RANITIDINE HYDROCHLORIDE: THE POTENTIAL IMPACT ON DOMESTIC COMPETITION IN THE ANTIULCER DRUG MARKET OF A TEMPORARY DUTY SUSPENSION ON IMPORTS

Report to the Senate Committee on Finance on Investigation No. 332–300 under Section 332(g) of the Tariff Act of 1930

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PREFACE

The Commission instituted this investigation on October 31, 1990, following the receipt of a letter of request therefor on October 16, 1990, from the Committee on Finance of the U.S. Senate.[1] The Committee requested that the Commission conduct an investigation under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)) to study the potential impact on domestic competition in the antiulcer drug market of suspending temporarily the duty on U.S. imports of ranitidine hydrochloride.

In its request, the Committee stated that H.R. 1594, as passed by the Senate, provided for the suspension of the existing tariff on imports of ranitidine hydrochloride (provided for in subheading 2932.19.50 of the Harmonized Tariff Schedule of the United States). The Committee said that the conference report on H.R. 1594 (later passed as the Customs and Trade Act of 1990, P.L. 101-382, which did not include the provision for the duty-suspension) stated that the House conferees were unable to accept the Senate provision because of strong opposition from domestic interests and the Administration. The Committee also stated that the conferees agreed, as part of the conference agreement, to request a Commission study of domestic competition in the antiulcer drug market to determine the potential impact of the provision. The Committee said that the House conferees had also agreed to hold public hearings on this issue and that, pursuant to this commitment, the Subcommittee on Trade of the House Committee on Ways and Means held a hearing on September 24, 1990.

Public notice of the investigation was given by posting copies of the notice at the Office of the Secretary, U.S. International Trade Commission, Washington, DC, and by publishing the notice in the *Federal Register* of November 8, 1990 (55 F.R. 47013).[2]

The information presented in this report was obtained from a variety of sources, including official Government statistics, industry representatives, and trade publications. Information on the topic was also gathered from the hearing held by the Ways and Means Subcommittee of the U.S. House of Representatives on September 24, 1990.

[1] Both Chairman Bentsen's request and Acting Chairman Brunsdale's reply on behalf of the Commission are reproduced in app. A.

[2] A copy of the Commission's Notice of Investigation which appeared in the *Federal Register* is reproduced in app. A.

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EXECUTIVE SUMMARY

A bill that would have provided duty-free entry for imported ranitidine hydrochloride[1] from most-favored-nation sources was introduced in the Senate on July 18, 1989, as S. 1342. A House counterpart bill was introduced on August 3, 1989, as H.R. 3130.[2] However, because of opposition from SmithKline Beecham,[3] the Administration, and from some members of Congress, the Senate Finance Committee was unable to agree on the provision and, as a result, it was not included in the noncontroversial miscellaneous tariff bills voted out of committee. Moreover, as indicated during the September 24, 1990, hearing held by the Subcommittee on Trade of the House Ways and Means Committee, House conferees on H.R. 1594 would not accept the inclusion of the provision for duty-free entry of imported ranitidine hydrochloride in the final proposed text of H.R. 1594, the Customs and Trade Act of 1990, because of this opposition. As requested by the Committee on Finance of the U.S. Senate and instituted by the Commission on October 31, 1990, this investigation will provide information pertaining to the potential impact on the domestic competition in the antiulcer drug market of suspending temporarily the duty on U.S. imports of ranitidine hydrochloride.

Industry sources estimated that the U.S. prescription antiulcer drug market was valued at $2.15 billion in 1989, compared with $825 million in 1985. In 1989, seven products, including Tagamet and Zantac, were sold in the U.S. prescription antiulcer drug market. In terms of value, Tagamet and Zantac accounted for 51 percent and 22 percent of the market, respectively. Of the seven domestic companies marketing these drugs in the United States, five have some foreign affiliation with respect to their antiulcer product.

In 1989, the total value of U.S. imports of the active ingredients in the seven antiulcer drugs under consideration was about $530 million, an increase of almost 50 percent compared with the estimated $350 million of imports in 1988. The estimated growth in imports of these products is expected to at least keep pace with the 9.5 percent average annual growth rate for the U.S. market for these products during 1991-95. Glaxo[4] is expected to account for least 65 percent of U.S. imports of the active ingredients during 1991-93, compared with 88 percent in 1985. Industry sources have indicated that U.S. exports of the active ingredients in these products during 1985-89 were negligible.

The highlights of the report are as follows:

- **Price competition in the antiulcer market can be affected by a number of factors, including changes in the structure of an industry, changes in future product mixes, and by pricing strategies.**

The U.S. pharmaceutical industry underwent a number of corporate mergers during the past decade. This trend towards consolidation, both on a domestic and an international basis, is continuing into the 1990s. In addition to mergers and joint ventures, a number of companies are entering into strategic alliances. In the antiulcer drug industry, Glaxo was the first company to enter a strategic alliance when it entered into an agreement in 1983 with Hoffmann-LaRoche, allowing Hoffmann-LaRoche to market Zantac (under the Glaxo trade name) in the United States. International strategic alliances and partnerships have since become an integral part of the antiulcer drug industry, as indicated by the number of licensing agreements currently in effect.

The current growth rate in the U.S. antiulcer market, about 15 percent, is expected to decrease to about 9.5 percent during 1991-95. Future competition from new products, including effective over-the-counter products; the availability of lower priced generic products; and possible legislation aimed at curbing price increases might lower the future growth rate and make the industry more price competitive.

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[1] Ranitidine hydrochloride is the active ingredient in Glaxo's brand-name product Zantac,® one of the seven prescription antiulcer drugs in the U.S. market. Zantac® is a registered trademark.

[2] Both pieces of legislation were introduced on behalf of Glaxo. Glaxo imports ranitidine hydrochloride from Singapore and the United Kingdom.

[3] SmithKline Beecham produces a brandname antiulcer product, Tagamet,® domestically. Tagamet® is a registered trademark. Tagamet was the first histamine H_2-receptor antagonist introduced in the United States for general clinical use. Cimetidine hydrochloride is the active ingredient in Tagamet.

[4] Glaxo is the company seeking to have the U.S. duty temporarily suspended on imports of ranitidine hydrochloride.

Another factor, pricing strategies, is affected by the market structure, which is unique to the U.S. pharmaceutical industry. In this market, the producer is separated from the ultimate consumer inasmuch as the purchase decision is made primarily by physicians and hospital formularies. As noted in a Federal Trade Commission study, "The ultimate consumer of drugs has only indirect control over the drug purchase decision." According to yet another study, however, "There is no reason to suppose that doctors will not be price sensitive agents on behalf of their patients' needs . . ."

- **One of the questions raised during the hearing held by the Subcommittee on Trade of the House Ways and Means Committee of the U.S. House of Representatives was the question of the actual value of the annual Customs revenue loss if this duty suspension is enacted. It is estimated that the average annual Customs revenue loss would be an estimated $11 to $13 million.**

In the hearing before the Subcommittee, witnesses agreed with USITC estimates of annual Customs revenue losses ranging from $11 to $13 million. The witnesses also agreed with the Congressional Budget Office estimates of a net revenue loss to the U.S. Treasury ranging from $7 to $9 million, which takes into account the availability of the business expense deduction for corporate taxpayers.

- **Glaxo and SmithKline Beecham's promotional efforts are unlikely to be directly linked to the outcome of any duty suspension granted.**

The two products with the largest share of the U.S. antiulcer drug market during the period of this investigation were Tagamet and Zantac. Correspondingly, these were the two products that were the subject of the largest promotional activity. As a percent of total "detailing," or calls made by a company's sales force on physicians to describe a product's efficacy and the benefits to the patient that would accrue through use of the product, Zantac's share has declined from 60 percent in 1985 to 33 percent in 1989; Tagamet's share has declined from 40 percent in 1985 to 17 percent in 1989.

One argument that was put forward during the Congressional hearing on this issue asserted that the likely outcome of a duty suspension on ranitidine hydrochloride would be that Glaxo would increase its promotional budget for Zantac by an amount equal to the duty paid. If Glaxo were to use the savings from a duty suspension on ranitidine hydrochloride for increased advertising, it could increase its promotional expenses by as much as 20 percent.

- **If the requested temporary duty suspension for ranitidine hydrochloride is granted, the price and U.S. consumption of the other antiulcer products discussed in this report would, at most, decline by 0.25 percent and 1.24 percent, respectively, and U.S. consumption of Zantac would increase at most by 2.16 to 2.60 percent.**

The potential impact of suspending the 3.7 percent duty on ranitidine hydrochloride is modeled by an imperfect substitutes model using 1989 data. It is assumed that Zantac and its competitors are imperfect substitutes and that two primary markets exist: 1) a market for Zantac and 2) a market for a composite good representing the other antiulcer medications.

The estimates presented in this report should be interpreted as upper bound estimates. Therefore, assuming a full-pass-through of the duty to the final consumer, it is estimated that Glaxo would lower the price of Zantac by 0.82 percent. It is estimated that the price of the non-Zantac good would decrease by 0.18 to 0.25 percent and that U.S. consumption of the non-Zantac good would fall by 0.91 to 1.24 percent. In the non-Zantac market the change in revenue, represented by both the price and quantity effects, is estimated to be $11.0 to $15.1 million. Whereas U.S. consumption of Zantac would increase by 2.16 to 2.60 percent, or by $24.5 to $29.4 million.

Based on 1989 data, the results of the model indicate that, at most, Zantac's market share (based on total sales) would increase by 1.1 to 1.4 percent. Similarly, the results indicate that, at most, Tagamet's market share (based on total sales) would decline by 0.27 to 0.37 percent, Carafate's by 0.09 to 0.13 percent, Pepcid's by 0.10 to 0.14 percent, and Axid's by 0.03 to 0.04 percent.

Introduction

This investigation was conducted at the request of the Committee on Finance of the U.S. Senate for the purpose of providing information pertaining to the potential impact on the domestic competition in the antiulcer drug market of suspending temporarily the duty on U.S. imports of ranitidine hydrochloride. Ranitidine hydrochloride is the active ingredient in Zantac, one of the seven prescription antiulcer drugs in the U.S. market.[1]

Scope of Report

This report provides a summary of data and other information on the U.S. antiulcer market for the past 5 years, and expected developments in the of the U.S. market during the next 3 years. Factors such as the structure of the U.S. industry, the size of the domestic market, and U.S. trade flows are examined. The report describes the tariff treatment of this product under both the *Tariff Schedules of the United States (Annotated)* (TSUSA) and the *Harmonized Tariff Schedule of the United States* (HTS). In addition, the report provides estimates, based on an economic analysis of the market, of the potential impact that granting a duty suspension for ranitidine hydrochloride could have on the U.S. antiulcer drug market.[2] The report also discusses possible additional promotional spending by Glaxo that could result from having these funds available if the duty suspension is granted, as well as the differing tax situations in Puerto Rico and Singapore.[3]

Legislative History

The first bill that would have provided duty-free entry for imported ranitidine hydrochloride[4] from most-favored-nation sources was introduced in the Senate on July 18, 1989, as S. 1342.[5] A House counterpart bill was introduced on August 3, 1989, as H.R. 3130.[6] Because of the date of introduction of the House measure (required to proceed first, as a bill affecting revenues), the proposal could not be included in the initial group of miscellaneous tariff bills sent to the Senate at the end of 1989 in H.R. 3299.

During review of miscellaneous tariff bills by the Senate Committee on Finance, early in 1990, SmithKline Beecham, a major U.S. drug company with antiulcer drug production facilities in Puerto Rico, indicated its opposition to S. 1342. The Administration also indicated that it opposed the bills. Other industry representatives stated that they would not object, largely due to their own ongoing effort to obtain worldwide duty-free entry for all pharmaceutical products and intermediates. As a result of the opposition, S. 1342 was not included in the group of miscellaneous tariff measures approved by the Committee on Finance for consideration early in 1990. Ultimately, following a floor amendment and debate,[7] the proposed duty suspension was included in the Senate version of H.R. 1594, the Customs and Trade Act of 1990, passed on April 24, 1990. A separate measure to suspend duties on the subject product failed to win approval during a second round of House consideration of miscellaneous tariff bills. The conference report on H.R. 1594 reflects the differences of opinion as to the duty suspension proposal. Senate conferees were compelled to recede from the Senate provision and to withdraw what was then section 1438 of the Senate bill:[8]

> The House conferees were unable to accept this provision because of strong opposition from domestic interests and the Administration. In light of the fact that a number of competing allegations have been made with respect to this product, however, the House conferees agree to hold public hearings on this issue this year. The conferees further agree to request an ITC study of the domestic competition in the ulcer drug market to determine the potential impact of this provision. The House conferees agree not to object to the inclusion of this provision in a subsequent tax bill solely on the grounds that this is a trade matter if the House's hearings demonstrate that the proposed relief does not adversely impact domestic competition.

