

# THE EFFECT OF AN IRS ENFORCEMENT LETTER ON DIESEL TAX CREDITS CLAIMED

Claudio A. Agostini\*, Universidad Adolfo Ibañez  
Claudia Martínez, Universidad de Chile

## INTRODUCTION

IN CHILE, AS IN MANY OTHER COUNTRIES, DIESEL consumption pays a specific tax and also value added tax (VAT). However, when diesel is consumed as an input in some industrial activities the amount of specific diesel taxes paid is considered a tax credit for VAT purposes. If diesel is used in transportation, diesel taxes paid cannot be fully recovered through VAT. Therefore, there exists an incentive to use diesel allowing a tax credit in activities requiring diesel that does not allow a tax credit. Multi-products firms, which use diesel in different economic activities, can take advantage of this incentive and claim higher amounts of tax credits than what they should (Marion and Muehlegger, 2008).

The Chilean Internal Revenue Service (IRS) has obviously been aware of the incentives to over-claim diesel tax credits, and in 2003 sent letters asking to document every diesel purchase to around 200 firms that had the largest increase in tax credits claimed between 2001 and 2002. Using data provided by the IRS for the period of January 2000 to September 2004 for all firms reporting diesel tax credits when filing VAT, we study the effect of receiving the letter from the IRS.

The preliminary results show that the letter sent by the IRS reduced the amount of tax credits claimed by the firms receiving the letter compared to the ones not receiving it by 36 percent, on average. This result can be interpreted as a reduction in diesel tax evasion and it may be due to an increased perception by firms of the probability of being caught evading (Fellner et al., 2009).

## DATA AND EMPIRICAL STRATEGY

The data set used in the empirical analysis contains information about 21,876 firms' charac-

teristics: size based on sales (very small, small, medium and large)<sup>1</sup>, number of different economic activities, tax regime (accrual based accounting, cash flow accounting, presumptive tax regime), and the year the firm started its operations.

Table 1 shows the summary statistics of the data we use in the empirical analysis. The average monthly diesel tax credit is \$457,362, with a standard deviation of \$5,045,984. The letter was sent to 1.02 percent of all credit users, and 0.03 percent of all credit users ended up being audited. The credit users are mostly very small firms (54.7 percent), and large firms represent only 3.2 percent. The main economic sector claiming the tax credit is, as expected, transportation (26.5 percent), followed by manufacturing and commerce. Regarding the type of tax reporting, 45 percent of the sample uses accrual reporting and 10.8 percent cash reporting. The average number of tax reported activities is 2.6, with a maximum of 18, and the average age is 7.3 years, with a maximum of 15. Even though presumptive taxes are used only in three economic sectors in Chile (mining, agriculture, and transportation), 34 percent of the firms claiming diesel tax credits are under a presumptive tax regime, most of them in the transportation sector.

The preliminary empirical strategy we consider to identify the effects of the IRS letter on the amount of diesel tax credit claims by the firms consists of a difference-in-difference estimator between firms receiving the letter and firm not receiving it.

## RESULTS

Table 2 shows the results of estimating the effect of the IRS letter on tax diesel credit claims using a difference-in-difference estimator with a random effects panel. The variable *Letter* is a dummy equal to 1 for the firms receiving the first letter from the IRS, the variable *After* is a dummy equal to 1 for the months after the letter was sent, and the variable *Letter\*After* is the interaction of these two variables whose coefficient's a difference-in-difference estimator. The first pair of columns show the results of

\*Agostini: claudio.agostini@uai.cl, Martínez A.: cmartineza@econ.uchile.cl. We also thank Servicio de Impuestos Internos for access to the data and the funding provided by the Research Grant Fondecyt 1110542. Javiera Selman provided excellent research assistance.

*Table 1*  
**Descriptive Statistics**

	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
Diesel Tax Credit	457362	5045984	1657	5.06E+08
Letter	0.0102	0.0316	0	1
Very Small Firm	0.5467	0.5372	0	1
Small Firm	0.2996	0.4431	0	1
Medium Firm	0.0479	0.1514	0	1
Large Firm	0.0321	0.1015	0	1
Construction	0.0201	0.0636	0	1
Transport	0.2651	0.8381	0	1
Manufacturing	0.0566	0.179	0	1
Commerce	0.0216	0.0683	0	1
Accrual Reporting	0.4511	0.5063	0	1
Cash Reporting	0.1083	0.3171	0	1
Number Activities	2.6183	2.8947	1	18
Presumptive Tax	0.3425	0.4853	0	1
Age	7.338	5.6743	1	15

Source: authors' calculations based on IRS data.

