

TOWARD A THEORY OF FOREIGN TRADE ZONES

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Although the Foreign Trade Zones Act became law in 1934, only within the last decade have firms realized their potential. Foreign merchandise enters a zone immune to tariffs, quotas, and customs procedures. Merchandise may be processed into the U.S. or exported; in fact, most goods are imported. The manufacturing sector has rather quietly been taking advantage of "inverted" or "upside-down" tariffs. This article confines itself to a descriptive analysis leading to rudimentary theory.

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I. INTRODUCTION

The history of Foreign Trade Zones (FTZs) in the United States goes back to 1934 when the FTZs Act was passed. However, only since the late 1970s have firms come to realize the advantages of FTZs for both import and export related activities. This has resulted from increased competition

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for both domestic and foreign markets by domestic and foreign firms alike.¹ In 1987 there were more than 120 zones and close to 100 subzones operating across the country.² This represents a tremendous increase over a ten-year period.

There is currently no comprehensive theory of FTZs. This study presents a descriptive analysis of FTZs in the United States based on aggregate data provided mainly by the Department of Commerce.³ The elements which a comprehensive theory must include are discussed.⁴

II. WHAT ARE FTZs?

FTZs are industrial parks or warehouses outside US customs territory traditionally located close to a port of entry (sea or air).⁵ Foreign merchandise is allowed to enter a zone with minimal customs procedures, without paying duties or adhering to import quotas.⁶ While in the zone, merchandise may be examined, sorted, repacked, stored, and made ready for

¹There are many countries, especially less developed countries, which operate Export Processing Zones with similar characteristics to those in the United States. For some less developed countries this has become a way of attracting foreign investments and technology. One of the latest of these was recently established in Abu Dhabi in the Persian Gulf.

²These zones and subzones are spread all over the country. All 50 states and Puerto Rico, with the exception of South Dakota, Wyoming, and Idaho, have at least one zone in operation. Some do not operate on a full time or full capacity basis.

³The data used in this study came from two sources: (a) Foreign Trade Zone Board, *Annual Report*, U.S. Department of Commerce, (various issues); and (b) *The Implications of Foreign Trade Zones for U.S. Industries and for Competitive Conditions between U.S. and Foreign Firms*, Washington, DC: United States International Trade Commission (USITC Publication 1946) February 1984.

⁴There have been theoretical studies, such as Hamada (1974) and Miyagiwa (1986), concerning the impact of zones in promoting exports from less developed countries.

⁵Some facilities are ready and can be leased. Firms may also build their own facilities.

⁶Equipment and machinery used in production are not exempt from customs duties. For example, a Japanese fork lift used to move merchandise in the zone is considered an import.

sale. Zones are used for manufacturing and assembling, which may involve foreign components or a mix of domestic components. Whereas zones are multi-user or multi-purpose facilities, subzones are for a single user. Subzone status is authorized when the needs of the firm cannot be accommodated by existing zones, that is the operation is too large. Facilities in subzones are built, owned, and operated by firms.

The purpose of the FTZ Act was "to expedite and encourage foreign commerce, and for other purposes." Congress had passed the Hawley-Smoot Tariff Act in 1930, which raised tariffs to an average of nearly 60 percent. Other industrialized countries imposed similar measures, causing world trade to come to a virtual halt. The FTZs Act was designed to partially offset the harmful effects of Hawley-Smoot.

Current trade barriers come in the form of tariffs, quotas, voluntary agreements, and the complexity involved with customs procedures. These barriers contribute significantly to costs of production. With increased competition in both domestic and foreign markets, firms look for ways to reduce costs. Paying a lower tariff or simply deferring payment may mean a great deal. In recent years many U.S. firms have moved operations abroad where labor cost or taxes are lower. This exodus creates an outflow of entrepreneurship and investment, decreasing demand for domestic labor. The cost saving features of FTZs may have encouraged some domestic firms not to set up operations abroad, and have been an invitation for foreign firms to move to the United States. FTZs are mostly used, both by domestic and foreign firms, to reduce the cost of *imports*.

