

An Economic History and Analysis of Section 337*

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January 16, 1990

INTRODUCTION

In the Omnibus Trade and Competitiveness Act of 1988 Congress made quite possibly the most significant changes to the laws governing U.S. trade policy, especially the "fair trade" laws, since their inception in the early twentieth century.¹ The widely discussed and highly controversial plant-closing and Gephardt amendments helped to mute debate on the other amendments contained in the bill. Once these two controversial provisions were dropped, the bill was ratified with relatively little discord. Only now that the bill is law are people realizing how significantly many of the changes really are.

This paper will focus on the revisions made to Section 337 of the Tariff Act of 1930² [hereinafter "Section 337" or the "statute"]. Section 337 provides protection for domestic industries against a broad array of unfair trade acts;³ however, for the purposes of this chapter we will focus on its application to patent infringement cases. Patent infringement cases have accounted for over 75% of Section 337 cases since 1975 (General Accounting Office, 1986).

Although many of the revisions contained in the 1988 bill are relatively innocuous the amendments concerning the economic tests fundamentally alter the statute.⁴ Under the old Section 337, complainants had to demonstrate that the alleged unfair practices had the "effect or tendency to destroy or substantially injure a domestic industry that was efficiently and economically operated." In practice the International Trade Commission [hereinafter the "ITC" or the "Commission"] interpreted these economic tests as requiring (i) evidence that the alleged unfair acts caused injury, (ii) the existence of a domestic industry, and (iii) proof that the domestic industry was "efficiently and economically operated." Each requirement was substantially altered by the 1988 bill: (i) the injury requirement was eliminated in patent infringement, copyright, registered

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trademark, and semiconductor mask work cases; (ii) the "efficient and economically operated" condition was dropped; and (iii) the definition of "domestic industry" was broadened, allowing protection to be granted in cases without domestic production. The cumulative effect of the changes most assuredly makes Section 337 protection more accessible to domestic complaints.

Now that the statute has been revised there is some concern that this attempt to enhance U.S. inventive activity and reduce unfair foreign competition might not have been a wise decision. From a political viewpoint, there is concern that the bill was too great a concession to the protectionist business interests and that the bill marks the beginning of a new protectionist era in U.S. trade policy. From a legal viewpoint, there are questions whether the revised statute is consistent with U.S. GATT obligations. The fact that the recent GATT panel report found the old 337 statute to be "inconsistent" with Article III:4 of the GATT treaty compounds fears that the revised statute is even further from GATT standards.⁵ From an economic viewpoint, there are two questions that should be answered in order to evaluate the 1988 bill. First, in what respects did the old statute failed to provide adequate protection? That is, what had been the performance of the old Section 337 statute? Was the old statute failing to provide protection for infringed industries? Only by answering this question can we determine whether changing the statute was warranted. As we will discuss, U.S. firms are now facing much tougher competition from their foreign rivals than they did in the 1950s and 1960s, but this implies neither that the foreign rivals have been competing more "unfairly" in recent years nor that having an injury requirement made Section 337 ineffective. One could imagine, for instance, that Congress revised the statute primarily because of the overall deterioration of the U.S. trade position and only secondarily because domestic complainants were not receiving adequate protection. The second key question is what the probable effect of the revisions will be. How will the amendments affect the inventive and patenting behavior of U.S. firms? If we assume the intent of the revisions was to encourage more inventive activity by domestic firms then we must ask whether the revised statute will increase or decrease the amount of R&D? How will the amendments affect U.S. firms' R&D behavior? Will they invest more in R&D and will this lead to improved competitiveness? Or will U.S. firms spend resources on legal and economic counsel in lieu of risky R&D investments?

In order to discuss these two questions I have divided the chapter into two distinct parts. In the next section, I present a brief history of Section 337. Two insights emerge from this historical perspective. First, even though the (pre-1988) revisions to Section 337 had strengthened the

penalties and reduced the time limits for relief, during recent years there has been a growing feeling that Section 337 has not provided adequate protection for U.S. industries. It is my opinion that this belief is due mainly to a handful of well-publicized controversial cases since an examination of the cases reveals that the overwhelming majority of 337 cases have been resolved favorable for the U.S. complainant. Second, the major revisions to Section 337 have occurred at the same time as the U.S. trade position has deteriorated. The timing of the revisions suggests that Congress revised Section 337 not just because of the inability of domestic complaints to receive adequate relief but also because of pressure to improve the trade balance.

In the second part of the chapter I more formally analyze the relationship between Section 337 and inventive activity. The analysis reveals that patent protection is necessary in order for domestic firms to engage in costly and risky R&D. I find that the elimination of the economic tests (which increases the probability that firms will receive relief from allegedly infringing rivals) creates incentives for additional R&D. This is exactly the pro-inventive stimulus Congress hoped the revisions would induce. However, the analysis also shows that the revisions to Section 337 create incentives that *discourage* R&D. These anti-inventive incentives reflect the fact that risky R&D investments can be reduced since legal expenditures are now more likely to lead to a successful ITC decision, generating larger profits. Thus, the net effect on inventive behavior will probably not be as great as Congress expected.

AN ECONOMIC HISTORY OF SECTION 337

Section 337 has a long a varied history. The statute was rarely used until the early 1970's but since then it has become one of the most powerful and widely used of the fair trade laws. During the 1970s and 1980s, as foreign firms have garnered larger and larger markets shares, U.S. firms have not only filed more and more Section 337 petitions but have also lobbied for tougher standards for their foreign competitors. The key issue discussed in this section is whether Congress revised Section 337 because it is unable to grant protection because of the commitment to multilateral tariff reduction (through the GATT) or because there was evidence that Section 337 was not protecting U.S. intellectual property rights.

1922–1974—Section 337: Rarely Used But Not Forgotten

Section 337 is the successor to Section 316 of the Tariff Act of 1922. The 1922 Act was an outgrowth of the post-World War I fear that traditionally dominant European industries would destroy fledgling U.S.

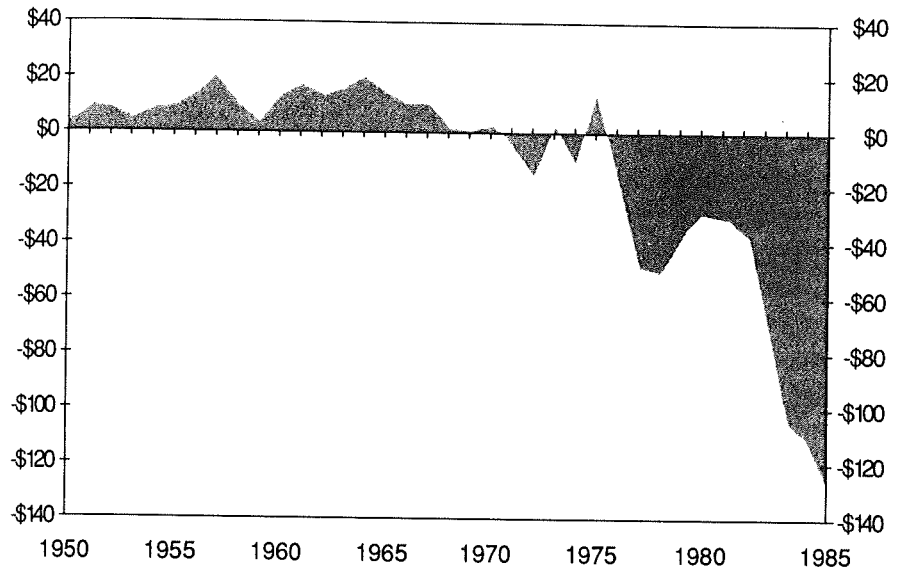
manufacturing industries. Distrust of Germany was particularly pronounced; people feared Germany would attempt to achieve economically what it was unable to achieve in war. The 1922 Act was just part of a series of protectionist actions and beggar-thy-neighbor policies that culminated in the Smoot-Hawley Tariff of 1930.⁶ The Act's main feature was an "elastic" tariff that essentially removed any comparative advantage-based reason for trade.⁷ Section 316 was enacted to prevent foreigners from escaping the tariff via unfair methods. The Act authorized unfair acts and make recommendations to the President who could penalize offenders by levying an additional duty, or, in extreme cases, exclude the imported product altogether.

The Tariff Act of 1930 renumbered the statute to Section 337 but did little to change the substantive aspects of the statute other than eliminating the additional duty remedy, leaving only the option of excluding the foreign competitor. The Act provided for relief from "unfair methods of competition" in the importation or sale of imported products, of which the effect or tendency was to "destroy or substantially injure an efficient and economically operated industry." Note that the original Act defined neither "unfair methods of competition" nor the injury standard. As a result, the Tariff Commission had (and the International Trade Commission continues to have) a great of discretion in determining when and how to apply the statute.

After World War II the U.S. emerged as the leader of the free trade movement. The U.S. had much to gain by have free access to the war-ravaged European economies and urged for trade liberalism. Interesting, it was at the U.S.'s insistence that Section 337, along with the other fair trade statutes, was "grandfathered" into the GATT and was excluded from the early rounds of GATT negotiations; over the years, due more to political inertia than popularity, Section 337 became an entrenched component of the U.S. trade laws.