*Table 2*  
**Difference-in-Difference Random Effects Panel**

<i>ln(diesel)</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>Coefficient</i>	<i>Std. Error</i>
Letter	4.2325	0.1135	4.2321	0.0923	1.9900	0.0289
After Letter	0.3043	0.0062	0.3810	0.0056	0.0747	0.0155
Letter*After Letter	-0.3640	0.0271	-0.3632	0.0199	-0.3525	0.0482
Number Activities					0.1024	0.0072
Commerce					0.0658	0.0259
Transportation					-0.0615	0.0077
Manufacturing					-0.1570	0.0152
Construction					0.1733	0.0200
Small Firm					0.2682	0.0239
Medium Firm					0.5774	0.0296
Large Firm					0.6278	0.0400
Age between 2 and 4					-0.1526	0.0161
Age between 5 and 7					-0.2513	0.0167
Age between 8 and 10					-0.1885	0.0178
Older than 10					-0.2952	0.0151
VAT reported					0.0916	0.0214
Accrual Accounting					0.5092	0.0277
Presumptive Tax					0.0039	0.0271
Constant	10.374	0.047	10.513	0.016	9.900	0.087
Monthly Dummies	No		yes		yes	
Year Dummies	No		yes		yes	
Wald	11831.4				3173.86	
R <sup>2</sup>	0.0842		0.0913		0.5012	

the estimation without considering additional controls; the second pair of columns show the results adding monthly and year dummies; and the third column shows the results of the regression including several firms' characteristics as explanatory variables.<sup>2</sup> The difference-in-difference estimator shows a consistently, statistically significant reduction of around 36 percent in tax credit claims by the firms that received the letter after receiving it.

One additional empirical result that is worth discussing is that the amount of tax credits claimed by firms' increases with the number of different economic sectors in which they report activities, showing that it is maybe easier to over-claim diesel tax credits for multi-sector firms. Finally, firms under accrual tax regimes also report larger amounts of diesel tax credits.

### CONCLUSIONS

The specific diesel tax in Chile allows different rates of tax credit against the VAT depending on its use, generating the possibility of evading the tax when firms use diesel in economic activities not allowing a tax credit, but report it as used in economic activities allowing the tax credit.

In 2003, with the goal of detecting diesel tax evasion, the Chilean IRS sent a letter to around 200 firms that had the largest increase in tax credit claims over the previous two years. In the letter the IRS requested detailed information of every diesel purchase. Receiving the letter from the IRS could have changed the estimated probability firms had of being detected in evading the diesel tax (Sheffrin and Triest, 1992).

Using firm level data from the IRS, we analyze the effect of the IRS letter on the tax diesel credits

claimed by the firms. The preliminary results using a difference-in-difference estimator show a large impact in terms of decreasing the amount of diesel tax credits claimed by firms. On average, firms receiving the IRS letter reduced their tax credit claims by around 36 percent after receiving it.

Future work considers analyzing the impact of the letter controlling for the sample selection process and studying the potential heterogeneous responses by different types of firms.

### Notes

- <sup>1</sup> The standard classification used by the Chilean government to determine firm size is based on annual sales: less than US\$100,000 are very small firms; between US\$100,000 and US\$1,000,000 are small firms; above US\$1,000,000 but below US\$4,200,000 are medium firms; and more than US\$4,200,000 are large firms.
- <sup>2</sup> Additionally, the third empirical specification was also estimated using Jackknife to address the potential existence of outliers driving the results, but the results were almost identical.

### References

- Fellner, Gerlinde, Rupert Sausgruber, and Christian Traxler. Testing Enforcement Strategies in the Field: Legal Threat, Moral Appeal and Social Information. CESifo Working Paper No. 2787, 2009.
- Marion, Justin, and Erich Muehlegger. Measuring Illegal Activity and the Effects of Regulatory Innovation: Tax Evasion and the Dyeing of Untaxed Diesel. *Journal of Political Economy* 116(41), 2008.
- Sheffrin, Steven M., and Robert K. Triest. Can Brute Deterrence Backfire? Perceptions and Attitudes in Taxpayer Compliance, in Joel Slemrod (ed.) *Why People Pay Taxes: Tax Compliance and Enforcement*, University of Michigan Press, Ann Arbor, 1992.