

How do Corporate Tax Incentives affect Firm- Level Performance? A Propensity Score Matching Analysis in Dominican Republic

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Research Question

What is the impact
of **Fiscal Incentive**
On **Firms' Performance** in the
Dominican Republic?

Motivation

- **Fiscal policy** is among the most important means through which governments influence the business cycle. Sound fiscal policies can promote sustained and **inclusive development** and reinforce both **social and economic stability**.
- **Tax expenditures**, which are fiscally equivalent to more traditional forms of public spending, can play an important role in **attracting specific types of private investment** and rewarding the production of **positive externalities**.
- Although **tax exemptions** are often intended to **advance worthwhile policy goals**, their **public benefits** can be **difficult to gauge**, while their **private benefits** create a **strong incentive** for firms and investors to lobby for preferential tax treatment.

Fiscal Policy in DR

The **Corporate Income Tax** (Impuesto Sobre la Renta, ISR) is **characterized** by the existence of a generous and complex **array** of **exemptions and tax credits**.

The special regimes include: the **Special Economic Zones (SEZs)**, the **tourism development clusters**, **special regions**, and a large number of individual additional exceptions to the standard regime.

- Law 8-1990: enterprises established in SEZs receive most benefits for their exporting activities. Firms operating within SEZs receive a full exemption from the ISR, ITBIS (Value Added Tax), and all local taxes.
- Law 158-2001: which exempted enterprises working in several tourism-development clusters from ISR, ITBIS, and other taxes and fees. New establishments, in particular, receive a 10-year tax exemption from the start of its operations, which was extended to 15 years in 2013 (Law 195-2013).
- Other special regimes include the exclusion from ISR and ITBIS for firms located in border regions (Law 28-2001), or other tax incentives commonly used by local enterprises are related to the film industry (Law 108-2010), and to renewable energy companies (Law 66-1997).

Literature Review

Some proponents argue that **investment allowances and tax credits, exemption from indirect taxes and export processing zones** improve **investment**, create **jobs** and other socio-economic **benefits** (Bora, 2002). While the opponents believe that the **cost of fiscal incentives** (such as deteriorating governance and increasing corruption) **outweighs its benefits** (see Cleeve, 2008).

Moreover there is a growing interest in evaluate the effects of **tax incentives** on the productivity of firms **in developing countries at the micro level**:

- **Tax incentive recipient firms** tend to have **higher growth** as a result of the productivity impact (Ohaka and Agundu, 2012) and **higher performance** in Ugandan manufacturing firms (Mayende, 2013). **Tax exemption and export financing** have a significant and **positive impact** on the productivity of firms in Cameron (Belmondo et al. 2016).
- **Tax incentives** and subsidized credit were **not correlated** with total factor **productivity of manufacturing firms** in Korea (Lee, 1996).

Methodological outline

The aim of this paper is to analyze whether the existing tax incentives in the Dominican Republic (DR) translate into significantly different economic outcomes, at the firm level.

- We consider these effects on a variety of Indicators of firm's performance,
- This issue is addressed by using the **Propensity Score Matching** (Heckman et al., 1997; Rubin, 1977; Rosenbaum & Rubin, 1983).
- We estimate these effects using the **Nearest Neighbor Matching (NNM)** and **Radius Matching (RM)** (Leuven E. & Sianesi B. (2003)).
- We allow for the **Balancing test** in order to validate the results

Data

- The “**Statement of Tax Return**»” is the result of a partnership between the Dominican Republic Ministry of Finance and the World Bank.
- The data observe **18.592 firms**, distributed in 31 Provinces, for ten years (**2006-2015**).
- The data contain information about the firms’ characteristics, the ownership and capital structure, the performance and other external factors that may affect the firms’ operations such as government incentives.

The Counterfactual Concept of Causality

➤ The Evaluation Problem:

To Evaluate The Average **Causal Effect** of the 'Treatment' (Corporate Income Tax) on outcomes.

