

# **Market Reactions to Export Subsidies**

Mihir A. Desai  
Harvard University and NBER

James R. Hines Jr.  
University of Michigan and NBER

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## *Market Reactions to Export Subsidies*

### ABSTRACT

This paper analyzes the economic impact of export subsidies by investigating stock price reactions to a critical event in 1997. On November 18, 1997, the European Union announced its intention to file a complaint before the World Trade Organization (WTO), arguing that the United States provided American exporters illegal subsidies by permitting them to use Foreign Sales Corporations to exempt a fraction of export profits from taxation. Share prices of American exporters fell sharply on this news, and its implication that the WTO might force the United States to eliminate the subsidy. The share price declines were largest for exporters whose tax situations made the threatened export subsidy particularly valuable. Share prices of exporters with high profit margins also declined markedly on November 18, 1997, suggesting that the export subsidies were most valuable to firms earning market rents. This last evidence is consistent with strategic trade models in which export subsidies improve the competitive positions of firms in imperfectly competitive markets.

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Mihir A. Desai  
Harvard Business School  
Morgan 363  
Soldiers Field  
Boston, MA 02163  
mdesai@hbs.edu

James R. Hines Jr.  
Office of Tax Policy Research  
University of Michigan Business School  
701 Tappan Street  
Ann Arbor, MI 48109-1234  
jrhines@umich.edu

## ***1. Introduction***

International trade policies affect the welfare of nations and the profitability of exporters. Classic trade models imply that countries benefit from free trade, whereas more recent strategic theories identify conditions in which interventionist policies such as export subsidies can improve domestic welfare. There has been considerable theoretical development of strategic trade theories with only modest accompanying empirical support for underlying assumptions and predictions. This paper offers evidence of the impact of a strategic trade policy by considering market reactions to a surprise challenge to an export subsidy embedded in the U.S. corporate income tax. This event identifies stock market valuations of tax-based export subsidies, and the degree to which they are affected by export propensities, firm-specific tax considerations, and market structure.

On November 18, 1997, the European Union declared its intention to bring a complaint before the World Trade Organization (WTO), accusing the United States of violating the rules prohibiting WTO members from subsidizing exports. Europe maintained that the ability of American firms to route their export sales through tax-avoidance devices known as Foreign Sales Corporations (FSCs) provided them with export-contingent tax subsidies of roughly \$4 billion a year. The European Union argued that European firms were thereby unfairly disadvantaged in competition with American firms in foreign markets, and requested that the WTO require the United States to discontinue its export subsidy or else face sanctions and penalties. Negotiations between the United States and Europe proved fruitless, and the WTO in due course ruled against the United States twice, as a result of which the export subsidies are in the process of being eliminated.<sup>1</sup>

This paper investigates the extent to which share prices of American exporters capitalized the threatened removal of export subsidies. For asset price reactions to convey such information,

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<sup>1</sup> In February 2000 the WTO ruled that the FSC program represented an illegal export subsidy. In November 2000 the United States passed legislation eliminating FSCs, but simultaneously introducing a new tax exemption for extraterritorial income that has almost exactly the same export-subsidy effect as the former FSCs. Europe balked at this purely formal change, challenging the revised U.S. provisions before the WTO; the WTO in January 2002 again found the United States to be in violation of its rules, and in August 2002 authorized the European Union to impose up to \$4 billion a year of retaliatory tariffs on the United States. In an effort to limit the economic damage from this and other trade disputes, President Bush and Congressional leaders have declared their intention to remove the export subsidies introduced in 2000, and not to replace them; such legislation is currently pending before Congress.

it is necessary that market participants considered the European challenge to be an unanticipated and significant development. U.S. news accounts on November 18, 1997 offered extensive coverage of the details and (large) magnitude of the subsidy; journalists described American officials as “stunned;” and the chief of staff of the U.S. Congress Joint Tax Committee later publicly commented, “frankly, we’ve been somewhat surprised by this development.”<sup>2</sup> Consequently, share price movements on the day of the European announcement should embody market valuations of expected losses from possible future repeal of the export subsidy.

The evidence indicates that shares prices of American firms whose sales were dominated by exports fell sharply on November 18, 1997. These price movements were greatly attenuated for exporters with net operating loss carryforwards, for whom tax subsidies are less valuable than they are for others. Similarly, the stock prices of firms with foreign income taxed at high rates reacted less sharply than did other stock prices, reflecting the existence of a generous alternative export subsidy available only to firms with heavily taxed foreign income. It is telling that share prices of Japanese firms, who were not directly affected by the events of November 18, 1997, exhibited none of the same price movement patterns as American firms, suggesting that the American share price reactions reflect considerations that are specific to U.S. taxpayers.

It is possible for export subsidies to improve the competitive positions of firms in imperfectly competitive markets by committing them to high levels of production for export markets, discouraging some of the competition that might otherwise come from foreign rivals. The strategic trade models developed by Brander and Spencer (1985), Eaton and Grossman (1986, 1988), and others, and reviewed in Brander (1995), take this observation as their point of departure. Subsequent developments in this literature explore the impact of differing specifications of oligopolistic interaction,<sup>3</sup> the informational and commitment requirements of

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<sup>2</sup> For journalistic accounts of the reaction from which these quotes are drawn, see Gordon Platt, “U.S. To Fight For Foreign Sales Corporations,” *Journal of Commerce*, December 2, 1997 and Judith Burns, “Treasury’s Lubick Says Can’t Rule Out Action Vs. EU,” *Dow Jones News Service*, December 12, 1997.

<sup>3</sup> See, for example, Eaton and Grossman (1986, 1988), Maggi (1996), Bagwell and Staiger (1997, 2001), Leahy and Neary (2001), Zhou, Spencer, and Vertinsky (2002), and Kohler and Moore (2003).

effective export promotion through subsidies,<sup>4</sup> and the impact of export subsidies when product quality is difficult to verify.<sup>5</sup>

Krugman (1993), Feenstra (1995) and others note that there is little in the way of systematic empirical investigation of the extent of competition in export markets and, therefore, the scope for income-enhancing strategic trade policies.<sup>6</sup> Krugman (1993) observes that “efforts to quantify the gains from rent-snatching suggest small payoffs” and Maggi (1996) adds that the “jury is still out for the empirical evaluation of trade policies.” A notable exception is Berry, Levinsohn and Pakes’s (1999) study of voluntary export restraints in the automobile industry. Share price reactions to the removal of export subsidies offer evidence of market perceptions, since the value of such subsidies should vary systematically with the degree of export market competition. The evidence indicates that the share prices of more profitable firms exhibited the most sharply negative reactions to news of the European complaint, which is consistent with the implications of models of export subsidies in imperfectly competitive industries and with aspects of strategic trade theory.

Section two of the paper considers a simple model of the incidence of export subsidies embedded in the corporate income tax under varying market structures, drawing predictions for the impact of the WTO controversy on share prices. Section three describes the two primary tax subsidies available to American exporters and their interaction. Section four examines the determinants of abnormal returns for American exporters on November 18, 1997, finding that the WTO event is associated with stock price movements that match tax characteristics and in which more profitable firms are the most severely impacted. Section five concludes with observations about the political economy of providing export subsidies through the income tax.

## **2. *The Incidence of Export Subsidies Under Imperfect Competition***

In order to assess the determinants of share price reactions to the WTO complaint, it is useful to consider a model of exporter behavior under varying market structures. This section

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<sup>4</sup> As in Qiu (1994, 1995), Goldberg (1995), Brainard and Martimort (1996, 1997), Maggi (1999), and Leahy and Neary (1999, 2000).

<sup>5</sup> See Bagwell (1991).

<sup>6</sup> More recently, Antweiler and Trefler (2002) offer evidence indicating that international trade patterns are consistent with production processes exhibiting scale economies that may support oligopolistic outcomes.

develops a partial equilibrium model that captures many of the features of the FSC regime – particularly that subsidies are functions of profits – in order to isolate the most important determinants of estimated price reactions, including the effect of market structure and the market share of American exporters.

