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The Internationalization of the Beer Brewing Industry

THE BEER BREWING INDUSTRY has been undergoing a process of internationalization for the past 25 years. This article examines the roles that three types of international transactions — merchandise trade, licensing agreements and foreign direct investment — have played in this internationalization. As in other industries, a few general economic factors explain much of the increase in international brewing activity. What makes beer brewing a particularly interesting case study is that it provides an opportunity to demonstrate how certain economic factors, such as economies of scale and trade barriers, can affect the internationalization of an industry.

THE INTERNATIONALIZATION OF THE BREWING INDUSTRY

Merchandise Trade

As with most other goods, world merchandise trade in beer has expanded rapidly over the past 25 years (see figure 1). Much of the increase in world beer trade — and in world trade in general — can be attributed to such factors as lower trade barriers, more efficient communication and transportation technology, and growth in real personal incomes. The value of world beer trade increased from $149 million in 1965 to $2.08 billion in 1987, a 14-fold increase; at the same time, world trade in all

goods increased to more than 12.5 times its 1965 value. In more recent years, between 1980 and 1987, world trade in beer expanded 83.8 percent, while total world trade grew only 23.4 percent. Despite its rapid growth, trade in beer in 1987 accounted for less than one-tenth of one percent of total world merchandise trade.

On a volume basis, world trade in beer has nearly tripled since 1965, growing at an average annual rate of 6.5 percent between 1965 and 1987. The largest exporters of beer in this growing market, ranked by volume, are the Netherlands, West Germany, Czechoslovakia, Belgium and Canada (see table 1).[1] The largest importers are the United States, the United Kingdom, France, Italy and West Germany.

Beer imports as a percent of total consumption (IPC) and exports as a percent of production (EPP) are larger for some of the smaller exporters and importers than they are for some of the larger exporting and importing countries. As table 1 shows, among 25 importers, beer IPC ranges from a low of 0.2 percent in Norway to 16.4 percent in Italy. The percent of beer consumption accounted for by imports in the largest beer importing country, the United States, is about 5 percent.

Similarly, among exporters, figures for EPP range from 0.4 percent in the United States to

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[1]The *FAO Trade Yearbook* indicates that Mexico was the world's third-largest exporter of beer in 1987.

Figure 1
World Merchandise Trade
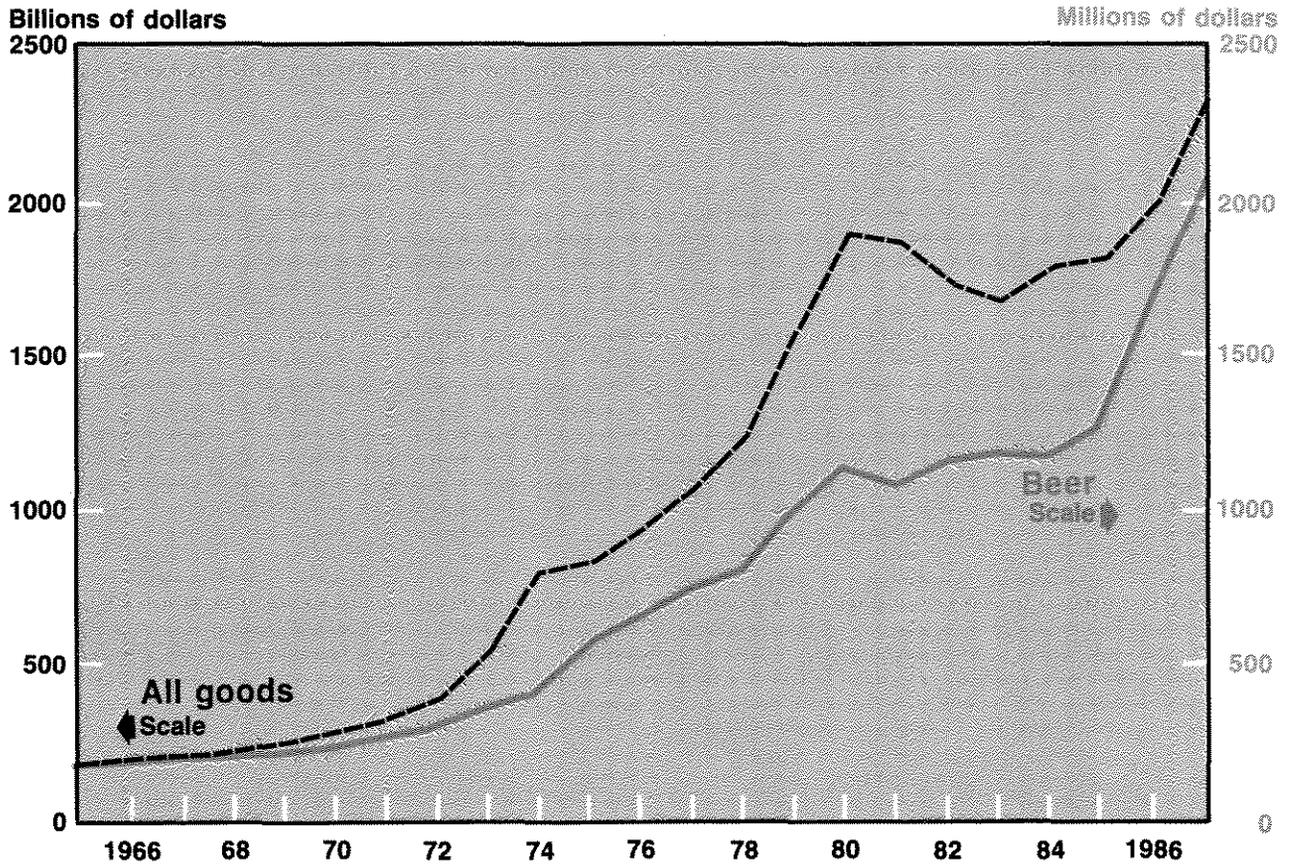
Billions of dollars

Millions of dollars

41.6 percent in Ireland. The export numbers as a percent of production for such countries as the Netherlands and Luxembourg, however, are questionable as these countries do a significant amount of re-exporting to other countries (that is, much of the beer reported as exports may simply be imported and then re-exported for consumption elsewhere).[2]

Few of the countries listed in table 1 are strictly importers or exporters of beer. Most of the countries that export beer also import some beer and vice-versa. This pattern of trade is known as intra-industry trade. An examination of the IPC and EPP statistics in table 1 show

that intra-industry trade in beer is more important to some countries than others. The largest exporter of beer, the Netherlands, imported only 4.3 percent of the beer it consumed in 1987.[3] Similarly, the two largest importers of beer, the United States and the United Kingdom, exported only 0.4 percent and 1.9 percent of their beer production in 1987. Ireland, on the other hand, exported nearly 42 percent of its production, while importing more than 12 percent of its beer consumption.

The degree of intra-industry trade for a country can be measured using a simple index, calculated for a given product as the absolute value

[2]Ott (1988) notes that the Netherlands has a long history of re-exporting imported goods.

[3]Ott (1988) notes that re-exported goods from the Netherlands are not included in the country's import figures.

