

# How Elastic is the Demand for Tax Havens? Evidence from the US Possessions Corporations Tax Credit\*

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## Abstract

Why do some firms adopt certain tax havens and how sensitive is the demand for tax havens? We address these questions by studying how the repeal of Section 936 tax credits affected firms with affiliates in Puerto Rico. We first describe the characteristics of US multinationals that were exposed to Section 936. We then show that the market value of exposed firms decreased after losing access to Section 936, implying that firms could not perfectly substitute to other tax havens. Finally, we find that firms exposed to Section 936 did not respond by expanding their network of tax havens.

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Why do some firms use tax havens and how easily are firms able to substitute between tax havens? The answers to these questions are crucial for designing policies that are effective at limiting profit shifting. If firms are able to substitute across tax havens with relative ease, efforts to limit access to particular tax havens will fail to limit profit shifting since firms can alter their tax planning strategies to rely on tax havens that are still accessible. As an example of this dynamic, Johannesen and Zucman (2014) find that banks avoided the many bilateral agreements enacted in 2009 by shifting the location of their deposits to tax havens without agreements. In contrast, Desai et al. (2006) find that firms are not very elastic in establishing operations in tax havens. If firms are not able to switch between tax havens, policies that limit access to tax havens will increase corporate tax liabilities, which can affect both firm values and employment and investment decisions.

We address the demand for tax havens by studying firms that could have taken advantage of the US Possessions Corporations Tax Credit (§936). §936 allowed US multinationals to essentially operate free of corporate income taxes in Puerto Rico and other US possessions. We build on work by Grubert and Slemrod (1998) and Suárez Serrato (2018) by identifying firms that could have exploited §936 as a conduit for profit shifting. We then study how firms exposed to §936 responded to the repeal of this policy.

We present three sets of results. First, we study the firm characteristics that predict that a US corporation would establish an affiliate in Puerto Rico. Consistent with the prior literature, we find that firms taking advantage of this tax credit are large, profitable, and research intensive. Second, we find that firms exposed to Puerto Rico experience a decline in firm value in response to news of the repeal of §936. Finally, we show that firms exposed to §936 do not immediately substitute to other tax havens.

Our results suggest that firms' demand for tax havens is not very elastic. We view this as a positive result for the prospect of policies that aim to limit profit shifting. However, the benefits from these enforcement efforts should be weighed against the real consequences of limiting profit shifting by US multinationals, as discussed in Suárez Serrato (2018).

## **I The US Possessions Tax Credit**

From the Revenue Act of 1921 until the Tax Reform Act of 1976, corporate income that originated in US possessions, such as Puerto Rico, was exempt from corporate taxation. After 1976, the

exemption was replaced with the US Possessions Tax Credit. The new tax credit continued to allow multinationals to repatriate possessions income to the US without incurring any federal income tax liabilities.

The US Possessions Tax Credit, commonly referred to as §936, was susceptible to profit shifting. Indeed, the Joint Committee on Taxation (2006) notes that it was possible for a US multinational to conduct R&D in the US, deduct the costs from US taxable income, and then transfer the resulting intellectual property to a Puerto Rican affiliate. The parent firm would reduce its US profits by paying a royalty to its Puerto Rican affiliate and then recognize the tax-free profits from the royalty payments in Puerto Rico. While the transfer of intangible property is generally a taxable transaction, transfers to possessions affiliates were not taxed until 1982. Moreover, possessions affiliates benefited from lax transfer pricing rules until the 1986 Tax Reform Act.

In 1995, 344 firms claimed §936 credits worth \$5 billion in 2017 dollars. Using tax return data, Grubert and Slemrod (1998) highlight that 96% of the §936 tax credits were claimed by 214 firms. Data from the IRS Statistics of Income show that 57% of the credits were claimed by firms in the chemical manufacturing industry. Most of these firms were concentrated in pharmaceutical manufacturing. Overall, 80% of the credits were claimed by firms that manufactured chemicals, food, beverages, tobacco, and equipment. §936 tax credits lowered the effective tax rates of these firms by close to 6 percentage points (Suárez Serrato, 2018).

Policymakers worried that §936 was a conduit for profit shifting. Grubert and Slemrod (1998) analyze the reasons behind US multinational operations in Puerto Rico. They conclude that income shifting advantages through §936 were the predominant reason why many firms operated in Puerto Rico. Further, the tax credits were greater than the total wages paid by §936 firms in Puerto Rico (GAO, 1993). In light of these concerns, the Small Business and Job Protection act of 1996 eliminated §936 and phased out the tax credits over the following decade.