➤ The Potential Outcome Model:

Y_1 = Outcome Under Treatment

Y_0 = Outcome without Treatment

$Y_1 - Y_0$ = Treatment Effect

$T = (1; 0)$ Treatment Indicator

$Y = \{Y_0 \text{ if } T=0 ; Y_1 \text{ if } T=1 \}$ Observed Outcomes

X = Set of Observed Characteristics

Model Specification

The parameter of interest is :

$$\Delta ATT = E(Y_{i1} | T_i = 1) - E(Y_{i0} | T_i = 1)$$

- Need to invoke assumption (CIA and Common Support) in order to identify the average **unobserved counterfactual**.
- Select a comparison group as similar as possible to the treatment group in terms of their observable characteristics:

$$E(Y_{i0} | T_i = 1) = E(Y_{i0} | T_i = 0)$$

- Employ a Propensity Score Matching:

$$\Delta ATT = E [E(Y_{i1} | T_i = 1, P(X)) - E(Y_{i0} | T_i = 0, P(X))]$$

Matching Estimators

- **Nearest Neighbor Matching**: consists of matching each treated firms with the control firms that has the closest propensity score. It allows for replacement of the matches which increases the average quality of matching, but reduces the number of distinct non-participant observations used to construct the counterfactual mean, thereby increasing the variance of the estimator (Smith and Todd, 2005).
- **Radius Matching**: a firm from the control group is chosen as a matching partner for a participant that lies within the specified radius in terms of propensity score. Usually a smaller radius results in better quality matching.

Outcomes of Interest

Variables	Description	Area
Liquidity	Current Assets to Fixed Assets	Liquidity
GFSAL	Financial Expences to sales	Operating Structure
ROS	Net operating Income to Sales	Operating Structure
ROA	Net Income to Total Assets	Profittability
STS	Sales to Total Assets	Turnover
Turnover	Sales to Current Assets	Turnover

Covariates Selected

Variables	Description
Capital stock	Value of a Firms Machinery and Equipment
Building	Value of Buildings-capturing the firms dimension
Employees' Cost	Total Cost of Wage
Urban Land	Value of Land
Economic Activities	Dummies for Economic activities: Public administration; Rental Housing; Trade; Communications; Construction, Grain Crop, Traditional Crops; Electricity, Gas and Water; Mine and Quarrying; Livestock, Forestry and Fisheries; Hotels Bars and Restaurants; Financial Intermediation, Insurance and Others; Manufacturing; Other Services; Agricultural Services; Teaching; Health Services, Transportation and Storage
Provinces	Dummies for Provinces

Descriptive Statistics; Beneficiaries and non Beneficiaries

Variables	Mean Beneficiaries	Mean Non-Beneficiaries	t-test
Capital stock	3179562	6157773	***
Building	1.08e+07	1.05e+07	ns
Employees' Cost	6827028	1.12e+07	***
Urban Land	4441331	5498850	**

Probit Estimation

VARIABLES	Corporate Income Tax
ALTAGRACIA	0.354*** (0.0566)
AZUA	0.213** (0.0948)
BAHORUCO	0.0749 (0.195)
BARAHONA	0.0446 (0.0798)
DAJABON	0.00299 (0.221)
DISTRITO NACIONAL	0.190*** (0.0519)
DUARTE	-0.0395 (0.0641)
EL SEYBO	-0.371*** (0.104)
PESPAILLAT	-0.311*** (0.0637)
HATO MAYOR	-0.00699 (0.0955)
INDIPENDENCIA	0.155 (0.193)
LA ROMANA	0.455*** (0.0563)
LAVEGA	0.0288 (0.0573)
MARIA TRINIDAD SANCHEZ	0.109 (0.0770)
MONSEOR NOUEL	-0.107(0.0755)
MONTE PLATA	0.0110 (0.148)
MONTECRISTI	0.505*** (0.0873)
PERNA DALES	0.200 (0.271)
PERAVIA	0.00185 (0.0733)
PUERTO PLATA	0.223*** (0.0552)
SALCEDO	-0.264*** (0.0867)
SAMANA	0.810*** (0.0651)
SAN CRISTOBAL	0.247*** (0.0563)
SAN JOSE DE OCOA	-0.265* (0.160)
SAN JUAN DE LAMAGUANA	-0.221*** (0.0835)
SAN PEDRO DE MACORIS	0.222*** (0.0607)
SANCHEZ RAMIREZ	-0.155* (0.0805)
SABTIAGO DE LOS CABALLEROS	0.0265 (0.0528)
SANTIAGO RODRIGUEZ	-0.189 (0.142)
SANTO DOMINGO	0.185*** (0.0523)
PUBLIC ADMINISTRATION	0.236 (0.202)
RENTAL HOUSING	0.481*** (0.0180)
TRADE	-0.0595*** (0.0165)
COMMUNICATION	0.345*** (0.0277)
CONSTRUCTION	0.237*** (0.0194)
GRAIN CROP	0.0700 (0.0765)
TRADITIONAL CROP	0.315*** (0.0418)
ELETTRICITY, GASW, WATER	-0.0534 (0.0450)
MINE AND QUARRIG	0.445*** (0.0814)
LIVESTOCK, FORESTRY AND FISHERIES	0.254*** (0.0404)
HOTEL, BAR , RESTAURANTS	0.340*** (0.0251)
FINANCIAL INTERMEDIATION, INSURANCE	0.493*** (0.0213)
MANUFACTURING	0.219*** (0.0188)
OTHER SERVICES	0.249*** (0.0175)
AGRICULTURE SERVICES	0.356*** (0.0371)
TEACHING	-0.236*** (0.0371)
HEALTH SERVICES	-0.286*** (0.0282)
Capital Stock	3.58e-11 (5.39e-11)
Building	2.05e-10 *** (3.12e-11)
Employees' Cost	-1.17e-09 *** (1.32e-10)
Land's Ownership	1.24e-10 *** (4.64e-11)
Constant	-0.743 *** (0.0539)
Observations	152,357