Consider the case of an American firm acting as a Cournot competitor in an international industry with a fixed number ( $N$ ) of equal-sized firms producing homogenous products. In order to simplify the analysis, firms are assumed to produce with constant return to scale technology using fixed capital ( $k$ ) and labor ( $l$ ) inputs per unit of output. The U.S. government subsidizes export income at rate  $s$ , so firm  $i$ 's economic profit ( $\pi_i$ ) is given by:

$$(1) \quad \pi_i = (p - wl)(1 + s)x_i - \rho kx_i,$$

in which  $p$  is the market price of the firm's output,  $x_i$  the quantity it produces, and  $w$  the wage rate. For simplicity, capital is assumed not to depreciate, and to be financed entirely with equity, the opportunity cost of which is denoted  $\rho$ . Since income is defined for U.S. tax purposes without a deduction for the opportunity cost of equity capital, the export subsidy applies to accounting profits that do not correspond to the economic profits that the firm maximizes. In this partial-equilibrium setting, it is appropriate to take  $p$  to be a function of industry output, denoted  $X$ .

The firm's first-order condition characterizing the profit-maximizing output level is

$$(2) \quad p + x_i \frac{dp}{dX} (1 + \theta) = wl + \frac{\rho k}{(1 + s)},$$

in which  $\theta$  is firm  $i$ 's conjectural variation, corresponding to  $\left( \frac{dX}{dx_i} - 1 \right)$ . Differing market structures correspond to differing values of  $\theta$ . In a Cournot-Nash setting, in which firm  $i$  believes that its quantity decisions do not affect the quantities produced by its competitors, then  $\theta = 0$ . In a perfectly competitive setting,  $\theta = -1$ . Various Stackelberg possibilities correspond to values of  $\theta$  that differ from these, and indeed, need not lie in the  $[-1, 0]$  interval.

It is useful to consider the pricing implications of (2). In doing so, it is necessary to take into account that foreign firms in the industry are ineligible for the American export subsidy (unless they produce in the United States for export). Let  $n$  denote the number of American exporters in the industry, and  $(N - n)$  the number of their foreign competitors. Furthermore, in order to simplify the calculations that follow, we consider the case in which the consumer demand function is locally linear, so that  $\frac{\partial^2 p}{\partial X^2} = 0$ .<sup>7</sup> For an American firm, differentiating both sides of (2) with respect to  $s$  produces the following comparative static:

$$(3) \quad \frac{dp}{dX} \left[ \frac{dX}{ds} + \frac{dx_i}{ds} (1 + \theta) \right] = -\frac{\rho k}{(1 + s)^2}.$$

By contrast, the behavior of foreign firms – who are ineligible for export subsidies, but otherwise (by assumption) identical to their American competitors – is determined by (indexing foreign firms with  $j$ ):

$$(4) \quad \frac{dP}{dX} \left[ \frac{dX}{ds} + \frac{dx_j}{ds} (1 + \theta) \right] = 0.$$

In order to assess the incidence of the subsidy, it is useful to consider the responsiveness of the market price to changes in the subsidy as given by the identity  $\frac{dp}{ds} \equiv \frac{dp}{dX} \frac{dX}{ds}$ . Since the market contains  $(N - n)$  foreign firms and  $n$  domestic firms, the relationship between market output and the subsidy is given by,

$$(5) \quad \frac{dX}{ds} = (N - n) \frac{dx_j}{ds} + n \frac{dx_i}{ds}$$

Equation (4) implies that, for foreign firm  $j$  and demand curves that are less than infinitely elastic,

$$(6) \quad \frac{dX}{ds} = -\frac{dx_j}{ds} (1 + \theta).$$

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<sup>7</sup> See Auerbach and Hines (2003) for an analysis of more general cases in which demand curves are not locally

As  $\frac{dx_j}{ds}$  is given by (6), and  $\frac{dx_i}{ds}$  is given by (3), (5) becomes

$$(7) \quad \frac{dX}{ds} \frac{(1 + \theta + N - n)}{n(1 + \theta)} = \frac{dx_i}{ds}.$$

Combining (2), (3) and (7) in the identity  $\frac{dp}{ds} \equiv \frac{dp}{dX} \frac{dX}{ds}$  produces:

$$(8) \quad \frac{dp}{ds} = -\frac{n}{1 + \theta + N} \left[ \frac{\rho K}{(1 + s)^2} \right].$$

It is possible to isolate the effect of changes in subsidies on firm profits by differentiating (1) with respect to  $s$ :

$$(9) \quad \frac{d\pi_i}{ds} = x_i(p - wl) + x_i \frac{dp}{ds} (1 + s) + \frac{dx_i}{ds} [(p - wl)(1 + s) - \rho k].$$

Equation (3) implies that:

$$(10) \quad \frac{dx_i}{ds} = -\frac{\frac{dp}{ds} + \frac{\rho k}{(1 + s)^2}}{\frac{dp}{dX} (1 + \theta)}.$$

Together, (2), (8), (9) and (10) imply:

$$(11) \quad \frac{d\pi_i}{ds} = x_i[p - wL] + x_i \frac{\rho k}{(1 + s)} \left[ 1 - \frac{2n}{1 + \theta + N} \right],$$

which in turn can be interpreted as:

$$(12) \quad \frac{d\pi_i}{ds} = \frac{\pi_i}{(1 + s)} + 2x_i \frac{\rho k}{(1 + s)} \left[ \frac{1 + \theta + N - n}{1 + \theta + N} \right].$$

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linear.



Equation (12) indicates that the impact of export subsidies on firm profitability is a function of the extent to which competition in firm  $i$ 's product market is imperfectly competitive and the prevalence of American firms in  $i$ 's product market.

The impact of subsidies on firm profits implied by equation (12) is usefully considered in three limiting cases of market structure and the prevalence of American firms. First, in the case in which American firms are greatly outnumbered by foreign competitors ( $n \rightarrow 0$ ), (12) becomes

$$\frac{d\pi_i}{ds} = \frac{\pi_i + 2x_i\rho K}{(1+s)},$$

regardless of the value of  $\theta$ . Inspection of equations (8) and (10) reveals why profits respond to higher subsidies in this way. Output prices do not react to changes in  $s$ , allowing American firms to realize the full benefit of the product of the subsidy and taxable

export profits (equal to  $\frac{\pi_i + x_i\rho K}{(1+s)}$ ). At the same time, American firms increase their output and

acquire market share from their foreign competitors, the value of which equals  $\frac{x_i\rho K}{(1+s)}$ .

Together, these two considerations account for the total change in exporter profits.

In cases in which American firms dominate the export market ( $n \rightarrow N$ ), market structure matters crucially. Under perfect competition ( $\theta = -1$ ),  $\frac{d\pi_i}{ds} = \frac{\pi_i}{(1+s)} = 0$ , as any benefit of the

subsidy is passed on to consumers (and  $\pi_i = 0$  if the market is perfectly competitive and

dominated by Americans). In contrast, with  $\theta = 0$ ,  $\frac{d\pi_i}{ds} = \frac{\pi_i}{(1+s)} + 2x_i \frac{\rho k}{(1+s)(1+N)}$ , which, in

the case of monopoly ( $N=1$ ) collapses to  $\frac{d\pi_i}{ds} = \frac{\pi_i + x_i\rho k}{(1+s)} = x_i[p - wl]$ . In the case of a

monopolist, the envelope theorem applies: the value of a change in the subsidy rate equals the additional subsidy that would be received assuming no behavioral response. More generally, as American firms constitute more of the market, market structure begins to dictate the incidence of the subsidy, less competitive market structures corresponding to greater impact of subsidies on profitability.