Table 1

Selected 1987 Brewing Industry Statistics

| | | | | | | | Average Annual Growth Rate, 1975 to 1987 | | | |
	Exports 1000 HL	Imports 1000 HL	Exports As Percent of Production	Imports As Percent of Consumption	Intra-Industry Trade Index 1975	Intra-Industry Trade Index 1987	Exports As Percent of Production	Imports As Percent of Consumption	Per Capita Consumption	Imports Per Capita
Australia	728.3	70.0	3.9%	0.4%	.83	.82	15.0%	17.0%	−1.7%	14.7%
Austria	361.0	285.0	4.0	3.2	.33	.12	7.4	−0.7	1.0	0.2
Belgium	2537.0	565.5	18.1	4.7	.23	.64	2.4	−5.3	−0.5	−5.7
Canada	2415.8	448.0	10.5	2.1	.63	.69	13.8	52.0	−0.4	50.7
Czechoslovakia	2698.0	0.0	12.1	0.0	1.00	1.00	5.9	0.0	−0.7	0.0
Denmark	1934.0	20.8	22.8	0.3	.98	.98	−0.3	*	−0.2	*
W. Germany	5706.0	1301.6	6.2	1.5	.54	.63	8.2	6.3	−0.2	6.1
Finland	22.8	13.9	0.7	0.4	.60	.24	53.7	171.1	1.9	184.6
France	672.0	2445.9	3.4	11.3	.56	.57	2.4	2.4	−1.1	1.3
E. Germany	N/A	N/A	N/A	N/A	.25	N/A	N/A	N/A	1.6	N/A
Hungary	0.0	1290.0	0.0	12.6	N/A	1.00	0.0	−2.86**	2.5	−0.83**
Ireland	2066.0	415.0	41.6	12.5	.98	.67	2.1	39.0	−2.0	35.9
Italy	73.1	2162.8	0.7	16.4	.95	.93	20.5	5.7	6.9	12.9
Japan	293.3	224.0	0.5	0.4	.73	.13	1.8	19.6	2.0	22.6
Luxembourg	270.3	42.2	40.9	9.8	.79	.73	−0.7	0.5	−0.8	−0.3
Netherlands	5725.2	534.9	32.6	4.3	.69	.83	6.2	2.4	0.6	2.8
New Zealand	83.2	70.5	2.0	1.7	.68	.08	7.2	36.7	−0.7	33.9
Norway	19.2	405.0	0.9	0.2	.89	.62	−12.2	22.6	1.1	26.6
Poland	327.1	106.2	2.8	0.9	.74	.51	2.7	12.3	−1.5	10.7
Portugal	74.5	34.3	1.5	0.7	.97	.37	10.9	N/A	3.7	N/A
Spain	121.0	735.0	0.5	2.8	.58	.72	14.5	19.3	2.7	22.4
Sweden	44.9	344.4	1.1	7.9	.91	.77	72.0	8.4	−1.2	7.0
Switzerland	36.7	485.9	0.9	10.5	.75	.86	2.8	6.4	−0.3	6.1
USSR	N/A	900.0	N/A	1.7	N/A	N/A	0.0	8.8	−1.4	7.0
United Kingdom	1140.0	4093.1	1.9	6.5	.54	.56	3.1	3.4	−0.4	2.9
USA	919.7	10991.1	0.4	5.0	.80	.85	22.1	13.7	0.8	14.7

SOURCE: Derived from information in the Brewers Association of Canada's *International Survey: Alcoholic Beverage Taxation and Control Policies.*

1 HL = 100 liters = 26.4 gallons

* Denmark's beer imports were generally small and declining throughout the period. However, a few relatively large increases in imports in later years caused imports as a percent of consumption and imports per capita to grow at average annual rates of 2,218 and 2,146.4, respectively.

** Average annual rate of growth for 1978-1986.

of the difference between exports and imports divided by the sum of exports and imports.[4] If the index is close to zero, the degree of intra-industry trade is substantial. An index value of one indicates that there is no intra-industry trade. This index, labeled the "Intra-Industry Trade Index" and shown in table 1, was calculated for beer trade in 1975 and 1987.

Of the 23 countries for which the index could be calculated for both years, nine countries' indexes rose over the period, indicating less intra-industry beer trade. In 12 countries, the indexes declined, indicating that intra-industry beer trade had increased. Only five countries in table 1 had an intra-industry index value of less than 0.5 in 1987. The majority (70 percent) had an index value of more than 0.5 in 1987, which indicates that intra-industry trade plays a minor role in the brewing industry in general, although it has become more prevalent during the past 15 years.

The growth rates of IPC and EPP provide further evidence of the increasing importance of intra-industry trade to the brewing industry. Of the 20 countries in table 1 reporting increased EPP between 1975 and 1987, 16 also reported increased IPC. Similarly, of the 19 countries reporting increased IPC, 16 reported increased EPP. In sum, merchandise trade in beer has expanded rapidly during the past 25 years, with intra-industry trade playing a small, but growing, role in beer trade.

Licensing Agreements

Brewers also use licensing agreements to make their products available to foreign consumers. A typical license agreement allows a brewer in one country to brew and market the beer of a foreign brewer. One example is Anheuser-Busch's (A-B) licensing agreement with the Canadian brewery John Labatt Ltd. This agreement allows Labatt to brew and market some A-B beers, such as Budweiser and Michelob, in Canada. In return, Labatt pays a royalty fee to A-B. Of course, the licensing brewers insist that the consistent quality of their products be maintained. In essence, the licenser is selling its

know-how in brewing a specific beer, the right to use a trademark and the name recognition it has built for that trademark in exchange for a royalty payment from the licensee. There were at least 30 licensing agreements among various brewers around the world in 1987 (see table 2).

Several factors that are not mutually exclusive promote the use of licensing agreements. First, some firms use licensing agreements to circumvent trade barriers. For example, U.S. beers that are brewed in Canada under license agreement are not subject to either the Canadian federal tariff or the discriminatory mark-ups that other imported beers face at the provincial government outlets.[5] Second, the physical qualities of beer promote the use of licensing agreements. Beer is about 90 percent water, so transportation costs can be reduced through local production. In addition, beer has a shelf-life of about three to four months, of which two to three weeks could be taken up by overseas shipment. Also, when companies enter new markets, they often find it more profitable to license existing plants and distribution systems to handle their products rather than build their own plants and establish their own distribution systems.

The import and export figures discussed previously did not include consumption of foreign-held brand names that are brewed domestically under a licensing agreement. Thus, the degree of internationalization is understated when only merchandise trade is analyzed. Information on the amount of beer brewed under licensing agreements is usually closely held by the companies involved, and not much data are publicly available. The Conference Board of Canada, however, has estimated the impact of licensed brewed beer in the Canadian beer market and its findings serve to demonstrate how important licensed production can be.

In the Canadian market, three U.S. brewers, Anheuser-Busch, Coors and Miller, had licensing agreements with the three largest Canadian brewers— John Labatt, Molson and Carling O'Keefe— respectively, in 1986.[6] The Conference

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[4]See Gray (1987), pp. 243-49.

[5]The U.S.-Canada Free Trade Agreement eliminates the federal tariffs on beer between these countries, but does not alter the pricing practices of the provincial liquor outlets. See Carter, et al (1989) for a more detailed description of Canadian barriers to beer trade.

[6]Molson and Carling O'Keefe agreed to merge their breweries in 1989. The new company is called Molson Breweries and will continue to brew for Coors and Miller under license.