Results

VARIABLES	Nearest Neighbor Matching	Radius Matching
Liquidity	268.08 (493.24)	268.14 (493.21)
Number of treated units	36,258	36,251
Number of untreated units	73,976	73,975
GFSAL	17295.32 *(9416.60)	17295.32 *(9416.60)
Number of treated units	15,724	15,724
Number of untreated units	34,802	34,802
ROS	2.56 **(1.22)	2.56 **(1.22)
Number of treated units	15,956	15,951
Number of untreated units	35,207	35,206
ROA	22463.54 (22462.53)	22464.74 (22463.73)
Number of treated units	37,513	37,515
Number of untreated units	76,747	76,747
STS	2.23 *(1.32)	2.23 *(1.31)
Number of treated units	20,393	20,293
Number of untreated units	37,216	37,216
Turnover	19.02 ** (9.16)	19.03 **(9.16)
Number of treated units	18,619	18,615
Number of untreated units	36,856	36,836

Propensity score distribution and common support for propensity score estimation (NNM)

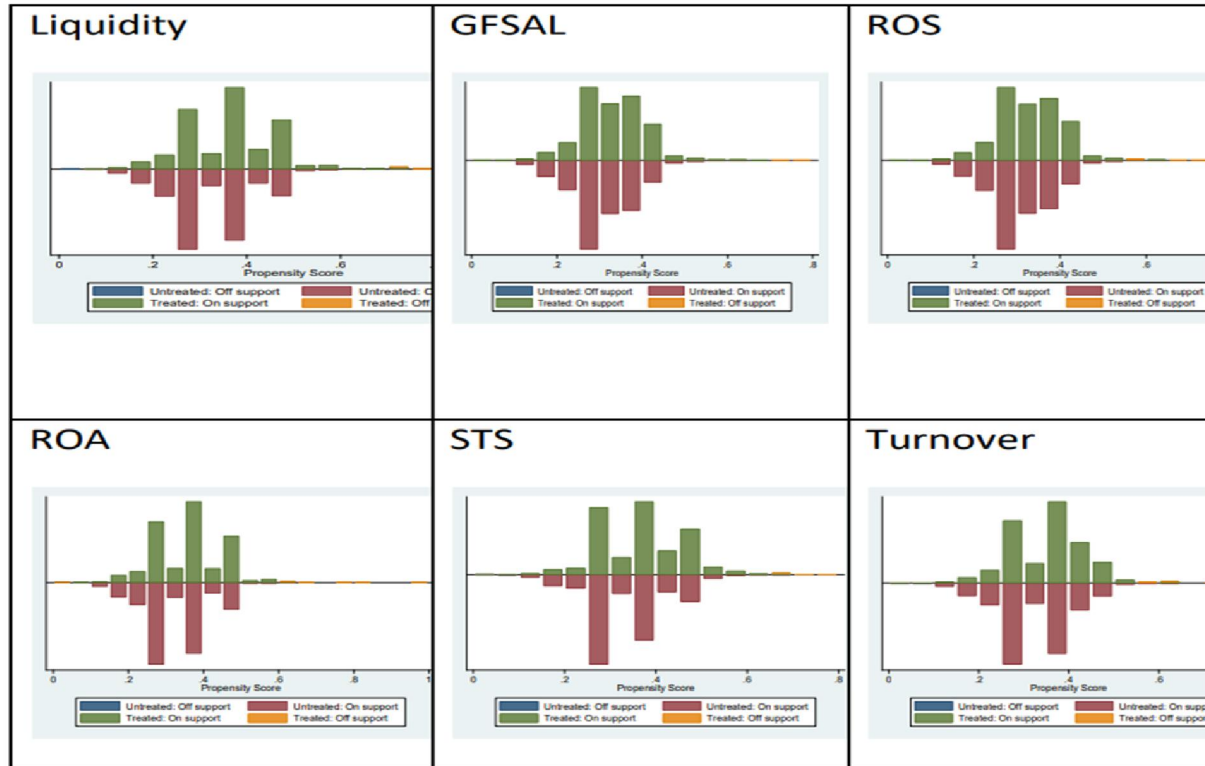


Figure 1: Propensity score distribution and common support for Propensity Score Estimation-NNM

Propensity score distribution and common support for propensity score estimation (RM)

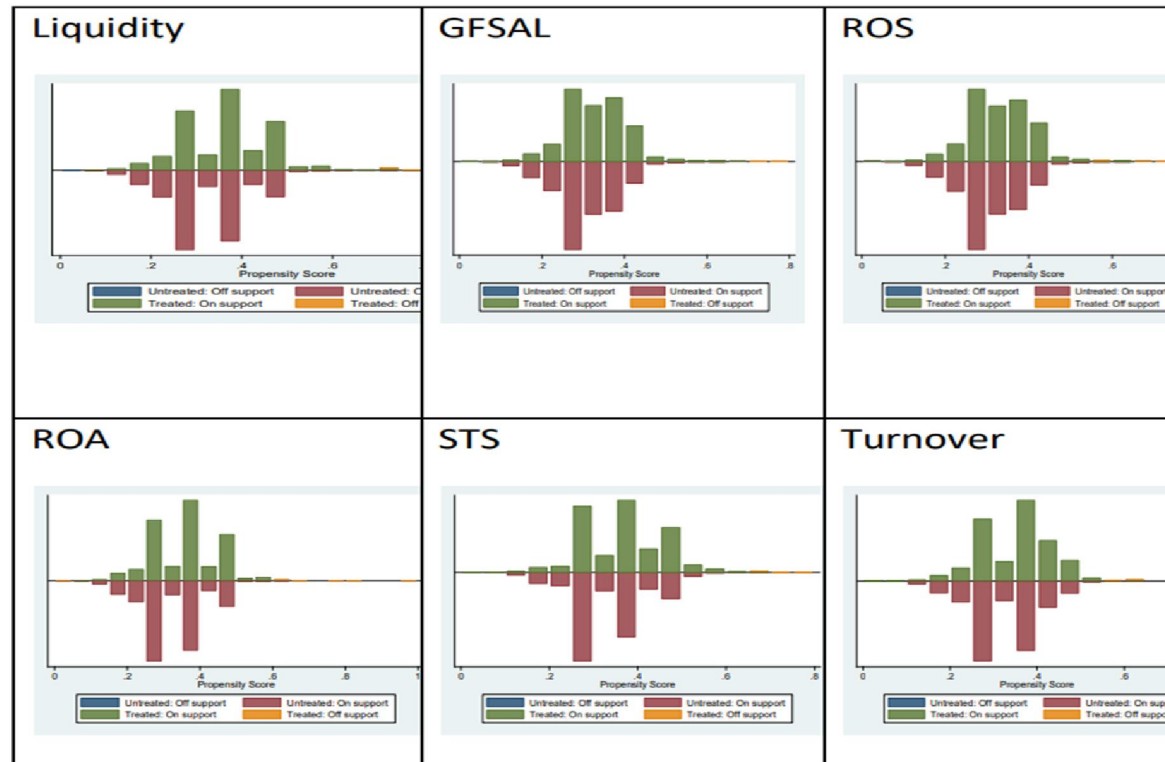


Figure 2: Propensity score distribution and common support for Propensity Score Estimation-RM