The Subcommittee on Trade of the House Ways and Means Committee conducted the hearing on September 24, 1990.[9] Witnesses for Glaxo and SmithKline and for the Administration testified concerning the proposal, with the Administration withdrawing its earlier stated opposition to the measure pending the outcome of the Commission study. Both oral testimony and written submissions indicate the continuing divergence of views of the two antiulcer drug manufacturers.

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[1] Zantac,® a registered trademark, is the brandname of Glaxo's antiulcer product. SmithKline Beecham produces another brandname antiulcer product, Tagamet,® domestically. Tagamet® is a registered trademark. Cimetidine hydrochloride is the active ingredient in Tagamet.

[2] The model used in the economic analysis is presented in app. D.

[3] These issues were raised in the hearing before Subcommittee on Trade of the House Ways and Means Committee on Sept. 24, 1990.

[4] Ranitidine hydrochloride is the active ingredient in Glaxo's brand-name product Zantac,® one of the seven prescription antiulcer drugs in the U.S. market. Zantac® is a registered trademark.

[5] As introduced by Senator Sanford on July 18, 1989, 1st Session, 101st Congress.

[6] As introduced by Mr. Valentine on August 3, 1989, 1st Session, 101st Congress. Both pieces of legislation were introduced on behalf of Glaxo. Glaxo imports ranitidine hydrochloride from Singapore and the United Kingdom.

[7] See *Congressional Record* for Apr. 24, 1990, pp. S4885-92.

[8] Conference Report on Customs and Trade Act of 1990, House of Representatives Report 101-650 (July 30, 1990), p. 202.

[9] See *Congressional Record* for Sept. 24, 1990, p. D1163.

However, as a result of the hearing, general agreement as to the potential impact on Government revenues of the potential duty suspension was reached. The witnesses agreed with the Commission estimates of annual Customs revenue losses ranging from $11 to $13 million. They also agreed with Congressional Budget Office (CBO) estimates of overall revenue loss ranging from $7 to $9 million, which took into account the availability of the business expense deduction for corporate taxpayers.[10]

Brief Review of the Antiulcer Drug Market in the United States

Ulcers are inflammatory lesions on the stomach or intestinal wall lining usually caused by acids generated in the stomach. According to a number of sources, the U.S. prescription antiulcer drug market currently consists of seven products.[11] The tabulation at the bottom of the page lists the products in alphabetical order by their brand name,[12] the generic name of the active ingredient used in each, and the names of the companies that manufacture the finished brand-name product in the United States.

These products represent several approaches to treating ulcers. Although all have different chemical structures, some are very similar in terms of therapeutic efficacy. It is estimated by industry sources that in 1989 the U.S. prescription antiulcer drug market was valued at $2.15 billion, compared with $825 million in 1985. Figure 1 indicates the relative share of the U.S. market in 1989, by value, held by each of the products listed above. Figure 2 shows the growth in the U.S. antiulcer market during the past five years.

[10] The Commission estimates of Customs revenue losses were derived by applying the column 1-general duty rate of 3.7 percent to Glaxo's estimates of U.S. imports of the bulk product during the lifetime of the legislation. CBO reportedly applies the business expense deduction to the annual Customs revenue loss.

[11] Over-the-counter (OTC) medications for the relief of gastrointestinal problems are used in conjunction with many of the products that are available by prescription, but are not, however, considered to be directly competitive to the prescription products. As such, OTC medications are not included in the scope of this report.

[12] The brand names are registered trademarks.

U.S. Tariff Treatment of Antiulcer Drugs

Tariff Treatment in the HTS and the TSUS

Ranitidine hydrochloride is provided for in subheading 2932.19.50 of the HTS, a residual or "basket" provision for nonenumerated heterocyclic compounds of specified molecular structures. In 1990, the most-favored-nation (column 1-general) duty rate was 3.7 percent ad valorem, and the column 2 duty rate was 25 percent ad valorem.[13] These rates of duty are identical to those that applied prior to 1989 under the former TSUSA. Duty-free entry is afforded to eligible goods under the Generalized System of Preferences (GSP), the Caribbean Basin Economic Recovery Act (CBERA), and the United States-Israel Free-Trade Agreement. Goods originating in the territory of Canada are eligible to enter under the 1990 duty rate of 2.2 percent ad valorem. The corresponding duty rate for 1991 is 1.4 percent ad valorem; for 1992, 0.7 percent ad valorem; and for 1993 and thereafter, free. The six other antiulcer drugs competing with ranitidine hydrochloride have column 1-general rates, ranging from 3.7 percent to 8.0 percent ad valorem.[14] If imported,

[13] The rates of duty in rate column 1-general of the HTS are most-favored-nation (MFN) rates and, in general, represent the final stage of the reductions granted in the Tokyo Round of the Multilateral Trade negotiations. Column 1-general duty rates are applicable to imported goods from all countries except those Communist countries and areas enumerated in general note 3(b) to the HTS, whose products are dutied at the rates set forth in column 2; the People's Republic of China, Hungary, Poland, and Yugoslavia are the only Communist countries eligible for MFN treatment. Among articles dutiable at column 1-general rates, particular products of enumerated countries may be eligible for reduced rates of duty or for duty-free entry under one or more preferential tariff programs. Such tariff treatment is set forth in the special rates of duty subcolumn of column 1.

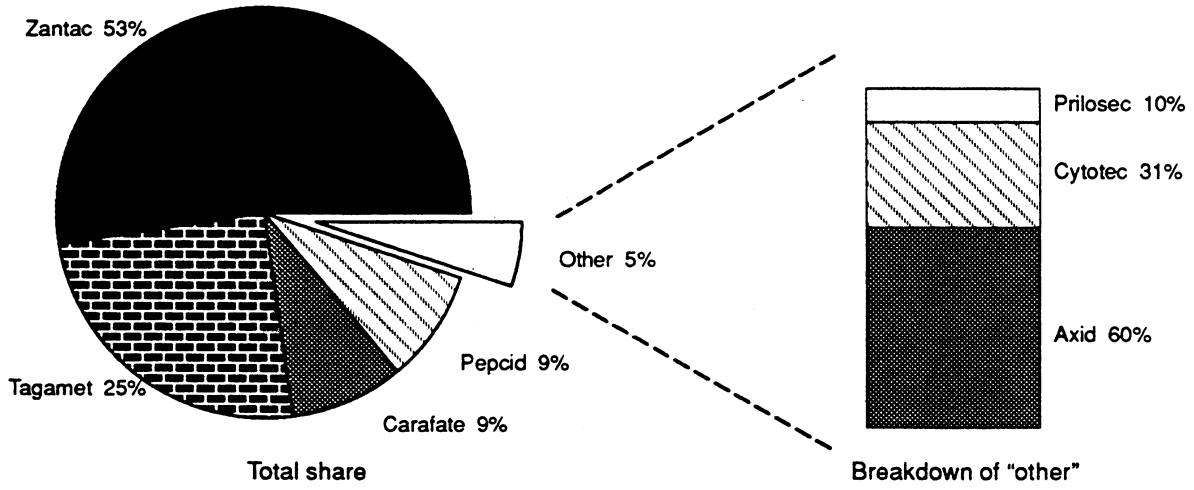
The column 1-general rate of 3.7 percent applies to all imported ranitidine hydrochloride, which is produced in the United Kingdom and Singapore. The latter country became ineligible for benefits of the Generalized System of Preferences as of January 1, 1989.

[14] The column 1-general rate of duty on U.S. imports of sucralfate is temporarily suspended through December 31, 1992 (see heading 9902.31.06 of the HTS).

Brand name	*Generic name*	*Manufacturer*
Axid	Nizatidine	Eli Lilly & Co.
Carafate	Sucralfate	Marion Merrell Dow Inc.[1]
Cytotec	Misoprostol	G. D. Searle & Co.
Pepcid	Famotidine	Merck & Co., Inc.[2]
Prilosec	Omeprazole	Merck & Co., Inc.[3]
Tagamet	Cimetidine hydrochloride	SmithKline Beecham
Zantac	Ranitidine hydrochloride	Glaxo Inc.[4]

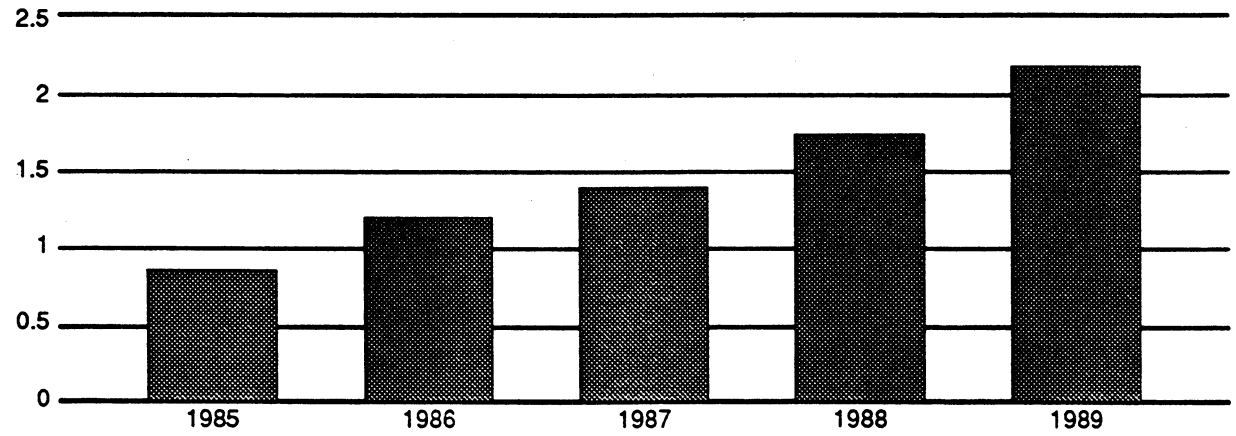
[1] Marion Merrell Dow is the U.S. licensee for Chugai Corp. (Japan).
[2] Merck is the U.S. licensee for Yamanouchi Chemical Co. (Japan).
[3] Merck is the U.S. licensee for Astra (Sweden).
[4] Glaxo entered into an agreement in 1983 with Hoffmann-LaRoche, allowing Hoffmann-LaRoche to market Zantac (under the Glaxo trade name) in the United States.

Figure 1
Percent market share, 1989 (in terms of sales)



Source: IMS

Figure 2
U.S. Antiulcer Market, 1985–89 sales (in billions of dollars)



Source: IMS

the finished drug Zantac is classifiable in HTS subheading 3004.90.60 with a 6.3 percent ad valorem MFN duty rate.

Table 1 sets forth the applicable duty treatment for various active ingredients for the antiulcer drugs[15] described by industry sources as competitive in the United States and in the European Community, one of the production sites of ranitidine hydrochloride.[16] None of these products is apparently subject to duty if imported into Singapore, the other location of ranitidine hydrochloride production.[17]

[15] Suspensions or reductions in applicable EC rates of duty are not reflected in this table. EC rates of duty were obtained from the Integrated Tariff of the European Communities, established under Council Regulation (EEC) No 2658/87 of July 23, 1987, *Official Journal of the European Communities* No L 256 (Sept. 7, 1987), p. 1.

[16] According to a letter from the Department of Trade and Industry in the United Kingdom that was included in a submission to the Commission from SmithKline (November 14, 1990), Glaxo successfully opposed Merck's efforts to obtain an extension of a duty suspension for famotidine in the European Community in 1987.

[17] As reflected in Singapore tariff schedule published in the *International Customs Journal* (generally referred to by its French name, Douanes).

Table 1
Antiulcer drugs: Tariff treatment of active ingredients, by subheading, 1990.

Article description and HTS subheading	*Col. 1–gen.*	*U.S. duty rates (Percent ad valorem) Col. 1–special*[1]	*Column 2*	*European Community 3rd country duty rates*
Misoprostol–2918.90.50	4	Free (A, E, IL) 2.4 (CA)	25	7.4
Ranitidine hydrochloride–2932.19.50	3.7[2]	Free (A, E, IL) 2.2 (CA)	25	8
Cimetidine hydrochloride–2933.29.45.	3.7[3]	Free (A, E, IL) 2.2 (CA)	25	5.5
Omeprazole–2933.39.35	8	Free (E, IL) 4.8 (CA)	15.4¢/kg +65	8
Nizatidine–2934.90.25	6.9[4]	Free (A, E, IL) 4.1 (CA)	15.4¢/kg +45	8
Famotidine–2935.00.46	6.9[5]	Free (CA, E, IL)	15.4¢/kg +45	6.6
Sucralfate–2940.00.00.	5.8[6]	Free (A, CA, E, IL)	50	20

[1] These special rates pertain to the following programs, indicated after the symbol utilized in the HTS and in this table: A–GSP; CA–United States–Canada Free–Trade Agreement; E–CBERA; and IL–United States–Israel Free–Trade Area Implementation Act of 1985. For additional explanatory information, see general note 3 to the HTS.
[2] Temporary duty suspension sought–see H.R. 3130 and S. 1342.
[3] Manufactured in Puerto Rico–no U.S. duties collected.
[4] Manufactured in Indiana–no U.S. duties collected.
[5] Temporary duty suspension sought during 101st Congress–see H.R. 4648.
[6] Duty temporarily suspended; see heading 9902.31.06 of the HTS.