Table 2
Licensing Accords Between Major Brewers

Anheuser-Busch	Heineken
Guinness Guinness brews Bud in Ireland	*Kirin* Kirin brews Heineken in Japan
Labatt Labatt brews Bud, Michelob & Bud Light in Canada	*Whitbread* Whitbread brews Heineken in U.K.
National National brews Bud in Israel	**Kirin**
Oriental Oriental brews Bud in Korea	*Molson* Molson test brewing Kirin in Canada**
Suntory Suntory brews Bud in Japan	**Lowenbrau**
United United brews Bud in Denmark	*Allied-Lyons* Allied-Lyons brews Lowenbrau in U.K.
Watney Mann Watney brews Bud in U.K.	*Asahi* Asahi brews Lowenbrau in Japan
Artois	*Miller* Miller brews Lowenbrau in U.S.
Whitbread Whitbread brews Stella in U.K.	*Molson* Molson brews Lowenbrau in Canada
Carlton & United*	**Miller**
*Carling O'Keefe** Carling brews Foster's in Canada	*Carling O'Keefe** Carling brews High Life, Lite in Canada
*Courage** Courage brews Foster's in U.K.	*Courage** Courage brews Lite in U.K.
Watney Mann Watney brews Foster's in U.K.	**United**
Castlemaine Parkins	*Beamish & Crawford* Beamish & Crawford brews Carlsberg in Ireland
Allied-Lyons Allied brews XXX in U.K.	*Carling O'Keefe** Carling brews Carlsberg in Canada[1]
Coors	*Falken* Falken brews Carlsberg in Sweden
Asahi Asahi brews Coors in Japan	*Heileman* Heileman brews Tuborg in U.S.
Molson Molson brews Coors in Canada	*Suntory* Suntory brews Carlsberg in Japan
Guinness	*Watney Mann* Watney brews Carlsberg in U.K.
Labatt Labatt brews Guinness in Canada	

*Parent company, Elders IXL.

**No licensing agreement in effect.

SOURCE: *Modern Brewery Age*, July 13, 1987.

[1]John Labatt Ltd. acquired the right to brew Carlsberg in Canada, effective July 1, 1988.

Board estimates that brands produced in Canada under license with U.S. brewers in 1986 may have accounted for as much as 15 percent of beer sales in Canada.[7] This amounts to approximately 2.7 million barrels of U.S. brands produced and sold under license agreements in Canada in 1986. If these estimates are correct, the volume of licensed production of U.S. beers in Canada was more than 17 times the amount of beer exported directly to Canada in 1986 and more than four times the amount of total U.S. beer exports to all countries (exclusive of shipments to U.S. military bases and Puerto Rico).[8] In terms of Canadian consumption, the licensed brewed beer might have accounted for 15 percent of Canadian beer consumption compared with the 2.1 percent of domestic consumption accounted for by imports.

The numerous licensing agreements with breweries in Japan and the United Kingdom might indicate that beer produced under license represents a significant part of the foreign beer consumed in these countries. At least in some countries, beer produced under license clearly accounts for a much larger portion of foreign beer consumption than does imported beer.

Foreign Direct Investment

In addition to merchandise trade and licensing agreements, the internationalization of the brewing industry has been characterized by the increasing production of beer by "foreign-owned" firms. This production reflects the increasing frequency of foreign direct investment (FDI), in which one brewer purchases an existing firm or invests in a new or existing facility in a foreign country. Like licensing agreements, FDI is a substitute for merchandise trade. Firms may be prompted to use FDI for the same reasons they use licensing agreements. In addition, such factors as lower labor and energy costs and less government regulation may also encourage the use of FDI.

Several brewers have invested capital in breweries outside their home countries. Two Australian brewers, Elders IXL and Bond, have used this method of globalization extensively. Elders purchased Courage Ltd. of England in 1986, then purchased Carling O'Keefe breweries of Canada in 1987. Early in 1989, Britain's Department of Trade and Industry blocked the proposed takeover of Scottish & Newcastle Breweries PLC by Elders IXL Ltd.[9] In 1990, Elders IXL announced that its United Kingdom Courage breweries would purchase Grand Metropolitan's U.K. brewing and brands interests and its beer distribution and wholesaling activities. Furthermore, Courage's 4,900 pubs will merge with Grand Met's 3,570 pubs in a joint venture under the name Inntrepreneur Estates.[10] Bond has purchased two U.S. breweries, Pittsburgh Brewing and G. Heileman.

Japanese brewers also have actively invested in foreign brewery operations. In 1989, Tatsuuma-Honke Brewing Co. announced plans to build a sake brewery on the grounds of the Coors brewery in Colorado. In 1990, Asahi Breweries Ltd. announced plans to invest $70 million to open a brewery near Denver, Colorado, where it will produce a dry beer.[11] Finally, the Canadian brewing company John Labatt Ltd. purchased Latrobe Brewing Co. of the United States in 1987.

THE ECONOMICS OF INTERNATIONALIZATION

Underlying the preceding description of the internationalization of the brewing industry are some economic factors. The next section outlines the reasons why demand for foreign beer can exist in a country that already produces some domestic brands and discusses how changing relative prices and rising income can expand the demand for foreign beer. The second section analyzes the basic economic factors that determine the type of international transaction a brewery will use to put its products in the hands of foreign consumers. A more technical presentation of the economics discussed in these two sections is provided in appendixes to this article.

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[7]Conference Board of Canada (1989), p. 9.

[8]Data for U.S. beer exports to Canada and total U.S. beer exports, exclusive of shipments to military bases, Puerto Rico and the territories, were provided courtesy of R.S. Weinberg & Associates.

[9]Carrington (1989).

[10]See Thornhill and Harris (1990), Harris (1990) and Sherwell (1990).

[11]"Japan's Asahi Plans Brewery in U.S." (1990).

Foreign Demand: The Attributes Approach

Why Demand for Foreign Beer Can Exist—

One reason why people consume foreign beer is that they can buy it at a price at which they want more beer than domestic brewers want to produce. That is, the quantity of beer demanded is larger than the quantity of beer supplied domestically at the price of foreign beer, and therefore, some foreign beer is imported to meet the excess demand. Another reason why people consume foreign beer is that at least some consumers prefer the attributes, or characteristics, of the foreign beer over domestic brands. This second possibility is discussed in this section.

In general, consumers purchase beer for the "services" that they feel it can provide.[12] Consumers have a wide variety of beer brands to choose from and, subject to price and income limitations, will choose those brands that have the attributes that most closely match their desired services from drinking beer. Many attributes, such as taste, caloric content, alcohol content and packaging, distinguish one brand from another, and each combination of characteristics offers a distinctly different package of services.

Brewers differentiate their products on the basis of attributes and price. Consumers compare the package of services provided by a particular beer and its price to the services and prices of other brands. If consumers prefer the services of foreign beer over domestic beer, at given market prices, then demand for foreign beer will exist in a country.

Of course consumers do not necessarily consume only one domestic beer or foreign beer. Consumer satisfaction may be maximized by purchasing a combination of domestic and foreign beers. Suppose a consumer prefers the taste of a high-calorie foreign beer over all other domestic brands, but needs to watch his caloric intake and finds the taste of a particular brand of light beer to be acceptable. This consumer might purchase both the foreign and domestic beers, drinking the foreign beer in limited amounts, say, on special occasions, and drinking the low-calorie beer the rest of the time.

Growth in the Demand for Foreign Beer—

The demand of foreign beer can expand if its price falls relative to the price of domestic beer. If a consumer had been purchasing domestic beer, the relative fall in the price of the foreign beer may be enough to compensate him for any perceived loss in services due to switching from the domestic to the foreign brand. In this case, the quantity demanded of the foreign beer will increase. The decline in the relative price of the foreign beer may also encourage people who already consume it to purchase more. Unfortunately, data on imported beer prices are scarce, and thus the role that changing relative foreign beer prices has played in the globalization of the industry is uncertain.