Suárez Serrato (2018) studies the real effects on the continental US economy from the repeal of §936. He finds that firms exposed to §936 decreased investment by 14% and employment by 7% relative to a set of peer firms. Further, these firm-level responses reverberated in local labor markets with greater exposure to §936 firms. Between 1996 and 2012, more exposed local labor markets saw decreased rates of employment and income growth and an increased reliance on government transfers.

This paper uses the repeal of §936 as a natural experiment to study whether US multinationals view tax havens as perfect substitutes. While the repeal of §936 may not be generalizable to all other tax havens, it is a particularly interesting case due to its size and importance in lowering the effective tax rates of the firms that used it.

## II Data

We combine several data sources to measure which firms could have used §936 and to what extent these firms substituted to other tax havens after its repeal. First, we use the list of firms that could have claimed §936 tax credits from Suárez Serrato (2018). These 682 US firms had at least one establishment in Puerto Rico in 1995, according to the National Establishment Time Series (NETS) database.

Second, we obtain financial information and other business characteristics by manually merging these firms with Compustat data. We use stock market return data from CRSP to measure the effects on firm values.

Finally, we use data from Dyreng and Lindsey (2009) who collect information on firms' subsidiaries from SEC filing Exhibit 21. These data allow us to validate our measure of exposure to Puerto Rico and to test for the differential use of other tax havens after the repeal of §936.

## III Which Firms Select Into Puerto Rico?

We begin by describing the characteristics of firms that located in Puerto Rico. We report the results of a probit regression describing the probability that a firm is exposed to §936. The dependent variable is an indicator that equals one if a firm had an establishment in Puerto Rico in 1995 and zero otherwise. Independent variables include the log of total assets, gross profit divided by assets, and indicators for whether the firm incurred any R&D or advertising expenditures as well as for the pharmaceutical sector. The regression includes 8,945 firms, 263 of which were exposed to §936.

Table 1 reports results from this regression. The first column displays the probit coefficients while the second column shows average marginal effects. The first row shows that the chance of being in Puerto Rico is increasing in the size of the firm as measured by total assets. A unit increase in the standard deviation of assets increases the probability of being in Puerto Rico by

4.4 percentage points, relative to a mean outcome of 2.9%. Firms in the pharmaceutical industry were also more likely to be exposed to §936. Overall, 16% of publicly traded pharmaceutical firms had an establishment in Puerto Rico and these firms employed 46% of pharmaceutical workers in the US.

Grubert and Slemrod (1998) predict that more profitable firms and firms with R&D and advertising expenditures are more likely to benefit from profit shifting. Table 1 confirms that having R&D expenses increases the likelihood of exposure to §936 but we do not find a meaningful association with advertising expenses. Gross profit relative to operating assets is an important measure of firm profitability because it is not influenced by a firm’s financing structure. Firms that are more profitable by this measure would be in a better position to engage in profit shifting and are also more likely to have an establishment in Puerto Rico in 1995.

The results from Table 1 are generally consistent with those of Grubert and Slemrod (1998). This shows that our measure of exposure to §936 is similar to measures that are based on confidential tax return data. The results also confirm the notion that larger, more profitable, and intangible-heavy firms are more likely to take advantage of tax havens (Desai et al., 2006). These facts are important when considering how these firms may respond to policies that aim to limit profit shifting.

## IV Did the Repeal of §936 Affect Firm Values?

How do investors respond to news of a crackdown against a single tax haven? If profit shifting only involves the movement of paper profits and tax havens are perfectly substitutable, firms would respond to a crackdown by immediately shifting reported profits to another tax haven. In this case, news of a crackdown against a single tax haven should not impact investors’ valuation of firms that rely on this tax haven. If the demand for tax havens is not very elastic, we would expect firms to lose firm value when a tax haven is eliminated. Indeed, Desai and Hines (2002) find that firms experience an increase in stock prices in response to the announcement that a firm will perform a corporate inversion.<sup>1</sup>

We examine stock returns around the announcement and implementation of the repeal of §936

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<sup>1</sup>Similarly, Bradley (2012) finds a positive stock price response to news of policies that may enable tax avoidance by multinationals. In contrast, Hanlon and Slemrod (2009) and Johannesen and Stolper (2017) find negative effects on stock prices in response to announcements that firms aggressively pursued tax havens and that banks facilitated tax evasion, respectively.

to test whether the repeal affected firm values. Following the event study literature (MacKinlay, 1997), we estimate a regression explaining the return of firm  $f$  at date  $t$ ,  $R_{ft}$ :

$$R_{ft} = X_t\beta_f + \gamma E_{ft}(k) + \epsilon_{ft}, \quad (1)$$

where  $X_t\beta_f$  includes the market returns minus the risk free rate.  $\gamma$  measures the Cumulative Abnormal Return (CAR) and is the parameter of interest.<sup>2</sup>

We study two dates that include the initial proposal to eliminate §936 as well as the date when the drafting of the legislation was announced. President Clinton first announced on February 16, 1993 that he wanted to limit the use of §936. Since this is the first mention of repeal, it is likely to have the largest effect on expectations. The US House of Representatives started writing the final bill to eliminate §936 on October 12, 1995.