In order to use stock market data to measure the impact of export subsidies on profitability, it is necessary to recast the relationship expressed in equations (11) and (12) as a function of changes in share prices rather than simply profits. This exercise yields similar intuitions but is useful in resolving the potential confusion arising from the fact that subsidies are functions of profits. For this purpose, it simplifies notation to consider the impact of small changes in export subsidies around the point that  $s = 0$ . The value of a firm's shares equals the sum of economic profits and the value of its invested equity capital, which can be denoted (in units of annual flows) by  $v_i$ . Letting  $\sigma_i$  denote firm  $i$ 's value from everything other than profits

on exports,  $v_i = \sigma_i + \pi_i = \sigma_i \left( 1 + \frac{\pi_i}{\sigma_i} \right)$ . For a fixed stock of equity (which is appropriate in

considering share price changes), and for  $\pi_i$  small relative to  $\sigma_i$ , then given that

$\log v_i \approx \log \sigma_i + \frac{\pi_i}{\sigma_i}$ , and  $\frac{d\sigma_i}{ds} = 0$ , the effect of export subsidies on firm valuation is

$\frac{d(\log v_i)}{ds} \approx \frac{d\pi_i/ds}{\sigma_i}$ . If each firm has roughly similar markups over labor cost for its export and

non-export sales, then  $\sigma_i \approx (p - wl)z_i$ , in which  $z_i$  is firm  $i$ 's non-export sales. Consequently,

(11) implies:

$$(13) \quad \frac{d \log v_i}{ds} \approx \frac{x_i}{z_i} \left\{ 1 + \frac{\rho k}{(p - wl)} \left[ \frac{1 + \theta + N - 2n}{1 + \theta + N} \right] \right\}.$$

Equation (13) explains the impact of export subsidies on stock market valuation as a function of the fraction of a firm's sales devoted to exports and a term that captures the degree of competition in the firm's markets. From equation (2),  $(p - wl) = \rho k - x_i \frac{dp}{dx} (1 + \theta)$ . Normalizing

the initial output price to be unity ( $p = 1$ ), defining the inverse demand elasticity  $\eta = \frac{dp}{dX} \frac{X}{p}$ , and

$$\text{noting that } \frac{x_i}{X} = \frac{1}{N}, \text{ (13) becomes: } \frac{d \log v_i}{ds} \approx \frac{x_i}{z_i} \left\{ 1 + \frac{1}{\left( 1 - \frac{\eta(1 + \theta)}{\rho k N} \right)} \left[ \frac{1 + \theta + N - 2n}{1 + \theta + N} \right] \right\}.$$

Differentiating both sides of (13) with respect to  $\theta$  produces:

$$(14) \quad \frac{d^2 \log v_i}{dsd\theta} \approx \frac{x_i}{z_i} \frac{1}{(1+\theta+N)^2(1-\mu)^2} \left\{ 2n(1-\mu) + \mu \left[ \frac{(1+\theta+N)(1+\theta+N-2n)}{(1+\theta)} \right] \right\},$$

in which  $\mu \equiv \frac{\eta(1+\theta)}{\rho k N}$ .

Equation (14) indicates that the effect of taxes on share valuation depends on the extent to which firms operate in imperfectly competitive environments. Seade (1980) notes that stable equilibria require that  $\mu \leq 0$ , which for downward-sloping demand curves ( $\eta < 0$ ) corresponds to  $\theta \geq -1$ . Hence  $n \geq (1+\theta+N)/2$  is a sufficient condition for the right side of (14) to be positive: a greater concentration of American firms in the export market increases the impact of imperfect competition on share price reactions to export subsidies.

In order to estimate the relationship implied by (14) it is necessary to have a measure of the extent of competition in a firm's export industry. In the absence of more direct measures, one usable proxy is firm  $i$ 's profit rate. Given that (12) and (14) predict that market structure matters in situations in which American firms comprise a nontrivial fraction of the firms in a given product market, the corresponding empirical strategy is to investigate the share price impact of the WTO controversy first as a function of the exposure of American firms to exports and the usefulness of export tax subsidies. Subsequent analysis considers the impact of market structure as proxied by average firm profitability.

### 3. *American export incentives*<sup>8</sup>

The United States subsidizes exports by exempting export profits from U.S. taxation and by permitting taxpayers to declare that a portion of export profits represents foreign source income; this section reviews these provisions and their implications.

#### 3.1 *Subsidy by exemption of income: FSCs and ETI*

Since 1971, firms exporting goods from the United States have been entitled to do so in a legally roundabout fashion that enables them to exempt a fraction of export profits from taxation.

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<sup>8</sup> For a more complete history of tax subsidies for U.S. exports, see Desai and Hines (2001a), from which this section draws.

A firm received tax benefits between 1971 and 1984 by routing exports through Domestic International Sales Corporations (DISCs); between 1984 and 2000, similar tax benefits were available by routing exports through FSCs. For example, an American computer company selling a computer manufactured in Texas to a buyer in northern Italy in 1997 might first sell the computer to its FSC located in Guam, which in turn sold the computer to the buyer in Italy. The computer did not travel to Guam in the course of this sale, nor was it necessary that any substantial business be conducted at the FSC offices located in Guam; instead, these were paper transactions. As a result, a portion (roughly 15 percent) of the export profit was attributed to the FSC and forever exempt from tax.<sup>9</sup>

In November 2000 the United States discontinued FSCs, replacing them with an automatic 15 percent exemption of “extraterritorial income” (ETI) from U.S. taxation. ETI consists of income earned by exporting goods from the United States, as well as income earned by foreign affiliates operating abroad. Since most exporters had previously used FSCs to exempt 15 percent of their export profits from U.S. taxation, the elimination of FSCs and their replacement by an exemption for 15 percent of ETI did not substantially change the tax benefit associated with exporting.

### ***3.2 Subsidy by allocation of income: Export source rules***

An entirely separate type of export subsidy is available to American multinational firms with excess foreign tax credits. The nature of the subsidy is that part or all of export profits can be treated as foreign source income for the purpose of U.S. income taxation. This export subsidy is more generous to qualifying firms than was the subsidy provided by the use of FSCs or the more recent automatic exemption of 15 percent of export profits. Since many American multinational firms have excess foreign tax credits,<sup>10</sup> and the parent companies of American multinational firms account for 58 percent of all U.S. exports of goods,<sup>11</sup> it follows that this

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<sup>9</sup> The tax benefits of exporting through FSCs were available to all corporations in the United States, including those that were foreign-owned. Belmonte (2000) provides aggregate data on the use of FSCs in 1996. See Desai and Hines (2001a) for a detailed description and analysis of FSC rules that permitted some taxpayers to exempt from U.S. taxation a fraction greater than 15 percent of export income.

<sup>10</sup> See the data reported by Grubert (2001).

<sup>11</sup> See the data for 1997 reported in Mataloni (1999, p. 14).

export subsidy is potentially quite important. Notably, this export subsidy is not available to American exporters that are not multinational firms.

In order to understand the tax subsidy available from the foreign source rules, and the circumstances under which taxpayers might be eligible for the associated tax benefits, it is necessary to review certain aspects of U.S. taxation of the foreign income of American taxpayers. A brief description of some of the relevant features follows.<sup>12</sup>

### *3.2.1 The foreign tax credit*

The United States taxes the foreign incomes of its resident companies, permitting them to claim foreign tax credits for income taxes (and related taxes) paid to foreign governments. These foreign tax credits are used to offset U.S. tax liabilities that would otherwise be due on foreign-source income. The U.S. corporate tax rate is currently 35 percent, so an American corporation that earns \$100 in a foreign country with a 10 percent tax rate pays taxes of \$10 to the foreign government and \$25 to the U.S. government, since its U.S. corporate tax liability of \$35 (35 percent of \$100) is reduced to \$25 by the foreign tax credit of \$10. The U.S. tax liability on such foreign income is typically deferred until profits are repatriated in the form of dividends.<sup>13</sup>

### *3.2.2 Excess foreign tax credits*

Because the foreign tax credit is intended to alleviate international double taxation, and not to reduce U.S. tax liabilities on profits earned *within* the United States, the credit is limited to U.S. tax liability on foreign-source income. For example, an American firm with \$200 of foreign income that faces an U.S. tax rate of 35 percent has a foreign tax credit limit of \$70 (35 percent of \$200). If the firm pays foreign income taxes of less than \$70, then the firm would be entitled to claim credits for all of its foreign taxes. If, however, the firm pays \$90 of foreign taxes, then it would be permitted to claim no more than \$70 of foreign tax credits. Firms calculate foreign tax credits based on their total (worldwide) foreign incomes and foreign tax payments (subject to certain restrictions). Taxpayers whose foreign tax payments exceed the foreign tax credit limit are said to have “excess foreign tax credits;” the excess foreign tax credits

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<sup>12</sup> Portions of this description are excerpted from Hines (1999).