Increases in consumer incomes can also spur the demand for foreign products. When consumers' incomes increase, they are able to purchase more of all of the products they desire. In general, however, the quantities purchased of some goods, like flour, decline as incomes rise, while quantities of other goods purchased, like furniture, increase as incomes rise. The statistical evidence relating beer consumption to income growth is mixed.[13] Some studies have shown that the quantity of beer consumed increases as income increases, while others have shown the opposite.

Although little work has been done to estimate the relationship between foreign beer consumption and income in general, there is some data to suggest that the demand for foreign beer might be positively influenced by increases in income. All 21 OECD countries in table 1 that provided import data on beer had positive per capita gross domestic product growth between 1975 and 1986; 16 of these reported a positive average annual rate of growth of beer imports per capita and imports as a percent of consumption. In addition, the market for imported beers grew much more rapidly than most domestic beer markets during the late 1970s and early 1980s, a period of income growth for most countries. These figures roughly suggest that per capita income growth has contributed to the internationalization of the brewing industry.

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[12]Much of the information in this section on the attributes model is taken from Douglas (1987).

[13]For a review of beer demand estimates, see Ornstein (1980). Also see Heien and Pompelli (1988). The estimated income elasticity of beer in these studies ranged from -0.46 to 0.79.

Where to Produce Beer: Some Economics

Once a firm determines that foreign demand for its products exists, it must determine the lowest-cost method of supplying these products to the foreign market. Should the firm use direct exports, a licensing agreement or direct foreign investment to enter the target market? The answer is relatively simple, in theory, and is based on the principle of profit maximization.

A brewery's total cost of supplying a foreign market is equal to the beer's cost of production plus transportation and distribution costs, marketing costs and overhead. A brewery's cost of producing beer is a function of its production technology and the cost of its inputs, such as labor, agricultural ingredients and packaging materials. Research has shown that the average cost of producing beer declines as production expands.[14] That is, economies of scale exist in the brewing industry. Economies of scale encourage direct exporting when the quantity demanded of foreign beer is relatively small and encourage foreign production either through licensing or foreign direct investment when the quantity demanded is relatively large.

Suppose a U.S. brewer and a Japanese brewer have identical production functions exhibiting economies of scale and that the firms pay the same price for their inputs. That is, their average cost of production curves are equal and are shaped as shown in figure 2. (For simplicity, assume that the U.S.-Japan exchange rate is fixed throughout and, given this exchange rate, Japanese prices are stated in U.S. dollars.) As the brewers expand production, the average cost of producing a unit of the product falls up to a point, after which average costs no longer decline but stabilize. Assume that Japanese demand exists for a beer—called Colony—produced by the U.S. firm. The U.S. firm must determine whether it can supply the Japanese market cheaper by producing Colony domestically and exporting or by producing it in Japan, either under license or by FDI.

Now suppose that supply and demand conditions and price in the U.S. are such that

American consumers consume Q_{US} units of Colony, as shown in figure 2. (Note that the supply and demand curves are not shown in figure 2 and the quantity Q_{US} is simply given.) This substantial amount of consumption allows the U.S. firm to achieve significant economies of scale, producing Q_{US} units of Colony at an average cost of C_2 per unit. Also assume that market conditions are such that a relatively small quantity of Colony, Q_{J1}, is demanded in Japan. Since the U.S. brewer is already producing some Colony for domestic consumption, expanding production to meet the extra demand of Colony in Japan would allow the U.S. brewer to move down its average cost-of-production curve from point A to point B, where it could produce Colony for C_1.[15]

The alternative to producing the beer in the United States and exporting it is to produce Colony in Japan. Since Colony is currently not being produced in Japan, the Japanese firm or branch brewery built by the U.S. firm would have to brew the relatively small amount of Colony, Q_{J1}, at a high average cost of production, C_3. In other words, the relatively small quantity of production will not allow the Japanese plants to achieve significant economies of scale. Thus, producing Colony in the United States for export would save the brewer $C_3 - C_1$ per unit of Colony. If the cost of transporting Colony to Japan and distributing Colony in Japan is less than the difference between C_3 and C_1, then the U.S. brewer would maximize profits by exporting Colony to Japan. If the quantity demanded of Colony in Japan were larger, it might be more profitable for the brewer to use a licensing agreement or foreign direct investment.

Suppose that the quantity of Colony sold in Japan grows to Q_{J2} as shown in figure 3, while sales of Colony in the United States remain at Q_{US}. Since the U.S. brewer has exhausted its economies of scale, it cannot produce $Q_{US} + Q_{J2}$ at a lower per unit cost than that for $Q_{US} + Q_{J1}$. The Japanese brewery, however, by increasing production from Q_{J1} to Q_{J2} could now match the U.S. brewer's cost of production because it has also achieved the lowest possible average cost of production. Thus, given equal average

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[14]Elzinga (1973), Fuss and Gupta (1981), Keithman (1978) and Scherer (1973) all provide evidence that economies of scale exist in the brewing industry. See Thompson (1985) or any micro-economic text for a discussion of the reasons why economies or diseconomies of scale can exist at the plant level.

[15]For simplicity, we have ignored any quantity response, stemming from lower prices, that might occur in the U.S. market as a result of the expanded output.