Figure 1 plots the results of estimates of Equation 1 where we pool both event dates. On average, firms exposed to §936 saw CAR of -1.4% between days (0,12). While we find a negative CAR on average, it is likely that more intangible intensive firms experience larger declines in values, as these firms are more likely to engage in profit shifting. Table 2 analyzes heterogeneous effects on firm value by regressing the CAR measures between 0-10 days on firm characteristics. The date indicators measure the average CAR for each event and the coefficient for each variable corresponds to an interaction term. Our main specification in column (6) shows that measures of intangible intensity negatively affect CARs. Firms that were more R&D intensive saw larger declines in firm value following these news events. Specifically, increasing R&D by a standard deviation results in a CAR that is 0.426 percentage points lower than average, which is close to one third of the average effect. We also find that firms with advertising expenses experienced larger losses in firm value.

We do not find evidence that more profitable firms experienced larger losses in value following these news events; indeed we find the opposite. We include a control for whether firms have access to other tax havens. While this coefficient is not statistically significant, its sign suggests that firms with access to other havens experienced a larger-than-average loss in firm value.<sup>3</sup> We also control for the fraction of employment in Puerto Rico, and we do not find a significant interaction.

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<sup>2</sup> $E_{ft}(k)$  is an adjusted indicator for an event period that is  $k$  days long. We follow Dube et al. (2011) by estimating all relevant parameters in one step. We use a period of 100 days before each event to establish the relationship between market and individual stock returns in normal times.

<sup>3</sup>For the purpose of this regression, other tax havens include mentions of Ireland, Barbados, Hong Kong, Singapore, Cayman Islands, or Switzerland before 1996 in SEC filing Exhibit 21.

Finally, we note that, as expected, the initial announcement that §936 would be repealed had a larger effect on firm values.

Overall, these estimates suggest that investors viewed the repeal of §936 as an indication that firms' US tax obligations would increase, which would reduce stock prices. These results also speak to the degree to which investors view tax havens as substitutes. In a world where firms are able to shift profits across multiple tax havens and can substitute between them when one of them is eliminated, we would not expect to see any effects on firm value. Moreover, we do not find that firms with access to other tax havens experience smaller declines in firm values. Our results therefore suggest that investors believe firms are not able to switch between tax havens with ease.

## V Did §936 Firms Expand to New Tax Havens?

We now test whether firms respond to the repeal of §936 by expanding operations to new tax havens. We use data from Dyreng and Lindsey (2009) who collect information on foreign subsidiaries from SEC filing Exhibit 21. These data provide the number of mentions of a given country in a firm's annual financial filings.

We estimate several linear probability regressions where the dependent variable is the event that a corporation mentions having operations in a certain tax haven. The main independent variable is an indicator of whether the firm had operations in Puerto Rico in 1995. Each regression controls for industry fixed effects (3-digit NAICS), year fixed effects, and a quadratic in the number of unique countries mentioned to control for size.

We first explore whether firms with Puerto Rican affiliates were more likely to also have operations in other tax havens. The first coefficient in the "Pre" column of Table 3 shows that, before the repeal of §936, firms with operations in Puerto Rico were just as likely as other firms to have operations in other tax havens. The remaining rows of this column show that this result also holds when we study individual tax havens. These results show that §936 firms had similar tax planning strategies as other firms. This may be surprising, since other Caribbean tax havens could have been complements in both profit shifting and real economic activity.

The first coefficient in the "Post" column of Table 3 tests whether §936 firms respond to the repeal of §936 by expanding to new tax havens. While this coefficient is positive, it is not statistically significant. The last column in Table 3 compares the estimates in the "Post" column

to the mean of each outcome conditional on the mean characteristics of §936 firms. This column shows that §936 firms were 2.8% more likely to mention a new tax haven after the repeal of §936. However, this effect is neither statistically nor economically significant. This result is robust to using probit and logit specifications as well as to including different forms of size controls.