<sup>13</sup> For analyses of the effect of taxation and deferral on dividend repatriations, see Hines and Hubbard (1990), Altshuler and Newlon (1993), Altshuler, Newlon and Randolph (1995) and Desai, Foley and Hines (2001).

represent the portion of their foreign tax payments that exceed the U.S. tax liabilities generated by their foreign incomes.

### *3.2.3 Source rules and excess credits*

U.S. tax law embodies the principle that the location of income arising from a sale is determined, in part, by the site of the sale rather than the site of production. Section 863(b) of the Internal Revenue Code provides that half of profits earned on goods exported from the United States will be deemed to have foreign source if the taxpayer elects to pass the export title (a purely formal action) in the foreign location rather than in the United States.

Firms with excess foreign tax credits can use this source rule to reduce U.S. taxes otherwise due on export profits. The benefit to a firm with excess foreign tax credits of attributing half of export income to foreign source is illustrated by the comparison presented in Table 1. The American multinational firm in this example earns \$40 by exporting from the United States and an additional \$100 from the operations of its foreign affiliate. The foreign affiliate is located in a country with a 50 percent tax rate, which, since it exceeds the U.S. tax rate of 35 percent, implies that the parent company has \$15 of excess foreign tax credits. If export profits are treated as domestic income, then the firm's \$40 of export income is fully taxed at the domestic tax rate of 35 percent, resulting in a tax liability of \$14. If instead the exporter can characterize 50 percent of export profits as having foreign source, then \$7 of the firm's excess foreign tax credits can be applied against the U.S. tax liability on export profits, leaving a net tax liability of \$7 on export profits.<sup>14</sup> Therefore, firms with excess foreign tax credits are able to shield 50 percent of their export profits from U.S. taxation by taking advantage of the opportunity provided by section 863(b).

### *3.3 Incentives for exporters and the prevalence of export subsidies*

Since 1971, American exporters have been faced with the enviable choice between two export tax benefits: the partial exemption of export income, and the allocation of half of export income to foreign source under section 863(b). These possibilities are exclusive, in that the same

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<sup>14</sup> An important aspect of this benefit is that foreign governments do not coordinate their taxation of export income with the United States. Thus, the election by an American taxpayer to treat \$20 of export profits as having foreign source for U.S. tax purposes has no effect on any foreign taxes that the taxpayer may owe.

dollar of export income cannot benefit from both subsidies. For firms without excess foreign tax credits, the export source rules do not offer the prospect of reduced U.S. tax liabilities, since income allocated to foreign source is nonetheless immediately taxed by the United States. From 1984-2000, such firms did better to route their exports through FSCs, in which case they were eligible for a 15 percent exclusion of export profits from U.S. taxation. Firms with excess foreign tax credits could benefit from the foreign source allocation rule under 863(b) to allocate 50 percent of export profits to foreign source and thereby exclude 50 percent of export profits from U.S. taxation.

The two columns of Figure 1 summarize an exporter's tax options as of 1997. A 15 percent exemption of export income was available regardless of a firm's excess foreign credit status, though if the exporter was a multinational firm with excess foreign tax credits, 50 percent of export income could escape taxation through the use of 863(b).

There are two important complications to this otherwise simple story, the first stemming from the fact that a firm's excess foreign tax credit status may change over time and is itself a function of many decisions that the firm makes every year. Such decisions include where to locate foreign operations, whether to finance foreign operations with debt or equity, how many dividends to repatriate from each of its foreign subsidiaries, and what costs (such as interest expenses or R&D expenses) the firm will incur in the United States and allocate in part against foreign income. Furthermore, excess foreign tax credits can be carried back two years and forward five. As a result, distinctions between firms with excess foreign tax credits and those with deficit foreign tax credits are only imperfectly captured by measured tax positions in any single year.<sup>15</sup>

The second complication is that the U.S. corporate income tax is asymmetric, in that profitable corporations must pay corporate taxes while corporations making losses do not receive refunds. Corporations with losses are permitted to carry them back against taxable income earned in any of the previous two years, thereby entitling them to refunds for taxes previously paid. If current tax losses exceed taxed income from the previous two years, then a corporation is permitted to carry its losses forward (without interest) to apply against taxable income earned

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<sup>15</sup> For an elaboration of this point see the discussion Scholes et al. (2002).

in subsequent years. Firms with such “net operating loss carryforwards” are effectively untaxed until (and unless) they return to profitability at some point in the future. Export tax subsidies are of considerably less value to such firms than they are to firms without net operating loss carryforwards, since the expected present value of a current tax benefit is reduced by nominal discounting to the date at which the firm again becomes taxable, which could be never. All other things equal, the threatened removal of export subsidies should therefore have much smaller effects on firms with significant net operating loss carryforwards than they do on other firms.

#### **4.     *Data and Results***

This section evaluates the incidence of U.S. export subsidies by examining the determinants of abnormal stock market returns on November 18, 1997, the date of the surprise European announcement of its intention to file a complaint against the U.S. FSC program.

##### **4.1    *Data description***

In order to match stock price reactions to firm attributes it is necessary to combine balance sheet and income statement data from Compustat with stock return data from CRSP. Since export exposure is central to this study, firms are included in the sample only if they have complete export data (which may be zero exports) continuously from 1992 to 1998, a restriction that reduces the sample size to 691 firms.

Share prices exhibit daily fluctuations for reasons that are unrelated to government policy. In calculating abnormal stock returns for November 18, 1997 it is important to adjust individual stock price movements for changes attributable to movements in aggregate stock indices or the value of the U.S. dollar against foreign currencies. Daily stock price returns for the 400 trading days prior to November 18, 1997 were regressed separately for each firm on contemporaneous daily changes in the S&P 500 index and changes in the dollar-pound sterling exchange rate. The resulting firm-specific coefficients were then used to create predicted stock returns for November 18, 1997 based on changes that day in the S&P 500 index and the value of the U.S. dollar. Differences between actual returns and predicted returns represent abnormal returns for that day.



Table 2 presents summary statistics for variables used in the regressions. Export propensity is measured as the 1997 ratio of exports to sales; this variable has a sample mean of 0.163 and a median of 0.1144. A firm's tax position, as measured by its ratio of net operating loss carryforwards to sales, has a mean of 0.29 and a median of zero. The degree of multinationality, as measured by the ratio of foreign to total assets, has a mean of 0.10 and a median of zero. The average foreign tax rate in 1997 is defined as the ratio of foreign income tax payments to foreign pretax income; its mean is 34.0 percent, and median is 33.2 percent. The average foreign tax rate variable is available for only 202 firms. The average pretax profit margin is the 1992-1998 mean ratio of pretax profits to total sales; this variable has a mean of 5.8 percent and a median of 6.6 percent.

It is instructive to examine unadjusted stock price reactions on November 18, 1997.<sup>16</sup> The U.S. stock market fell on that day, the S&P 500 falling by \$61 billion, or 0.76 percent of its aggregate value.<sup>17</sup> Figure 2 depicts average (unweighted mean) daily returns for four subsamples of firms, distinguished by exporting propensity and the presence of net operating loss carryforwards. Firms classified as "major exporters" are those whose export/sales ratios exceed the sample median of 0.1144; "minor exporters" have export/sales ratios below 0.1144.