Figure 2
Average Cost of Production: U.S. Plant Achieves Economies of Scale
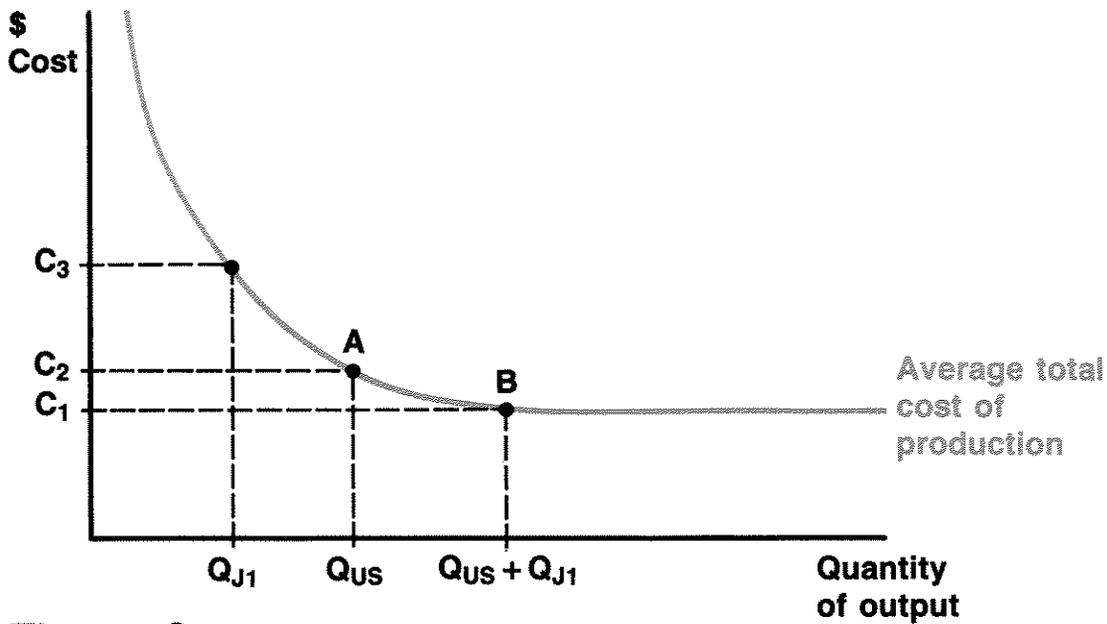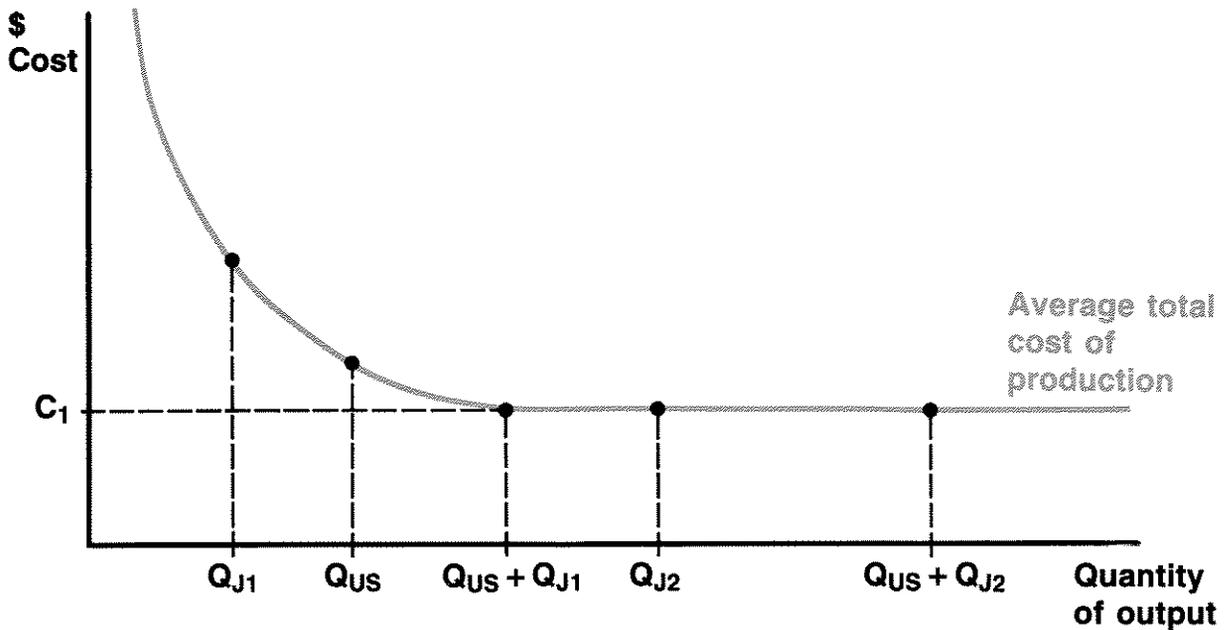

Figure 3
Average Cost of Production: U.S. and Japanese Plants Achieve Economies of Scale

production costs, the U.S. firm will now prefer to either negotiate a licensing agreement with the Japanese brewer or use FDI, thereby saving the additional export-related expenses of shipping Colony overseas and distributing it within Japan.

Like transportation costs, trade barriers also offset production cost advantages. If a target country has high tariffs or distribution systems for imported goods that are relatively costly, production cost advantages in the home country may be offset and licensing and foreign direct investment become the only feasible methods of entering the target market. As shown below, trade barriers have had a significant effect on the choice of licensing agreements and foreign direct investment in the internationalization of the brewing industry.

BARRIERS TO BEER TRADE

Japan

In Japan, two types of barriers inhibit foreign beer from entering the country. The most significant of these is the Japanese distribution system. The Japanese have a complex multi-tiered system, comparable to the U.S. beer distribution system, in which beer moves from producer to wholesaler to consumer.[16] In addition, Japan has little warehouse space, which means shipments are smaller and more frequent than in the United States. Both aspects of the Japanese distribution system raise the cost of distributing beer in Japan, relative to less complex systems. Japan also charges a small customs duty on imported beer. These factors raise the cost of exporting beer to Japan and make licensing agreements or foreign direct investment relatively more attractive methods of selling beer in Japan.

Canada

A GATT panel ruled in 1988 that specific practices of the Canadian provincial governments discriminated against imported beer.[17] Canadian trade barriers include discriminatory mark-ups at provincial liquor outlets and different marketing techniques for foreign beer,

such as smaller packages and warm foreign beer sales at the governmental outlets. These non-tariff barriers have prompted U.S. brewers to use licensing agreements in Canada even though several brewers have U.S. plants that are located quite close to the Canadian border. The Australian brewer Elders IXL has chosen to use foreign direct investment to enter the Canadian market. This creates an interesting situation in which a U.S. beer is being made under license in a Canadian brewery that is partially owned by an Australian brewer.

United Kingdom

As in Japan, distribution practices are the main barriers to trade in the United Kingdom. Most beer consumed in the United Kingdom is draft beer, and most of this is sold in pubs. Many pubs are owned outright by breweries, managed by the breweries or leased to individuals who enter into exclusive supply agreements with the breweries. This system was the subject of eight investigations between 1966 and 1986, that focused chiefly on pricing and supply competition.[18] Given the relationship between the pubs and the domestic breweries, foreign label brewers have problems getting local brewers to carry their products in British pubs. Thus, many foreign brewers have chosen to use licensing agreements with domestic firms to penetrate the U.K. beer market. Foreign direct investment has also been used to enter this market.

SUMMARY

The brewing industry has evolved from an industry that concentrated on domestic markets to one that views itself as part of a global market. This internationalization has occurred via the use of merchandise trade, licensing agreements and foreign direct investment. Merchandise trade in beer has developed in an intra-industry pattern, whereas international transactions in licensing agreements and foreign direct investment have not developed, in general, in a bilateral pattern. Licensed production and production at foreign-owned breweries likely account for an unknown, but probably large, part of foreign beer consumption in some countries.

[16]See VandeWater and Curley (1990).

[17]G. Heileman Brewing Co. filed a Section 301 trade action against Canada over unfair pricing and distribution prac-

tices of provincial governments. See *Daily Report for Executives* (1990).

[18]Brewers Association of Canada (1989), pp. 387-88.

Two conditions must hold for trade in similar goods, such as beer, to occur. First, the foreign product must offer a combination of desired attributes that are not available to domestic consumers from domestic products. Second, it must be profitable to produce the product for the foreign market. Which type of international transaction will be used to supply a foreign market with beer is related to the existence of economies of scale, distribution costs and trade barriers.

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Appendix A
Foreign Demand for Beer: The Attributes Model

The attributes model, introduced by Lancaster (1966, 1971), can be used to show how demand for foreign beer can exist in a country in which domestic brands are already produced.[1] Suppose a consumer chooses between two brands of beer so that, subject to income limitations, his satisfaction from the services provided by the beer is maximized. For simplicity, assume the consumer values only two attributes of beer: taste and low calories. The two types of beer provide these attributes in differing proportions and at different prices.

After sampling both products, the consumer rates each brand on a scale of 1 to 3, 3 being best, for both taste and calorie content, as shown in table A1. Brand F is a foreign beer that tastes great, but is high in calories (thus receiving a low rating on caloric content) giving it a relatively high ratio of taste-to-calorie appeal. Brand D, a domestic beer, does not taste quite as good, but is very low in calories. This beer then has a relatively low taste-to-calorie appeal ratio.