III. FTZs AND IMPORTS

Merchandise entering a zone remains exempt from all customs duties and import quotas. Zones are used by firms of diverse size for various types of operations. Activities related to both importing and exporting are carried out. FTZ users vary from small firms with storage facilities to giant multinational corporations which use subzones for assembly and production with foreign or domestic components. There are restrictions applied to

the types of products and activities permitted in the zones. In general, any product which can lawfully enter the United States is allowed into the FTZ. The FTZ Board may prohibit other products which it judges detrimental to public health, interest, or safety. (Department of Treasury, 1979, page 3)

About 86 percent of the \$18.5 billion of merchandise shipped from the zones in 1984 were imported into the United States. Zones are used for import activities by firms utilizing foreign components. The following three examples illustrate how firms save on their cost of imports through the use of zones.

1. An importer may ship dutiable foreign products to a zone and store them until they are ready to be shipped to retailers. While in the zone, merchandise can be examined for defects and destroyed or sent back. In this fashion, the importer defers payment of duties, creating a cash flow advantage. Furthermore, the firm does not have to pay duties on defective merchandise.
2. When there are quotas, an importer may ship the good into a zone to be stored. Since most quotas are imposed for a limited time, the good can be stored until the quota is lifted. The importer may also manipulate the merchandise into a product not subject to the quota. In both ways, firms avoid quota restrictions.
3. There are many products for which duties on the finished good are lower than duties on intermediate inputs. One such product is typewriters; they are dutiable at about six percent if unassembled, but there are no duties on the fully assembled product. (Dulaney, 1980, page 91) In this case, parts are imported into a zone and the finished product enters the United States. The firm saves by taking advantage of the "inverted" or "upside-down" tariff. Imported parts may be mixed with domestic components in the zone. This is done on a large scale by transport equipment manufacturers. As another example, paper by itself is dutiable, but when used in the production of books is duty free. A publisher using foreign paper can set up a printing shop in a zone to

take advantage of this inverted tariff. This feature of FTZs resulted in manufacturing becoming the most important aspect of zone activity, accounting for 86 percent of the merchandise shipped from FTZs in 1984.

IV. FTZs AND EXPORTS

Although FTZs in the United States are used mostly for importing, the literature, Spinager (1984) for instance, stresses the role of FTZs in exporting for the less developed countries. Exports from FTZs in the United States have been as high as 40 percent of the outgoing shipment (1982). Multi-purpose zones contribute more to exports than subzones; in 1984 more than 39 percent of the total shipment from zones was destined to foreign countries, as opposed to just over 11 percent for subzones. The following are three examples of how export industries use FTZs.

1. FTZs may be used simply as a distribution center. Foreign merchandise is shipped to the zone, and after inspection is repacked and exported to a third country. If defective merchandise is found, it can be sent back to the country of origin or destroyed. In the absence of FTZs, the imported merchandise would have been levied a tariff. So the existence of FTZs makes this process less cumbersome and less costly.
2. Products for export may be assembled using foreign or domestic components. This benefit of using a zone rests in not having to pay duties on foreign components. When a firm located outside a zone exports a product containing foreign components, it can recover duties paid on the foreign components. Firms inside a FTZ do not have to go through the customs procedure of first paying duties and then filing for refunds when the merchandise is exported. This feature is being used for production of goods with a relatively high technology content, such as computers, health care equipment, and communication equipment. (Daponte, 1978, page 210) It should be noted that a product assembled using only foreign components in an FTZ can be shipped bearing the

"Made in USA" label. (USITC, 1984, page 22)

3. Domestic products which contain some foreign parts may be shipped to a zone to obtain "export status" before actually being shipped. This makes it possible for the manufacturer to recover duties paid on foreign parts. This is an example of the "drawback" procedure. Obtaining an accelerated export status is obviously beneficial. Merchandise such as liquor, tobacco products, trucks, and tires fall into this category. (Daponte, 1978, page 212)

V. AN HISTORICAL PERSPECTIVE OF FTZ PERFORMANCE

To evaluate the performance and impact of FTZs, detailed statistics on the operation of individual firms are needed. These statistics would include employment of various sorts of labor, productivity, foreign and domestic investment, capital stock, and duties avoided and collected. Unfortunately these data are not readily available. However, some aggregate data are available through the Foreign Trade Zones Board and International Trade Commission.