Although the statute was clearly meant to offer protection and (potentially) exclude foreign rivals, it was rarely used until revised in 1974. During the thirty-two year period, 1936-1968, the Tariff Commission received only thirty-six Section 337 complaints. Moreover, the Tariff Commission recommended exclusion orders for only three of these complaints, all of which were rejected by the President.⁸ There are several reasons why the statute was used so rarely during this period. First, the Tariff Commission, believing this statute treated foreign firms unfairly, set an extremely high injury standard and did not consistently lower the injury standard until the mid-1960s.⁹ Second, as previously mentioned, the U.S. promulgated and embraced a liberal trade philosophy during the immediate post-World War II era. The U.S., bearing the free trade stan-

FIGURE 1
U.S. Merchandise Trade Balance*
1950-1986
(billions of 1982 \$)



*Source: Economic Report of the President (1988)

dard, could hardly be seen restricting trade by aggressively using the unfair trade laws. Hence the Executive branch felt it was not in the U.S.'s best international interests to encourage Section 337 actions. Domestically, this was not a politically unpopular stance since during this period the U.S. consistently ran a trade surplus (see Figure 1); in fact between 1950 and 1970, the U.S. was the world's biggest creditor, running a trade surplus every year. With the trade surplus running about one-percent of GNP (Table 1), I think it is fair to say that U.S. manufacturers were more concerned with pressuring Congress to multilaterally reduce tariffs rather than pursue the occasional patent right violation.

Note that there is no priori reason why the incidence of Section 337 actions should be related to the trade balance. In fact, it is generally believed that Section 337 is the least political of the fair trade laws. However, the consistently large trade surplus during the 1950s and 1960s does reflect the U.S.'s dominance in the international marketplace and is consistent with the feeling that during this time there was little fear that foreign rivals would challenge the U.S.'s technological leadership—therefore, there was little political pressure to exclude foreign rivals. Additionally, the U.S. had the most to lose if the world became more protectionist.

TABLE 1:
U.S. GNP, IMPORTS, AND EXPORTS*
(BILLIONS OF 1982 \$)
1950-1985

<u>Year</u>	<u>Imports</u>	<u>Exports</u>	<u>GNP</u>	<u>Imports/GNP</u>	<u>Exports/GNP</u>
1950	\$36	\$41	\$1,204	3.03%	3.40%
1955	\$42	\$52	\$1,495	2.78%	3.48%
1960	\$48	\$64	\$1,665	2.89%	3.85%
1965	\$66	\$81	\$2,088	3.15%	3.88%
1970	\$99	\$103	\$2,416	4.10%	4.27%
1975	\$176	\$192	\$2,695	6.53%	7.13%
1980	\$293	\$263	\$3,187	9.18%	8.24%
1985	\$303	\$194	\$3,608	8.41%	5.37%

*Sources: Trade Figures (United Nations, 1986);
GNP data (Economic Report of the President, 1988)

Note: The import and export figures are for merchandise trade.

In 1950 the U.S. produced over 40% of the world's GNP, far more than all of Western Europe (21.1%) and Japan (1.6%) combined; U.S. exports dominated foreign markets. Even if foreigners were thought to be occasionally "stealing" U.S. ideas and patents, there was no need to "rock the boat" by aggressively enforcing U.S. trade laws. It was thought that these foreign competitors would always be secondary sources and the U.S. would remain the world's primary exporter.

A final reason why there were so few Section 337 cases was that during the 1950-1974 period a Section 337 investigation took an average of three years to complete.¹⁰ This long delay for any potential protection increased the costs of filing a Section 337 complaint and further reduced the popularity of Section 337. All factors considered—inconsistent injury standards, no Executive branch support, little or no public awareness of trade problems, a strong belief that U.S. economic hegemony would continue indefinitely, and long delays in proceedings—made it extremely unlikely that a Section 337 petition would result in an exclusion order; thus, it is not surprising that there were few cases initiated and even fewer positive determinations.

By 1970, both exports and imports were more than twice their 1950 values (in real terms). As trade volumes increased, the U.S. economy became increasingly interdependent with other countries' economies and domestic industries became more vulnerable to surges in imports; as economic growth slowed during the early 1970s, industries lobbied Congress to revise the U.S. trade laws. The Trade Act of 1974 was the result of these efforts.

1974–1988—Section 337: An Increasingly Important Weapon

The Trade Act of 1974 marked a fundamental turning point in U.S. trade policy. By 1974 the average tariff in the U.S. was only 7% of its pre-war level.¹¹ For the first time in history, non-tariff barriers (NTBs), instead of tariffs, were seen as the major impediment to a liberal trade order. In a very real sense, it was GATT's success at reducing tariffs that stimulated the use of NTBs.

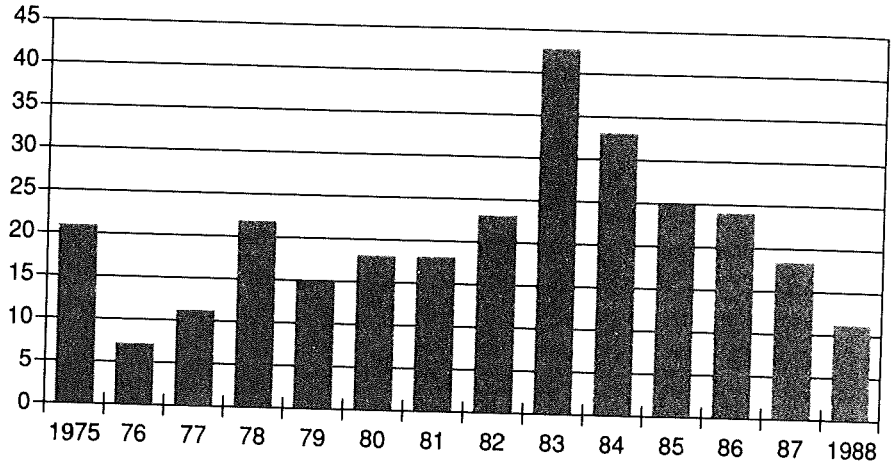
Congress believed that fairness and equity in international trading relations was only possible with equal competitive opportunities, and therefore felt it was imperative to strengthen the laws governing unfair foreign trade practices.¹² Thus, it was argued that the Trade Act of 1974 was necessary to promote a liberal trade environment; ironically, the 1974 Act's inception is coincident with the unprecedented increase, not decrease, in alleged unfair trade acts. It has been argued that instead of promoting a more liberal trade order, the 1974 Act made it easier to grant protection.¹³

The 1974 Act renamed the "Tariff Commission" the "International Trade Commission,"¹⁴ gave the Commission the power to investigate any alleged violation of Section 337, and gave the Commission the ability to issue cease and desist orders. Procedurally, the 1974 Act made Section 337 investigations adjudicative in nature. The 1974 Act also mandated strict time limits for Section 337 investigations and made the ITC's determinations final rather than merely recommendations to the President. Thus, the 1974 Act eliminated the President's power to revise ITC decisions except to disapprove the proposed remedy for "policy" reasons.¹⁵ The 1974 Act did state however, that despite a positive determination, the ITC was to issue a remedial order only if it was in the "public interest."¹⁶

It is noteworthy that early drafts of the 1974 Act contained various proposals to substantially revise statutory requirements of Section 337, but none were ultimately incorporated into the final version. In particular, the Executive branch's original proposal would have (i) eliminated the injury standard and (ii) not required proof that the industry was efficiently and economically operated.¹⁷ As discussions progressed, however, the Senate and House subcommittees agreed that it was important to have an injury requirement. They argued that in practice there was a low threshold for proof of injury¹⁸ and, therefore given the historical precedent, that it was important to retain the injury standard. This is especially interesting since these were among the key amendments contained in the 1988 trade bill.

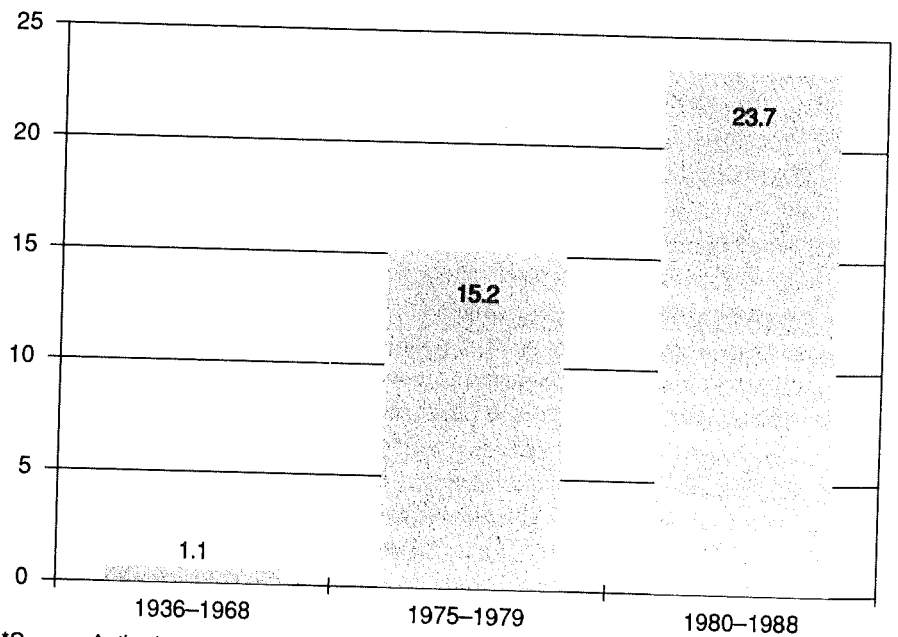
The popularity of Section 337 increased dramatically after the passage of the Trade Act of 1974. As shown in Figure 2 and Figure 3, there was an

FIGURE 2
NUMBER OF SECTION 337 CASES INITIATED BY YEAR*
1976-1987



*Source: Author's compilation from USITC (various issues) and internal ITC documents.