Special Tariff Provisions

According to U.S. Customs Service officials at the port of Miami, FL, Glaxo has recently made 3 claims for so-called "same condition" drawback under section 313(j) of the Tariff Act of 1930 (19 U.S.C. 1313(j)). Under this subsection, duties, taxes, or fees paid upon importation (minus 1 percent for administrative costs) are, upon proper claims, refunded to importers who export or destroy the imported merchandise without having changed its condition or having used it in the United States. The exported goods may comprise fungible domestic or other imported merchandise, held in the possession of the claimant for drawback, where the goods are exported within 3 years of the date of the imported goods that are the basis for the claim and are in the same condition as were the imported goods at their date of entry. The latter category of drawback is commonly described as "same-condition substitution" drawback.

Precise information as to the quantities of goods or amounts of duty payments to be refunded cannot be included here because the pertinent documents are not publicly available. However, based upon the information obtained from Customs, none are believed to be significant. Because such drawback claims are provided for by law, any collected duties being potentially refunded to Glaxo should not be counted as lost customs revenues when evaluating the proposed duty suspension. No other special provisions of the customs laws are known to be utilized with respect to ranitidine hydrochloride.

Structure of the U.S. Antiulcer Drug Industry

Producers and products

The U.S. pharmaceutical industry, like other segments of the chemical industry, underwent a number of corporate mergers during the 1980s (see table 2). This trend towards consolidation, both on a domestic and an international basis, is continuing into the 1990s.

In addition to mergers and joint ventures, however, a new concept of "strategic alliance" or "partnerships" is becoming more popular. Strategic alliances are considered to be more focused in terms of objectives than joint ventures, yet more flexible in performance. According to analysts, partnerships that fall outside the range of joint ventures take one of three forms: (1) a company takes a minor equity holding in a second

Table 2
Antiulcer drugs: Recent mergers in the U.S. pharmaceutical industry, 1985–90

Year	*Acquired company*	*Acquiring company*
1990	Rorer	Rhone–Poulenc
	Genentech	Hoffmann–LaRoche
1989	SmithKline[1]	Beecham
	Squibb	Bristol Myers
	Marion Laboratories	Merrell Dow
1988	Pennwalt (Ethical Drugs Division)	Fisons (plc)
	Sterling Drug	Eastman Kodak
1987	Robbins	American Home Products
1986	Revlon Ethical Drug Div.	Rorer
1985	G.D. Searle	Monsanto

[1] Although SmithKline Beecham can be considered a "transnational" company, it should be noted that the firm is now based out of London. SmithKline USA is based in Philadelphia, Pennsylvania.

company, (2) companies share a distribution network, or (3) companies share technology.[18] The trend for strategic alliances is most prevalent where technology is changing and distribution is important.

In the antiulcer drug industry, Glaxo was the first company to enter a strategic alliance when it entered into an agreement in 1983 with Hoffmann-LaRoche, allowing Hoffmann-LaRoche to market Zantac (under the Glaxo trade name) in the United States. In late 1987, SmithKline and DuPont agreed to jointly market Tagamet; that agreement, however, is no longer in effect. International strategic alliances and partnerships have since become an integral part of the antiulcer drug industry, as indicated by the number of licensing agreements currently in effect (see table 3).

Prior to 1977, ulcers were generally treated first with medications that acted locally in the stomach by neutralizing gastric acidity or by coating the stomach lining with a viscous barrier. This barrier reduced or prevented the access of gastric secretions to the ulcer site, allowing it to heal.[19] If the medications failed to heal the ulcer, surgery was often the only answer.

In 1977, however, cimetidine hydrochloride was introduced in the United States for general clinical use. Cimetidine hydrochloride, as the first histamine H_2-receptor antagonist, represented a new generation of antiulcer drugs. H_2-antagonists treat ulcers on a systemic basis by blocking the ability of histamine to stimulate gastric acid secretion, thus inhibiting gastric acid secretion. In some cases, once the ulcer is cured, the H_2-antagonist is prescribed on a "maintenance" basis to prevent recurrence. New generations of H_2-antagonists entered the U.S. market in the 1980s, including ranitidine hydrochloride (1983), famotidine (1987), and nizatidine (1988). As shown in table 2, two of the H_2-antagonists, cimetidine hydrochloride and nizatidine, are produced in the United States. Glaxo and Merck formulate imported bulk active ingredient (ranitidine hydrochloride and famotidine, respectively) into dosage form in the United States.

Sucralfate, a pepsin inhibitor, is the active ingredient in the brand-name product Carafate. Carafate was introduced to the U.S. market in late 1981. Although the exact mechanism of action of the product in peptic ulcer disease is unclear, once ingested, sucralfate forms a barrier at the ulcer site and protects the ulcer from continued attack by pepsin, acid, and bile, allowing the ulcer to heal. Carafate is generally indicated for the short-term treatment of duodenal ulcer. According to a company representative, it is the only nonsystemic pharmaceutical product approved by the Food and Drug Administration (FDA) for the short-term treatment of duodenal ulcer disease. Sucralfate has recently received FDA approval for maintenance (i.e., long-term) treatment of duodenal ulcers. Marion Merrell Dow formulates imported bulk active ingredients (sucralfate) into dosage form in the United States.[20]

Misoprostol, the active ingredient in the brand-name product Cytotec, received FDA approval in late 1988 and entered the market soon after. Like the H_2-antagonists, misoprostol, an analog of prostaglandin E, also regulates acid secretions. It is generally prescribed for patients with arthritis who must take relatively large doses of non-steroidal antiin-

[18] Andrew Baccone, President Kline & Co., reported in "The Case For Alliances", *Chemical Week*, May 30, 1990, p. 30.

[19] "Agitation in a Crowded Anti-Ulcer Drug Market," *Chemical Week*, Jan. 25, 1989, p. 8.

[20] The column 1-general rate of duty on U.S. imports of sucralfate is temporarily suspended through December 31, 1992 (see heading 9902.31.06 of the HTS).

Table 3
Antiulcer drugs: Activity in the antiulcer drug market

Active ingredient (Brand name)	*U.S. company*	*Source of active Ingredient*	*Background*
Cimetidine (Tagamet)	SmithKline Beecham	Puerto Rico[1]	Both the active ingredient and the finished product are manufactured in the SmithKline Beecham's facilities in Puerto Rico.
Famotidine (Pepcid)	Merck	Ireland	Since 1990, the active ingredient has been manufactured by the Yamanouchi Chemical Company in Ireland and then sold to Merck who formulates the bulk into finished product at their West Point, PA, facility and markets it in the United States.
Misoprostol (Cytotec)	Searle	Puerto Rico	Both the active ingredient and the finished product are manufactured in G. D. Searle's facilities in Puerto Rico.
Nizatidine (Axid)	Lilly	Indiana	Manufactured domestically.
Omeprazole (Prilosec)	Merck	Sweden	Astra (Sweden) manufactures omeprazole the active ingredient in Sweden and sells it to Merck; Merck then formulates the bulk into dosage form in their Wilson, NC, facility and markets the finished product in the United States.
Ranitidine (Zantac)	Glaxo USA/ Hoffman–LaRoche	Singapore United Kingdom	Active ingredient manufactured by Glaxo UK primarily in Singapore and then sold to Glaxo USA, who formulates it in Zebulon, NC, and markets it domestically.
Sucralfate (Carafate)	Marion Merrell Dow	Japan	Active ingredient imported in bulk from the Chugai Corporation (Japan); then formulated in Kansas City, MO, and marketed in the United States by Marion Merrell Dow.

[1] Puerto Rico, according to the U.S. Customs Service, is included in the term "customs territory of the United States."

flammatory agents (NSAIAs). Misoprostol allows for the replacement of prostaglandins that are depleted by the NSAIAs. Misoprostol is manufactured in the United States by G.D. Searle.

Omeprazole, a "proton pump," represents the newest generation of antiulcer drugs. The product is the active ingredient in the brand-name product Prilosec. Prilosec was launched in the United States in October 1989. Unlike H2-antagonists, which do not always inhibit all production of gastric acid, proton pumps suppress gastric acid secretion by blocking the final step of acid production in the cell itself. Omeprazole has recently received FDA approval for treatment of both gastroesophageal reflux and Zollinger-Ellison syndrome. FDA approval for use of omeprazole in the treatment of duodenal ulcers is expected soon and industry sources believe that once such approval is granted, omeprazole will compete directly with H2-antagonists such as cimetidine hydrochloride and ranitidine hydrochloride. Merck formulates the imported bulk active ingredient (omeprazole) into dosage form in the United States. According to a company representative, once FDA approval is granted, Merck plans to bring domestic production of omeprazole onstream. The company presently expects to continue importing omeprazole until offsetting domestic production is achieved.

Information on production processes and costs associated with these products were not disclosed by the manufacturers. As mentioned earlier, each product under consideration in this report is currently produced by only one manufacturer in the United States and, as such, their production processes and costs are considered proprietary information and have not been disclosed by the manufacturers. Glaxo, in a public submission, indicated that the value of ranitidine imports represents about 30 percent of the value of sales of the dosage form end-product.[21] If that the value of the imports includes taxes and manufacturing costs paid offshore, then the remaining 70 percent would apparently include the costs pertaining to the formulation of the product in the United States, general expenses incurred in the United States, research and development (R&D) costs, and profit.

[21] According to a submission to the Commission by Glaxo, dated November 27, 1990.

Taxation

During the hearing before the Subcommittee on Trade of the House Committee on Ways and Means, Glaxo indicated that it believed that tax considerations were an important factor in the decision regarding a duty suspension for ranitidine hydrochloride. Given the time constraints of this study, neither a detailed analysis of the companies' tax situations nor a comparison of the two situations will be provided. However, information is presented below on two tax issues identified by Section 936 of the Internal Revenue Code, which provides for special U.S. tax treatment of income of Puerto Rican origin, and about "tax sparing relief[22]," here in the case of Singapore.

Section 936 of the Internal Revenue Code

In testimony during the September 24, 1990 hearing, witnesses for both Glaxo and SmithKline made reference to U.S. tax benefits available to the latter for locating production in Puerto Rico. Section 936 (26 U.S.C. 936), applicable to business operations in Puerto Rico, allows a domestic corporation, under two conditions,[23] to elect to claim a credit against taxable income in computing taxes due to the United States.[24]

The provision prevents "double taxation" (taxes otherwise due to both Puerto Rico and the United States) and serves as an incentive to locate some operations in Puerto Rico. The tax credit equals an amount equal to the portion of the tax otherwise due which is attributable to the sum of (1) taxable income from the non-U.S. (whether in a possession or a foreign country) part of the filer's trade or business or the sale or exchange of its assets and (2) the "qualified possession source income." This term is defined as income from the filer's trade or business in a U.S. possession plus income from invested possession business-source funds, minus allocated or apportioned deductions.

In addition, section 936 dictates the treatment of tax payments and the determination of taxable income earned in foreign countries for purposes of the credit calculation. Income received within the United States from U.S. or foreign sources is not counted toward the filer's taxable income for purposes of the above credit computation (where the income is from a related person). The provision permits the filer to count certain investments in some of the Caribbean Basin countries as possession business activity, including the filer's investments in Puerto Rican banks or in the Puerto Rico Economic Development Bank for loans to designated CBERA beneficiaries. The tax treatment of intangible property income, distributions, and the sale of certain intangible assets is also set forth.

SmithKline stated that it has elected to claim the credit made available in Section 936. The benefits of the election reportedly amount to as much as $88-90 million annually, according to Glaxo.[25] Information provided by SmithKline indicates that, under formulas contained in section 936, the tax credit to be claimed in any tax year is computed on a product-by-product basis, depending both on how long the product has been made in Puerto Rico and other statutory variables. SmithKline indicated that recently it has been able to claim about two-thirds of the maximum credit amount available to the company, but did not dispute Glaxo's figures as to tax savings.[26]

Tax Sparing Relief in Singapore

Glaxo Inc. (the U.S. subsidiary of the United Kingdom parent company Glaxo Holdings, p.l.c.) purchases the bulk of its imports of ranitidine hydrochloride from Glaxochem (Pte.) Ltd., a Singapore subsidiary owned by the British parent.[27] Under a tax treaty between the United Kingdom and Singapore and under related implementing legislation in Singapore, taxes otherwise payable to Singapore on earnings of the Singapore firm are substantially reduced by statutory provisions covering the tax treatment of British businesses operating in Singapore. Because the taxes due to Singapore (reportedly a tax rate of about 4 percent) are paid by Glaxo Holdings, the tax reduction does not appear to benefit Glaxo Inc., which, in respect to ranitidine hydrochloride, pays only the current 3.7 percent ad valorem rate of duty to the U.S. Treasury.[28] Nor do United Kingdom statutory provisions to avert double taxation of its firms' income from foreign operations or to avoid taxation of the earnings covered by the Singapore tax

[22] Provisions or related calculations resulting in lower tax liability, often as a result of international agreements.

