

# GPEARI: The impact of tax incentives for investment on firm's economic outcomes

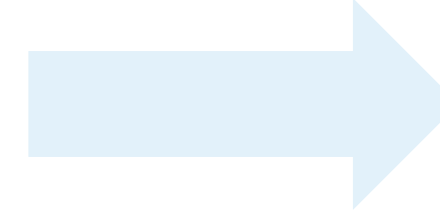
A PSM evaluation of the Portuguese case of RFAI and DLRR - Miguel Machado

An analysis of the Portuguese tax system, focused on the performance of RFAI and DLRR - Carolina Pereira

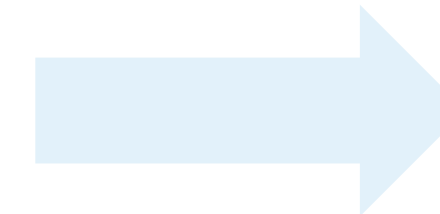
Work project carried out under the supervision of:  
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Doutora Sílvia Fonte-Santa, GPEARI – Ministério das Finanças

# Introduction

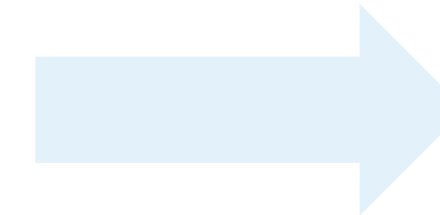
A **tax system can impact behaviour and social welfare** through different channels, such as influencing or distorting economic decisions like **Investment.**



**Many governments, including the Portuguese, have implemented tax incentives to correct for the lack of investment**



**The complexity of the tax system in Portugal** is one of the factors that contribute to sluggish productivity growth among other factors



Despite the significant monetary expenses, **no study in Portugal** has focused on providing an **evaluation of DLRR and RFAI.**

It is important to evaluate whether incentives such as **DLRR and RFAI are beneficial** for the population and economy at large **by looking to the main economic outcomes** such as employment, productivity, sales and earnings and investment.

# Summary of the Portuguese Tax Incentives

Summary of the benefits established in the CFI				
Specifications	Benefit			
	BFCIP	RFAI	DLRR	SIFIDE II
<b>Benefit tax</b>	10% to 25% of the relevant applications		10% of retained profits	32.5% of R&D expenses and an incremental rate of 50% of the increase in expenditure
<b>Other benefits</b>	<ul style="list-style-type: none"> <li>• Exemption/reduction of IMI</li> <li>• Exemption/reduction of IMT</li> <li>• Exemption from stamp duty</li> </ul>			
<b>Duration</b>	10 years	10 years	Same year	8 years
<b>Investment permanence period</b>	3 to 5 years	3 to 5 years	5 years	
<b>Investment</b>	≥ 3 M€			
<b>Cumulations</b>	DLRR	DLRR	BFCIP and RFAI	x
<b>Limitations</b>	<ul style="list-style-type: none"> <li>• Investment project;</li> <li>• Financial contribution ≥ 25%;</li> <li>• Eligible costs;</li> <li>• Balanced financial situation.</li> </ul>	<ul style="list-style-type: none"> <li>• Financial contribution ≥ 25%;</li> <li>• Eligible costs;</li> <li>• In the general case, deduction up to the limit of 50% of the IRC collection.</li> </ul>	<ul style="list-style-type: none"> <li>• Maximum amount of retained and reinvested profits is 12M€;</li> <li>• In the general case, deduction up to the limit of 50% of the IRC collection.</li> </ul>	<ul style="list-style-type: none"> <li>• Application project.</li> </ul>
<b>Obligations</b>	<ul style="list-style-type: none"> <li>• To have organised accounts;</li> <li>• Taxable profit is not determined by indirect methods;</li> <li>• Regularized tax and social security situation;</li> <li>• They must not be considered to be companies in difficulty;</li> <li>• Deduction to the taxable income has to be justified by a document to be included in the tax documentation file.</li> </ul>			

Source: Peixoto (2016, p.20)

# Literature Review

## On Tax Incentives for Investment

- **Caiumi's (2011)** → A tax-based subsidy targeted to the accumulation of capital is not an optimal tool due to the prohibited cost.
- **Bronzini et al. (2008)** → The policy was effective in stimulating investment, although fiscally unsustainable.
- **Kersten et al. (2017)** → SME support has positive effects on firms' economic outcomes.
- **Piza et al. (2016)** → Positive effects on the firm's performance, employment and labour productivity.
- **Harris and Trainor (2005)** → Mixed effects of tax incentives as well as capital grants.
- **Chirinko and Wilson (2016)** → Evaluate the effects of tax credits for job creation in the USA.