Matching Covariates Balancing Property

Outcome			Radius Matching		Nearest Neighbor Matching	
			%bias	P -Value	%bias	P-Value
Liquidity	U	Buildings	4.0	0.000	4.0	0.000
	M		0.1	0.859	0.5	0.560
	U	Employees' Costs	-3.1	0.000	-3.1	0.000
	M		0.7	0.221	0.7	0.178
GFSAI	U	Buildings	1.0	0.275	1.0	0.275
	M		-2.4	0.028	-2.4	0.028
	U	Employees' Cost	-5.5	0.000	-5.5	0.000
	M		-2.1	0.077	-2.1	0.077
ROS	U	Buildings	0.9	0.321	0.9	0.321
	M		-0.8	0.398	-0.8	0.332
	U	Employees' Cost	-5.5	0.000	2.9	0.000
	M		-0.4	0.617	0.5	0.307
ROA	U	Buildings	1.6	0.321	1.6	0.008
	M		0.2	0.398	0.4	0.379
	U	Employees' Cost	-3.8	0.000	-3.9	0.000
	M		0.5	0.617	0.9	0.051
STS	U	Buildings	0.5	0.523	0.5	0.523
	M		-0.1	0.933	-0.1	0.933
	U	Employees' Cost	-5.4	0.000	-5.4	0.000
	M		0.3	0.672	0.3	0.672
Turnover	U	Buildings	1.0	0.262	1.0	0.262
	M		1.2	0.053	1.2	0.050
	U	Employees' Cost	-4.5	0.000	-4.5	0.000
	M		1.4	0.042	1.4	0.042

Balancing Test

		Nearest Neighbor Matching			Radius Matching		
Outcome		Ps R2	B	R	Ps R2	B	R
Liquidity	U	0.033	43.7*	1.07	0.033	43.7*	1.07
	M	0.001	7.3	1.03	0.001	7.3	1.03
GFSAL	U	0.021	34.5*	0.89	0.033	34.5*	0.89
	M	0.000	7.9	0.82	0.001	7.9	0.82
ROS	U	0.021	34.3*	0.90	0.021	34.3*	0.90
	M	0.001	8.7	1.44	0.001	8.7	1.52
ROA	U	0.028	40.3*	0.90	0.028	40.6*	0.98
	M	0.001	8.7	1.31	0.001	8.7	1.29
STS	U	0.027	39.2*	0.92	0.027	39.2*	0.92
	M	0.002	9.1	1.36	0.002	9.1	1.36
Turnover	U	0.023	36.5*	0.87	0.023	36.5*	0.87
	M	0.002	11.2	1.59	0.002	11.2	1.56

Results

- The results show that the existing **exemption** regime directly affects firm **performance**, sector-level **competition**, and economy-wide **productivity**. Firms located in **special economic zones** (SEZ) receive preferential tax treatment, and these firms tend to **perform better than their non-SEZ-based** peers.
- However, the **disparity** in tax liability **between SEZ and non-SEZ** firms creates **distortions** that inhibit the efficient allocation of factors, resulting in **two parallel production and export structures**.

Conclusions

- **Authorities** should consider **leveling the playing field between SEZ-based and non SEZ-based enterprises** (which means essentially, enterprises benefiting from large fiscal incentives, and enterprises not benefiting from large incentives) by fixing asymmetries related to tax neutrality across firm types and economic activity.
- As the analysis shows, the existing exemptions regime directly affects the performance - and therefore the competitiveness - of firms, and thus the overall productivity of the economy. **Reducing the proven tax liabilities** divide between SEZ and non-SEZ firms will **alleviate distortions** and **promote economy-wide competitiveness**, thus contributing to put to an **end** the country's **dual production and export structure**.
- The **DR** maintains large **incentives** for firms operating in the SEZ (tax relief, capital allowances, exemptions and incentives) which appear to be **costly** and fundamentally **inefficient for the economic system**. **Tackling this aspect**, by rethinking and gradually phasing out SEZs subsidies **would be a positive first step**, although it may likely face strong opposition from vested interests.
- **Increasing the neutrality of the tax system** would also **help fighting tax avoidance**, thus having a **positive effect on addressing informality**.

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Thank You!