Table A1
Attribute Ratings and Prices of Three Beers

Brand	Attribute Rating Calories	Attribute Rating Taste	Ratio of taste to calories	Bar price per bottle	Bottles per $12
D	3	1	1/3	$2	6
F	1	3	3	$3	4

The amount of each beer the consumer can purchase is determined by his income and the price of the products. Assume that the consumer has decided to spend $12 on beer during a visit to a local bar and the cost of each kind of beer is as shown in table A1. If he spends the entire $12 on only one product, he could buy at most six bottles of D or four bottles of F. Four bottles of F would provide 4 units (4 bottles X 1 unit of caloric

Figure A1
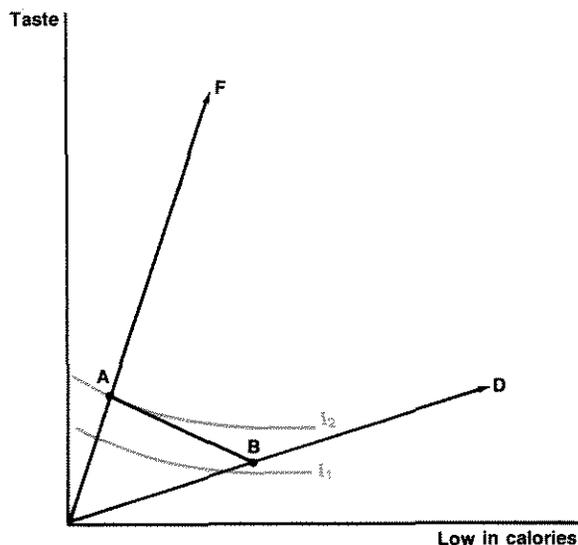## Maximization of Utility by Consuming Only Domestic Beer
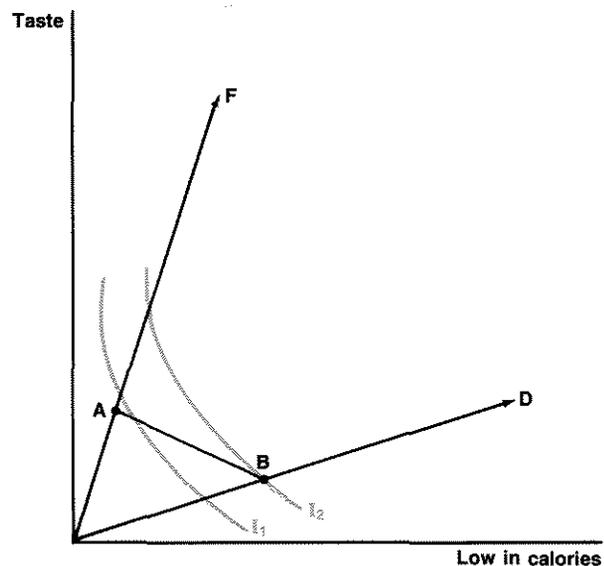
appeal per bottle) of the caloric attribute and 12 units (4 X 3) of the taste attribute.

The two products are depicted in figure A1 in an attribute space as rays from the origin. The slope of each ray is determined by the ratio of taste to calorie appeal. If the consumer drinks brand F, then he moves out along ray F, absorbing the two attributes in a ratio of 3:1. Points A and B represent the maximum amount of the two attributes that can be obtained by consuming beers F and D, respectively, given the spending constraint of $12.

Joining points A and B provides the consumer's efficiency frontier. The efficiency frontier is the outer boundary of the attainable combination of the two attributes, given the budget constraint of $12. It is called efficient because a utility-maximizing consumer will get more utility by being on the frontier rather than within the frontier, even though these interior points are attainable.

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[1]Much of the information in this appendix follows the discussion of the attributes model as presented by Douglas (1987), pp. 86-102.

Figure A2
Maximization of Utility by Consuming Only Foreign Beer

Taste

F

A

B

I_2

I_1

D

Low in calories

Figure A3
Maximization of Utility by Consuming Both Domestic and Foreign Beer

Taste

F

N

Y_2

M

Y_1

L
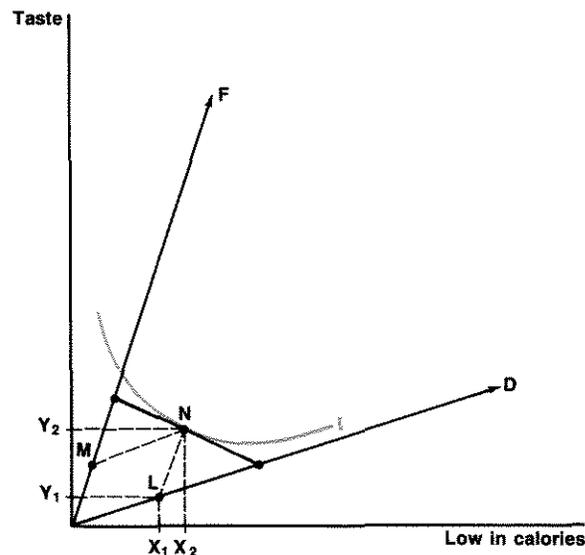
D

X_1 X_2

Low in calories

How do we know which beer, or combination of beers, the consumer will choose? In the attributes model, consumer preferences between attributes can be expressed using indifference curves. Like indifference curves used to express the marginal rate of substitution (MRS) between two products, the attribute indifference curves express the MRS between attributes, and higher indifference curves represent higher levels of utility. The beer consumer's assumed attribute indifference curves I_1 and I_2 have been superimposed on the attribute space in figure A1. Assuming that a consumer wishes to maximize his satisfaction from taste and caloric content, he would choose to be on the highest attainable indifference curve, which occurs at point B in figure A1.

The position and slope of the indifference curves will determine the brand or brands of beer chosen. This particular consumer has an indifference curve that is relatively steep indicating that, compared with a consumer with a flat indifference curve, he is willing to give up a lot of taste to get a few less calories.

Now suppose that a different consumer, who gives the beers the same attribute ratings, is willing to consume a lot more calories to gain a bit better taste. The shape of this consumer's indifference curve would be more flat, and as shown in figure A2, this person would choose

the foreign brand F, at point A. Thus, in a society where some consumers prefer the attributes of foreign beers over domestic beers, a demand for foreign beer will exist.

Figure A3 shows an example of a consumer who would purchase both foreign and some domestic beer. Neither of the beers provides the attributes exactly in the ratio represented by point N. The consumer could reach this point, however, by consuming some of both products. By consuming L units of the domestic brand, the consumer would obtain Y_1 units of taste and X_1 units of caloric appeal. By spending the rest of his budget on brand F, the consumer would travel along the path LN, which has the same slope as ray F, to obtain the $X_2 - X_1$ units of calorie appeal and the $Y_2 - Y_1$ units of taste needed to reach his maximum level of utility at point N. Alternatively, the consumer could have started by consuming M units of brand F and then consumed L units of brand D to reach point N.