[23] The two conditions noted above are that (1) 80 percent of the gross income of the filer must have come from a possession source for the 3-year period prior to the tax year and (2) 75 percent of the filer's gross income must be from active conduct of trade or business in a U.S. possession (rather than passive investment or similar activities). The maximum available credit may be limited by the application of subsequent subsections of section 936.

[24] According to Robert A. Holland, Director, Federal Affairs, SmithKline pays corporate income taxes to Puerto Rico, a portion of which represents a statutory assessment on all firms doing business there (much of which is excused under a program to promote investment in Puerto Rican manufacturing operations) and the remainder represents a tax on profits earned from Puerto Rican operations but removed from Puerto Rico. Collected through withholding in Puerto Rico, SmithKline pays this so-called "toll-gate tax" on such profits as they are brought into the United States. The overall rate of tax SmithKline pays is reported to be just over 11 percent, although the 1990 Puerto Rican corporate tax rate is 39 percent (the 1991 rate will be 37 percent).

[25] Testimony by Charles A. Sanders, M.D., Chief Executive Officer of Glaxo Inc., before the Subcommittee on Trade, Committee on Ways & Means, U.S. House of Representatives, Sept. 24, 1990.

[26] Information supplied by Robert A. Holland of SmithKline.

[27] According to a submission to the Commission from Glaxo Inc., dated November 27, 1990.

[28] According to a written submission to the Commission from Glaxo USA, dated December 14, 1990, p. 5.

credit appear to benefit Glaxo Inc. Such benefits would probably accrue to the Singapore and United Kingdom companies.[29] It would be left to the discretion of the parent firms whether these benefits would be reflected in the price of product sold/transferred to the U.S. subsidiary. As such, no definitive effect on the price of ranitidine hydrochloride to Glaxo Inc. can be identified at this time.

Patents and Copyrights

All of these products under consideration, except for sucralfate, are currently patent protected in the United States, assuring the individual companies domestic market exclusivity for their products throughout the life of the patent. The tabulation at the bottom of the page shows the product (by generic name), the U.S. patent holder, and the date of expiration of the patent.

As the U.S. licensees of foreign firms, Merck and Marion Merrell Dow are allowed to domestically formulate finished dosage form product from imported bulk active ingredient and market the end product in the United States. According to industry sources, the patent terms for famotidine, nizatidine, and misoprostol include 2-year extensions granted under the provisions of the 1984 Drug Price Competition and Patent Term Restoration Act. These extensions are intended to compensate for any reduction in the effective patent term of a product as a result of applying for FDA approval to market the product. A representative of Merck has stated that a similar patent extension is pending for omeprazole. Patents on two additional formulations of omeprazole (i.e., parenteral and capsule forms) expire in the year 2005.

The Structure of the U.S. Antiulcer Drug Market

The size of the market created by the prevalence of gastric disorders has, in part, created the significant level of interest in the pharmaceutical industry in developing drugs that will cure these diseases. Gastroenterological disorders are among the most prevalent causes for visits to physicians. Physicians prescribe drugs for a number of acid peptic diseases.

In addition to treating stomach and duodenal ulcers, the products prescribed by physicians have been used to prevent severe heartburn (acid backwashing into the esophagus) and dyspepsia (non-specific abdominal pain). For severely ill patients, hospitals prescribe these products to prevent "stress ulcers." Analysts have noted that the overall safety of the products in this market has led to their relatively widespread use. Furthermore, ulcers are often a chronic disease requiring extended treatment. Initial medication for an acute duodenal ulcer may last 6 to 8 weeks, while treatment for an acute gastric ulcer may last 10 to 12 weeks. It is also not unusual for an ulcer to reoccur 2 to 3 times in a year requiring intermittent therapy. Finally, in some cases patients may require maintenance dosage that may last for a few years (administered at a lower dosage). Physicians account for some 75 percent of the prescriptions, while hospital formularies account for the rest.

In 1990, seven distinct prescription antiulcer products were available in the U.S. market. As noted earlier, the discussion of the antiulcer drug market in this report is limited to prescription antiulcer drugs and does not include over-the-counter (OTC) medications. Given the similarities in therapeutic efficacy between several of the prescription products,[30] differentiation in prescribing often depends on such factors[31] as ease of administration, incidence and severity of adverse effects, availability, cost, and potential interactions with other drugs prescribed for other conditions.[32]

[29] Based on information provided by Glaxo and SmithKline Beecham and on provisions of the Economic Expansion Incentives (Relief from Income Tax) Act (1970) of Singapore, as amended, and of the United Kingdom-Singapore tax treaty supplied by SmithKline.

[30] According to *Drug Evaluations* (American Medical Association, September 1986, p. 939), "similar rates of healing, 75–85 percent, are reported for cimetidine hydrochloride, ranitidine hydrochloride, sucralfate, antacids, and a number of investigational agents." The statement continues by ascribing a 100 percent rate of healing to omeprazole, then considered an investigational drug.

[31] American Medical Association, *Drug Evaluations*, September 1986, p. 939.

[32] For example, according to *Drug Information 90* (American Hospital Formulary Service, pp. 1668, 1673, and 1693), cimetidine hydrochloride and ranitidine hydrochloride both reduce the hepatic metabolism of some drugs, although to varying degrees. According to a staff telephone conversation with Dr. Louis Morris, Acting Director, Division of Drug Advertising and Labeling, FDA, on December 7, 1990, the Food and Drug Administration has objected to past claims made by both SmithKline Beecham and Glaxo about their products in their promotional materials.

Generic name	*U.S. Patent Holder*	*Expiration date of Patent*
Cimetidine hydrochloride	SmithKline Beecham	1994
Famotidine	Yamanouchi	2000
Misoprostol	Searle	1995
Nizatidine	Lilly	2002
Omeprazole	Astra	1998
Ranitidine hydrochloride	Glaxo	2002[1]
Sucralfate	Expired (was held by Chugai)	–

[1] According to a written submission from Glaxo, dated December 20, 1990, Glaxo holds patents on ranitidine hydrochloride that extend to 2002. A patent on one form of ranitidine will expire in 1995.

U.S. Consumption and Product Market Share during 1985-89

When SmithKline Beecham first marketed Tagamet in the United States during 1977-81, it had, in effect, a monopoly in the U.S. antiulcer drug market for 5 years. The market grew rapidly because Tagamet was an effective drug responding to an ever present medical need. Zantac, a second generation H2 receptor antagonist, received FDA approval in 1983 and was launched domestically soon thereafter. This product proved to be commercially successful, and by 1989, Zantac had gained the largest share of the U.S. market (see tables 4 and 5). According to industry sources, the success of Zantac can be attributed both to reports of adverse side effects and drug-drug interactions that have been associated with Tagamet and to aggressive promotion of Zantac that take these reports into consideration.[33]

Since the introduction of Zantac, two other second generation H_2-antagonists have entered the market: Pepcid and Axid. Although both are considered effective, neither has yet captured a major portion of the U.S. market.

In 1989, third and fourth generation antiulcer products, Cytotec and Prilosec, rspectively, entered the U.S. market. The growth of the total U.S. prescription antiulcer drug market during 1985–89 is presented in the following tabulation:

	1985	1986	1987	1988	1989
U.S. sales (billions of dollars)	0.82	1.11	1.44	1.82	2.15
Annual percentage increase	–	35	29	26	18

Source: IMS.

Estimate of Market Growth During 1991-93

Growth Rates

More recently, the large annual growth rates exhibited by the industry in the early 1980s have begun to level off. The estimated annual growth rate for 1990 is 15 percent. During 1991-95, the average annual growth rate for the U.S. market for these products, according to IMS, is expected to be 9.5 percent. In the future, competition from new products, the availability of lower priced generic products, and possible legislation aimed at curbing price increases might lower the future growth rate (particularly, in terms of sales value) and make the industry more price competitive.

[33] "Agitation in a Crowded Anti-Ulcer Drug Market," *Chemical Week*, Jan. 25, 1989, p. 8; "How Glaxo's Eager Beavers Chewed Up Tagamet's Lead," *Business Week*, Oct. 10, 1988, p. 40.

Table 4
Antiulcer drugs: Market share based on total numbers of U.S. antiulcer prescriptions written, 1985–90

Product	1985	1986	1987	1988	1989	1990[1]
Zantac	28.7	35.7	41.3	44.2	45.3	44.8
Tagamet	65.2	56.3	44.1	36.6	29.8	26.3
Carafate	6.1	7.9	10.3	12.2	11.4	9.7
Pepcid	–	0.1	4.3	6.3	8.3	9.7
Axid	–	–	–	0.9	3.3	4.7
Cytotec	–	–	–	–	1.7	2.7
Prilosec	–	–	–	–	–	2.1

[1] Through September 1990.

Note.—Totals may not sum to 100 due to rounding.

Source: IMS. Note: Much of the information submitted to the Commission was attributed to IMS, without specifying whether it originated from IMSAmerica or IMSInternational. For the purposes of this report, IMS will refer to both organizations.

Table 5
Antiulcer drugs: Market share based on total value of U.S. sales, 1985–1990

Product	1985	1986	1987	1988	1989	1990[1]
Zantac	36.8	44.1	50.0	52.6	52.8	51.1
Tagamet	58.5	49.9	37.9	30.4	24.6	21.5
Carafate	4.7	5.9	7.3	8.9	8.6	7.2
Pepcid	–	0.1	4.3	6.3	8.3	9.7
Axid	–	–	–	0.9	3.3	4.7
Cytotec	–	–	–	–	1.7	2.7
Prilosec	–	–	–	–	–	2.1

[1] Through September 1990.

Note.—Totals may not sum to 100 due to rounding.

Source: IMS.

At least one company, Takeda Chemical Industries (Japan), is reportedly planning to seek marketing approval for a second proton pump in Japan, the United States, and Western Europe. According to industry sources, the product lansoprazole is expected to be approved first in France in 1991 and then in the United States, Germany, and Japan in 1992-93. Takeda has already established marketing partners in Western Europe and is expected to develop a marketing agreement with Abbott Laboratories in the United States.[34] There have also been reports of companies developing non-prescription counterparts of current prescription drugs.[35] Estimates of the size of the U.S. market from 1990 through 1993 are presented in the following tabulation:

	1990	1991	1992	1993
U.S. sales (billions of dollars)	2.47	2.71	2.98	3.28
Annual growth	–	9.7	10.0	10.1
Total Prescriptions (thousands written)	41.8	42.9	44.7	46.4

Source: Industry estimates.

Promotion and Pricing

Promotion

Although market supply in the U.S. antiulcer drug market is controlled by a relatively small number of producers, there are thousands of consumers in the United States. It was noted, however, in a Federal Trade Commission (FTC) study that, unlike most markets, "The ultimate consumer of drugs has only indirect control over the drug purchase decision."[36] The purchase decision is made primarily by physicians and hospital formularies. "Since physicians select but do not pay for the drugs they prescribe, market forces would require physicians to consider price in their prescribing decisions only if consumers were willing and able to make informed decisions about physicians' prescribing habits when they shopped for medical care."[37,38]

This particular market structure, which separates the producer from the ultimate consumer, could influence the competitive conduct of the producers. In the conclusion of the FTC report quoted above the authors stated that—

> First, strong preferences are revealed for brands that are the first of their kind to appear on the market. These preferences wane only slowly over time and also spill over to follow-on brands marketed by the first firm in the market. Second, the data also reveal that physicians can be persuaded to prescribe late-entering brands if those brands offer some therapeutic gain useful to a subset of patients. Overall, the effect of these prescribing habits is to raise promotional expenditures as a proportion of sales to late entering firms and to minimize the incentives for price-cutting on large-selling brands.[39]

In reviewing the literature on the marketing practices, market structure and competition, F. M. Scherer identified three possible reasons why intense marketing could influence a purchasers decision—

> First, sellers are likely to be more successful in maintaining escalated prices through image differentiation, the more difficult it is for consumers to determine whether one product is in fact superior to another...Second, especially when the "objective" characteristics of competing products do not differ widely or when it is difficult to discern whether they do differ, image differentiation is likely to permit wider price differentials, the more prominently status considerations enter into consumptions....Third, price differentials linked with image are larger, the greater is the cost of an unfavorable consumption experience in relation to the product's price. Pharmaceuticals are again at an extreme here. A wrong choice could mean prolonged illness or adverse side effects for the patient and a malpractice suit for the prescribing physician.[40]

The above analysis indicates that promotional activity is a significant form of competition, particularly in the early stages of a market. However, as a number of new products enter the market, as a significant number of products go "off patent," and as effective OTC products appear in the market, price competition is likely to become a more effective factor.[41] Since only

[34] "Takeda Files Antiulcer Drug," *European Chemical News*, Oct. 22, 1990, p. 24.

