policy could be used to offset unfavorable exchange rate developments. Trade interventions for consumer protection are discussed in chapter 7.

Import Policies

Tariffs

Where import policies exist, trade rules under the World Trade Organization (WTO), the successor organization to the General Agreement on Tariffs and Trade (GATT), prefer tariffs, which are essentially border taxes. Countries will occasionally impose tariffs on exports, but import tariffs are much more common. There are several types of tariffs, including ad valorem tariffs, specific tariffs, and variable import levies. An ad valorem tariff is a percentage tax on the value of the product. A specific duty is a tax on each unit, without regard to the value of the product. A variable import levy adjusts as international prices and domestic prices change. As practiced by the European Union for food and agricultural products, the variable levy adjusts to bring the price of imported products at the (usually lower) international price to the level of European prices. The variable levy is set a little larger than the difference in prices to provide a margin of preference, enough price advantage so European products will be preferred over imported products of similar quality.

Tariff escalation, a feature of the tariff structure for many products and many countries (Langhammer, 1987, Mabbs-Zeno and Krissoff, 1989) is a topic particularly important for processed products. Tariff escalation occurs when a country's import tariff schedule is structured to favor the importation of less-processed products by imposing a higher tariff on processed products than on the raw commodity (L. Neff, 1989). Houck (1986, pp.140-142) demonstrates the effects of introducing a tariff on final goods with free trade in raw products. A country might choose tariff escalation in order to boost use of its domestic manufacturing capacity. An example would be if a country had a relatively low tariff on soybeans, a somewhat higher tariff on soybean oil, and a much higher tariff on margarine. By doing so, the importer can increase processing throughput (and utilization of its associated factors of production) in its own market at the expense of its trading partners and overall economic efficiency. While tariff escalation is a strategy that distorts trade, it is not prohibited in WTO rules. By its potential to affect location of processing, tariff escalation is a factor in trade versus FDI decisions.

Nontariff Import Barriers

In addition to tariffs, there are quantitative restraints (Hillman, 1978) including quotas and voluntary restraint agreements (VRA). An import quota specifies the quantity that may be imported into a country during a specified time period. In the United States, import quotas have been imposed on a number of processed food products, including dairy products and sugar or sugar-containing products.

In the Uruguay Round agreements that transformed GATT into WTO and initiated a phased reduction of trade intervention, nontariff trade barriers were eliminated as instruments of protection. In the case of the United States (and some other countries), quotas were converted to tariff-rate quotas, a two-tier tariff that imposes a low tariff on a specified quantity and a higher tariff on quantities in excess of that specified quantity. In practice, the specified quantity may be very similar to the former quota and the second-tier tariff may be sufficiently high to deter further imports under most market conditions. The second-tier tariff is

meant to be reduced gradually, allowing countries time to adjust while import protection is reduced.

Voluntary restraint agreements, also known as voluntary export restraints (VER's), are typically negotiated quantitative targets that an exporting country agrees not to exceed. They are voluntary in the sense that the importer will not impose mandatory ceilings or prohibitive tariffs so long as the exporter does not exceed the voluntary limit. VRA's are most familiar in the form of automobile agreements limiting the number of Japanese vehicles imported into the United States. An example in food and agriculture is the voluntary restraint agreement on feed ingredients entering Europe from Thailand, Indonesia, and other suppliers (McCalla and Josling, 1985).

Import licensing, especially non-automatic licensing, is another way in which governments can control quantities imported. Whereas automatic licensing allows for monitoring trade, non-automatic licensing means that the government may use the issuance or nonissuance of an import license to restrict trade. In the case of NAFTA, the Mexican government had long used a system of import licensing in combination with other import barriers (Valdes, 1994). While the tariff for a product might have been relatively modest and trade prospects for export seemed promising, Mexican imports of the product may have been small if the government determined that the imports were unnecessary and denied the import license.

Import licenses were used legitimately in the presence of a quantitative restriction (before implementation of the Uruguay Round agreement) and are used legitimately in the related case of a tariff-rate quota. In the case of U.S. dairy product imports that fall under tariff-rate quotas, many products have quantity limits assigned to each country of origin, and importers must have licenses matching the product and country of origin. In this way, U.S. Customs tracks imports of dairy products and applies the higher, second-tier tariff to products in excess of licensed quantities.

Export Policies

Export subsidies are the provision of government funds—whether derived from general revenues, producer contributions, or some combination—that enables the exporting country to sell products in the international market at prices lower than in its domestic market. Export subsidies have been paid on some processed products as well as raw commodities by many countries including most European countries and the United States.