Growth in Foreign Demand

The demand for foreign beer can increase if the relative price of the foreign beer falls. As shown in figure A4, when the price of the foreign beer falls, the maximum amount of the foreign brand that can be purchased increases,
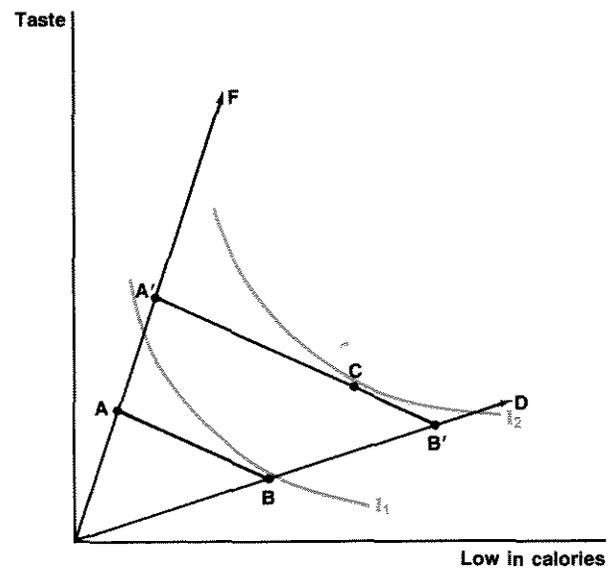
Figure A4
The Price Effect Shown by the Attribute Approach

Figure A5
The Income Effect Shown by the Attribute Approach
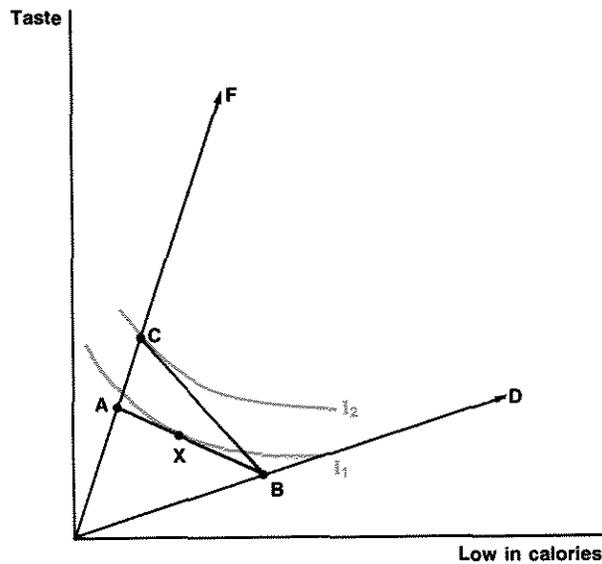
shifting out the efficiency frontier from AB to BC. In this example, the consumer goes from buying some of both brands at point X to only buying the foreign brand at point C.

Expanding incomes can also explain increased consumer demand for foreign beer. In figure A5, the consumer's increase in income has led to a shift from buying only the domestic beer to buying some of both beers. Initially the consumer's efficiency frontier is AB, the highest indifference curve attainable is I_1 and the consumer purchases only the domestic product D. When the consumer's income increases, the efficiency frontier shifts out in a parallel fashion to A'B', because prices and attributes are fixed and only income is changing. For the given prices and attributes, the increased income allows more

consumption of each beer. To maximize utility, the consumer shifts to point C on the higher indifference curve I_2, where he consumes some of both brands of beer. Thus, a higher level of income has induced the consumer to purchase more of the foreign brand of beer.

Of course, the example could have been constructed to show how a shift in the consumer's income could have led to a reduction in the amount of foreign beer purchased. Several researchers have estimated the demand for beer, but no conclusive evidence has been provided as to whether beer consumption expands as a consumer's income expands. Some data, as discussed in the text, however, suggest that the demand for foreign beer might be positively influenced by increases in income.

Appendix B
Whether to Produce Domestically or Abroad: Some Economics

Suppose that a U.S. brewer wants to sell its beer, Colony, in Japan. The U.S. brewer has three methods of supplying Japan with Colony: 1) produce Colony domestically and export to Japan, 2) negotiate a licensing agreement with a Japanese brewer who would brew and distribute Colony in Japan, or 3) produce Colony in Japan either by purchasing an existing Japanese brewery or building a new brewery. Which is the cheapest?

Assume that the long-run average cost (LRAC) curves of any plants where Colony could be brewed are identical. These potential plants include the U.S. parent firm and any branch plant it may establish in Japan, as well as any existing brewery in Japan that could brew Colony under license. In addition, assume that the U.S.-Japan exchange rate is fixed throughout and, given this exchange rate, Japanese prices are stated in U.S. dollars.

Consider the level of demand for Colony in the two countries. In the United States, as shown in figure B1, part of the demand curve is above the LRAC curve, indicating that consumers are willing to pay a price for Colony that is above the U.S. firm's average cost for some levels of production. In Japan, however, if the demand for Colony is relatively small, say D_{J1}, as shown in figure B2, then Colony cannot be brewed profitably there. At each quantity along D_{J1}, the price consumers are willing to pay is below the Japanese plant's average cost of producing Colony. Thus, when demand is D_{J1}, direct exports from the U.S. brewery will be the only way the Japanese market might be supplied with Colony. However, if the Japanese demand schedule for Colony were much larger, say, at D_{J2}, then the Japanese brewery could at least cover its production costs for some level of production. Thus, at this larger level of demand, both production in the United States and in Japan are potential routes of supplying Japan with Colony.

Consider the cost of producing different levels of Colony for foreign consumption more closely.

Figure B1
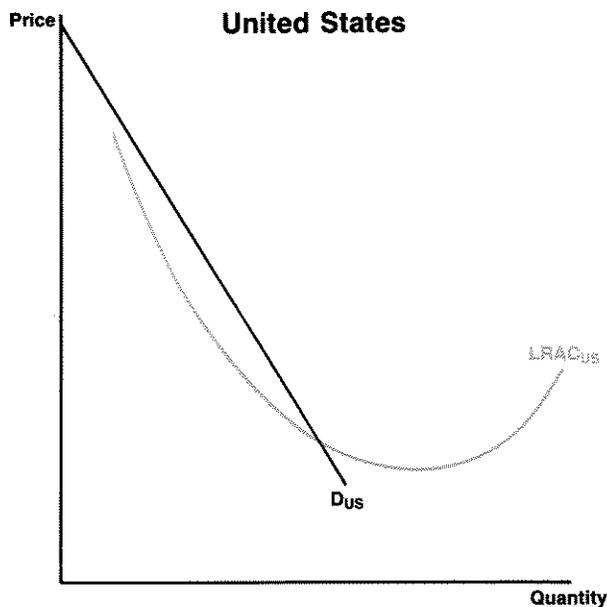**U.S. Production Costs and Demand for Beer**

Figure B2
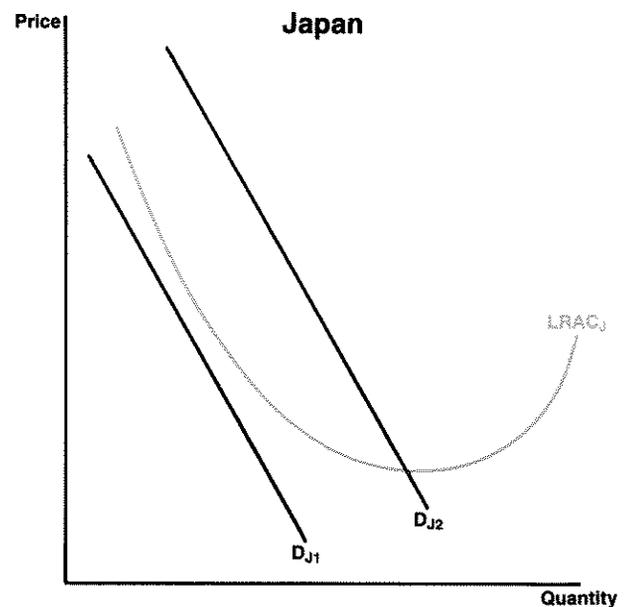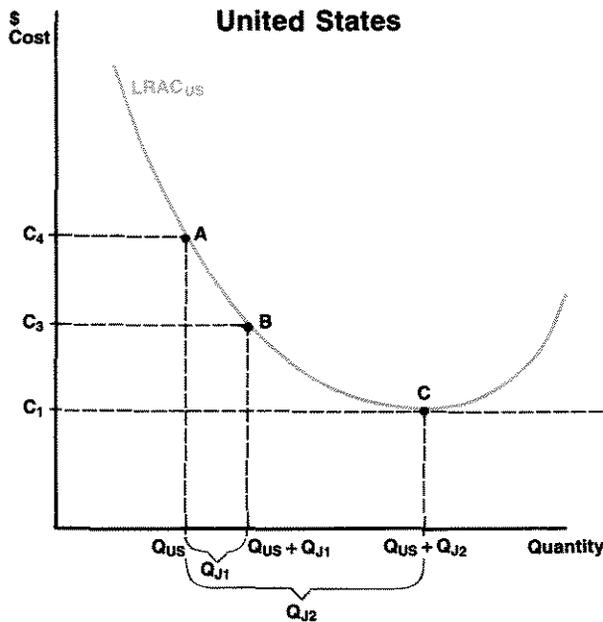**Japanese Production Costs and Two Demand Curves for Beer**