[35] *Business Week*, Oct. 23, 1989, p. 62. and *Ad Age*, July 17, 1989, pp. 4, 52. Some journals have referred to the eventual possibility of OTC versions of Zantac, Carafate, and Tagamet.

[36] Ronald Bond and David Lean, FTC, Bureau of Economics, *Sales, Promotion, and Product Differentiation in Two Prescription Drug Markets*, (Washington, DC, GPO, February 1977), p. 75.

[37] Ibid.

[38] Although physicians do not pay for the drugs they prescribe, W. Duncan Reekie asserts that "U.S. doctors have long been aware that patients vary in ability to pay. . . . There is no reason to suppose that doctors will not be price sensitive agents on behalf of their patients' needs for all parts of the health care 'package' they provide, including drugs." (W. Duncan Reekie, "Price and Quality in the United States Drug Industry," *The Journal of Industrial Economics*, vol. 26, March 1978, p. 234.)

[39] Ibid., p. 76.

[40] F.M. Scherer, "Product Differentiation, Market Structure, and Competition," *Industrial Market Structure and Economic Performance* (Boston: Houghton Mifflin, 1980), p. 382–3.

[41] See for example D. L. Cocks, "Product Innovation and the Dynamic Elements of Competition in the Ethical Pharmaceutical Industry." in R. B. Helms, ed., *Drug Development and Marketing* (Washington D.C.: American Enterprise Institute) p. 283–360. See in particular p. 247 and the studies cited therein.

one antiulcer drug is currently off patent and there are no OTC products comparable to the four generations of antiulcer compounds defined in this market, it may be too early to witness a great deal of price competition. Price competition will probably increase after 1994, when the patents on the individual products begin to expire.

Recently, promotion appears to have become an important factor in marketing drugs. One analyst reported that since 1984, the domestic pharmaceutical industry sales force increased by 50 percent to 30,000. This expanded force made some 30 million calls (details), and at $100 per call, the direct cost of detailing in 1989 was some $3 billion.[42] Detailing has increased correspondingly in the antiulcer sector, as the annual IMS data (through September, 1990) in the following tabulation indicate:

	1985	1986	1987	1988	1989	1990
Total details (1,000s)	1,329	1,078	1,131	1,756	2,207	1,902

Furthermore, the data in tables 6 and 7 show that Smith-Kline Beecham and Glaxo, the manufacturers of the two leading products in the market, have been the two leading detailers during this period.

[42] Scott-Levin Associates, as reported in *Drug Topics*, Mar. 19, 1990, p. 60. "Detailing" has been defined as calls made by a company's sales force on physicians to describe a product's efficacy and the benefits to the patient that would accrue through use of the product.("Pharmaceutical Industry Faces Pressure on Prices," *European Chemical News*, Aug. 20, 1990, pp. 34 and 54.)

One argument that was put forward during the Congressional hearing on this issue asserted that the likely outcome of a duty suspension on ranitidine hydrochloride would be that Glaxo would increase its promotional budget for Zantac by an amount equal to the duty paid. If Glaxo were to use the savings from a duty suspension on ranitidine hydrochloride for increased advertising,[43] it could increase its promotional expenses by as much as 20 percent, potentially resulting in an additional 90,000 details.[44]

The duty suspension savings, if Glaxo does not reduce its consumer prices, increases Glaxo's supply of earnings available for investment or noninvestment uses. This additional supply of earnings affects Glaxo's evaluation of the net returns from additional

[43] A discussion on the potential impact of a complete pass-through of the duty suspension to the final consumer appears in the section entitled, "The Potential Impact of Duty-Free Imports of Ranitidine Hydrochloride on the U.S. Antiulcer Industry."

[44] This estimate is based on information on market shares and total promotional spending for the industry presented in the supplement to the statement by Edward Tower, Ph. D., Duke University, dated Oct. 1, 1990. It is likely that Glaxo could target any increased promotional spending towards new entrants to the U.S. antiulcer drug market. FDA approval for use of omeprazole in the treatment of duodenal ulcers is expected imminently and industry sources believe that once such approval is granted, omeprazole will compete directly with H_2-antagonists such as cimetidine hydrochloride and ranitidine hydrochloride. ("Astra Drug on Course to Inject Dose of Optimism," *Financial Times*, Dec. 19, 1990, p. 18.)

Table 6
Antiulcer drugs: Percent distribution of detailing calls by product, 1985–90

Product	1985	1986	1987	1988	1989	1990[1]
Zantac	39.4	41.1	34.8	30.7	36.8	21.0
Tagamet	39.7	36.8	29.9	25.6	16.7	19.3
Carafate	20.2	18.5	17.6	12.3	8.1	9.8
Pepcid	–	3.7	17.7	15.2	17.1	13.7
Axid	–	–	–	16.2	18.5	17.9
Cytotec	–	–	–	–	10.5	6.6
Prilosec	–	–	–	–	2.3	11.0

[1] Through September 1990.

Note.—Totals may not sum to 100, due to rounding.
Source: IMS

Table 7
Antiulcer drugs: Distribution of detail calls, 1985–90
(In thousands of calls)

Product	1985	1986	1987	1988	1989	1990[1]
Zantac	534	443	455	539	590	411
Tagamet	527	396	392	449	370	367
Carafate	268	199	231	216	178	187
Pepcid	–	40	232	268	378	260
Axid	–	–	–	284	408	340
Cytotec	–	–	–	–	232	126
Prilosec	–	–	–	–	51	210
Total	1,329	1,078	1,130	1,756	2,207	1,902

[1] Through September 1990.

advertising and other investment opportunites. However, the level of duty suspension savings available for all uses, whether it be additional advertising, new equipment or stockholder dividends, are determined by Glaxo's pricing decisions following duty suspension. Both the level of the duty suspension savings and the utilization of these additional funds depend on Glaxo's strategic interests, the possible response of its competitors and the nature of competition in the antiulcer drug market.

Pricing

The primary factors involved in pricing pharmaceutical products include costs of production, profit, and perceived therapeutic value. Glaxo, in a submission dated November 27, 1990, stated that it "set the price for Zantac, in part, to recoup its research and development costs and by assessing its therapeutic value." As noted by the company, "Zantac has always been priced at a premium, due to its therapeutic advantages and safety profile."

Two estimates are available on the pricing of the prescription products in the U.S. market. The first, provided by Glaxo, indicates that the current cost of daily treatment by prescription antiulcer drugs in the United States, on the basis of average wholesale price (AWP), as shown in the first tabulation at the bottom of the page.[45]

Based on information provided by the marketing company PDS, the second estimate indicates that, during January-April 1990, the average U.S. retail price (ARP) of the prescription antiulcer drugs under consideration as shown in the second tabulation at the bottom of the page.[46]

U.S. Exports of Antiulcer Drugs

U.S. Exports During 1985-90

U.S. exports of the active ingredients in the products under consideration were reportedly negligible during 1985-89. According to information that Glaxo provided to its Congressional Representative, U.S. exports of ranitidine hydrochloride during 1985-89 amounted to less than 500 kilograms per year.[47] A rep-

[45] According to a public submission to the Commission by Glaxo, dated Nov. 27, 1990, p. 8.

[46] *SCRIP*, No. 1529, July 6, 1990, p. 19. The price cited is the average retail price (ARP). The ARP is derived from dividing the total retail cost of a particular form or strength in various quantities by the total number of Rx purchases in the PDS sample.

[47] Official statistics are not available for the individual antiulcer drugs or their active ingredients as they are classified in residual, or "basket," provisions in the HTS.

Product	*Cost per day (AWP)*	*Zantac Premium/Discount*
Zantac	$2.62	–
Prilosec	$3.22	–18.6 percent discount
Pepcid	$2.35	11.5 percent premium
Tagamet	$2.08	26.0 percent premium[1]
Axid	$2.07	26.6 percent premium

[1] According to a note provided by Glaxo regarding this data, the information on pricing is based on a "benchmark" form of each product as of Nov. 1, 1990. Tagamet's 400 mg form is the relevant form for price considerations.

Brand	*ARP*	*Number of days therapy*	*ARP per day of therapy*[1]
Zantac			
150 mg tab	$60.33	28.8	$2.09
300 mg tab	$67.47	29.3	$2.30
Tagamet			
300 mg tab	$39.93	27.2	$1.47
400 mg tab	$47.24	29.3	$1.61
800 mg tab	$55.15	28.2	$1.96
200 mg tab	$34.59	28.7	
Carafate			
1 g tab	$42.81	24.9	$1.72
Pepcid			
40 mg tab	$66.54	29.6	$2.25
20 mg tab	$46.37	28.1	$1.65
Axid			
300 mg cap	$54.15	26.7	$2.03
150 mg cap	$41.47	25.9	$1.60
Cytotec			
200 mg tab	$41.89	26.4	$1.59
Prilosec	$78.53	25.7	$3.06

[1] These figures do not reflect the dosing schedule of the individual products.

resentative of the company stated that the primary reason for these exports was for testing purposes prior to its use in Glaxo's U.S.-based formulating plant. These exports to the United Kingdom are believed to account for up to half of the exports of the active ingredients of the antiulcer drugs covered by this report. There were no exports of the formulated product, Zantac, during 1985-89.

According to a spokesperson for SmithKline Beecham, there were no exports of bulk cimetidine hydrochloride during 1985-89 because of their predecessor company's commitment to U.S.-based plants. There were no exports of the formulated product, Tagamet, during these years because of the concentration of ulcer patients in the United States.

A representative of Merck has stated that only "noncommercial" quantities of bulk famotidine were exported during 1986-89. These U.S. exports are believed to account for up to half of the exports of the antiulcer drugs covered by this report. There have been no exports of omeprazole because there is no domestic production of the product.

According to the records of Marion Merrell Dow, there were no U.S. exports of sucralfate during 1985-89. The formulated product, Carafate, is exclusively licensed in the United States to Marion Merrell Dow. The value of U.S. exports of misoprostol and nizatidine was not disclosed by company representatives.

Estimate of Growth in Export Markets During 1991-93

In 1990, SmithKline Beecham began commercial exports of cimetidine hydrochloride to Japan from its facility in Puerto Rico. The other suppliers of antiulcer drugs have indicated that increases in exports of their products from current levels are not expected during 1991-93. Exports of cimetidine hydrochloride are expected to grow because of SmithKline Beecham's decision to use its capacity to supply the Japanese market for antiulcer drugs with their patented product. Since U.S. exports of antiulcer drugs have been in "noncommercial" quantities, if Tagamet is widely accepted by doctors in Japan, the growth rate of U.S. exports could be relatively high. However, competition from the Japanese equivalents of Carafate and Pepcid, which are produced in Japan by integrated Japanese pharmaceutical companies, and from Zantac, which is tabletted for the Japanese market, could limit this growth rate.

U.S. Imports of Antiulcer Drugs

U.S. Imports During 1985-90

The tabulation at the bottom of the page lists the total value of the U.S. imports in 1989 reported under each of the HTS subheadings specified above.

The major sources of all imports classified under subheading 2932.19.50 (the subheading in which ranitidine hydrochloride is classified among other products) in 1989 were Singapore and the United Kingdom. Total U.S. imports from Singapore were valued at $122.64 million, or 73 percent of the total, compared with $39.41 million, or 24 percent of the total, from the United Kingdom.

According to industry sources, the value of U.S. imports of the active ingredients of the antiulcer drugs considered in this report amounted to at least $530 million in 1989.[48] The 1989 value of imports represents an increase of about 50 percent compared with the estimated $350 million of imports in 1988. U.S. imports of these products during 1988-89 were significantly above the average value of $166 million for imports of these products during 1985-87. The primary reason for the increase in the U.S. imports covered by this report is a 2.7-fold increase in the value of ranitidine hydrochloride imported for use in Glaxo's plant in Zebulon, NC.

[48] Commission staff estimate based on available information and discussions with industry sources.

HTS subheading[1]	*Active ingredient*	*Value of imports*	*Major source of the imports classified under this subheading*
	(In millions of dollars)		
2918.90.50	Misoprostol[2]	9.88	United Kingdom
2932.19.50	Ranitidine hydrochloride	167.39	Singapore
2933.29.45	Cimetidine hydrochloride[2]	0.46	Italy
2933.39.35	Omeprazole	64.18	Ireland
2934.90.25	Nizatidine[2]	112.77	Japan
2935.00.4€	Famotidine	67.67	Japan
2940.00.00	Sucralfate	36.37	Japan

[1] The totals for the individual HTS subheadings reflect *all* of the products imported under a particular subheading and not just the active ingredient cited.