Finally, Table 3 uncovers evidence that §936 firms have different patterns of new exposure to tax havens after the repeal of §936. These firms are 3.9 percentage points (11.4%) more likely to mention Ireland. §936 firms are also 4.6 percentage points (10.7%) less likely to mention Singapore than other similar firms. We do not find any statistically significant difference in new exposure to the other major tax havens—Cayman Islands, Switzerland, Barbados, and Hong Kong. Thus, while §936 firms were not more likely to expand to other tax havens, the set of tax havens they favor evolved differently than that of other firms after the repeal of §936.

## VI Conclusions

This paper presented evidence on the degree to which firms can substitute across tax havens. First, we showed that the firms that selected into Puerto Rico were larger, more profitable, and more R&D intensive. These characteristics are consistent with those of firms that are more likely to engage in profit shifting. Second, we showed that §936 firms experienced a 3% loss in firm value as a result of news of the repeal of §936. Moreover, these losses were concentrated in firms that were more likely to engage in profit shifting. Finally, we showed that §936 firms did not increase their reliance on other tax havens after the repeal of §936, suggesting that firms' demand for tax havens is not very elastic.

We view these results as suggesting that efforts to limit profit shifting can be successful at raising the tax burden on multinational corporations. Indeed, Suárez Serrato (2018) shows that exposed firms experience a 6 percentage point increase in effective tax rates after the repeal of §936.

A crucial question for policymakers is whether the benefits from decreasing tax avoidance exceed the real economic consequences that result from limiting profit shifting. Specifically, Suárez Serrato (2018) shows that, after the repeal, multinationals that were exposed to §936 responded by decreasing investment and employment in the continental US, and that these firm-level decisions had long-lasting effects on communities that were more exposed to these firms.

The conclusion that tax havens are not highly substitutable is consistent with a growing body



of literature (e.g., Desai et al. (2006)). In ongoing work, Laffitte and Toubal (2018) highlight the attractiveness of different tax havens for different sectors of economic activity. We show that, even within a 3-digit industry, firms' demand for tax havens may be influenced by idiosyncratic factors that may not be available across tax havens.

While §936 provides an interesting natural experiment to study firms' use of tax havens, the experience of §936 may not generalize to other tax havens. In particular, there are cultural and economic reasons why Puerto Rico may have been an especially profitable platform for the profit shifting activities of US multinationals. Nonetheless, the results reported in this paper suggest that the demand for tax havens is not very elastic.

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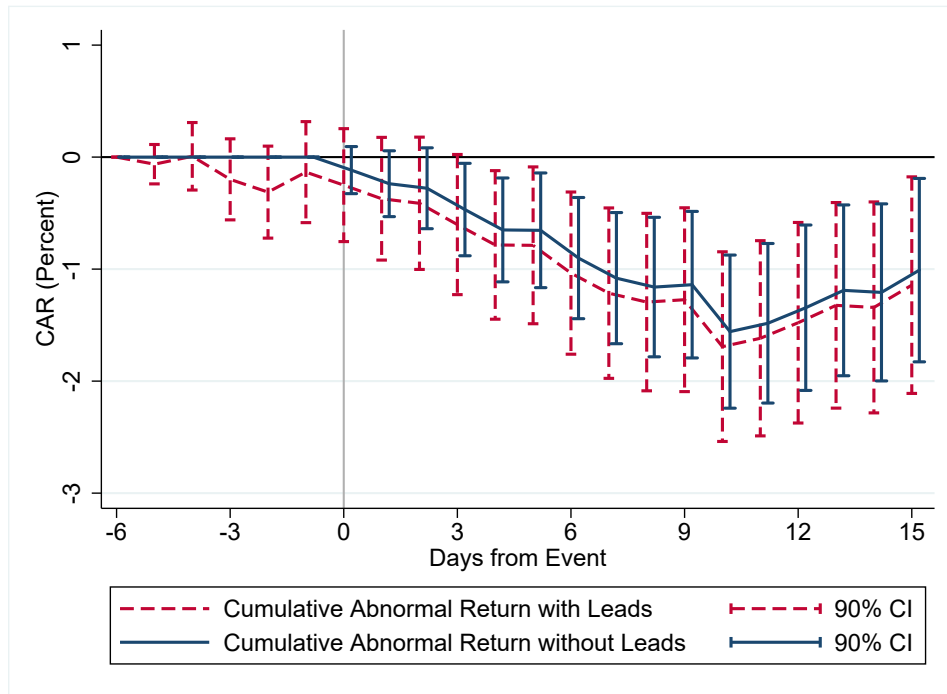
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**Table 1:** Likelihood of Being in Puerto Rico