# Average Statistics for Treated and Untreated Firms

- On average, treated firms are more productive, older and the percentage of tangible assets is higher as well as the value of total assets.
- Moreover, treated firms are more commonly exporters, which seems to signal more competitive firms.

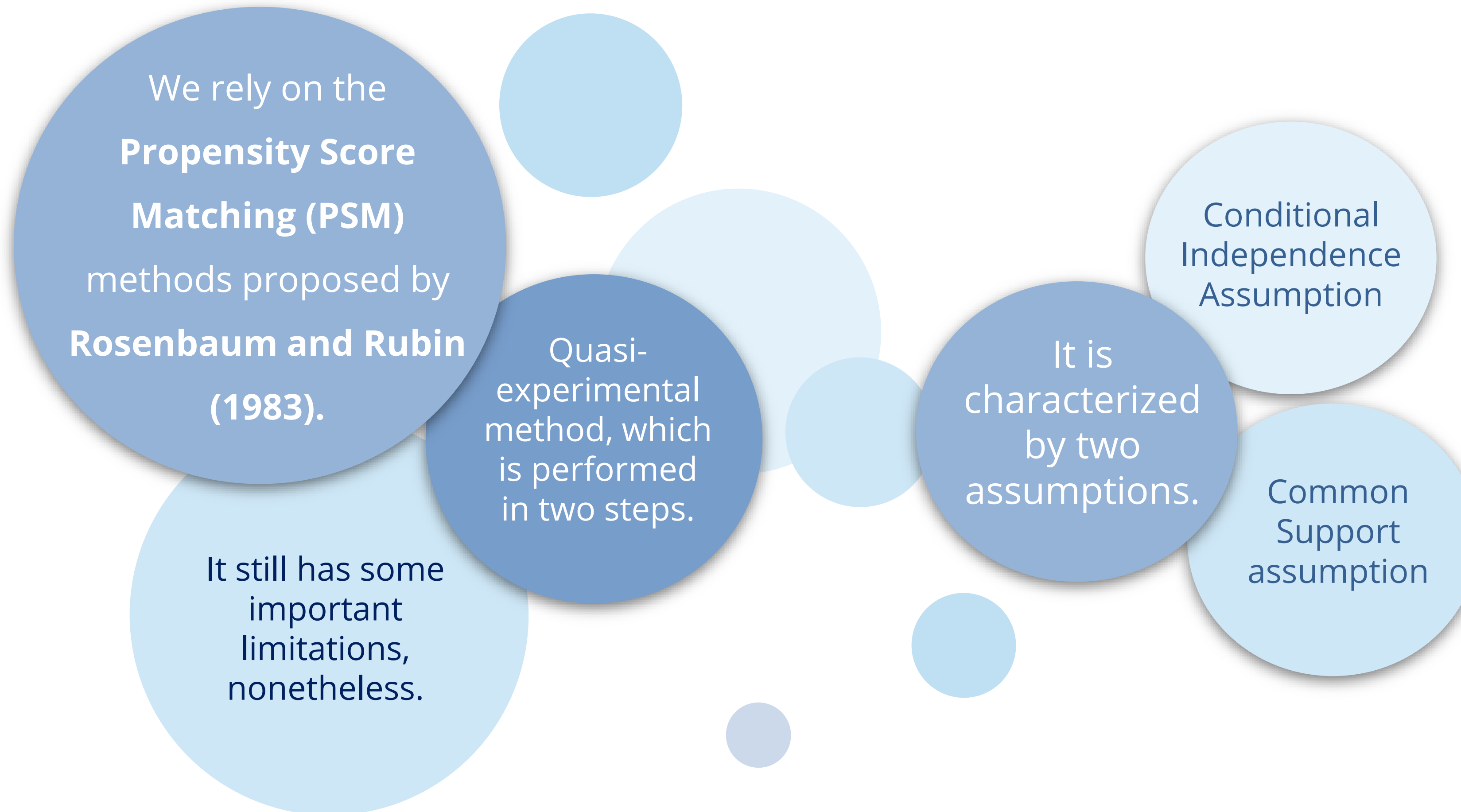
	Treated	Untreated
<b>Liquidity</b>	3.12	5.24
<b>Solvability</b>	1.95	2.63
<b>% Current Liabilities</b>	0.68	0.66
<b>In Labour Productivity</b>	10.9	10.13
<b>Age</b>	18.54	13.3
<b>% Tangibles</b>	0.32	0.21
<b>% Intangibles</b>	0.02	0.12
<b>In Employment</b>	2.73	1.06
<b>In Total Assets</b>	14.2	11.46
<b>In EBITDA</b>	12.32	9.70
<b>% Volume of Exports / Total Sales</b>	0.19	0.06
<b>In Taxes Paid</b>	9.93	7.36
<b>In Credit</b>	12.27	10.66
<b>Rentability of Assets</b>	0.19	-0.21
<b>Rate of Indebtedness</b>	2.71	4.76
<b>Dimension of Firm</b>	1.85	1.12