Shares of major exporters showed the greatest price declines on November 18, 1997, particularly those without net operating loss carryforwards, whose average share price fell by 0.80 percent. Share prices of minor exporters without net operating loss carryforwards fell by just 0.23 percent. Among firms with net operating loss carryforwards, share prices of major exporters fell by more than did the share prices of minor exporters, but the difference between them is considerably smaller than in the case of firms that are currently taxable. This price movement pattern is consistent with changes in after-tax profitability that are likely to be associated with the WTO action by the European Union, since tax benefits are less valuable to firms with net operating loss carryforwards than they are to others.

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<sup>16</sup> The pattern of abnormal returns is almost identical to that of unadjusted returns.

<sup>17</sup> It is noteworthy that the \$61 billion loss of aggregate stock market value on November 18, 1997 approximately equals the present value of the estimated \$4 billion annual flow of FSC tax benefits to U.S. exporters, discounted at the prevailing 30-year AAA corporate bond rate of 6.84 percent. While \$4 billion per year is a conservative estimate of FSC benefits (see Desai and Hines, 2001a), and the benefits were likely to grow significantly over time, the WTO complaint by the European Union did not necessarily imply that the export benefits would be immediately or permanently removed.

## 4.2 *Determinants of abnormal returns*

Table 3 presents regressions in which the dependent variable is a firm's abnormal stock return on November 18, 1997. The sole independent variable in the regression in column 1 is a firm's export/sales ratio; its estimated coefficient is -0.0198, though not statistically different from zero. The regression reported in column three includes two additional independent variables: the net operating loss ratio and an interaction of the net operating loss ratio and the export ratio. The estimated coefficients reported in column three confirm the visual picture provided by Figure 2: the coefficient on the export ratio is negative (though statistically insignificant), the coefficient on the net operating loss variable is negative, and the coefficient on the interaction of the export ratio and net operating losses is positive. These coefficient estimates imply that abnormal daily returns of exporting firms differed between those with and without significant net operating loss carryforwards.

The regressions reported in columns 4-7 add control variables that improve the fit of the regression and continue to imply that share prices fell most sharply for firms most at risk from the threatened removal of export tax benefits. The ratio of foreign to total assets indicates the extent to which a firm has international production and therefore the ability to substitute foreign production for domestic exports, as well as the possibility of generating excess foreign tax credits that make the export source rule more attractive than exporting through FSCs. Hence large values of the interaction of foreign assets and the export ratio should be associated with smaller share price effects of FSC removal, and therefore a positive coefficient in the regression. Log assets is included as an independent variable to control for any pure size effects that might be correlated with export propensities, net operating loss carryforward status, or foreign asset fraction. The negative effect of export shares on daily share price returns becomes statistically significant in the regressions reported in columns 5-7, while other variables have expected signs and magnitudes.

It is useful to consider the economic interpretation of the magnitudes of the estimated coefficients reported in column 6. The -0.0283 coefficient on the export ratio suggests that a firm with one hundred percent exports would suffer a 2.83 percent negative abnormal share return relative to the same firm with no exports. In principle, firms could use FSCs to reduce

taxable income by roughly fifteen percent of export profits, which at a 35 percent tax rate corresponds to a tax saving of 5.25 percent of export profits, or 8.08 percent of after-tax export profits.<sup>18</sup> Hence the estimated effect of the WTO event is just 35 percent (2.83/8.08) of the profitability impact of an unexpected and permanent removal of export tax benefits. This smaller effect is attributable in part to uncertainty over the ultimate resolution of the FSC dispute, and the long delays in implementing any changes that reduce the present value of their impact. Furthermore, removal of export tax benefits should occasion a fall in the value of the U.S. dollar relative to other currencies,<sup>19</sup> thereby offsetting a portion of the cost to exporters. Finally, endogenous behavioral shifts on the part of exporters are likely to attenuate at least some of the costs of losing the export subsidies.

The estimated 0.0049 coefficient on the interaction of the net operating loss ratio and the export ratio can be understood by comparing it to the export ratio coefficient. Given that the export ratio coefficient is 5.8 times larger in magnitude, the implication is that a firm with net operating loss carryforwards equal to 5.8 times annual sales would be fully insulated from any adverse price effect associated with the loss of export tax subsidies. Certainly such a firm is unlikely to return to taxpaying status any time soon, though there is always the possibility that firms with ample net operating loss carryforwards might be acquired by taxable firms who can use the losses to reduce tax obligations on their own income.<sup>20</sup>

The regressions presented in Table 3 offer evidence that the U.S. share prices reacted to the news of November 18, 1997 in a manner that is consistent with the profitability implications of losing FSC tax benefits. Table 4 presents similar regressions for abnormal Japanese share price movements on November 19, 1997 (the first Japanese trading day that could incorporate news of the European Union announcement), calculating one-factor abnormal returns based on covariance with the Nikkei index. Since the loss of U.S. tax benefits would not directly affect

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<sup>18</sup>  $5.25/(1.0-0.35) = 8.08$ .

<sup>19</sup> Desai and Hines (2001b) offer evidence that the U.S. dollar fell on November 18, 1997 in a manner that is consistent with the implied impact of the FSC dispute.

<sup>20</sup> For a more general discussion of mergers and tax loss carryforwards, see Auerbach and Reishus (1988).

Japanese exporters,<sup>21</sup> it is instructive to compare the determinants of Japanese price reactions to the determinants of American price reactions.

Japanese firms do not report foreign assets or foreign tax payments, making it impossible to replicate exactly all of the regressions that can be run on American firms, but the broad pattern of Japanese price reactions is clear from Table 4. Share prices of Japanese exporters did not exhibit abnormal declines following the European Union announcement, and indeed, all of the coefficients reported in Table 4 are statistically insignificant and of the opposite signs of their counterparts in Table 3. Hence the drop in the share prices of exporters in the United States, who stood to lose tax benefits, was not repeated among exporters abroad who never had tax benefits to lose.

#### **4.3 Firm Profitability and Abnormal Returns**

Table 5 presents regressions in which the November 18, 1997 abnormal returns to U.S. shares are regressed against variables including foreign tax rates and total firm profit margins. The foreign tax rates facing American exporters determine the desirability of using FSCs, since firms whose foreign operations are located in high-tax countries are very likely to have excess foreign tax credits, and therefore benefit by avoiding FSCs and instead using the source rule to characterize export profits as foreign income. Unfortunately, foreign tax rate information is available only for 202 firms, so the sample for the regressions reported in Table 5 is considerably smaller than that for the regressions reported in Table 3.

Column 1 of Table 5 reports estimated coefficients from a regression that includes as independent variables export ratios, foreign tax rates, and interactions of these two variables. The 0.1509 coefficient on the interaction of the export ratio and foreign tax rate implies that the negative effect of greater exports is attenuated by having higher foreign tax rates, presumably because higher tax rates reduce the value of exporting through FSCs. The regressions reported in columns 2-5 add as independent variables measures of pretax profit margins and their interactions with export ratios. A firm's pretax profit margin is its average ratio of profits to sales over the 1992-1998 period, and serves as a proxy for market structure (higher profits

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<sup>21</sup> Japanese firms with affiliates in the United States were entitled to use FSCs for their U.S. exports, and therefore stood to lose tax benefits, but this would represent a very small fraction of their total value.

corresponding to less competitive markets).<sup>22</sup> The estimated effect of the interaction of the export ratio and the foreign tax rate remains positive with the inclusion of profitability variables and others in the regressions reported in columns 2-5.

Share prices of profitable firms did not exhibit abnormal returns on November 18, 1997 that differed systematically from those of less profitable firms, but share prices of more profitable firms with significant exports fell on that day. The estimated negative coefficients on interactions of export ratios and profitability in the regressions reported in columns 2-5 indicate that the combination of export exposure and high profit margins is associated with share value losses (though the coefficient on the interaction is statistically insignificant in the regression reported in column 3). Firms operating in less competitive markets are likely to maintain high profit margins over time, and as outlined in section 3, market structure is an important determinant of the predicted impact of the WTO event on shares prices to the extent that American firms comprise a nontrivial fraction of the firms competing in a given industry.