Tables I and II (page 209) show the four most active zones and subzones from 1978 to 1982, respectively. The four most active zones accounted for more than 73 percent of all merchandise shipped in 1982. These four zones were host to a wide range of firms, including Zenith Radio, General Electric, Kimball Piano, and Sears Roebuck. The firms in Table II accounted for more than 90 percent of outgoing shipments from all subzones in 1982. It should be mentioned that since 1982 the number of approved subzones has increased from 17 to 96, mostly due to greater participation of the automobile industry.

One way to measure the level of activity FTZs is to look at the movement of merchandise. As summarized in Table III (page 210), there has been a steady increase in the shipment of merchandise from 1978 to 1984. Total value of merchandise shipped to FTZs increased from \$806 million in 1978 to more than \$14.9 billion in 1984.

Table I
By The Value of Outgoing Shipments
The Most Active Multi-Purpose Zones

(millions of dollars)

Zone (number)	1978	1979	1980	1981	1982
1. McAllen, Texas (12)	87.1	135.4	271.0	308.3	685.7
2. Miami, Florida (32)	—	8.1	74.4	159.8	227.8
3. New Orleans, Louisiana (2)	55.8	34.3	80.2	76.0	118.2
4. New York, New York (1)	96.7	91.8	115.1	100.2	78.7
5. Others	151.8	331.4	413.0	335.8	414.4
Total	391.4	601.0	953.7	980.1	1,524.8

Table II
Most Active Subzones By Value
Of Outgoing Shipments

(millions of dollars)

Subzone	1978	1979	1980	1981	1982
1. Hawaiian Independent Refinery (9A)	338.1	428.8	683.0	867.4	894.9
2. Chrysler (70B)	—	—	—	—	743.0
3. Volkswagon of America (33A)	—	400.6	747.7	808.1	443.8
4. Honda of America (46B)	—	—	18.3	111.7	117.0
5. Others	13.8	24.5	41.9	119.7	209.0
Total	351.9	853.9	1,490.9	1,906.9	2,407.7

Table III

Movement of Merchandise

In Millions of Dollars
(Percent of Total)

Merchandise Shipped to FTZs	1978	1979	1980	1981	1982	1983	1984
Foreign	632 (78.5)	1,091 (71.7)	1,706 (65.7)	1,993 (65.9)	2,076 (61.0)	2,925 (45.0)	4,470 (30.0)
Domestic	174 (21.5)	431 (28.3)	889 (34.3)	1,032 (34.1)	1,324 (39.0)	3,575 (55.0)	10,430 (70.0)
Total	806	1,522	2,595	3,025	3,400	6,500	14,900

Merchandise Shipped Out To:	1978	1979	1980	1981	1982	1983	1984
Foreign	236 (31.8)	347 (23.9)	694 (28.4)	926 (32.1)	1,539 (39.2)	1,700 (21.0)	2,600 (14.0)
U.S.	507 (68.2)	1,108 (76.1)	1,750 (71.6)	1,961 (67.9)	2,393 (60.8)	6,395 (79.0)	15,971 (86.0)
TOTAL	743	1,455	2,444	2,887	3,932	8,095	18,571

As shown in Table III, there has been a steady increase in the percentage of domestic merchandise shipped to FTZs. In 1984, 70 percent of the merchandise shipped to the FTZs was of domestic origin, a tremendous increase over the 21.5 percent for 1978. This indicates that the domestic content of merchandise shipped from FTZs has been increasing over the years. Table III also includes figures for merchandise shipped to foreign and domestic markets. While there has been tremendous growth in outgoing shipments, most of this activity was directed toward the domestic market.