# Methodology

REGRESSION AND MATCHING



# Propensity Score Matching



# Regression and Matching



The treatment group includes firms that benefitted from DLRR or RFAI in 2017, but not in 2018 and 2019.

The matching process was conducted in 2015 (t-2).

The assessment of the impact was done in 2018 and 2019.



# Regression and Matching – Stages

1

## Estimation of the Propensity Score

The control variables used include **net income, liquidity ratio, solvability ratio, current liabilities ratio, rentability of assets ratio, ratio of personnel costs against total assets, indebtedness rate\*** and **ratio of financial investments against assets\*\***.

Despite our propensity score suffering from low pseudo R-square and low p-score we do not consider this to be a failure.

2

## Calculation of ATT

The ATT is computed by averaging over the unit-level treatment effects of the treated.

For the calculation of the ATT and the robustness of its results we used as control, variables such as, **firm size, age and sector of activity as well as financial indicators (liquidity ratio, solvability ratio and exports as percentage of sales)**.

# Results

RESULTS ON THE OUTCOMES OF INTEREST

# Treated Firms

*Table 10 Results for treated firms*

	All firms treated					
	2018			2019		
Outcomes of Interest	ATT	S.Dev	t	ATT	S.Dev	t
In Labour Productivity	0.092	0.026	3.526	0.050	0.027	1.876
In Wages	0.093	0.021	4.504	0.106	0.019	5.598
In EBITDA	0.650	0.051	12.620	0.604	0.052	11.573
In Employment	0.620	0.039	17.752	0.627	0.040	15.763
In Tangible Fixed Assets	0.977	0.065	14.998	0.849	0.064	13.291
In Volume of Exports	0.529	0.119	4.439	0.624	0.122	5.106
In Intangible Fixed Assets	-0.310	0.157	-1.980	-0.112	0.166	-0.675
In Taxes	0.668	0.057	11.741	0.584	0.058	10.013
In Sales	0.797	0.050	14.858	0.753	0.052	14.546
In Credit	0.356	0.071	4.995	0.224	0.069	3.253
In Assets	0.501	0.048	10.485	0.481	0.049	9.752

- For all outcomes, we focus on the ATT rate in percentual points, as we defined each outcome variable as the natural logarithm of the variable in the year of interest, 2018 and 2019 respectively.
- The main outcome is that the public support measures under analysis have a positive and significant effect for all variables of interest, except exports and intangible assets and for both years.