The regression reported in column 5 of Table 5 includes controls for the effect of net operating losses, the magnitude of foreign assets, and total firm size, with an estimated  $-0.1878$  coefficient on the interaction of average firm profitability and the export ratio. The magnitude of this estimated effect can be evaluated by comparing it to the initial finding of a 2.83 percent fall in market valuation for an export-only firm (relative to a firm with no exports). The  $-0.1878$  coefficient on the interaction term suggests that a three percent higher pretax profit margin (for example, the difference between 4.3 percent and 7.3 percent) increases by 20 percent the share price impact associated with exports.<sup>23</sup> While it is difficult to map differences in profitability to measurable features of market structure, a profit margin difference of three percent is significant relative to the sample mean of 5.8 percent, and has a correspondingly significant estimated effect on the relationship between export exposure and share price reactions.

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<sup>22</sup> Profitability is an imperfect indicator of the extent of competition, but alternatives such as concentration indices are likewise problematic and cannot be constructed at the firm level for major exporters that operate in multiple industries and markets, only some of which are publicly reported. Similar considerations make it impossible to control directly for firm-level differences in the extent to which export markets are dominated by American firms, so the profitability variable is a noisy measure of market considerations that are relevant to the likely share price impact of export subsidies.

<sup>23</sup>  $0.03(0.1878)/0.0283 = 0.20$ .

The WTO event caused firms to be revalued in a way that suggests that the stock market perceived export subsidies to be most valuable to firms operating in imperfectly competitive markets. Stock market reactions reflect the behavior of market participants, as expressed by their willingness to buy and sell shares, so they are informative about market beliefs and not necessarily the true state of the economy. These market reactions nonetheless offer useful information about the likely impact of policy changes, since traders have incentives to price securities accurately and to acquire the information necessary to do so.

## 5. *Conclusion*

This paper offers evidence of the importance of export subsidies to American exporters. Stock price movements on November 18, 1997 imply that the threatened elimination of Foreign Sales Corporations reduced the values of firms with large export exposures, those whose tax situations rewarded the use of FSCs, and those with market positions that made them highly profitable.

The empirical strategy used to estimate share price reactions on November 18, 1997 combines the asset pricing approach to tax incidence (Summers, 1981, 1985; Cutler 1988) with the strategic trade literature's emphasis on the importance of imperfect competition. By comparing predicted abnormal returns with the effects of mitigating factors such as net operating loss carryforwards and the availability of substitute export subsidies, it is possible to sharpen estimates of the value of FSCs. The correlation of price movements and firm profitability implies that the stock market believes export subsidies to benefit firms with strong market positions, suggesting that home country export policies could be designed to aid domestic firms from a strategic trade policy perspective.

The use of the income tax system to subsidize exports is just one example of the connection between trade policy and broader domestic policies noted by Bhagwati and Ramaswami (1963) and numerous subsequent observers. In a world where *ad valorem* subsidies are being negotiated away, corporate tax policies are increasingly viewed as instruments of international competition, not only to prevent taxation from impeding the ability of domestic firms to compete in global markets, but also to enhance their competitive positions. While analyses such as Bagwell and Staiger (2001) and Ederington (2003) consider how domestic

policies such as labor standards and environmental policies might be incorporated into multilateral arrangements, the embedding of subsidies in corporate taxes raises a number of new issues, possibly strengthening calls for the coordination of corporate tax policies. These corporate tax issues, including their implications for saving and investment and the implicit indexing of subsidies to profitability, are likely to receive significant attention given the magnitude and impact of subsidies such as those historically provided to exports under the U.S. income tax.

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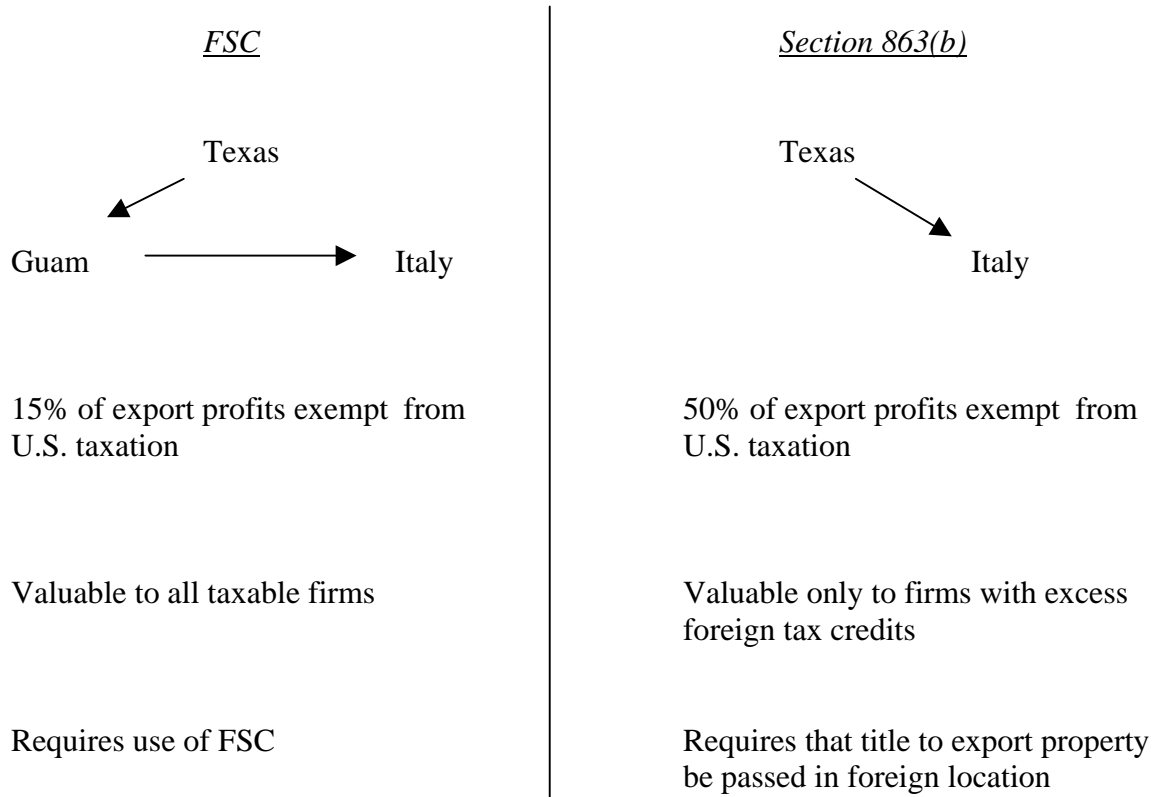