Inverted tariffs have caused automobile manufacturers, using both foreign and domestic components, to become the major subzone users. Table IV (page 212) lists the transportation (mainly automobile) manufacturers operating in subzones. In 1983 the number of approved subzones accelerated. All four major U.S. auto makers are operating in some capacity in FTZs, with General Motors having the largest number of plants. Foreign auto makers have also realized the significance of FTZs.

VI. THE THEORY OF FTZs

Since there are gains to be had from free trade, most economists (unless employed by a protected industry) would recommend the entire country become a free trade zone, albeit gradually. Protectionism in any form benefits small but politically active groups, namely capital owners and workers in the protected industry, while hurting the average consumer by raising prices and limiting available goods. When FTZs skirt protectionist measures, the country as a whole benefits at the expense of a few, with gains outweighing losses.

FTZs are somewhat akin to workers crossing the border for employment, except for income taxes collected by the foreign country and whatever the workers might spend across the border. Whether it happens to be a foreign or a domestic firm setting up operation in a zone is in a sense irrelevant, since specialization according to comparative advantage determines which activity is best suited for a particular location. Financing

Table IV
Transport Manufacturers Operating in Subzones

<u>Firm</u>	<u>Location</u>	<u>Date Approved</u>
1. Volkswagen	Westmoreland Co., Pa	1977
2. Honda	Union City, OH	1979
3. Kawasaki	Lincoln, NE	1980
4. Ford	Romeo, MI	1981
5. American Motors	Kenosha, WI	1981
6. Chrysler	Detroit, MI	1982
7. Nissan	Nashville, TN	1982
8. Ford	Wayne, MI	1983
9. Chrysler	Grante City, IL	1983
10. Ford	Landsdale, PA	1983
11. Ford	Claycomo, MO	1983
12. General Motors	Atlanta, GA	1983
13. Toyota	Long Beach, CA	1983
14. Ford	Wixom, MI	1983
15. Ford	Dearborn, MI	1983
16. Jeep Corp.	Toledo, OH	1984
17. Ford	Edison, NJ	1984
18. Ford	Hazelwood, MO	1984
19. Chrysler	Neward, DE	1984
20. Ford	Louisville, KY	1984
21. Ford	Lorain, OH	1984
22. GM	Wilmington, DE	1984
23. GM	Ypsilanti, MI	1984
24. GM	Pontiac, MI	1984
25. GM	Kokomo, IN	1984
26. GM	Oklahoma City, OK	1984
27. Porsche	Reno, NV	1984
28. Porsche	Charleston, SC	1984
29. Winnebago, Inc.	Forest City, IA	1984
30. Nummi, BMS Toyota	Fremont, CA	1984
31. Caterpillar	Peoria, IL	1984
32. GM	Kansas City, MO	1985
33. GM	Lordstown, OH	1985
34. GM	North Tarrytown, NY	1985
35. Chrysler	Sterling Heights, MI	1985
36. GM	Janesville, WI	1985
37. GM	Oak Creek, WI	1985
38. Ford	Hapeville, GA	1985
39. GM	Kansas City, KS	1985
40. GM	Linden, NJ	1985
41. Ford	Chicago, IL	1986
42. Chrysler	Indianapolis, IN	1986
43. Chrysler	Kokomo, IN	1986
44. Chrysler	New Castle, IN	1986
45. Mazda	Flat Rock, MI	1986

for either domestic or foreign firm operations can come from either domestic or foreign countries. Opposition to FTZs can be expected to come from the same groups that support protectionism. Although FTZs are not much in the news, opposition to FTZs can be anticipated with any wave of protectionism.