Figure B3
U.S. Plant's Production Costs

United States

Figure B4
Japanese Plant's Production Costs Compared to U.S. Plant's Cost of Exporting
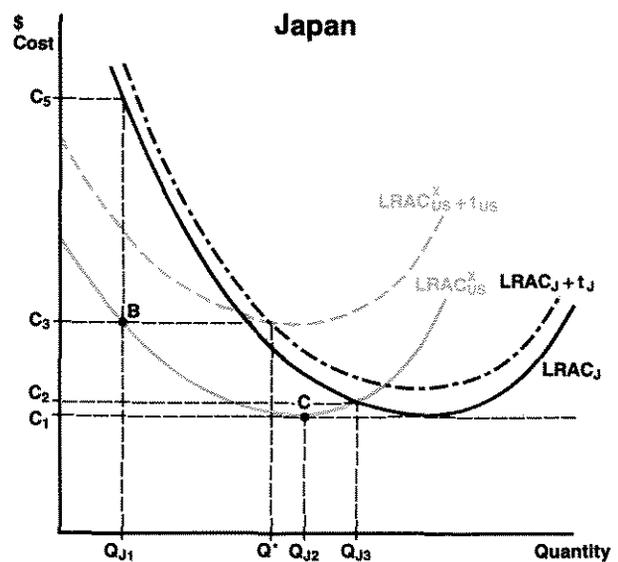

Japan

The goal is to determine which type of international transaction allows the firm to provide Colony to the Japanese market at the lowest cost. First, consider the U.S. brewer's cost of producing and exporting Colony to Japan. Assume for a given market price, the quantity of Colony demanded in the United States is Q_{US}, as shown in figure B3. The U.S. brewer produces this amount at an average cost of C_4 per unit.

Now suppose that for a given price, the quantity demanded of Colony in Japan is Q_{J1}, as shown in Figures B3 and B4. Since the U.S. brewer already produces some Colony for domestic consumption, by expanding production to $Q_{US}+Q_{J1}$ to meet the export demand, the U.S. brewery could move down its LRAC curve from point A to B in figure B3, lowering its average cost of producing Colony from C_4 to C_3.[1] If the quantity demanded of Colony in Japan was larger, at Q_{J2}, the U.S. brewery's average cost of producing it would fall even further to C_1 at point C. By doing a similar analysis for other quantities of U.S. exports, we can develop the

U.S. brewer's cost of producing different amounts of Colony for export to Japan, shown by the line $LRAC_{US}^{X}$ in figure B4.

Figure B4 allows a straightforward comparison of the production costs of exports to Japan, $LRAC_{US}^{X}$, with the production of these quantities in Japan, $LRAC_J$. It shows that the average cost faced by the U.S. brewer producing a given amount of Colony for export is lower than the Japanese brewer's average cost, $LRAC_J$, up to the quantity Q_{J3}, but higher for all subsequent levels. This is possible, even when cost curves are identical across countries, because the U.S. plant was already producing Colony for domestic consumption and that by expanding production to meet export demand, the average cost of producing Colony fell. The Japanese plant currently is not producing any Colony; if it were to start brewing Colony for Japanese consumption, it would have to start at a higher cost on its long-run average cost curve. Economies of scale, however, do not continue indefinitely. Consequently, the cost of producing

[1]For simplicity, the analysis ignores any potential sales price decline in the United States that may stem from the brewer achieving greater economies of scale. Thus, the quantity demanded in the United States, after production is increased to meet export demand, is assumed to remain at the same level as before export production occurred.

Colony eventually starts to rise and the Japanese plant can produce Colony cheaper than the U.S. plant after point Q_{J3}.

Thus far, the discussion has focused solely on the cost of producing Colony. Transportation and distribution costs are likely to influence where production is located. Assume that it costs the same per unit to ship and distribute a small amount of Colony as it does a large amount of Colony. Since the U.S. plant has to ship Colony overseas, it is reasonable to assume that its transportation and distribution costs will be significantly higher than a Japanese plant's would be if Colony were produced there. Adding these average per unit transportation and distribution costs to the plant's respective long-run average cost of production curves gives the two dashed lines, $LRAC^X_{US} + t_{US}$ and $LRAC_J + t_J$, shown in figure B4. The U.S. plant can produce, transport and distribute Colony to the Japanese market at a lower cost than the Japanese brewery can up to the quantity Q^*. Notice that the additional costs of transportation and distribution have lowered the quantity at which the U.S. brewery can compete from Q_{J3} to Q^*. At quantities beyond Q^*, the Japanese firm can produce and distribute Colony for less than C_J, giving it a cost advantage over the U.S. brewer.[2]

Because of the cost advantage, for any given quantity of Colony demanded in Japan up to Q^*, the U.S. firm would prefer to produce Colony domestically and export the product to Japan. If the quantity of Colony demanded in Japan were greater than Q^*, the U.S. firm would either attempt to negotiate a licensing agreement with the Japanese brewer or purchase or build a Japanese brewery for production of Colony.

Whether the U.S. brewer would choose to license production or open a branch brewery in Japan would depend on several factors. Horstmann and Markusen (1987) note that if the li-

censee and the plant to be built or purchased are equally efficient, then the need to give the licensee the incentive to maintain the reputation of the licenser's product will result in FDI always dominating the use of licensing. They also conclude, however, that if the licensee and branch plant are not equally efficient—that is, if their LRAC curves are not identical—then other factors such as the size of the market, the existence of close substitutes in the target market and the level of interest rates in the two countries will determine whether licensing agreements or FDI will be used.

In addition to production and distribution costs, brewers also face tariff and non-tariff trade barriers, which raise the cost of supplying a country with beer. In terms of figure B4, it is conceivable that the U.S. brewery could have an average cost of production considerably below breweries in Japan, but that trade barriers in Japan are so high that licensing agreements or foreign direct investment become the preferred method of supplying the foreign country at all levels of demand. Here, the $LRAC^X_{US} + t_{US}$ curve can be used to incorporate this idea. Let the t_{US} variable now stand for transportation and distribution as well as costs associated with trade barriers, such as tariffs. The existence of trade barriers simply shifts the U.S. brewer's export cost curve upward, pushing Q^* closer to the origin.

Other realistic problems associated with international transactions have been ignored in this example. Some of the other factors that would affect how a firm supplies a foreign market include differences in production technology and input costs, government restrictions on foreign investment, costs of negotiating and monitoring licensing agreements, exchange-rate movements and the role other products being produced at the breweries might have on the plant's cost of production.

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[2]Of course, the Japanese firm will eventually reach its points of diseconomies of scale and its average cost of production will rise above C_J.