FIGURE 3
AVERAGE NUMBER OF SECTION 337 CASES INITIATED PER YEAR*
1936-1988



*Source: Author's compilation from Simms (1982), USITC (various issues), and internal ITC documents.

average of 15.2 Section 337 investigations per year during the 1974-1979 period, which contrasts with the 1936-1968 period average of 1.1 Section 337 investigations per year. In the legal literature it is argued that the increase in Section 337 actions is due to the removal of some of the President's discretion and the reduced time limits for an investigation.¹⁹ While these changes certainly helped make Section 337 protection easier to obtain, it is not coincidental that the 1970s were also characterized by the deterioration in the position of the U.S. in the international marketplace and a rising tide of public sentiment for protection.

For instance, in 1971 the U.S. ran a merchandise trade deficit for the first time during the post-war era (see Figure 1). In contrast with the surpluses that characterized the earlier 1950-1970 period, the U.S. has run a merchandise trade deficit every year since 1976, including the 1986 record deficit of \$127 billion. Another perspective on the changing trade pattern can be gained by looking at trends in imports and exports. During the 1970s, exports grew at a 10.1% average annual rate, an historically impressive rate. At the same time, however, imports grew at an average annual rate of 12.3%.²⁰

It was becoming increasingly apparent that the U.S. was losing dominance in a number of basic manufacturing sectors and that the changing trade pattern was the result of shifting comparative advantage across countries. A convenient and popular way to interpret this changing trend in trade was that foreign firms were competing more and more unfairly. While in many cases foreign producers had garnered large market share because of superior quality and value of their products, it was feared (and alleged) that foreign producers had used unfair trading practices to gain market share. While unfair foreign trade practices probably contributed to the U.S.'s deteriorating trade position, events such as the 1973-75 recession, the OPEC oil crisis, a high and variable inflation rate, and an appreciating exchange rate had much more to do with the U.S.'s changing comparative advantage than unfair foreign trade practices.

The 1974 Trade Act also marked the beginning of a much more political decision process at the ITC. Congressmen began to put more pressure on the ITC to make affirmative decisions and grant the protection which they were unable to provide.²¹ Naturally, pressure was also being put on Congress from struggling industries and organized labor. Labor's change in attitude toward international trade is characteristic of the change in the general public's perception of trade. During the 1950s and early 1960s trade was thought of as a way to export our excess productive capacity, and thus labor embraced a free trade position as a way to keep unemployment low. However, with the rapid rise in import penetration ratios (and thus the increase in competitive pressures) that

occurred in many manufacturing sectors in the late-1960s labor realized that foreign products were viable *substitutes* for domestic products, and thus labor began to argue that one should "buy American" to protect jobs.²²

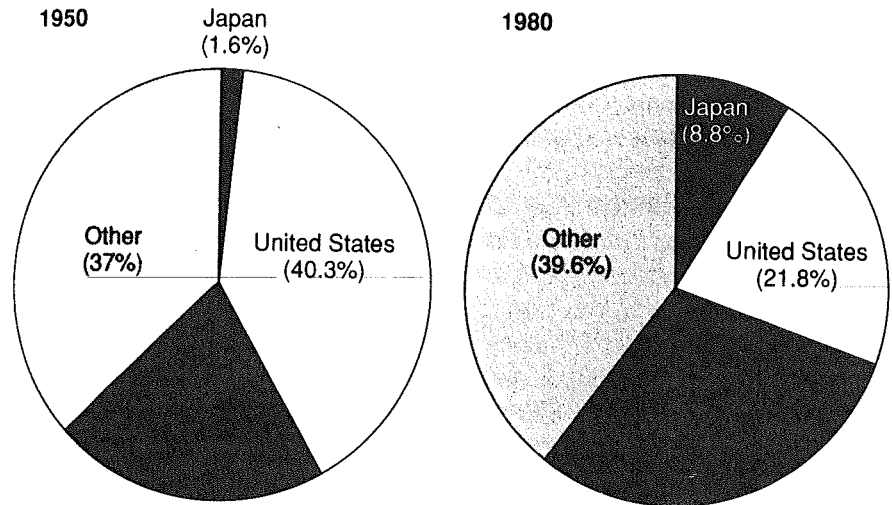
If the intent of the 1974 amendments was to encourage greater use of Section 337, then the 1974 Act was tremendous success. In 1975 alone, twenty-one petitions were initiated (a record number at the time), and during the following years a number of well publicized cases involving products such as color television sets, high fidelity audio equipment, and steel pipes and tubes were initiated. These cases along with the continuing deteriorations of U.S. competitiveness contributed to the growing perception that there was a need for more protection against unfairly competing foreign firms.

The popularity of Section 337 has continued to rise in the 1980s. As shown in Figure 3 there has been an average of 23.7 Section 337 investigations per year in the 1980's in contrast with an average of 15.2 Section 337 investigations per year in the late-1970s. While there were no significant changes to Section 337 during these years, there was a significant deterioration in the U.S.'s trade balance, with the trade deficit growing from about 1% of the GNP during the late-1970s to approximately 3% of GNP during the 1980s (Table 1). The popular press' explanations for the slower domestic economic growth always seem to include some mention of the trade situation. The fact that export growth had become negative during 1980-1986 period was frequently cited in these discussions. Given these facts, it is not surprising that the public's reaction to large trade deficits has centered on the inability of U.S. exports to sell in foreign markets, which naturally leads to more sympathy towards allegations of unfair competition.

Figure 4 nicely summarizes the U.S.'s fall vis-à-vis its trading partners. In 1950 the U.S. produced 40.3% of the world's GNP while all of Western Europe produced only 21.1% and Japan only 1.6%. In contrast, in 1980 the U.S.'s share had fallen to 21.8% while European and Japan's shares had grown to 29.8% and 8.8%, respectively. The U.S. no longer dominated international trade and people reacted to this by arguing that "something needed to be done about trade."

The large bilateral trade deficits that the U.S. was running with several countries, especially Japan, further fueled the feeling that foreign countries were trading unfairly. Japan's large trade surplus in particular has been widely noted. The feeling that the large bilateral deficits are due in part to unfair trade practices is confirmed in the data: more than 20% of 337 actions have been against Japanese firms (see Table 3 for evidence). Of course, this is also consistent with the argument that countries with

FIGURE 4
SHARES OF WORLD GNP*
U.S., EUROPE, AND JAPAN
1950-1980



* Source: Bhagwati (1988)

large trade imbalances with the U.S. are more susceptible to trade actions. In other words, it is debatable whether unfair acts lead to trade imbalances or whether bilateral imbalances lead to an increased incidence of trade actions.

The data clearly indicates that the amendments to Section 337 were due at least in part to the overall trade position. This is not to say however, that the trade deficit was the only reason why Congress amended Section 337. To the contrary, there was clearly several controversial ITC decisions that preceded the amendments. However, as previously mentioned, Congress refused to drop the injury standard and the requirement that the domestic industry be "efficiently and economically operated" in 1974 bill but elected to do so in 1988. What had changed in the intervening years? Had the injury standard become particularly onerous? A cynical observer might argue that the key difference between 1974 and 1988 was that special interest groups have become more adept at lobbying Congress. Certainly the amendments were not due to a large number of "no violation" findings based on "no injury." Surveying Section 337 case history, I found that the outcomes of only 7 cases were influenced by the injury requirement. Similarly, the "domestic industry" requirement was an important issue in 16 cases and a crucial factor in the final determina-

tion in only 5 cases.²³ To my knowledge, there have been no cases influenced by the "efficient and economically operated" requirement.

The actual number of cases hinging on the economic tests belies their significance for several reasons. First, dropping the economic tests substantially reduces the cost of initiating a Section 337 investigation. According to the General Accounting Office (GAO) "most Section 337 proceedings that are litigated to final determination cost between \$100,000 and \$1 million, with a few costing over \$2.5 million."²⁴ The GAO also estimates that the legal costs of satisfying the economic tests account for more than *half* the total litigation expenses. Second, the lower costs of initiating a petition will likely lead to an increase in the number of cases filed. This raises the expected costs (due to higher legal fees) to foreign firms of competing in the U.S. market which will lead to less entry into the U.S. market—even for legitimate and fairly competing firms. Third, dropping the economic tests reduces the standard of proof necessary for a positive determination, and thus increases the probability of successfully obtaining protection. Fourth, the bargaining position of the U.S. complainants has increased relative to the foreign respondents. Thus, the foreign firms will likely face higher licensing fees.