A complete theory of FTZs would be based on a general equilibrium model, so the gains and losses of various groups could be examined. Characteristics which should be developed by the theory include those found in the examples given in Sections III and IV. In this section, partial equilibrium conditions which would induce firms to establish FTZs in each of those examples are stated. Thus some of the characteristics which a complete theory must contain are specified. It would be a simple exercise to develop results with supply and demand diagrams involving losses and gains pictured by consumer and producer surpluses. Such an analysis could serve as the basis of an empirical study, pending the accumulation of reliable data regarding zone operations.

Regarding the use of zones in importing, a zone will be used as a distribution center whenever:

$$b_i > z_i$$

where:

b_i = the benefit of processing a unit of good

z_i = the unit cost

Zones will be used for "quota skirting," either manipulating the product or simply waiting for a quota to expire, whenever:

$$p_i > p_i^* + q_i$$

where:

p_i = the domestic price of good (i)

p_i^* = the foreign price of good (i)

q_i = the average or unit cost of skirting the quota

Inverted tariffs involve intermediate goods or components which may be imported. For notation:

d_i = the domestic costs of assembling a unit of good (i)

t_i = the tariff rate on a unit of good (i)

u_i = the tariff rate on the component used in good (i)

m_i^* = the price of the component.

The cost of a unit of good (i) assembled in an FTZ is

$$c_1 = (d_i + m_i^*)(1 + t_i)$$

while producing the good domestically with no FTZ has unit cost

$$c_2 = d_i + m_i^*(1 + u_i)$$

and importing a unit of the good costs

$$c_3 = p_i^*(1 + t_i).$$

Operations in the zone replace domestic production whenever

$$c_1 < c_2 < c_3$$

and replace imports whenever

$$c_1 < c_3 < c_2$$

If c_2 or c_3 were lowest, then production would be characterized by domestic production without FTZs or imports respectively. It is a simple exercise to see how changing tariffs on components or finished goods can affect the decision of where to locate production.

On the export side, FTZs are again utilized for three basic purposes. Ignoring transportation costs which could readily be added, an FTZ will gain

good (i) for distribution from country (1) to country (2) whenever

$$P_i^1(1 + n_i) < P_i^2 < P_i^1(1 + n_i)(1 + t_i)$$

where:

P_i^j = the cost of good (i) in country (j), $j = 1, 2, \dots, n$

n_i = the rate of distribution cost per value unit of the good.

Considering export assembly with foreign components, a good will be attracted to a FTZ whenever:

$$d_i + m_i^* < P_i^* < d_i = m_i^*(1 + u_i)$$

The third way FTZs could be used for export involved drawbacks, either import duties or excise tax refunds. For notation:

e_i = the drawback benefit per unit

z_i = the unit cost of utilizing the zone

Clearly the zone will be used whenever $e_i < z_i$.

Much could be done in an application to develop any of these conditions. A complete model would not only characterize these conditions for zone utilization, but also capture manners in which zones affect the general equilibrium in the local or national economy. Zones represent an area ripe for economic research, at both theoretical and empirical levels.

VII. CONCLUDING REMARKS

In recent years FTZs have become popular, especially with manufacturing industries. Most of the increased activity has occurred because of inverted tariffs. FTZs have attracted direct investment by foreign firms. This is most evident in the automobile industry; foreign manufacturers would likely not have brought operations into this country

in the absence of FTZs.

Another view, which includes arguments of national labor unions, suggests that FTZs have harmed import competing industries and smaller firms which cannot take advantage of FTZs. According to this view, FTZs have accomplished a shift in employment at the expense of areas without zones. Industries effectively protected by trade barriers have been hurt by the FTZs.

From a policy perspective, FTZs allow firms to avoid protective legislation which is the product of a political process. FTZs encourage free trade and alter the political process of protectionism.

The need for comprehensive models and systematic econometric analyses of FTZs grows with their activities. Any current judgment about the impact of FTZs remains speculative. Looking at the entire economy, there is no doubt that zones are beneficial. Comparisons across regions will show variation in this benefit, especially if regions without zones are included.