# Manufacturing Firms

*Table 11 Results for manufacturing firms*

	Only Manufacturing Industries Firms					
	2018			2019		
Outcomes of Interest	ATT	S.Dev	t	ATT	S.Dev	t
In Labour Productivity	0.056	0.039	1.415	-0.008	0.043	-0.198
In Wages	0.066	0.027	2.452	0.052	0.027	1.912
In EBITDA	0.481	0.091	5.293	0.510	0.089	5.733
In Employment	0.467	0.068	6.839	0.475	0.070	6.771
In Tangible Fixed Assets	0.534	0.101	5.273	0.539	0.104	5.192
In Volume of Exports	0.064	0.181	0.354	0.307	1.179	1.717
In Intangible Fixed Assets	0.010	0.206	0.050	-0.063	1.198	-0.319
In Taxes	0.407	0.102	3.979	0.444	1.106	4.205
In Sales	0.515	0.087	5.892	0.495	0.090	5.491
In Credit	0.242	0.119	2.041	0.171	0.110	1.557
In Assets	0.368	0.084	4.391	0.362	0.084	4.331

→ When focusing only on Manufacturing Industries, we confirm the positive effects of the policy, nonetheless the statistic significancy of the results drops drastically, probably due to the sharp decrease in observations in the dataset and the resulting low pscore values in the matching.

# Small and Medium Enterprises

*Table 12 Results for small and medium enterprises*

	Only SMEs					
	2018			2019		
<b>Outcomes of Interest</b>	<b>ATT</b>	<b>S.Dev</b>	<b>t</b>	<b>ATT</b>	<b>S.Dev</b>	<b>t</b>
In Labour Productivity	0.035	0.026	1.313	0.059	0.027	2.191
In Wages	0.081	0.020	3.943	0.095	0.019	4.938
In EBITDA	0.606	0.050	12.147	0.626	0.051	12.208
In Employment	0.651	0.037	17.734	0.636	0.037	17.142
In Tangible Fixed Assets	0.940	0.066	14.288	0.886	0.063	13.674
In Volume of Exports	0.522	0.121	4.566	0.576	0.128	4.511
In Intangible Fixed Assets	-0.408	0.143	-2.860	-0.330	0.143	-2.373
In Taxes	0.617	0.055	11.191	0.589	0.057	10.333
In Sales	0.778	0.048	16.063	0.796	0.049	16.123
In Credit	0.311	0.067	4.633	0.301	0.067	4.476
In Assets	0.498	0.047	10.685	0.509	0.047	10.874

→ When we only consider SMEs the results go in line with the info previously obtained, thus giving extra robustness to the first set of results. Nevertheless, this was already expected as the economy is characterized by micro and small firms as already described

# Conclusions

PRESENTATION OF POLICY IMPLICATIONS AND SUGGESTIONS FOR FUTURE STUDIES



# Conclusions

## Average impact

**Positive impact** of the treatment, both in the short and medium run, with ATT showing positive values in pp terms **across most of the outcomes of interest.**

## Tangible assets

**Significant Increase in 2018 and 2019** which is accompanied by an **increase of credit** by those same firms, thus reflecting **leverage investment.**

## Labour productivity

**A slight increase** in labour productivity, outcome to which we only expect to see the true treatment effect in **the long run.**

## Employment

**Significant increases** in employment, suggesting that treated firms are able to improve their **business competitiveness and scale.**

# Comparison with previous works



How do our conclusions line up with others from previous studies?



Bronzini et al.  
(2008)

Santi (2021)

Chirinko et al.  
(2016)

Silva et al.  
(2019)

# Policy Implications

The loss of revenue is recouped by the increase in taxes paid due to higher revenues