The question remains whether the old statute provided inadequate protection. Was there a need to change Section 337? We can use Table 2 to get a broad idea of how the statute has been used since 1974. As we have already discussed, Section 337 is more popular now than ever before. More important for evaluating how effective the statute has been is whether the industries which have used the statute have been granted relief. A review of the data reveals is that approximately 75% of Section 337 cases since 1976 have resulted in some sort of relief for the complainant (i.e., exclusion order, cease and desist order, consent order, settlement, licensing agreement, etc.). Interestingly, fewer than 15% of the cases actually resulted in exclusion or cease and desist orders, and "no violation" has been found in only 20% of the cases. Thus, in far less than half the cases did the ITC actually have to make a final decision. In nearly all the remaining cases the U.S. complainant has negotiated some type of agreement with the foreign respondent(s). Combining the settled cases with those receiving some remedy from the ITC, we find about 75% of the cases have resulted in some type of remedy for the U.S. complainant. This is an impressive percentage, and on average U.S. firms which have used Section 337 have been very successful in receiving relief.

It is quite striking that over 50% of Section 337 cases are settled. The growing popularity of Section 337 has increased the ITC's caseload, straining the Commission's resources. In many cases, the ITC encourages parties to settle.²⁵ A settled case saves the government the expense of an

investigation. Additionally, a settled case reduces the international tensions that may be caused by an exclusion order, and thus both governments prefer the firms to settle. The parties often prefer settling since it guarantees both sides a satisfactory and certain outcome. Respondent(s) fear a general exclusion order and thus are willing to negotiate a settlement; domestic parties can often use the threat of the ITC order to obtain favorable marketing arrangements both here and abroad. Finally, a settlement agreement ends the investigation process.²⁶ Thus, it might be desirable for a domestic complainant with a weak claim or a foreign firm with a particularly egregious violation to settle before the ITC can decide.

It is not clear, however, that the large number of settlements is desirable. One needs to be concerned that the agreements may have a detrimental affect on competitiveness. That is, do these agreements involve market sharing arrangements or restraints of trade that would otherwise violate antitrust law? The fact that such settlements are negotiated in order to settle a Section 337 investigation gives the parties greater immunity from potential antitrust actions, and therefore it is quite possible that Section 337 cases are initiated with the *intent* of settling. Given that the 1988 revisions have significantly reduced the costs of filing a Section 337 petition and that most cases are settled without any official ITC decision, it is reasonable to expect many more cases to be filed with the intent of settling.

Summary: What does Section 337's History Tell Us?

Since its protectionist beginnings, Section 337 has been a broadly defined and potentially powerful statute. Although the statute was not widely used for many years, largely due to the strong free trade philosophy that emerged in the immediate post-World War II era, it remained an important part of the U.S.'s trade policy arsenal. In the 1970s and 1980s, we have witnessed a steady increase in the use of the statute; although some increase in Section 337 action should be expected due to the larger volume of trade, it is pretty clear that the 1974 revisions greatly facilitated the use of Section 337.

While on average there have been more Section 337 cases during the 1980s than during the 1970s (Figure 2), in recent years there has been a noticeable decrease in Section 337 cases (Figure 3). The 1980s have also been a period of unprecedentedly large trade deficits. Thus, in 1988 Congress was faced with the dilemma that Section 337 use was decreasing at the same time there was increasing pressure for some type of relief from the pressures of foreign competition. Congress chose to address this situation by eliminating the economic criteria.

TABLE 2:
SUMMARY OF SECTION 337 OUTCOMES BY YEAR*

Year	Action										Total
	Exclusion	Cease & Desist	No Violation	Settlement	Consent	Prejudice	Withdraw	Other			
1975	3	—	5	11	—	1	—	—	1	21	
1976	2	—	4	—	1	—	—	—	—	7	
1977	4	—	3	3	—	—	—	—	1*	11	
1978	6	1	7	3	2	1	—	—	2†,‡	22	
1979	3	—	3	5	—	1	1	—	2	15	
1980	2	—	1	9	2	—	1	—	3§	18	
1981	3	—	2	8	1	—	2	—	2	18	
1982	3	—	6	7	3	1	2	—	1	23	
1983	9	—	5	11	5	3	1	—	9**	43	
1984	2	1	5	13	5	—	—	—	7	33	
1985	3	—	4	12	1	2	1	—	2	25	
1986	—	—	7	7	3	1	—	—	6††	24	
1987	1	—	—	7	2	4	—	—	4	18	
1988	—	—	2	2	1	—	—	—	6‡‡	11	
Total	41	2	54	98	26	14	8	46		289	
As a % of total # of cases	14.2%	0.7%	18.7%	33.9%	9.0%	4.8%	2.8%	15.9%		100.0%	

*Source: Author's compilation from U.S.I.T.C. Annual Reports and internal ITC documents. Year is year petition initiated.

Notes:

- *In connection with case 337-TA-29, Certain welded stainless steel pipe and tube, the ITC issued a cease-and-desist order against a predatory pricing practice. The President prevented the cease-and-desist order from taking effect.
- †In connection with case 337-TA-60, Certain automatic crankpin grinders, although the ITC found a violation it also determined that it would not be in the public interest to exclude the offending imports because automatic crankpin grinders were in short supply.
- ‡In connection with case 337-TA-67, Certain inclined-field acceleration tubes and components thereof, a violation was found but public interest considerations—the continued availability of tubes essential to scientific research programs affecting the public health and welfare—precluded taking remedial action.
- §In connection with case 337-TA-82, Certain headboxes and paper machine forming sections for the continuous production of paper and components thereof, the President disapproved the exclusion order because he considered it to be too broad. The ITC reinstated the case as 337-TA-82A and issued a limited exclusion order.
- ||In connection with case 337-TA-99, Certain molded-in sandwich panel inserts and methods for their installation, the President disapproved the scope of the remedy. Consequently, the ITC modified the exclusion order. The modified remedy was not disapproved.
- **In connection with case 337-TA-165, Certain duracell alkaline batteries, the President disapproved the exclusion order.
- ††In connection with case 337-TA-242, Certain dynamic random access memories, components thereof, and products containing the same, the President disapproved the settlement agreement.
- ‡‡4 cases have not been resolved as of June 1989.

**TABLE 3:
SUMMARY OF SECTION 337 ACTIONS BY YEAR AND COUNTRY***

Region/Country	Year														Total
	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	
Canada	—	1	—	1	2	1	3	3	4	3	2	1	3	—	24
EC	5	3	2	4	5	7	2	3	13	21	9	7	5	2	88
U.K.	2	—	—	2	2	2	1	—	—	5	1	4	1	—	20
France	—	1	—	—	2	—	—	—	—	3	1	—	1	1	9
W. Germany	1	—	1	2	1	2	1	3	6	5	4	2	2	—	30
Other EC	2	2	1	—	—	3	—	—	7	8	3	1	1	1	29
Japan	9	2	7	5	3	5	8	5	9	6	5	7	3	1	75
NICs	2	4	8	12	5	2	11	11	18	11	9	15	11	7	126
Hong Kong	1	1	2	3	1	—	2	3	4	1	3	6	4	—	31
South Korea	—	—	3	3	1	—	1	2	3	2	—	3	4	1	23
Taiwan	1	2	3	6	3	2	7	6	10	8	6	6	3	6	69
Singapore	—	1	—	—	—	—	1	—	1	—	—	—	—	—	3
Other	4	2	2	6	3	4	2	4	9	2	3	5	10	1	57
Total	20	12	19	28	18	19	26	26	53	43	28	35	32	11	370

*Source: Author's compilation from various issues of U.S.I.T.C. *Annual Report* and internal ITC documents.

Notes: (i) Year is defined as year case was initiated. (ii) Many Section 337 cases involve more than one country. In other cases, no country was specified in the petition.

Therefore, annual totals may differ from annual totals presented in Table 2.

The amendments to the economic tests are likely to be quite important—influencing the number of cases initiated, changing the relative bargaining strengths of the parties, and reducing the volume of international trade. It is debatable, however, whether the revisions were necessary given the extremely high success rate that U.S. complainants have enjoyed under the old statute.

SECTION 337 AND FIRM BEHAVIOR

The previous section discussed reasons why the statute was revised. In this section I would like to look at how Section 337, as revised, affects a firm's inventive and patenting behavior. In the next section, I review the traditional argument for patent protection. When one discusses why Section 337 is important, the traditional argument is what one is likely to hear. Later in the section, I incorporate the uncertainty surrounding a Section 337 action; the uncertainty (with respect to the final outcome) can have important effects on the incentives to use the law.

The Traditional Theory Behind Patent Protection

In this section we are interested in examining in what patent protection encourages research investment and inventive activity. What is it about inventive activity that necessitates patent protection? How is production of knowledge different from the production of a house or other tangible investment? First, the outcome of R&D expenditures is more uncertain than the expenditure on a house; the riskier the investment, the greater the payoff (to a successful invention) must be if the R&D investment appropriated by others unless there are legal barriers to prevent this appropriation. Third, if the inventor is given patent protection (i.e., sole possession of the knowledge or invention), a monopoly is created.

It is these issues, especially the appropriability problem, with which the traditional arguments for patent protection are concerned. Unless one can overcome the appropriability problem there would be little incentive to make R&D investments. The following quote summarizes the traditional argument for patent protection.

Developing an invention to the point of commercial application is costly. To be willing to bear these costs and risks, potential investors must have some hope to recoup . . . their development costs . . . But if imitators can swarm in to copy an invention as soon as it has been introduced, post-innovation prices will fall rapidly to level of production cost, wiping out supranormal profits. (Scherer, 1980)

The traditional argument then, is that patents promote inventive activity by eliminating (or at least reducing) the appropriability problem. Since

research expenditures are uncertain, the expected value of such an investment is negative unless there is some type of patent protection. Section 337 protection can be simply thought of as extending patent protection to international competitors, and in this sense it encourages inventive activity.