[2] It should be noted that the HTS subheadings are the ones under which the active ingredients under consideration would be classified if imported into the United States. Some of the active ingredients are produced domestically and, therefore, are not included in the value of imports listed for each HTS subheading. Moreover, the figures provided here are transaction values, generally free on board point of export.

Approximately 90 percent of the imported ranitidine hydrochloride is obtained from Singapore and the remainder from the United Kingdom.[49] Japan has been the only source of famotidine and sucralfate; Sweden has been the only source of omeprazole. The respective patent holders decide where to source each active ingredient. As long as famotidine and omeprazole are patent protected in the United States and license agreements are in effect, only the U.S. licensees for the products can import these products. Given that the patent on sucralfate expired in 1986, generic manufacturers are free to enter the U.S. market with formulations of the product, provided that these formulations have received FDA approval. None have done so as of this time. It is likely that some formulations of sucralfate will enter the domestic market soon.

Because of the concentration of imports among U.S. importers, the share of imports of each company's active ingredient is regarded as business proprietary information and was not disclosed by some of the companies. However, according to data on total sales compiled by the IMS, the shares of sales of all products containing imported active ingredients were 77 percent, 13 percent, and 10 percent in 1988 for Zantac, Carafate, and Pepcid, respectively. With the introduction of Prilosec amounting to 1 percent of sales in 1989, the shares of sales for the other products formulated from imports were 74 percent, 12 percent, and 13 percent, respectively, in 1989.

Based on information provided by industry sources, the import unit value of ranitidine hydrochloride increased from $1,236 per kilogram in 1988 to $1,310 per kilogram in 1989.[50] The unit value of famotidine increased from $16,600 per kilogram in 1988 to $16,800 per kilogram in 1989, and the unit value of sucralfate increased from $220 per kilogram in 1988 to $250 per kilogram in 1989.[51]

Estimate of Growth in Imports during 1991-93

The estimated growth in imports of the active ingredients in the antiulcer drugs is expected to at least keep pace with the average annual growth rate for the U.S. market for these products, which, according to IMS, is expected to be 9.5 percent during 1991-95. The growth in sales of Zantac could be as high as 18-20 percent, but Glaxo stated that its U.S.-based plant is operating at capacity, and lower growth is expected owing to competition from other antiulcer drugs. The growth rate in sales of Pepcid is expected to be higher than that of Zantac because of the extensive marketing power of Merck and the relative size of the past years' sales: sales of Zantac were more than 5.6 times the sales of Pepcid in 1989. The growth rate for imports of omeprazole is expected to be approximately 3-fold in 1991, the second full year following its approval by the FDA. The growth rate for imports of sucralfate is expected to be negative.

According to public data on total sales estimated by IMS, the shares of company sales containing imported active ingredients would be 67 to 78 percent for Glaxo, 2 to 8 percent for Marion Merrell Dow, and 14 to 30 percent for Merck during 1991-93 for Zantac, Carafate, and the sum of Pepcid and Prilosec, respectively. These estimates assume that Prilosec will be widely accepted during 1991-93. The introduction of Prilosec captured only 1 percent of company sales in 1989, and no estimate is available for 1990, so the estimated shares of company sales for the other products formulated from imports are less precise than the estimates indicate owing to the uncertainty associated with the acceptability of Prilosec. No estimates are available concerning how the growth in the antiulcer drug market would be allocated if Prilosec is not widely accepted, but Carafate and Pepcid would be expected to retain a larger share of company sales in the slower growing market.

The Potential Impact of Duty-Free Imports of Ranitidine Hydrochloride on the U.S. Antiulcer Drug Industry

This section models the potential impact of suspending the 3.7 percent duty on ranitidine hydrochloride and presents an upper bound estimate of the effect of the duty suspension on the industry. The basic assumptions of the model are:

1. Glaxo reduces the price of Zantac by an amount equal to the net customs revenue recovered;
2. The price reduction is passed through fully to the final consumer of Zantac;
3. The antiulcer medications are imperfect substitutes for each other;
4. Two primary markets exist: a market for Zantac and a market for a composite non-Zantac good representing the other antiulcer medications; and
5. The effects of the duty suspension are immediate and remain in effect as long as the duty is suspended.

[49] According to a representative of Glaxo, the company has imported ranitidine hydrochloride from Singapore since 1984. The Singapore facility was expanded during mid-1988 to mid-1989. While the expansion was underway, the product was imported from the United Kingdom.

[50] Staff meeting with Glaxo's representatives on Nov. 9, 1990.

[51] "Zantac Pinches its Rivals," *Drug Topics*, Mar. 19, 1990, p. 60.

Although Glaxo has indicated that they do not intend to lower the price of Zantac,[52] the assumptions above are made with the intention of presenting upper bound estimates. It should be noted that these estimates reflect the result of price competition. The effect of the duty suspension is likely to be between zero and the estimates presented here.

As indicated earlier, ranitidine hydrochloride is the active ingredient in Zantac. The duty on ranitidine hydrochloride can be regarded as a tax on an input to produce Zantac. This tax raises the cost of producing Zantac and is likely to be embodied in its price. If the duty is temporarily suspended, then Glaxo could lower its price by an amount equal to the duty paid and potentially increase its profits. A firm would do this if the expected gain from lowering its price exceeded the duty savings. Economic research on the pharmaceutical industry suggests that price is likely to be an important element of demand.[53] However, in this case, it is not clear whether or not reducing the price of Zantac would actually be the most profitable course of action.

The potential impact of suspending the 3.7 percent duty on ranitidine hydrochloride is modeled by an imperfect substitutes model using 1989 data.[54] To ascertain the maximum impact of the proposed duty suspension, it is assumed that Glaxo reduces the price of Zantac by the full amount of the duty paid. Moreover, it is assumed that the price reduction is passed through fully to the final consumer of Zantac.[55] According to the CBO, Glaxo will benefit an average of $9 million annually over the 3-year duty suspension period.[56] Therefore, based on a full-pass-through assumption, it is estimated that Glaxo would lower the price of Zantac by 0.82 percent.[57] This estimate is based on U.S. sales of Zantac in 1989 of $1.13 billion.[58]

To quantify the economic effects of the duty suspension, it is assumed that Zantac and its competitors are imperfect substitutes and that two primary markets exist: 1) a market for Zantac and 2) a market for non-Zantac. If the price of Zantac is lowered, then the quantity demanded of Zantac will increase. In the non-Zantac market, consumers will substitute towards Zantac thereby demanding less of the non-Zantac good, and thus, causing its price in the non-Zantac market to decline. Assuming the export price of the non-Zantac good also declines as a result of reduced U.S. demand, an expansion in U.S. exports of the non-Zantac good would occur, somewhat offseting the decrease in U.S. consumption. Therefore, the decrease in the total production of the non-Zantac good will be less than the decrease in consumption in the U.S. market.[59]

The price and quantity estimations for Zantac and the non-Zantac good stem from several parameters. The size of the U.S. antiulcer market in 1989 was $2.13 billion in total sales with Zantac accounting for $1.13 billion or a 52.8 percent market share. Two price elasticities of demand are used and, thus, provide a range of possible effects. An elasticity of 0.5 is used to represent inelastic demand for Zantac and an elasticity of 1.5 is used to represent elastic demand for Zantac.[60] Based on conversations with producers of antiulcer medications, it is assumed that the products in this market are substitutable, and an elasticity of substitution of 5 is used. The supply of Zantac is represented by an infinitely elastic (horizontal) supply curve. This assumption may be debated, but it was chosen to provide upper bound estimates of the effects of the duty suspension. The supply of the non-Zantac good is represented by two elasticities. In the U.S. market, a supply elasticity of 5 is used. This elasticity represents the supply available to U.S. consumers. In the world market, a supply elasticity of 3 is used. This elasticity represents the supply available to the rest of the world.[61]

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[52] According to a written submission from Geoffrey Littlehale, Vice President, Government Relations, Glaxo, dated Dec. 14, 1990, p. 2. Glaxo also indicates in this submission that they do not intend to spend the duty savings on increased promotion for Zantac.

[53] For example see W. Duncan Reekie, "Price and Quality Competition in the United States Drug Industry," *The Journal of Industrial Economics*, vol. 26 (March 1978), pp. 223–237, and William S. Comanor, "The Political Economy of the Pharmaceutical Industry," *The Journal of Economic Literature*, vol. 24 (September 1986), pp. 1178–1217, and the literature cited therein.

[54] The underlying equations and a graphical presentation of the imperfect substitutes model used here are presented in App. D.

[55] It may be debatable as to whether these events would actually occur; however, these assumptions allow for a maximum price change for Zantac.

[56] The CBO estimates a revenue loss to the U.S. Treasury of $7.3 million in 1990 and $9.9 million in each of the years 1991 and 1992. The total loss comes to $27.1 million for the 3 years or an average of approximately $9 million per year. Although the actual Customs revenue amounts to $13 million per year, the net loss to the U.S. Treasury is less because of the way customs payments are treated in the U.S. tax code. (*Congressional Record*, April 24, 1990, p. S4891)

[57] The price reduction is given by the following relationship:

$$\hat{P} = T(1+t)/S$$

where $\hat{P}$ is the percentage change in price, T is the customs revenue, t is the tariff rate on ranitidine hydrochloride, and S is the total sales for Zantac in the U.S. market.

[58] The sales and market share data used in this section are provided by IMS.

[59] These interactions are illustrated graphically in app. D.

[60] In a public submission by Glaxo, they estimate the price elasticity of demand for Zantac to be in the range of 0.6 to 0.9.

[61] The elasticity of supply to U.S. consumers will always be greater than the elasticity of world supply. For example, an increase in U.S. demand would induce additional production and attract production that previously was sold elsewhere in the world. However, an increase in world demand will induce new production but cannot divert sales from other markets. Consequently, supply response to a single market exceeds supply response to the world as a whole.

The potential impact of reducing the U.S. price of Zantac by 0.82 percent is reported in tables 8 and 9. The results of the model indicate that:

1. U.S. consumption of Zantac will increase;
2. The price of the non-Zantac good will decrease;
3. U.S. consumption of the non-Zantac good will decrease; and
4. The quantity produced of the non-Zantac good will decrease.

However, this model does not explicitly quantify the potential impact on employment, investment, R&D, or upstream suppliers that would result from the duty suspension. In the Zantac market, it is estimated that U.S. consumption of Zantac would increase by 2.16 to 2.60 percent, or by $24.5 to $29.1 million. The revenue effect in the Zantac market is comprised of only a quantity effect because the supply curve is assumed to be infinitely elastic. The revenue effect in the non-Zantac market is comprised of both the price and quantity effects. In the non-Zantac market, it is estimated that the price of the non-Zantac good would decline by 0.18 to 0.25 percent and U.S. consumption of the non-Zantac good would decline by 0.91 to 1.24 percent, or by a total of $11.0 to $15.1 million. Based on market shares for 1989,[62] it is estimated that U.S. consumption of Tagamet would decline by $5.7 to $7.9 million; Carafate would decline by $2.0 to $2.7 million; Pepcid would decline by $2.2 to $3.0 million; and Axid would decline by $0.7 to $0.9 million. Since demand abroad should rise with the decline in price of the non-Zantac good, it is estimated that the total quantity produced of the non-Zantac good would decline by only 0.55 to 0.75 percent.

As such, the results of the model indicate that if the duty suspension is enacted, Zantac's market share (based on total sales in 1989) would increase by no more than 1.1 to 1.4 percent. Similarly, the results indicate that at most Tagamet's market share (based on total sales) would decline by 0.27 to 0.37 percent, Carafate's by 0.09 to 0.13 percent, Pepcid's by 0.10 to 0.14 percent, and Axid's by 0.03 to 0.04 percent.

[62] The market shares used here reflect the market shares of the products in the non-Zantac market. Sales of antiulcer medications other than Zantac amounted to $1.01 billion in 1989. In this market, Tagamet had a 52.0 percent market share; Carafate had an 18.1 percent market share; Pepcid had a 19.8 percent market share; and Axid had a 6.0 percent market share. These four products account for 95.9 percent of the non-Zantac market.

Table 8
Antiulcer drugs: Potential impact of reducing the U.S. price of Zantac by 0.82 percent
(In percent)

Item	Price elasticity of demand 0.50	1.50
Change in U.S. consumption of Zantac	2.16	2.60
Change in price of the composite non–Zantac good	–0.25	–0.18
Change in U.S. consumption of the composite non–Zantac good	–1.24	–0.91
Change in quantity produced of the composite non–Zantac good	–0.75	–0.55

Source: Estimated by the staff of the U.S. International Trade Commission.

Table 9
Antiulcer drugs: Potential revenue impact of reducing the U.S. price of Zantac by 0.82 percent
(In millions of dollars)

Item	Price elasticity of demand 0.50	1.50
Change in revenue: Zantac	24.5	29.4
Change in revenue: non–Zantac good	–15.1	–11.0
Change in revenue: non–Zantac good components:[1]		
Tagamet	–7.9	–5.7
Carafate	–2.7	–2.0
Pepcid	–3.0	–2.2
Axid	–0.9	–0.7

[1] See fn. 62 for an explanation of these figures.