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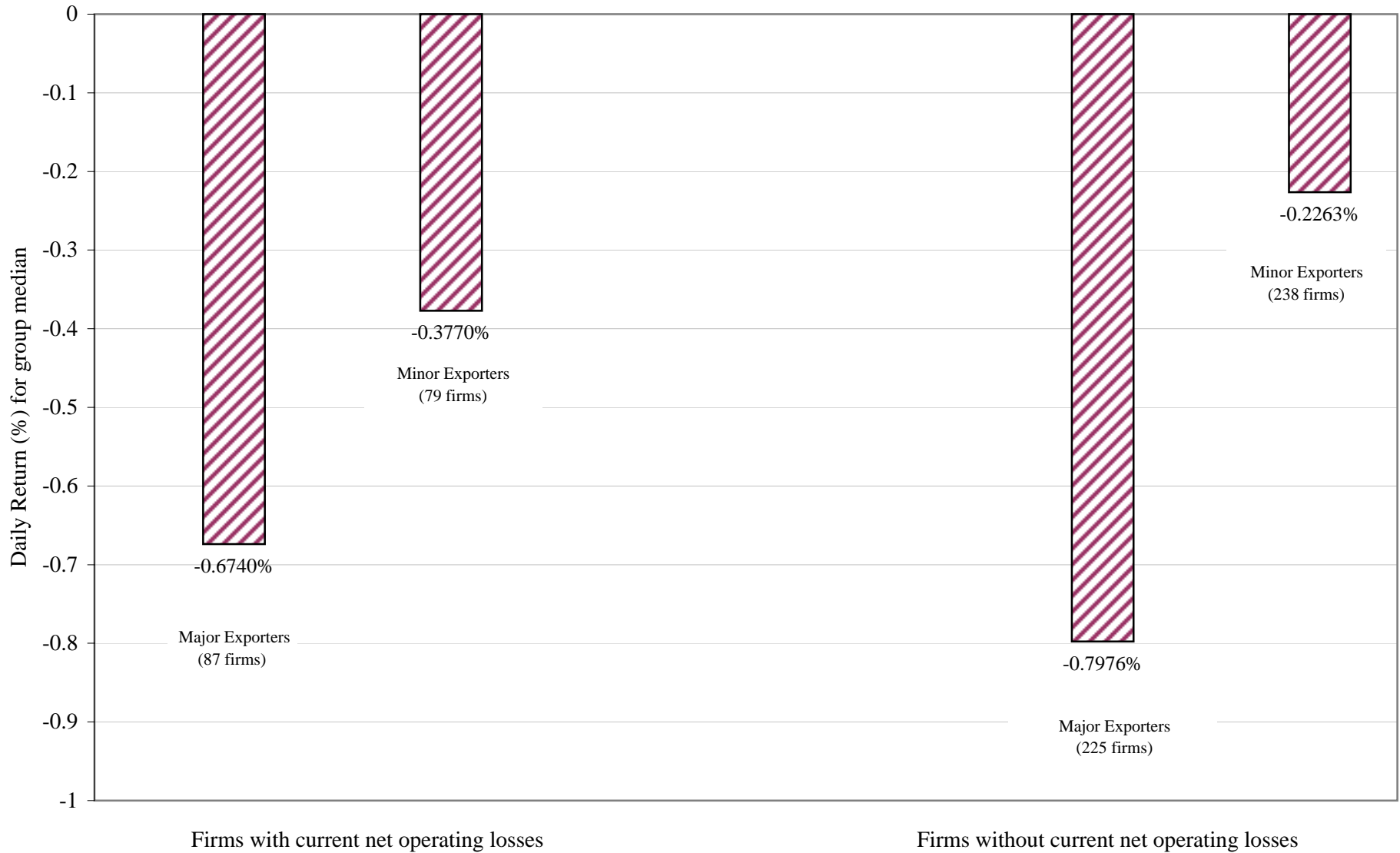
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**Figure 1: Overview of Incentives for Exporters, 1984-2000**



Note: The figure depicts the two alternative export subsidies available to U.S. exporters from 1984 to 2000. The left column depicts the use of a Foreign Sales Corporation (FSC) and the characteristics of that export subsidy. The right column depicts the use of allocation of export income to foreign source under Section 863 (b) and the characteristics of that export subsidy.

**Figure 2: Stock Price Returns for Major and Minor Exporters, by Tax Loss Status, November 18, 1997**



Note: The figure depicts stock returns of American firms on November 18, 1997, the day on which the European Union filed its complaint over the U.S. FSC program. The first two bars are for firms with net operating losses in 1997; the second two bars are for firms without net operating losses. Major exporters have export to total sales ratios exceeding 11 percent; minor exporters have export to total sales ratios of less than 11 percent. The bars depict the median daily returns of firms in each group.

**Table 1**  
**The Benefits of Foreign Source Allocation to Firms with Excess Foreign Tax Credits**

	Pretax Export Income	Pretax Income From Foreign Subsidiaries	Domestic Source Income	Foreign Source Income	Domestic Tax Rate	Foreign Tax Rate	After-Tax Net Income	Excess Foreign Tax Credits
Without Foreign Source Allocation	\$40	\$100	\$40	\$100	35%	50%	\$76= \$50 (\$100 x 50%) + \$26 (\$40 x 65%)	\$15
With Foreign Source Allocation of 50% of Export Income	\$40	\$100	\$20	\$120	35%	50%	\$83= \$50 (\$100 x 50%) + \$20 (\$20 x 0%) + \$13 (\$20 x 65%)	\$8

Note: The figures above depict the tax payments associated with a firm with excess foreign tax credits that receives both export income and dividend repatriations from foreign subsidiaries. In the top row, there is no foreign source allocation of export income. As a result, the firm has \$15 ( $100 \times (50\% - 35\%)$ ) in excess foreign tax credits. In the second row, foreign source allocation of half of export income allows the exporter with excess foreign tax credits not to pay taxes on the portion of export income allocated to foreign source. It is important to note that U.S. allocation rules have no effect on foreign tax liabilities.

**Table 2**  
**Variable Summary Statistics**

	<u>Mean</u>	<u>Median</u>	<u>Standard Deviation</u>	<u>No. of Obs.</u>
Abnormal Returns, 11/18/97	(0.0046)	(0.0012)	0.0376	648
Ratio of Exports to Sales, 1997	0.1630	0.1144	0.1772	690
Ratio of NOLs to Sales, 1997	0.2900	0.0000	2.6544	647
Interaction of NOLs and Export Ratio	0.0573	0.0000	0.5063	647
Ratio of Foreign Assets to Total Assets, 1997	0.0997	0.0000	0.1700	691
Interaction of Foreign Asset Ratio and Export Ratio	0.0117	0.0000	0.0298	690
Foreign Tax Rate, 1997	0.3397	0.3323	0.2510	202
Interaction of Foreign Tax Rate and Export Ratio	0.0416	0.0251	0.0609	202
Average Pretax Profit Margin, 1992-1998	0.0579	0.0662	0.1200	202
Interaction of Pretax Profit Margin and Export Ratio	0.0074	0.0041	0.0297	202
Log Total Assets, 1997	5.0835	4.9114	2.0658	648
Interaction of Foreign Asset Ratio, Export Ratio and NOL Ratio	0.0015	0.0000	0.0305	647
Interaction of NOL Ratio, Export Ratio and Foreign Tax Rate	0.0015	0.0000	0.0146	202

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Note: Abnormal returns on November 18, 1997 control for the effect of stock market and exchange rate movements on that day. "Ratio of Exports to Sales, 1997" is the ratio of exports to total sales in 1997. "Ratio of NOLs to Sales, 1997" is the ratio of net operating loss carryforwards to sales in 1997. "Interaction of NOLs and Export Ratio" is the product of "Ratio of Exports to Sales, 1997" and "Ratio of NOLs to Sales, 1997." "Ratio of Foreign Assets to Total Assets, 1997" is the ratio of foreign assets to total assets. "Interaction of Foreign Asset Ratio and Export Ratio" is the product of "Ratio of Exports to Sales, 1997" and "Ratio of Foreign Assets to Total Assets, 1997." "Foreign Tax Rate, 1997" is the ratio of foreign taxes paid to foreign pretax income. "Interaction of Foreign Tax Rate and Export Ratio" is the product of "Ratio of Exports to Sales, 1997" and "Foreign Tax Rate, 1997." "Average Pretax Profit Margin, 1992-1998" is the average of the annual ratios of total pretax profits to total sales from 1992 to 1998. "Interaction of Pretax Profit Margin and Export Ratio" is the product of "Average Pretax Profit Margin, 1992-1998" and "Ratio of Exports to Sales, 1997." "Log Total Assets, 1997" is the natural logarithm of total assets in 1997. "Interaction of Foreign Asset Ratio, Export Ratio, and NOL Ratio" is the product of "Ratio of Exports to Sales, 1997," "Ratio of Foreign Assets to Total Assets," and "Ratio of NOLs to Sales, 1997." "Interaction of NOL Ratio, Export Ratio and Foreign Tax Rate" is the product of "Ratio of Exports to Sales, 1997," "Foreign Tax Rate, 1997," and "Ratio of NOLs to Sales, 1997."