It will be illustrative to formally sketch the logic behind this argument. We will assume that there are only two firms, one which is domestic and one which is foreign.²⁷ We will assume that only the domestic firm engages in R&D, or more generally, that the domestic firm's environment, including the R&D expenditures of the foreign firm, is exogenous. This allows us to concentrate on the incentives to innovate without undue emphasis on strategic considerations²⁸ and facilitates the discussion of how the legal rules governing patent protection, including the revisions to Section 337, influence this firm's incentives to invest in R&D. We will assume, however, that the foreign firm does have the ability to duplicate or copy the U.S. firm's innovation.

Let ρ , $0 \leq \rho < 1$, denote the probability that an investment will yield a successful outcome. Let $C_{R\&D}$ denote the expenditures the firm spends on R&D. We make the following simplifying assumptions. First, we assume that the more the firm spends on R&D, the greater the chance it will successfully innovate, i.e., $\rho = \rho(C_{R\&D})$. We also assume that $\rho(0) = 0$ and that $\rho(\infty) \rightarrow 1$. The innovation function ρ is *stochastic* in the sense that no matter how much the firm spends, there will always be some residual uncertainty. We will assume that the innovation function is a strictly *concave* function. By concavity we mean that the chance that an investment will be successful is positively related to R&D expenditures, but at a decreasing rate. In other words, concavity implies that the more the firm spends on R&D the more likely such investments will be successful; it also implies that the first dollar has a greater *marginal* impact than any subsequent dollar. Formally, concavity means that $\rho(\cdot)' > 0$, $\rho(\cdot)'' < 0$, where the $'$ notation denotes the first derivative and $''$ denotes the second derivative with respect to $C_{R\&D}$. Second, we will assume what the firm will earn with or without the innovation is known. Let π^s denote the profits the firm will earn if the research is successful and π^u denote the profits the firm will earn if the research is unsuccessful.²⁹ We will assume that $\pi^s \geq \pi^u \geq 0$.

We can write the firm's expected profit as

$$\begin{aligned} E\pi(C_{R\&D}) &= \rho(\cdot) [\pi^s - C_{R\&D}] + (1 - \rho(\cdot)) [\pi^u - C_{R\&D}] \\ &= \rho(\cdot) [\pi^s - \pi^u] + \pi^u - C_{R\&D} \end{aligned} \quad (1)$$

The term $[\pi^s - \pi^u]$ can be interpreted as the gain that the firm will realize if the investment is successful.

How much R&D should the firm undertake? If it seeks to maximize profits, the firm will invest until the point that the marginal value of an extra research dollar just equals the marginal cost of that dollar. Formally, the optimal research expenditures, $\tilde{C}_{R\&D}$, will satisfy

$$\frac{\partial E\pi}{\partial C_{R\&D}} = \rho'(\cdot) [\pi^s - \pi^u] - 1 = 0 \quad (2)$$

We can rearrange equation 2 to express $\tilde{C}_{R\&D}$ as

$$\tilde{C}_{R\&D} = \phi(\pi^s - \pi^u), \quad (3)$$

(+)

where $\phi(\cdot) = \rho'(\cdot)^{-1}$. Equation 3 states that the optimal amount of R&D is an increasing function of the gain from a successful innovation.³⁰ That is, the larger the profit from a successful innovation (i.e., π^s), the larger is the R&D the firm will undertake. On the other hand, the less profitable the new innovation, the smaller is the R&D the firm will undertake. This relationship is the key determinant underlying the firm's R&D behavior. Our analysis of the affect legal rules on R&D ultimately depends on how the term $\pi^s - \pi^u$ is affected.

We can summarize this discussion as follows:

Proposition 1. The amount of R&D investment undertaken depends on the return from a successful innovation, $\pi^s - \pi^u$. The larger the return, the larger is the firm's R&D expenditures. Changes in legal rules affect R&D only through the term $\pi^s - \pi^u$.

How does patent protection affect the firm's research expenditure? Suppose the innovation is successful. Without patent protection, the rival will enter and duplicate the innovation, reducing the profits that the innovation would have generated, i.e., reducing π^s . According to proposition 1 this will imply that the firm will reduce its R&D investments, and if the firm reduces its R&D the probability that there will be a new invention is lowered. With patent protection, however, a successful innovation cannot be easily copied by the rival. In other words, patent protection increases the return R&D and therefore increases the amount of R&D a firm will undertake.

We can summarize this discussion as follows:

Proposition 2. The patent system permits an inventor to capture a greater share of the returns from his (risky) investment

and hence encourages R&D investment. The patent system benefits society by encouraging socially desirable innovative activity.

Section 337 and R&D investment

While the previous section was useful for explaining the theoretical reasons for patent protection, in the real world firms use Section 337 to defend themselves from an *allegedly* infringing foreign rival by filing a petition at the ITC. This means (1) that the firm will have to spend money on lawyers and economists (L&E) to prepare its case, (2) that the firm may lose a case when it has truly been infringed, and (3) that the firm can file a petition and might win a case when in fact it has not been infringed. In other words, patent protection is neither costless nor perfect. This suggests that the Section 337 protection may not be as simple as portrayed in the previous section. In this section we will examine more carefully how bringing a case before the ITC affects R&D investment.

We will examine how uncertainty over the ITC's decision affects R&D by examining two polar cases. In the next subsection we discuss incentives assuming the uncertainty only matters when the domestic firm has successfully innovated. We will then discuss incentives assuming the uncertainty only matters when the domestic firm has not successfully innovated. Clearly, both cases are relevant and so we will conclude by discussing the net effect of this uncertainty.

Infringement

For the moment suppose the U.S. firm makes R&D investments that lead to a successful innovation. In the terminology from the previous section, $\rho = 1$.

Because the firm's investment is successful, it now faces the possibility that its foreign rival will copy the innovation, and produce a "clone." Section 337 gives the firm the legal right to stop this unfair trade action. If the innovation has been infringed, the U.S. firm can initiate a Section 337 case and with probability ω , $0 \leq \omega < 1$, the firm will win its 337 case. If Section 337 protection was perfect and the foreign firm has infringed then the U.S. firm would always win its case (i.e., $\omega = 1$). We will instead assume that there is uncertainty over the outcome. That is, we assume that $\omega = \omega(C_{L\&E}; \alpha)$, where $C_{L\&E}$ denotes the cost of initiating a 337 case. We will assume that $\omega(\cdot)$ is a strictly concave function of $C_{L\&E}$ and that $\omega(C_{L\&E} = 0; \alpha) = 0$ and $\omega(C_{L\&E} \rightarrow \infty; \alpha) \rightarrow 1$. In other words, the probability that a firm will win its case depends on how much it spends on lawyers and economists. The more it spends, the more likely it will win its case. We have assumed this function is stochastic, implying that no matter how

much the firm spends on lawyers and economists, there will always be some residual uncertainty about the decision.

The function $\omega(\bullet)$ summarizes the ITC's decision process. The parameter α , $0 \leq \alpha \leq 1$, summarizes the legal rules and public pressure on the ITC. Our convention will be that a large ω denotes a "tough" ITC regime; this regime is characterized by public opinion and/or ITC rules that make it difficult for the U.S. firm to prove infringement. For instance, after World War I it was widely perceived that the ITC set a highly injury standard, making it difficult for U.S. firms to gain an exclusion order. In our terminology, " α was large" during the immediate post-war period. Alternatively, a small α denotes a "lenient" regime at the ITC, wherein the circumstances are more protectionist. The 1988 trade bill, for example, which removed the injury standard was a legal change that lowered α . Using a parameter to summarize a change in rules provides a convenient way to examine how altering the rules governing ITC decision (i.e., eliminating the injury standard) affects the optimal amount of inventive research.

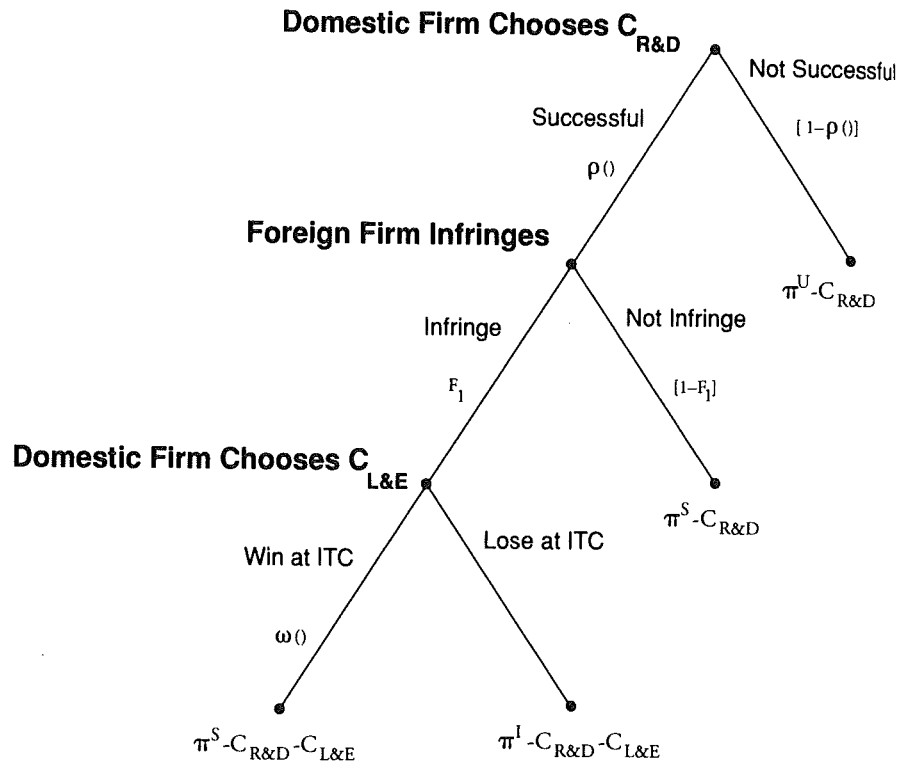
In this section we will examine how the threat of an infringement on a successful innovation affects research. The following describes the circumstances we are modelling (see Figure 5(a)): At stage 1, the domestic firm chooses how much to spend on R&D; just as in the previous section, the probability that the project will be successful is positively related to the amount of research expenditures. In contrast with the previous section, if the investment is successful, the foreign firm may "copy" or infringe on the innovation. If the foreign firm infringes, the domestic firm chooses how much to spend on lawyers and economists to defend itself (stage 2); the probability that the ITC will provide remedy is positively related to the amount of legal expenditures. If the ITC decides no infringement, the firm is injured and earns π' , where $\pi' < \pi^s$.