In the United States, export subsidies are paid under the Export Enhancement Program (EEP), the Dairy Export Incentive Program (DEIP), and the Cottonseed Oil and Sunflowerseed Oil Assistance Programs (COAP and SOAP). While dairy products and some grain mill products (oils and meals) are included, some agribusiness interests have complained that the programs are oriented too much toward unprocessed products. On average from 1989-1993, 81 percent of all export subsidies were paid on grains. The remaining 19 percent was divided among grain and oilseed products, dairy products, frozen meat and poultry, and canned peaches (Ackerman, Smith, and Suarez, 1995). Under the WTO trade rules established in the Uruguay Round, export subsidies are being scaled back in terms of quantities exported with the aid of subsidy and the total funds expended on each product or product group.

Export Promotion

Aside from export subsidization, countries also sponsor or become partners with firms to enhance exports through nonprice promotion activities such as foreign advertising and trade fairs in foreign countries. To this end, the United States instituted the Foreign Market Development Program (FMDP) in 1954 and the Market Promotion Program (MPP) in 1990. These programs promote the entire range of U.S. food and agricultural exports from raw commodities to branded food products. WTO rules do not impinge on non-price export promotion activities carried out under the MPP (Ackerman, Smith, and Suarez, 1995).

Export Credit

The United States and other countries, notably France, have established export credits, usually for less developed countries that have foreign exchange constraints. U.S. export credit programs are operated by the Commodity Credit Corporation (CCC), mostly for raw commodities but also for dairy products and products of grain and oilseed mills.

Export Restraint

A country may restrain food and agricultural trade in a variety of ways and for diverse purposes. One of these is to tax exports to raise revenue for the treasury. If the export taxes are higher on unprocessed goods, the result is to reduce exports overall and to encourage exports in a processed form. This strategy was followed by Argentina in its grains and grain products industries until eliminated at the end of 1991 (Roberts, 1994). While policies such as acreage set-aside may lead to smaller-than-otherwise exports, the United States does not employ policies for food and agricultural products that directly restrain exports.

More frequently used and more familiar to American food and agriculture industries is a trade embargo. For economic or political reasons, a country may impose an embargo (ban) on exports of a product or products to a single country or to all countries for a definite or indefinite time. In 1973, the United States imposed an embargo on oilseed product exports. International prices were unusually high, inflation was higher than desired, and devaluation of the U.S. dollar was making U.S. oilseed products less expensive to foreign buyers. To counteract potential inflationary effects on food prices and offset the exchange rate devaluation, the United States imposed the embargo.

While the oilseed embargo was undertaken for economic reasons, another embargo was imposed 7 years later for political purposes. The United States placed an embargo on grain sales to the former Soviet Union in 1980, when President Carter sought tangible steps to punish the Soviets for their invasion of Afghanistan.

In both U.S. embargoes, the immediate effect was achieved. In the former, exports were curtailed at a time of short supplies. In the latter, U.S. grain sales to the Soviets were halted. Both embargoes remain points of contention, however. The United States was considered by some countries to be a less reliable supplier than it had been formerly because the United States suspended contracts during the embargo. While political risks—in this case, commercial nonperformance due to governmental intervention —are a consideration in trade-versus-FDI decisions, the United States is generally considered among the countries with the lowest political risk associated with capital investment. Other complaints were that the earlier embargo exacerbated volatile international market conditions and that the later embargo was ineffective because it only diverted U.S. sales to other markets and Soviet purchases to other origins (U.S. Department of Agriculture 1986).

State Trading

State trading occurs when a government body performs trading functions. The most commonly observed state trading, at least until the collapse of the Soviet Bloc, was practiced by centrally planned economies. Some countries (e.g., North Korea, Cuba, and, for the most part, China) are still centrally planned, and others (for example, New Zealand, Canada, and Japan) have some form of governmental control of imports or exports through government trading agencies, licensing systems, statutory monopolies, and commodity marketing boards. State trading in its various forms may prevent or constrain trade and investment decisions in processed foods markets.

Summary

Trade in the U.S. processed foods sector has increased dramatically. Increased imports have brought a greater variety of food choices to U.S. consumers, while the expansion of exports, led by exports to East Asia, have grown still faster. U.S. exports of processed food have surpassed the exports of raw agricultural

products to make processed foods exports the larger part of food and agricultural trade.

The United States has long been a major trading nation in food and agricultural products, partly reflecting the abundant, fertile land base and the high productivity in food manufacturing. A large population base of high-income consumers makes the United States a magnet for food imports—or an attractive target for foreign food manufacturers. Standard trade theory helps to explain some of the growth in U.S. food trade. Intra-industry trade, on the other hand, does not accord with standard trade theory. It provides evidence that considerations other than relative factor costs and transportation costs are at work, and it directs attention to topics such as the strategies of firms and the role of information.