**Table 3**  
**Determinants of Abnormal Returns on November 18, 1997**

Dependent Variable: One Day Abnormal Return from Two-Factor Model							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	-0.0013 (0.0019)	-0.0010 (0.0019)	-0.0007 (0.0019)	0.0000 (0.0022)	0.0011 (0.0024)	-0.0016 (0.0057)	-0.0018 (0.0057)
Ratio of Exports to Sales, 1997	-0.0198 (0.0114)	-0.0193 (0.0115)	-0.0222 (0.0120)	-0.0232 (0.0119)	-0.0292 (0.0143)	-0.0283 (0.0137)	-0.0280 (0.0137)
Ratio of NOLs to Sales, 1997		-0.0012 (0.0004)	-0.0016 (0.0002)	-0.0016 (0.0002)	-0.0017 (0.0002)	-0.0016 (0.0002)	-0.0015 (0.0002)
Interaction of NOLs and Export Ratio			0.0045 (0.0021)	0.0045 (0.0021)	0.0048 (0.0021)	0.0049 (0.0021)	0.0033 (0.0024)
Ratio of Foreign Assets to Total Assets, 1997				-0.0068 (0.0067)	-0.0175 (0.0095)	-0.0200 (0.0108)	-0.0193 (0.0108)
Interaction of Foreign Asset Ratio and Export Ratio					0.0943 (0.0635)	0.0927 (0.0625)	0.0815 (0.0618)
Log Total Assets, 1997						0.0006 (0.0010)	0.0006 (0.0010)
Interaction of Foreign Asset Ratio, Export Ratio and NOL Ratio							0.0627 (0.0208)
No. Obs.	647	647	647	647	647	647	647
R-Squared	0.0084	0.0157	0.0182	0.0192	0.0224	0.0232	0.0254

Note: The dependent variable in all specifications is the abnormal return on November 18, 1997, controlling for the effect of stock market and exchange rate movements on that day. "Ratio of Exports to Sales, 1997" is the ratio of exports to total sales in 1997. "Ratio of NOLs to Sales, 1997" is the ratio of net operating loss carryforwards to sales in 1997. "Interaction of NOLs and Export Ratio" is the product of "Ratio of Exports to Sales, 1997" and "Ratio of NOLs to Sales, 1997." "Ratio of Foreign Assets to Total Assets, 1997" is the ratio of foreign assets to total assets. "Interaction of Foreign Asset Ratio and Export Ratio" is the product of "Ratio of Exports to Sales, 1997" and "Ratio of Foreign Assets to Total Assets, 1997." "Log Total Assets, 1997" is the natural logarithm of total assets in 1997. "Interaction of Foreign Asset Ratio, Export Ratio, and NOL Ratio" is the product of "Ratio of Exports to Sales, 1997," "Ratio of Foreign Assets to Total Assets," and "Ratio of NOLs to Sales, 1997." Heteroskedasticity-consistent standard errors are in parentheses.



**Table 4**  
**Determinants of Abnormal Returns for Japanese Firms on November 19, 1997**

Dependent Variable: One Day Abnormal Return from A One-Factor Model						
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-0.0066 (0.0012)	-0.0066 (0.0012)	-0.0067 (0.0012)	0.0322 (0.0125)	0.0335 (0.0123)	0.0353 (0.0123)
Ratio of Exports to Sales, 1997	0.0036 (0.0052)	0.0038 (0.0053)	0.0037 (0.0053)	0.0079 (0.0054)	0.0085 (0.0054)	0.0085 (0.0055)
Ratio of NOLs to Sales, 1997		0.0013 (0.0047)	0.0102 (0.0159)		0.0035 (0.0053)	0.0159 (0.0168)
Interaction of NOLs and Export Ratio			-0.0168 (0.0231)			-0.0231 (0.0244)
Log Total Assets, 1997				-0.0022 (0.0007)	-0.0023 (0.0007)	-0.0024 (0.0007)
No. Obs.	1,202	1,202	1,202	1,202	1,202	1,202
R-Squared	0.0003	0.0004	0.0010	0.0074	0.0078	0.0091

Note: The dependent variable in all specifications is the abnormal return for Japanese firms on November 19, 1997, controlling for the effect of the local stock market on that day. "Ratio of Exports to Sales, 1997" is the ratio of exports to total sales in 1997. "Ratio of NOLs to Sales, 1997" is the ratio of net operating loss carryforwards to sales in 1997. "Interaction of NOLs and Export Ratio" is the product of "Ratio of Exports to Sales, 1997" and "Ratio of NOLs to Sales, 1997." "Log Total Assets, 1997" is the natural logarithm of total assets in 1997. Heteroskedasticity-consistent standard errors are in parentheses.

**Table 5**  
**Firm Profitability and Abnormal Returns on November 18, 1997**

Dependent Variable: One Day Abnormal Return from Two-Factor Model					
	(1)	(2)	(3)	(4)	(5)
Constant	-0.0037 (0.0044)	-0.0041 (0.0051)	-0.0061 (0.0050)	-0.0088 (0.0057)	-0.0126 (0.0076)
Ratio of Exports to Sales, 1997	-0.0241 (0.0156)	-0.0209 (0.0197)	-0.0179 (0.0183)	-0.0021 (0.0193)	-0.0008 (0.0192)
Foreign Tax Rate, 1997	-0.0083 (0.0103)	-0.0109 (0.0100)	-0.0061 (0.0099)	-0.0065 (0.0098)	-0.0074 (0.0097)
Interaction of Foreign Tax Rate and Export Ratio	0.1509 (0.0593)	0.1766 (0.0514)	0.1335 (0.0532)	0.1364 (0.0528)	0.1383 (0.0526)
Average Pretax Profit Margin, 1992-1998		0.0241 (0.0265)	0.0266 (0.0265)	0.0294 (0.0260)	0.0259 (0.0262)
Interaction of Pretax Profit Margin and Export Ratio		-0.2230 (0.1064)	-0.1733 (0.0983)	-0.1914 (0.0912)	-0.1878 (0.0916)
Ratio of NOLs to Sales, 1997			0.0361 (0.0705)	0.0391 (0.0723)	0.0412 (0.0725)
Interaction of NOLs and Export Ratio			0.1217 (0.2478)	0.0982 (0.2517)	0.0988 (0.2537)
Ratio of Foreign Assets to Total Assets, 1997				0.0109 (0.0134)	0.0103 (0.0137)
Interaction of Foreign Asset Ratio and Export Ratio				-0.0793 (0.0662)	-0.0834 (0.0660)
Log Total Assets, 1997					0.0007 (0.0009)
No. Obs.	202	202	202	202	202
R-Squared	0.0781	0.1099	0.1566	0.1623	0.1644

Note: The dependent variable in all specifications is the abnormal return on November 18, 1997, controlling for the effect of stock market and exchange rate movements on that day. "Ratio of Exports to Sales, 1997" is the ratio of exports to total sales in 1997. "Foreign Tax Rate, 1997" is the ratio of foreign taxes paid to foreign pretax income. "Interaction of Foreign Tax Rate and Export Ratio" is the product of "Ratio of Exports to Sales, 1997" and "Foreign Tax Rate, 1997." "Average Pretax Profit Margin, 1992-1998" is the average of the annual ratios of total pretax profits to total sales from 1992 to 1998. "Interaction of Pretax Profit Margin and Export Ratio" is the product of "Average Pretax Profit Margin, 1992-1998" and "Ratio of Exports to Sales, 1997." "Ratio of NOLs to Sales, 1997" is the ratio of net operating loss carryforwards to sales in 1997. "Interaction of NOLs and Export Ratio" is the product of "Ratio of Exports to Sales, 1997" and "Ratio of NOLs to Sales, 1997." "Ratio of Foreign Assets to Total Assets, 1997" is the ratio of foreign assets to total assets. "Interaction of Foreign Asset Ratio and Export Ratio" is the product of "Ratio of Exports to Sales, 1997" and "Ratio of Foreign Assets to Total Assets, 1997." "Log Total Assets, 1997" is the natural logarithm of total assets in 1997. Heteroskedasticity-consistent standard errors are in parentheses.