Since there is a chance that the foreign rival will infringe on its invention, we write the domestic firm's expected profits, given that it has successfully innovated (i.e., $\rho = 1$), as³¹

$$\begin{aligned}
 E\pi(C_{LSE} | \rho = 1) &= F_1[\omega(\bullet)(\pi^s - C_{LSE}) + (1 - \omega(\bullet))(\pi' - C_{LSE})] + (1 - F_1)\pi^s \\
 &= F_1[\omega(\bullet)(\pi^s - \pi') + \pi' - C_{LSE}] + (1 - F_1)\pi^s \\
 &= F_1\{[\omega(\bullet) - 1](\pi^s - \pi') - C_{LSE}\} + \pi^s,
 \end{aligned} \tag{4}$$

where F_1 denotes the exogenous probability that the foreign firm infringes.³² The first term on the right hand side, $F_1\{[\omega(\bullet) - 1](\pi^s - \pi') - C_{LSE}\} \leq 0$, is interpreted as the expected loss due to the threat of infringement. Note if the foreign firm never infringes (i.e., $F_1 = 0$) then

FIGURE 5
GAME TREE
(a) MODEL WITH INFRINGEMENT



$E\pi(C_{L\&E} | \rho = 1) = \pi^*$ and the model is the same as the previous section.
In this case, the domestic firm's expected profit is just

$$\begin{aligned} E\pi(C_{L\&E}) &= \rho E\pi(C_{L\&E} | \rho = 1) + (1 - \rho) E\pi(C_{L\&E} | \rho = 0) - C_{R\&D} \\ &= \rho E\pi(C_{L\&E} | \rho = 1) + (1 - \rho) \pi^U - C_{R\&D} \end{aligned} \quad (5)$$

The only difference between equation 5 and equation 1 is the term $F_1 \{ [\omega(\bullet) - 1] (\pi^S - \pi^I) - C_{L\&E} \}$, which is less than zero.

We now must solve for both the optimal amount of legal expenses ($\tilde{C}_{L\&E}^{\rho=1}$) and the optimal amount of R&D expenses ($\tilde{C}_{R\&D}^{\rho=1}$). We do this by "solving backwards"; that is, we solve first for the optimal amount of legal expenses (the second stage) and then solve for the optimal R&D expenditures (the first stage).

At the second stage, the firm will invest in legal expenses to balance the marginal benefit of an extra dollar with the marginal cost of the extra dollar. Following the same procedure as above we can write the optimal

amount of legal expenditures as,

$$\tilde{C}_{L\&E}^{\rho=1} = \Phi(\pi^s - \pi^l; \alpha) > 0 \quad (6)$$

(+)(+)

where $\Phi(\bullet) = \omega'(\bullet)^{-1}$. Equation 6 states that (i) the greater the potential loss due to infringement, the greater the legal expenses, and (ii) lowering the injury standard (holding $[\pi^s - \pi^l]$ constant), decreases the amount of legal expenses. Equation 6 offers a quite intuitive explanation for the firm's legal expenses. First, it states that if the domestic firm will lose very little due to the infringement (i.e., $\pi^l \approx \pi^s$) then it will spend very little on legal expenses. If on the other hand, the firm stands to lose a great deal due to the infringement (i.e., $\pi^l \ll \pi^s$) then the firm will spend a great deal on legal expenditures. Second, the firm will spend less on legal services if the ITC regime is more protectionist. Figure 6(a) depicts the situation. The figure depicts the firm's profits stemming from legal expenditures. Equation 6 implies that under an "easy" regime (small α) the firm will spend less on legal services and is expected to earn a larger profit. Third, the firm will only initiate a Section 337 investigation if it increases the firm's expected profit. That is, if

$$\omega(\tilde{C}_{L\&E}^{\rho=1})(\pi^s - \pi^l) - \tilde{C}_{L\&E}^{\rho=1} \geq 0 \quad (7)$$

FIGURE 5
GAME TREE
(b) MODEL WITHOUT INFRINGEMENT

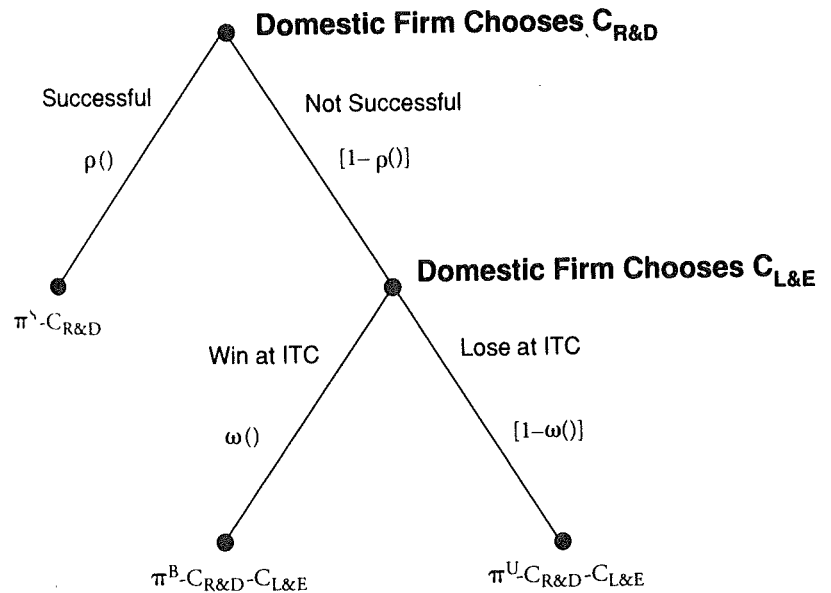
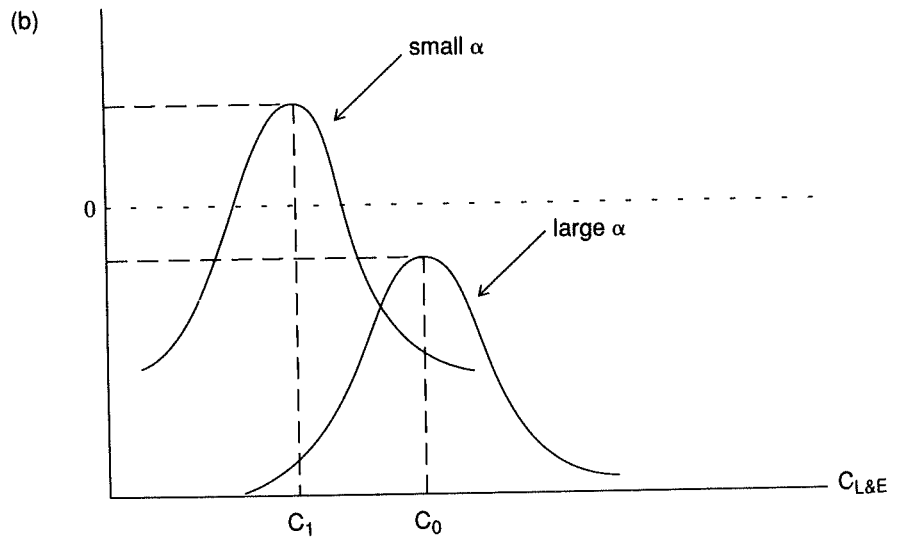
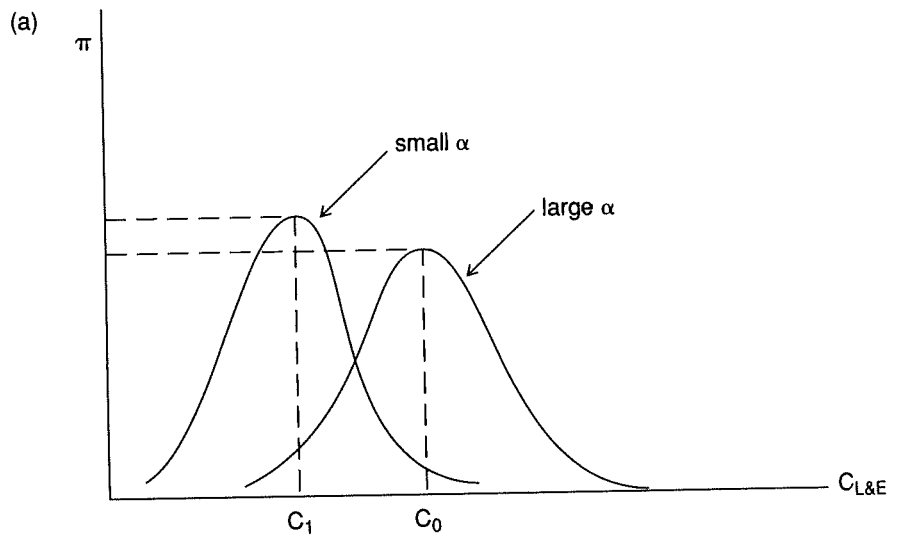