Source: Estimated by the staff of the U.S. International Trade Commission.

APPENDIX A
REQUEST, COMMISSION RESPONSE TO REQUEST, AND NOTICE

RECEIVED

United States Senate

COMMITTEE ON FINANCE
WASHINGTON, DC 20510-6200

90 OCT 16 P2:03

October 16, 1990

OFFICE OF THE SECRETARY

1589

The Honorable
Anne Brunsdale
Acting Chairman
United States International
Trade Commission
500 E Street, S.W.
Washington, D.C. 20436

Dear Madam Chairman:

Pursuant to the conference agreement on the Customs and Trade Act of 1990 (P.L. 101-382), the Committee on Finance hereby requests that the United States International Trade Commission study the potential impact on domestic competition in the ulcer drug market of suspending the tariff on U.S. imports of ranitidine hydrochloride. This study is requested pursuant to section 332 of the Tariff Act of 1930, as amended.

Section 1438 of H.R. 1594, as passed by the Senate, provided for the suspension of the existing tariff on imports of ranitidine hydrochloride (provided for in subheading 2932.19.50). As stated in the conference agreement, the House conferees were unable to accept this provision because of strong opposition from domestic interests and the Administration. However, as part of the conference agreement, the conferees agreed to request an ITC study of the domestic competition in the ulcer drug market to determine the potential impact of this provision. The House conferees also agreed to hold public hearings on this issue. Pursuant to this commitment, the Ways and Means Trade Subcommittee held a hearing on September 24, 1990.

In light of the relevance of this study to any future consideration of legislation suspending the tariff on imports of ranitidine hydrochloride, the Committee requests that the Commission submit its report to the Committee on Finance no later than Friday, January 18, 1991. We request that the Commission provide an opportunity for public comment with regard to the issues addressed in this study.

91 OCT 16 P2:52

Sincerely,

Lloyd Bentsen

Lloyd Bentsen

CHAIRMAN

UNITED STATES INTERNATIONAL TRADE COMMISSION

WASHINGTON, D.C. 20436

Honorable Lloyd Bentsen
Chairman
Committee on Finance
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

On October 16, 1990, the Commission received a letter from you requesting advice pursuant to section 332(g) of the Tariff Act of 1930, with respect to the potential impact on domestic competition in the antiulcer drug market of a temporary duty suspension on imports of ranitidine hydrochloride. You asked that we provide this advice by January 18, 1991.

In response to your request, the Commission has instituted investigation No. 332-xxx, "Ranitidine Hydrochloride: The Potential Impact on Domestic Competition in the Antiulcer Drug Market of a Temporary Duty Suspension on Imports". In particular, the report will focus on the potential effects that section 1438 of H.R. 1594 could have on U.S. competitors. The Commission will make every effort to comply with your request within the required timeframe.

A copy of the Commission's notice of investigation published in the Federal Register is enclosed.

Please continue to call on us whenever we can be of assistance to you.

Sincerely,

Anne Brunsdale

Anne Brunsdale
Acting Chairman

Enclosure

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

(332-300)

Ranitidine Hydrochloride: The Potential Impact on Domestic Competition in the Antiulcer Drug Market of a Temporary Duty Suspension on Imports

AGENCY: United States International Trade Commission

ACTION: Institution of investigation and request for comments.

EFFECTIVE DATE: October 31, 1990

FOR FURTHER INFORMATION CONTACT: Ms. Elizabeth R. Nesbitt (202-252-1355), Energy and Chemicals Division, Office of Industries, U.S. International Trade Commission, Washington, D.C. 20436.

SUMMARY: Following receipt on October 16, 1990, of a request from the Committee on Finance of the U.S. Senate, the Commission instituted investigation No. 332-300 under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)) to provide information pertaining to the potential impact on the domestic competition in the antiulcer duty market of suspending temporarily the duty on U.S. imports of ranitidine hydrochloride.

In its request, the Committee stated that H.R. 1594, as passed by the Senate, provided for the suspension of the existing tariff on imports of ranitidine hydrochloride (provided for in subheading 2932.19.50 of the Harmonized Tariff Schedule). The Committee said the conference agreement on the Customs and Trade Act of 1990 (P.L. 101-382), which considered the provision, stated that the House conferees were unable to accept the provision because of strong opposition from domestic interests and the Administration. The Committee said that the conferees agreed, as part of the conference agreement, to request an ITC study of domestic competition in the antiulcer drug market to determine the potential impact of the provision. The Committee said that the House conferees also agreed to hold public hearings on this issue and that, pursuant to this commitment, the Subcommittee on Trade of the House Committee on Ways and Means held a hearing on September 24, 1990.

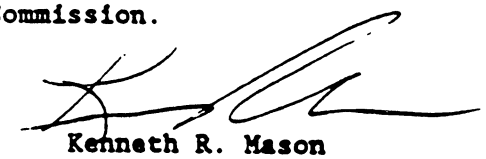
The Committee request that the Commission submit its report by January 18, 1991, and that the Commission provide opportunity for public comments.

WRITTEN SUBMISSIONS: Interested persons are invited to submit written statements concerning the investigation. Written submissions should be received by 5:00 p.m. on December 14, 1990, to be considered by the Commission for the report . Commercial or financial information which a submitter desires the Commission to treat as confidential must be submitted on separate sheets of paper, each marked "Confidential Business Information" at the top. All submissions requesting confidential treatment must conform with the requirements of section 201.6 of the Commission's Rules of Practice and Procedure (19 CFR 201.6). All written submissions, except for confidential business information, will be available for inspection by interested persons.

All submissions should be addressed to the Secretary at the Commission's office in Washington, D.C.

Hearing impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on 202-252-1810.

By order of the Commission.



Kenneth R. Mason
Secretary

Issued: October 31, 1990

APPENDIX B
RECENT PROPOSED LEGISLATION

101ST CONGRESS
1ST SESSION

H. R. 3130

To suspend temporarily the duty on ranitidine hydrochloride.

IN THE HOUSE OF REPRESENTATIVES

AUGUST 3, 1989

Mr. VALENTINE (for himself and Mr. PRICE) introduced the following bill; which was read twice and referred to the Committee on Ways and Means

---

A BILL

To suspend temporarily the duty on ranitidine hydrochloride.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. RANITIDINE HYDROCHLORIDE.

Subchapter II of chapter 9902. . of the Harmonized Tariff Schedule of the United States is amended by inserting in numerical sequence the following new subheading:

	N[2-[[[5-[(dimethylaminolmethyl]-2-furanyl]methyl]thio]-ethyl]-N'-methyl-methyl-2-nitro-1,1-ethenediamine, hydrochloride (RANITIDINE HYDROCHLORIDE) (Provided for in subheading 2932.19.50007).....	Free	No change	No change	On or before the close of the 3-year period beginning on the date of the enactment of this subheading	"

SEC. 2. EFFECTIVE DATE.

The amendment made by this Act shall apply with respect to articles entered, or withdrawn from warehouse for consumption, on or after the date of enactment of this Act.

The amendment made by this Act shall also apply with respect to articles entered subsequent to December 31, 1989, and upon which liquidation of the entry by the United States Customs Service has not occurred.

O

APPENDIX C
SELECTED PORTIONS OF THE HTS

Heading/ Subheading	Stat. Suf. & cd	Article Description	Units of Quantity	Rates of Duty 1 General	Rates of Duty 1 Special	Rates of Duty 2
2931.00		Other organo-inorganic compounds:				
		Aromatic:				
2931.00.10	00 8	4,4'-Diphenyl-bis-phosphonous acid, di(2',2",4',4"-di-tert-butyl)phenyl ester	kg	3.7¢/kg + 12.5% 1/	Free (E,IL) 2.9¢/kg + 10% (CA)	15.4¢/kg + 40%
2931.00.15	00 3	Sodium tetraphenylboron	kg	5.8% 1/	Free (E,IL) 4.6% (CA)	15.4¢/kg + 40%
		Other:				
2931.00.22	00 4	Drugs	kg	8.1%	Free (E,IL) 6.4% (CA)	15.4¢/kg + 67.5%
2931.00.25	00 1	Pesticides	kg	11.1%	Free (A,E,IL) 8.8% (CA)	15.4¢/kg + 40%
		Other:				
2931.00.27	00 9	Organo-mercury compounds	kg	6.6% 1/	Free (E,IL) 5.2% (CA)	15.4¢/kg + 40%
		Other:				
2931.00.30	00 4	Products described in additional U.S. note 3 to section VI	kg	13.5% 1/	Free (E,IL) 10.8% (CA)	15.4¢/kg + 68.5%
2931.00.40	00 2	Other	kg	17.7% 1/	Free (E,IL) 14.1% (CA)	15.4¢/kg + 68.5%
2931.00.50		Other		3.7%	Free (A,E,IL) 2.9% (CA)	25%
	10 7	Organo-silicon compounds	kg			
		Organo-tin compounds:				
	21 4	Dibutyltin oxide	kg			
	25 0	Tetrabutyltin	kg			
	29 6	Other	kg			
	30 3	Organo-phosphorus compounds	kg			
	50 8	Other	kg			
2932		Heterocyclic compounds with oxygen hetero-atom(s) only:				
		Compounds containing an unfused furan ring (whether or not hydrogenated) in the structure:				
2932.11.00	00 6	Tetrahydrofuran	kg	3.7%	Free (A,E,IL) 2.9% (CA)	25%
2932.12.00	00 5	2-Furaldehyde (Furfuraldehyde)	kg	Free		Free
2932.13.00	00 4	Furfuryl alcohol and tetrahydrofurfuryl alcohol	kg	3.7%	Free (A,E,IL) 2.9% (CA)	25%
2932.19		Other:				
2932.19.10	00 6	Aromatic	kg	6.7% 1/	Free (E,IL) 5.3% (CA)	25%
2932.19.50	00 7	Other	kg	3.7%	Free (A,E,IL) 2.9% (CA)	25%
		Lactones:				
2932.21.00	00 4	Coumarin, methylcoumarins and ethylcoumarins	kg	20%	Free (A,E,IL) 16% (CA)	15.4¢/kg + 48%
2932.29		Other lactones:				
		Aromatic:				
2932.29.10	00 4	Pesticides	kg	12.5%	Free (A,E,IL) 10% (CA)	15.4¢/kg + 64.5%
2932.29.20	00 2	Drugs	kg	7.4%	Free (E,IL) 5.9% (CA)	15.4¢/kg + 53%
		Other:				
2932.29.30	00 0	Products described in additional U.S. note 3 to section VI	kg	13.5% 1/	Free (E,IL) 10.8% (CA)	15.4¢/kg + 53.5%
2932.29.40	00 8	Other	kg	3.7¢/kg + 16.2% 1/	Free (E,IL) 2.9¢/kg + 12.9% (CA)	15.4¢/kg + 52%

1/ Duty on certain chemicals used to produce photographic color couplers temporarily suspended. See subheading 9902.29.01.

APPENDIX D
METHODOLOGY

Methodology

This appendix explains the methods used to estimate the effects of suspending the duty on ranitidine hydrochloride in the U.S. antiulcer drug market. The estimates are based on an imperfect substitutes model with the geometry and underlying equations of the model presented here.

The geometry of the model

To understand how a price change affects the U.S. antiulcer drug market it is necessary to consider the interactions between Zantac and the other antiulcer drug medications. This section graphically illustrates these effects. Recall from the text that it is assumed that two primary markets exist: 1) a market for Zantac and 2) a market for a composite good representing the other antiulcer medications.

The U.S. market for antiulcer drugs is presented in panel A of Figure D–1. The market for Zantac is represented by supply and demand curves S_Z and D_Z and the market for the composite non-Zantac good is represented by supply and demand curves S_{NZ} and D_{NZ}. The price decrease in Zantac is reflected in a shift in the supply curve from S_Z to S'_Z. The result is an increase in the quantity demanded of Zantac. In the non-Zantac market, the price decrease in Zantac causes agents to substitute away from the non-Zantac good to Zantac. This is represented by a shift in demand in the non-Zantac market from D_{NZ} to D'_{NZ}. This shift results in a reduction in the quantity supplied of the non-Zantac good and a decrease in its price. This shift is also shown in panel B in the U.S. market. In this panel, S^E_{NZ} represents the excess supply of non-Zantac consumed in the U.S. market; S^W_{NZ} represents the world supply of non-Zantac; D^{US}_{NZ} represents the demand for non-Zantac in the United States; and D^{ROW}_{NZ} represents the demand of non-Zantac in the rest of the world. Since the price of the non-Zantac good declines, the quantity demanded abroad will increase (QD^0_{NZ} to QD^1_{NZ}) to somewhat offset the decrease in quantity demanded in the United States. Therefore, the decrease in the total production of the non-Zantac good (QS^0_{NZ} to QS^1_{NZ}) will be less than the decrease in consumption in the U.S. market (Q^0_{NZ} to Q^1_{NZ}). This is illustrated in panel B by the smaller decrease in the quantity supplied in the market representing the rest of the world. Note that, as shown in panel B, $Q^0_{NZ}Q^1_{NZ} = QD^0_{NZ}QD^1_{NZ} + QS^0_{NZ}QS^1_{NZ}$.