	Estimates	Marginal
ln(Assets)	0.919 (0.063)	0.044 (0.002)
	0.000	0.000
Gross Profit / Operating Assets	0.142 (0.038)	0.007 (0.002)
	0.000	0.000
NAICS 3254 (Pharma)	0.225 (0.033)	0.011 (0.001)
	0.000	0.000
Any Research & Development	0.137 (0.067)	0.007 (0.003)
	0.040	0.043
Any Advertising	-0.084 (0.144)	-0.004 (0.007)
	0.559	0.561
Observations	8945	8945
Industry Fixed Effects	Yes	Yes
Mean of §936 Exposure		0.029

**Notes:** The displayed coefficients are the result of a probit regression of exposure to §936 on firm characteristics including the a 3-digit NAICS fixed effect, natural log of assets, long-term debt, an indicator for pharmaceuticals, an indicator and controls for R&D, controls for profitability, and an indicator and controls for advertising. The second column shows the average marginal effect of a unit standard deviation increase in each control. Standard errors are clustered at the industry level.

**Figure 1:** Repealing §936 Reduced Firm Value of Exposed Firms



**Notes:** Author's calculations using data from Compustat and CRSP. The event study takes place on two dates regarding the repeal of the Possessions Tax Credit: February 16, 1993 and October 12, 1995. Cumulative abnormal returns are calculated for firms with exposure to the Possessions Tax Credit. Between days (0,12), firms exposed to §936 experienced a CAR of -1.4%. The event study results are shown with additional specifications in Table 2 that include interactions with firm characteristics.

**Table 2:** Event Study Results on Firm Value with Heterogeneous Effects

	(1)	(2)	(3)	(4)	(5)	(6)
Exposure to Section 936	-1.523 (0.362)	-1.492 (0.387)	-1.465 (0.385)	-1.474 (0.386)	-1.467 (0.386)	
	0.000	0.000	0.000	0.000	0.000	
February 16, 1993						-2.272 (0.543)
						0.000
October 12, 1995						-0.788 (0.500)
						0.117
Research & Development	-0.548 (0.103)	-0.451 (0.105)	-0.461 (0.108)	-0.461 (0.108)	-0.462 (0.107)	-0.438 (0.078)
	0.000	0.000	0.000	0.000	0.000	0.000
Gross Profit / Operating Assets		0.912 (0.440)	1.114 (0.487)	1.110 (0.486)	1.176 (0.487)	0.943 (0.453)
		0.039	0.023	0.023	0.016	0.038
Any Advertising			-0.550 (0.523)	-0.501 (0.529)	-0.459 (0.529)	-0.463 (0.459)
			0.293	0.345	0.386	0.314
Reported Major Haven Access				-0.265 (0.410)	-0.327 (0.410)	-0.358 (0.363)
				0.517	0.426	0.325
Relative PR Employment					-0.804 (0.339)	-0.449 (0.277)
					0.018	0.106
Observations	407	326	326	326	325	325
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

**Notes:** This table estimates the heterogeneous effects of the event study using a two step process. Counterfactual returns for the event period are predicted using a regression on the 100 days of trading before the event. The dependent variable for regressions in this table is the [0,10] day cumulative abnormal return for stocks of firms with exposure to Section 936. Independent variables other than exposure to Section 936 and its interactions with dates are normalized to be mean zero and scaled to standard deviations for interpretation. Two digit industry NAICS controls are included in all specifications. Data on financial characteristics come from Compustat and daily stock return data come from CRSP. Robust standard errors are shown in parentheses.

**Table 3:** Impact of Firm Exposure to §936 on Future Tax Haven Use

	Pre	Post	Post (Percent)
All Havens	0.003 (0.008)	0.018 (0.012)	2.780 (1.790)
Barbados	-0.010 (0.008)	-0.014 (0.011)	-8.473 (6.693)
Cayman Islands	-0.001 (0.007)	0.014 (0.010)	5.898 (4.255)
Ireland	0.006 (0.008)	0.039 (0.013)	11.390 (3.704)
Hong Kong	-0.004 (0.007)	0.005 (0.011)	1.310 (2.707)
Singapore	-0.013 (0.008)	-0.046 (0.009)	-10.694 (2.139)
Switzerland	-0.007 (0.007)	0.006 (0.010)	1.534 (2.720)

*Notes:* This table estimates linear probability regressions of firm presence in major tax haven countries on exposure to §936. Before the repeal of §936, we fail to reject the hypothesis that the firms with establishments in Puerto Rico had a different probability of being in other tax havens conditional on the industry, year, and number of countries in which they were present. Ten years after the repeal of §936, firms with exposure are 3.9 percentage points more likely to mention operations in Ireland and 4.6 percentage points less likely to mention operations in Singapore. Standard errors clustered at the industry by year level are shown in parentheses.