FIGURE 6
LEGAL RULES AND THE
PROFITABILITY OF INITIATING A PETITION



then the firm will initiate a petition, otherwise it will choose $C_{L&E} = 0$. Note that in general lowering α (changing the legal regime) will decrease legal expenditures (from equation 6); however, lowering α can cause the firm to spend a positive amount on legal expenditures when it would previously have spent zero. Figure 6(b) depicts the situation. Under a "tough" regime at the ITC the firm would optimally want to spend $\tilde{C}_{L&E} = C_0$ but doing so would earn the firm negative profits, so instead the firm would choose to spend $\tilde{C}_{L&E} = 0$. Under an "easy" regime, however, the firm would want to spend $\tilde{C}_{L&E} = C_1$, which yields positive profits. In other words, there is a range of cases which would never be initiated under the old rules but will now be initiated. Thus, firms will spend less (on legal expenditures) per case, but will initiate more Section 337 cases.

It is worth stating this result as a proposition:

Proposition 3. Removing the injury standard (lowering α) will cause more Section 337 cases to be initiated. Some cases which were not worth initiating under the old rules will be initiated under the new rules.

Now that we have determined the optimal legal expenditures, we can determine how much R&D the firm will do. Substituting equation 6 into equation 5 we find that the optimal of research expenditures, when there is a threat of infringement, can be written as

$$\tilde{C}_{R\&D}^{\rho=1} = \phi(E\pi(\tilde{C}_{L\&E}^{\rho=1}) - \pi^U), \quad (8)$$

(+)

where $\phi(\bullet) = \rho'(\bullet)^{-1}$.

Comparing equation 3 and equation 8 we can immediately see that the only difference between the two models is the terms π^s versus $E\pi(\tilde{C}_{L\&E}^{\rho=1})$, and since $E\pi(C_{L\&E} | \rho = 1) \leq \pi^s$ the threat of infringement (with imperfect patent protection) will *decrease* research expenditures in comparison with the perfect and costless patent protection discussed in the previous section. Research expenditures fall for two reasons. First, the chance that a rival will infringe and not be detected lowers the expected return to a successful invention; by proposition 1 we know that lowering the expected return lowers the incentive to innovate. Second, the fact legal defense is costly (i.e., $C_{L\&E} > 0$) lowers the expected return to a successful invention.

The crucial issue for our purposes is how changing regimes at the ITC affects research investments. By equation 8 we know that decreasing α increases the amount of R&D investments. We will refer to the fact that decreasing α raises R&D expenditures as the *efficiency or pro-inventive* effect. In other words, the 1988 revisions will increase R&D expendi-

tures, which increase the likelihood of a successful innovation. This was the argument behind the 1988 trade bill. Eliminating the injury standard reduces the uncertainty over the ITC outcome and thereby increases the return to a successful innovation. Given that the firm has successfully innovated, eliminating the injury standard allows Section 337 protection to be more like the "perfect" patent protection discussed in the previous section.

We can summarize this discussion as follows:

Proposition 4. Section 337 protection does not ensure domestic firms that their inventions will not be infringed. No matter how much the domestic firm invests in legal and economic counsel, any Section 337 case has some chance of being rejected. This residual uncertainty lowers the amount of inventive activity the firm will undertake (relative to perfect patent protection). However, lowering injury standards (as the 1988 trade bill did) reduces the chance that a legitimate petition will be rejected and thereby increases the optimal amount of inventive activity.

Remedy without Infringement

In contrast with the previous section, in this section we examine how the revised Section 337 rules affect behavior when there has been no infringement. The issue is whether a domestic firm, realizing that a foreign rival is becoming increasingly competitive in the U.S. market, will initiate a Section 337 investigation to bolster profits. Just as a firm can never be assured that a truly infringing rival will be punished, it also knows that there exists a chance that a fairly competing rival might be sanctioned. Thus, the U.S. firm can exploit the fact that it is often difficult to distinguish "fair" from "unfair" trade. This is a valid concern, for the marked increase in Section 337 cases may reflect an increase in strategic use of Section 337 protection rather than an increase in unfair trade acts. Even though the intent of the law is to provide U.S. firms with a defensive weapon against unfair foreign trade practices, businessmen can use the statute in an offensive manner. Consider the following quote:

Every U.S. business should be aware of, and seek protection against, the increasingly pervasive effects of foreign imports within the U.S. market. Companies should consider the *offensive* use of the U.S. trade laws as a *strategic business tool* in the same sense as more traditional elements of business planning such as *research and development*, capital investment, productivity improvements . . .
(Hartquist, 1987)(p. 54, emphasis added)

The key questions for our purposes is whether such strategic use of Section 337 reduces the incentive to invest in R&D, and if so, how the

elimination of the injury standard affects R&D expenditures.

Consider once again a situation where there are two firms, one domestic and one foreign. In this section we will assume that each of the two firms already has an existing product. These products are substitutes and thus the firms are competing with each other for profits. Once again we will assume that only the domestic firm can engage in R&D. If the domestic firm's R&D investment is successful, the domestic firm will have a new product which substitutes for its original products and would help it earn greater profits. In other words, we once again assume $\pi^s > \pi^u$.

We suppose that the U.S. firm's investment is unsuccessful. In the previous section we assumed that an unsuccessful investment implied the firm earned π^u . Consider now the firm initiating a Section 337 investigation against the rival, even if its investment was unsuccessful. Such an investigation might be plausible since each firm owns patent rights for its pre-existing product (or a process used in producing the pre-existing product) in its own country. Thus, there might be some dispute concerning the foreign firm's right to export into the U.S. If a petition is initiated, the domestic firm will gain remedy with probability ω , $0 \leq \omega < 1$; we will once again assume that $\omega = \omega(C_{L&E}; \alpha)$, where $C_{L&E}$ once again denotes the cost of initiating a 337 case. We will continue to assume that $\omega(\bullet)$ is a strictly concave function of $C_{L&E}$. As in the previous section, the function $\omega(\bullet)$ summarizes the ITC's decision process while the parameter α summarizes the ITC regime.

We examine the following situation (see Figure 5(b)): At stage 1, the domestic firm chooses how much to spend on R&D; just as in the previous section, the probability that the project will be successful is positively related to the amount of research expenditures. In contrast with the previous section, if the investment is unsuccessful, the domestic firm may initiate a Section 337 investigation. If so, the domestic firm chooses how much to spend on lawyers and economists. If the ITC decides infringement, the firm benefits and earns π^b , where $\pi^b > \pi^u$.

If the domestic firm does initiate a Section 337 petition, its expected profits, given that it has not successfully innovated ($\rho = 0$), can be written as

$$E\pi(C_{L&E} | \rho = 0) = \omega(\bullet)(\pi^b - \pi^u) + \pi^u - C_{L&E} \quad (9)$$

The term $\omega(\bullet)(\pi^b - \pi^u)$ is interpreted as the expected gain from strategically using Section 337. In this case, the firm's expected profit is just

$$\begin{aligned} E\pi(C_{L&E}) &= \rho E\pi(C_{L&E} | \rho = 1) + (1-\rho)E\pi(C_{L&E} | \rho = 0) - C_{R&D} \\ &= \rho\pi^s + (1-\rho)E\pi(C_{L&E} | \rho = 0) - C_{R&D} \end{aligned} \quad (10)$$

Without being needlessly repetitive, we can solve for the firm's optimal legal ($\tilde{C}_{L&E}^{\rho=0}$) and research ($\tilde{C}_{R\&D}^{\rho=0}$) expenditures. It is easy to show that the optimal amount of legal expenditures in this case are

$$\tilde{C}_{L\&E}^{\rho=0} = \Phi(\pi^b - \pi^u; \alpha) > 0 \quad (11)$$

(+)

where $\Phi(\cdot) = \omega(\cdot)^{-1}$, and that the optimal amount of research expenditures are

$$\tilde{C}_{R\&D}^{\rho=0} = \phi(\pi^s - E\pi(\tilde{C}_{L\&E}^{\rho=0})), \quad (12)$$

(+)

where $\phi(\cdot) = \rho'(\cdot)^{-1}$.