The equations

This section derives the equations used to calculate the price and quantity effects presented in the text. The equilibrium conditions for the Zantac and non-Zantac markets are given by:

$$D_{NZ}(P_{NZ}, T * P_Z) = S_{NZ}(P_{NZ}) \quad (1)$$

$$D_Z(T * P_Z) = S_{NZ}(P_Z) \quad (2)$$

where D_{NZ} is the demand for non-Zantac, S_{NZ} is the supply of non-Zantac, P_{NZ} is the price of non-Zantac, D_Z is the demand for Zantac,[63] S_Z is the supply of Zantac, P_Z is the price of Zantac, and T represents one plus the *ad valorem* tariff equivalent on Zantac of the actual tariff on ranitidine hydrochloride, an input into the production of Zantac. Taking the natural logarithms and differentiating equations (1) and (2) with respect to T yields:

$$\eta_{NZ}(\hat{P}_{NZ}/\hat{T}) + \eta_{NZ,Z}(1 + \hat{P}_Z/\hat{T}) = \epsilon_{NZ}(\hat{P}_{NZ}/\hat{T}) \quad \text{from (1)} \quad (3)$$

$$\eta_Z\ (1 + \hat{P}_Z/\hat{T}) = \epsilon_Z(\hat{P}_Z/\hat{T}) \quad \text{from (2)} \quad (4)$$

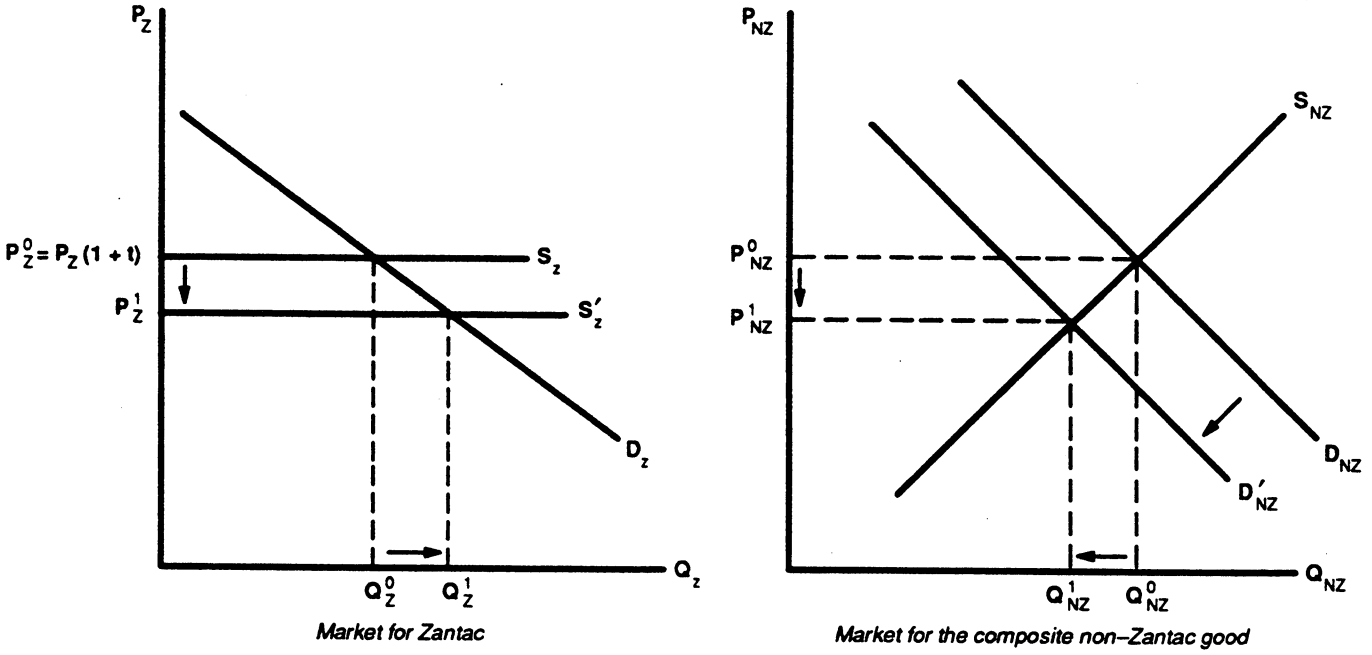
where η 's are demand elasticities, ϵ 's are supply elasticities, and the $\hat{}$'s indicate percent changes.

To solve for the percentage change in price in the non-Zantac market, first solve equation (4) for $\hat{P}_Z/\hat{T}$:

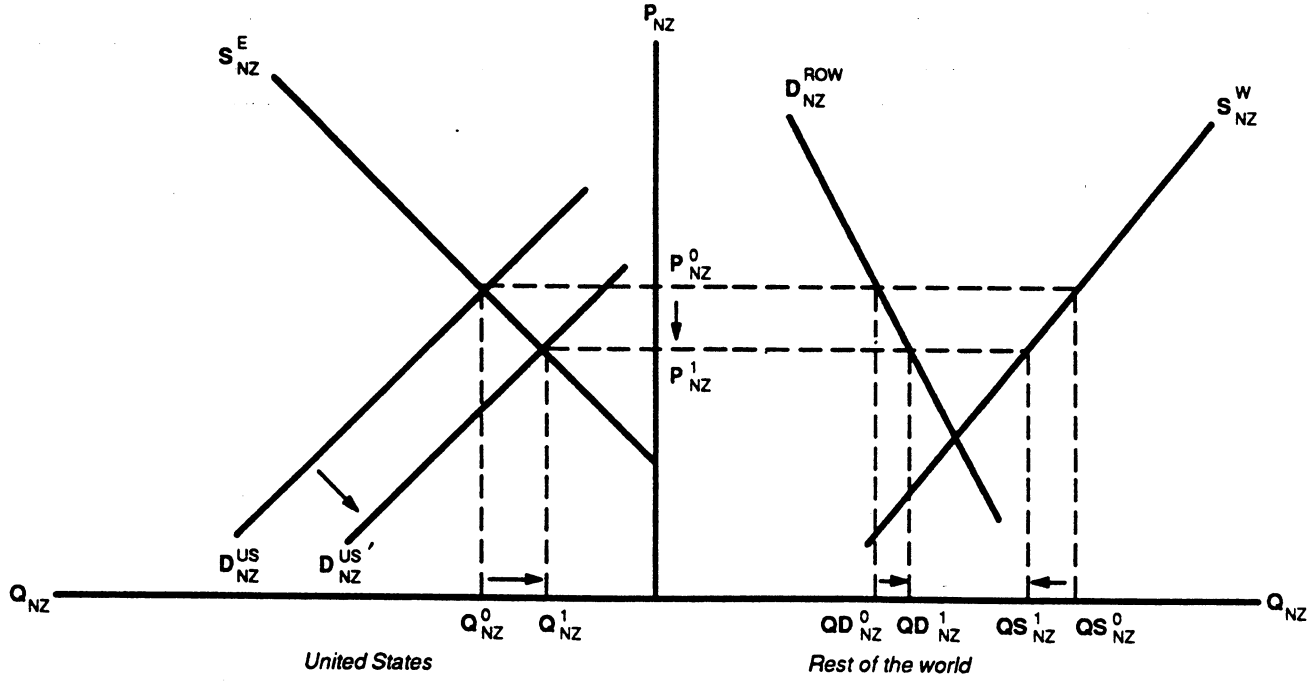
$$\hat{P}_Z/\hat{T} = \eta_Z/(\epsilon_Z - \eta_Z) \quad (5)$$

[63] A more general demand function for Zantac would have included the price of the non-Zantac good, but the feedback effects that would have been captured by this term are negligible and are not included here.

Figure D–1
Partial equilibrium analysis of the effects of suspending the duty on ranitidine hydrochloride resulting in a decrease in the price of Zantac



Panel A: U.S. antiulcer market



Panel B: U.S. and world market for the non–Zantac good

Next, substitute equation (5) into equation (3) to solve for $\hat{P}_{NZ}/\hat{T}$:

$$\hat{P}_{NZ}/\hat{T} = \eta_{NZ,Z} * \epsilon_Z/(\epsilon_{NZ}-\eta_{NZ})(\epsilon_Z-\eta_Z) \quad (6)$$

To solve for the percentage change in the quantity of U.S. sales of Zantac use equation (5):

$$\hat{Q}_Z/\hat{T} = \epsilon_Z * \hat{P}_Z/\hat{T} = \epsilon_Z\eta_Z/(\epsilon_Z-\eta_Z) \quad (7)$$

From equation (6) we can derive the percentage change in the U.S. consumption of the composite non-Zantac good (equation 8) and the change in the total quantity produced of the composite non-Zantac good (equation 9):

$$\hat{Q}_{NZ}/\hat{T} = \epsilon_{NZ} * \hat{P}_{NZ}/\hat{T} = \epsilon_{NZ}\eta_{NZ,Z}\epsilon_Z/(\epsilon_{NZ}-\eta_{NZ})(\epsilon_Z-\eta_Z) \quad (8)$$

$$Q_{TPNZ}/\hat{T} = \epsilon_{TPNZ} * P_{NZ}/\hat{T} = \epsilon_{TPNZ}\eta_{NZ,Z}\epsilon_Z/(\epsilon_{NZ}-\eta_{NZ})(\epsilon_Z-\eta_Z) \quad (9)$$

The demand elasticities used in equations (3) through (9) are given by:

$$\eta_{NZ} = \alpha_{NZ}\eta - \alpha_Z\sigma \quad (10a)$$

$$\eta_{NZ,Z} = \alpha_Z(\eta+\sigma) \quad (10b)$$

$$\eta_Z = \alpha_Z\eta - \alpha_{NZ}\sigma \quad (10c)$$

$$\eta_{Z,NZ} = \alpha_{NZ}(\eta+\sigma) \quad (10d)$$

where α_{NZ} is the market share of the composite non-Zantac good, α_Z is the market share of Zantac, η is the price elasticity of demand for the antiulcer drug market,[64] and σ is the elasticity of substitution for antiulcer medications.

The parameters needed to use the model include η, σ, α_Z, and the following supply elasticities: ϵ_Z, the supply elasticity of Zantac, ϵ_{NZ}, the supply elasticity of the composite non-Zantac good, and ϵ_{TPNZ}, the elasticity of production supply for the composite non-Zantac good. Finally, since full pass through of the duty savings on Zantac is assumed, the percentage change in the price of Zantac is also needed.

[64] All own price demand elasticities are, by convention, negative numbers.

APPENDIX E
LIST OF SUBMISSIONS TO THE COMMISSION

List of Submissions to the Commission

Glaxo

Date	*Description*
September 18, 1990	Statement of Edward Tower, PhD., Duke University, to Subcommittee on Trade of the Ways and Means Committee of the U.S. House of Representatives.
September 24, 1990	Statement of Charles A. Sanders, MD, CEO, Glaxo Inc., before the Subcommittee on Trade of the Ways and Means Committee of the U.S. House of Representatives.
October 1, 1990	Supplement to statement by Edward Tower, PhD.
November 27, 1990	Information provided in response to Commission staff questions.
December 13, 1990	Information on relevant factors in evaluating the probable economic effect of a duty suspension. The submission includes IMS data.
December 13, 1990	A corrected copy of the November 27, 1990, submission.
December 14, 1990	A brief summary of Glaxo's position concerning Investigation No. 332-300.
Received December 14, 1990	Factors to be considered in evaluating the probable economic effect of duty suspension.
December 20, 1990	Further corrections to submission on November 27, 1990.

SmithKline Beecham

Date	*Description*
September 24, 1990	Testimony of Henry Wendt, Chairman of the Board, SmithKline Beecham, before the Subcommittee on Trade of the Ways and Means Committee of the U.S. House of Representatives.
October 12, 1990	Supplement to the testimony of Henry Wendt, September 24, 1990.
October 16, 1990	Background paper on the impact of Duty Suspension on Ranitidine Hydrochloride on the H_2 Ulcer Drug Market.
November 6, 1990	Market share data.
November 14, 1990	Background Information related to investigation materials related to: -loss of revenue to the United States -1990 Congressional considerations -intense marketing competition -economic harm to SmithKline Beecham resulting from the duty suspension.
December 3, 1990	Updated IMS data.
December 5, 1990	Annual report and comparison price data.
December 14, 1990	SmithKline Beecham's written comments on Investigation 332-300.
December 12, 1990	Competitive impact analysis conducted by Paul A. London Associates, Inc.