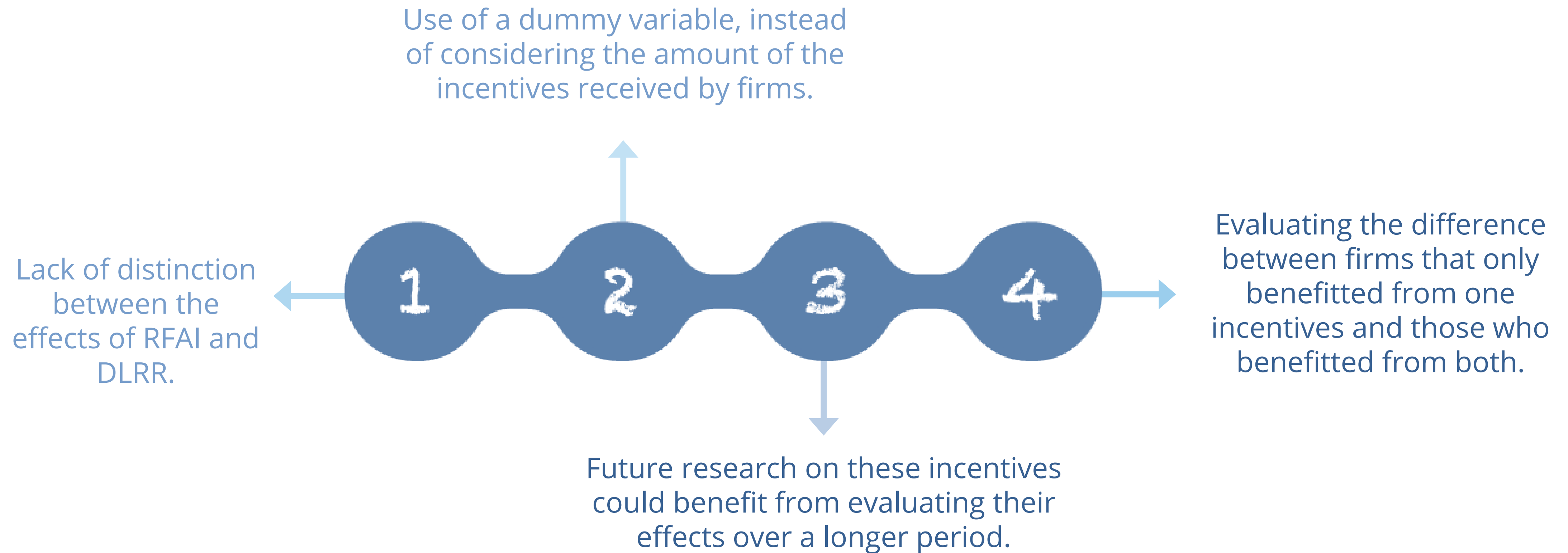


The benefits of the program should not be overstated, but the stimulation of investment, employment and wages and sales point towards competitiveness, growth and better economic performance due to the policy.



The government may **reduce the number of incentives and focus on those which are found to have positive effects** on the outcomes of interest and necessities of the economy.

# Limitations and Suggestions for Future Research



Obrigado

# Appendix

09

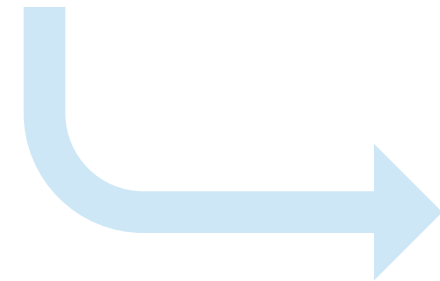


# Average statistics for treated and untreated firms

	Treated			Untreated		
	N	Mean	S.Dev	N	Mean	S.Dev
<b>In Net Result</b>	2478	10.66	1.84	174447	8.88	1.93
<b>Liquidity</b>	2662	2.90	4.67	283257	5.04	10.9
<b>Solvability</b>	2675	1.70	4.20	291574	2.63	8.67
<b>% Current Liabilities</b>	2681	0.69	0.28	296120	0.68	0.57
<b>Rentability</b>	2689	0.14	0.29	302694	-0.11	2.05
<b>% Personnel Costs / Total Assets</b>	2689	0.29	0.32	302944	5.68	2698.55

# Construction of Variables

Construction of  
some of the Control  
Variables and  
Outcome Variables  
(Table 9)



Control Variables	
<b>Liquidity Ratio</b>	Current Assets / Current Liabilities
<b>Solvability Ratio</b>	Equity / Total Liabilities
<b>Current Liabilities Ratio</b>	Current Liabilities / Total Liabilities
<b>Rentability of Assets Ratio</b>	EBITDA / Total Assets
<b>Ratio of Personnel Costs against Total Assets</b>	Personnel Costs / Total Assets
<b>Indebtedness Rate</b>	Total Assets / Equity
<b>Ratio of Financial Investments against Assets</b>	Financial Investments / Total Assets
<b>% Volume of Exports</b>	Exports / Total Sales
<b>Age of Firm</b>	Dummy==1 if firm age>10
Outcomes of Interest	
<b>Wages</b>	Remuneration of Personnel / N° of Remunerated Personnel
<b>Labour Productivity</b>	(Sales and Services Provided - CMVMC) / N° of employees