There are several interesting implications of equations 11 and 12. First, the fact that the firm can use a legal action to bolster profits even if its R&D is unsuccessful raises the firm's expected profits without an innovation. On other words, $E\pi(\tilde{C}_{L\&E}^{\rho=0}) \geq \pi^u$. Thus, by proposition 1 the domestic firm has less to gain by successfully innovating and therefore will invest less in R&D. That is, the fact that domestic firms can use Section 337 even if they have not successfully innovated *lowers* R&D investment as compared with the perfect and costless patent protection discussed in section 3.1. Second, by equation 12 we see that decreasing α , as the 1988 trade bill did, makes it easier for the firm to win an investigation. This further increases the domestic firm's profits when it does not successfully innovate and further decreases the firm's desire to invest in R&D. Thus, the 1988 trade bill creates incentives that decrease R&D expenditures. We will call this the *strategic* or *anti-inventive* effect. This implies that lowering the injury requirement can *decrease* the amount of R&D done because profits can be increased not only through R&D but also via legal methods.

We can summarize this discussion as follows:

Proposition 5. The domestic firm can initiate a Section 337 investigation even if its foreign rival has not infringed since it knows that the ITC may occasionally grant protection even without a violation of a newly inventive product. Eliminating the injury standard reduces the chance that a petition will be rejected and thereby increases the firm's expected profit when R&D expenditures do not yield a successful invention. This decreases the optimal amount of inventive activity.

Will the revised Section 337 Increase or Decrease R&D Expenditures?

The key assumption underlying the discussion in this section is the ITC's inability to perfectly discern whether the foreign firm has infringed on a U.S. firm's patent. The ITC has to choose between two alternative conclusions, violation and no violation, and there is a risk of making the incorrect choice. Such errors are called *inference* errors, because they entail drawing the incorrect inference on some issue. There are two types of inference errors, which we denote as TYPE I and TYPE II errors according to the following definitions.

A *TYPE I* error is made if the ITC decides there has been *no violation* when, in fact, the correct conclusion should have been *violation*.

A *TYPE II* error is made if the ITC decides there has been a *violation* when, in fact, the correct conclusion should have been *no violation*.

As is well known, it is not possible to simultaneously minimize both types of errors unless one increases the "sample size"—or in our framework, unless one increases the time limits for the investigation; in other words, changing the rules governing a Section 337 outcome cannot simultaneously reduce the chance of a TYPE I and TYPE II error. From our analysis in the previous sections we know that dropping the injury requirement will increase the likelihood of the ITC determining "violation" and thus the 1988 trade bill is likely to decrease the chance of a TYPE I error at the expense of increasing the chance of a TYPE II error. This is not surprising result and is quite consistent with our intuition about Congress' intentions: there was strong feeling in Congress that there was a pressing need to solve the trade problem. Most Congressmen would undoubtedly prefer an occasional TYPE II error if there were little chance of TYPE I errors.

We referred to the fact that reducing the chance of a TYPE I error increases R&D activity as the *efficiency* or *pro-inventive* effect, and to the fact that increasing the chance of a TYPE II error decreases R&D activity as the *strategic* or *anti-inventive* effect. I chose to examine each effect individually because I think doing so clarifies the incentives behind each effect.

Whether the revisions of Section 337 will increase research expenditures depends on whether the strategic incentives outweigh the efficiency incentives. While I hope the efficiency effect dominates there are several reasons why the strategic effect could be important. First, the 1988 trade bill's lower standards makes it more profitable to use legal action as opposed to R&D investments to maintain profits. When one considers the pressure for firms to post profits every quarter and the fact that R&D

expenditures are not only risky but may not affect profits for many years, time-effective Section 337 could be interpreted as a way to maximize short-term profits. Second, the ITC's relaxed attitude towards settlement agreements would also tend to make strategic use of Section 337 more likely. For instance, a domestic firm could initiate a complaint and achieve a settlement with a foreign rival before the ITC even starts its investigation. For example, Budoff (1985) cites a case³³ when the settlement agreement was submitted to the ITC the same day that the investigation was instituted.

In summary, the key point to remember is that eliminating the injury requirement does not trivially imply that research incentives are increased and therefore the consequences of the 1988 trade bill may not be as desirable as initially argued. If the gain from legal actions are made extremely profitable, the revisions could actually lower R&D investment. If this is the case, U.S. consumers will clearly be made worse-off since they no longer benefit from increased competition (i.e., lower prices) nor will they have U.S. firms aggressively innovating new products.

CONCLUDING COMMENTS

The revisions contained in the 1988 trade bill quite significantly alter the laws governing U.S. trade policy. Dropping the injury test and eliminating the requirement that the "domestic industry be efficiently and economically operated" makes Section 337 relief much more accessible to many U.S. firms. In the first part of this chapter, we found that Section 337 relief has been sought in record numbers in recent years. In addition, we found that the vast majority of Section 337 cases (initiated under the old statute) resulted in some type of relief for the U.S. complainants. In nearly all cases, then, it appears that the old statute provided effective protection. Over the past two decades the U.S. has lost its dominance in many export markets and the trade balance has reflected this decline. It is likely that Congress' frustration with its inability to effectively reduce the external imbalance was at least as important behind the decision to revise Section 337 as Congress' frustration with Section 337's inability to effectively protect U.S. intellectual property rights. In the second part of the chapter, we examined the incentives created by the amendments to the statute. This analysis showed that the revisions create incentives that encourage additional R&D investment—just as its proponents argued would. However, we also found that the revisions create an opportunity for domestic firms to reduce R&D expenditures since they can rely on the greater protection to maintain profits.

FOOTNOTES

¹There are five unfair trade and import relief actions available under the U.S. international trade laws. They are (i) antidumping actions, (ii) countervailing duty actions, (iii) escape clause actions, (iv) "unjustifiable foreign trade practice" actions brought under Section 301, and (v) "unfair methods of competition in import trade" brought under Section 337.

²19 U.S.C. §1337, as amended.

³Section 337 has been used against a wide variety of actions such as copyright and trademark infringement cases, palming off, unfair use of advertising, trade libel, and false designation of origin. Useful references include (Budoff, 1985; Wilson and Hovanec, 1986; Plaia and Kaufman, 1984; Perry, 1985; Simms, 1982).

⁴The 1988 bill also strengthened the enforcement of intellectual property rights. Most significantly, the bill expedited the granting of temporary exclusion orders (TEO) and broadened the International Trade Commission's authority to impose bonds on complainants prior to the issuance of a TEO. The bill also authorized the Commission to issue cease and desist orders "in addition or in lieu of" exclusion orders.

⁵See John Barton's chapter in this volume for an excellent discussion of the legal issues surrounding Section 337.

⁶Interestingly, the earliest version of the 1922 Act was sponsored by none other than that ardent protectionist, Senator Reed Smoot.

⁷The elastic tariff allowed the President to set duties on imports to eliminate any cost advantage a foreign producer might have. This type of protection was based on the now discredited economic notion of a "scientific" tariff.

⁸(Simms, 1982)

⁹(Simms, 1982)

¹⁰(Simms, 1982; Budoff, 1985)

¹¹(Bhagwati, 1988)

¹²(Knight, 1988)

¹³(Page, 1987) documents the large increase in antidumping petitions since 1974.

¹⁴In fact, the renaming of the ITC was part of the overall plan to decrease Executive branch discretion. Congress felt that the old Tariff Commission was too closely aligned with the President and that the new ITC would more closely carry out its intent in trade policy.

¹⁵The President has exercised this right on five occasions. See Table 2 for the cases.

¹⁶There have only been two cases when the ITC has refused to give protection on "public interest" grounds. See Table 2 for the cases.

¹⁷(Brunsvold et al., 1982)

¹⁸(Brunsvold et al., 1982)

¹⁹(Simms, 1982; Wilson and Hovanec, 1986)

²⁰Undoubtedly the large OPEC oil price increases contributed to the large import surge. Oil imports accounted for 7.96% of total imports for the 1965-1972; in contrast, oil imports accounted for 25.85% of total imports for the 1973-1980 period.

²¹(Baldwin, 1984) describes the steps taken by Congress to ensure "stricter" enforcement of U.S. trade laws. For instance, in the early-1970s appointments to the ITC went to those with congressional experience; in previous years appointments had tended to favor people with executive branch backgrounds.

²²(Baldwin, 1984)

²³See (Klett, 1986)

²⁴(General Accounting Office, 1986)

²⁵(Glick, 1980)

²⁶There has been considerable debate whether the ITC should continue to investigate an allegation if the parties have reached a settlement. The Commission seems to have

decided that a settlement agreement should end the investigation. See (Glick, 1980) for more discussions.

²⁷The ideas presented here extend to more than two firms, but at the expense of greater complexity.

²⁸See (Tirole, 1988) for a detailed review of the literature concerning strategic incentives to innovate.

²⁹Note that the size of π^s will depend upon the patent rules in effect; we are assuming that given the patent rules, we can calculate π^s .

³⁰The firm will invest $C_{R\&D}$ if and only if such an investment is profitable. That is, if $\pi(C_{R\&D}) \geq 0$ the firm will engage in R&D. If, on the other hand $\pi(C_{R\&D}) < 0$, the optimal investment is $C_{R\&D} = 0$.

³¹For notational convenience we will use ρ to refer to both the innovation distribution and the realizations from the distribution.

³²Since we are primarily concerned with the domestic firm's investment decision we will avoid modelling the foreign firm's decision whether or not to copy the patent. For simplicity we will just assume that there is some positive probability, F_1 , that the innovation will be duplicated.

³³Certain Airtight Cast-Iron Stoves, Investigation No. TA-337-106.

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