

# Final evaluation plan

***Component C05 – Agendas for Business Innovation aid scheme***

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# Table of Contents

<b>1 Introduction</b> .....	<b>3</b>
<b>2 Description of the aid scheme</b> .....	<b>5</b>
<b>3 Theory of change of the aid scheme</b> .....	<b>8</b>
<b>4 Evaluation questions</b> .....	<b>10</b>
4.1 Evaluation questions .....	10
4.2 Relation to the specific objectives of the aid scheme .....	10
<b>5 Evaluation strategy and proposed methodology</b> .....	<b>12</b>
5.1 General strategy .....	12
5.2 Control group delimitation .....	19
5.3 Outcome indicators .....	20
5.4 Data availability .....	20
<b>6 Preliminary analysis</b> .....	<b>22</b>
6.1 Data description .....	23
6.2 Data preprocessing .....	23
6.3 Search for potential confounders .....	23
6.4 Search for functional forms .....	24
6.5 Synthetic Differences-in-Differences .....	25
6.6 Doubly Robust Difference-in-Differences .....	25
6.7 Generalized Propensity Score .....	25
<b>A Mobilising Agendas</b> .....	<b>28</b>
A.1 Manufacturing Industries .....	28
<b>B Green Agendas</b> .....	<b>119</b>
B.1 Manufacturing Industries .....	119

# 1 Introduction

This document outlines the final evaluation plan of component C05 — Agendas for Business Innovation aid scheme. It presents the evaluation questions and their motivation, proposes specific methods to address them and describes the data that will be available for their implementation. It also conducts a feasibility analysis of these methods, considering the data availability and the specificities of the support scheme.

Furthermore, we present a preliminary analysis of the currently available data. This has three objectives: 1) describing the treated population and revealing the characteristics of the selection process (the association between the treatment indicator and the features of the firms); 2) exploring the relationship between outcome variables and features of the firms; and 3) conducting a placebo study to shed light on feasibility, robustness, and potential caveats of the selected methods.

It is important to acknowledge that our team's access to data represents only a fraction of what will be available for the final evaluation. This limitation extends to both the features considered and the data entries accessed. Despite this constraint, our preliminary analysis focuses on key features aligned with the evaluation objectives, shedding light on available data. We emphasize the assurance of comprehensive feature set availability for both applicant and non-applicant firms in the final evaluation.

Although conducting an exhaustive descriptive statistical analysis of all features and all firms exceeds the scope of this report, we present selected insights. Our analysis remains aligned with the evaluation objectives, using the data readily accessible for the analysis. These presented snapshots serve to lay a foundation for more in-depth exploration in the final evaluation.

The first two objectives of the preliminary data analysis are instrumental for the third: although some methods proposed do not rely on controlling for confounders (namely, Synthetic DiD), they can benefit from it; at the same time, controlling for confounders is essential for the other methods proposed. Thus, the first two objectives of this preliminary data analysis are really a search for observable confounders, and the third is a naïve test for the presence and influence of unobserved or unaccounted ones.

The placebo study proved insightful, albeit being conducted in a limited and naïve manner. The constrained nature of the available data has shaped the extent of this analysis. Despite the limitations, this initial endeavour provides a glimpse into the appropriateness of some of the methods proposed.

Additionally, the strategy followed in the placebo study can be seen as a evaluation protocol for the final evaluation. It describes and implements an end-to-end data-driven approach

to causal inference, entirely replicable and purged of arbitrary, unexplained and unreported human decisions. Importantly, the design of this strategy happens under full ignorability of any post-treatment outcomes.

We recommend the application of a similar protocol in the final evaluation, as it guarantees the inexistence of “p-hacking” behavior from the evaluators, ensuring the credibility and honesty of the final estimates and associated conclusions.

In the following sections, we explore the intricacies of the aid scheme, the evaluation plan, the proposed methodologies, as well as both the challenges encountered and those anticipated.

## 2 Description of the aid scheme

The Portuguese Recovery and Resilience Program (PRR) identifies a set of investments and reforms to contribute to the following dimensions: Resilience, Climate Transition, and Digital Transition.

In this context, component C05 – Capitalization and Business Innovation, particularly through the investments "Mobilizing Agendas for Business Innovation" and "Green Agendas for Business Innovation", integrated into the Resilience dimension, aims to support and accelerate the innovation process and firm's progression in value added chains by promoting clustering strategies and collaborative innovation dynamics, based on partnerships between scientific and technological institutions and companies.

The investment planned in this measure is intended to promote and financially support projects that aim to:

1. Contribute to changing the specialization profile of the Portuguese economy, encouraging activities with higher added value, more knowledge-intensive, more oriented towards international markets, and more intensive in qualified jobs. The goal is also to support the consolidation or emergence of new innovative products, processes or services with greater technological complexity, reducing dependence on external markets and increasing the country's strategic autonomy;
2. Increase exports of goods and services and contribute to European technological sovereignty, aiming to achieve an export volume equivalent to 50% of GDP by 2027 and 53% of GDP by 2030, focusing on increasing the technological balance of payments;
3. Increase investment in R&D, ensuring a target of 3% of GDP by 2030, with 1.25% of public expenditure and 1.75% private expenditure. This corresponds to ensuring 25,000 new qualified jobs by 2030 and tripling business R&D spending compared to 2020;
4. Reduce CO2 emissions by 55% by 2030, following a trajectory that allows carbon neutrality by 2050.

In terms of beneficiaries, as well as regarding common interest, the expected impact translates into an increase in innovative productive potential, coupled with the ability to achieve the goals associated with the green and digital transition, and accelerating the structural transformation of the Portuguese economy towards the development of higher value-added activities.

It also aims to foster collaborative dynamics, expanding the synergistic connection and progress between the business fabric and the scientific and technological system in Portu-

gal, aiming to strengthen the capacity to transform existing knowledge into the production of new innovative goods and services in sectors exposed to international competition.

The submission of applications for this aid scheme was preceded by the expressions of interest by consortia of companies and non-business entities. In a later stage, some of these consortia were invited to submit applications. Tables 1 and 2 summarise these expressions of interest, distinguishing between eligible (those subsequently invited to submit applications) and non-eligible consortia.

**Table 1: Expressions of Interest: Innovation Pacts**

		<b>ELIGIBLE</b>	<b>NON-ELIGIBLE</b>
<b>GREEN INNOVATION PACTS</b>	Nr. of Consortia	19	4
	Nr. of applicant firms	334	30
	Nr. of applicant non-business entities	197	35
<b>INNOVATION PACTS</b>	Nr. of Consortia	49	21
	Nr. of applicant firms	1067	204
	Nr. of applicant non-business entities	543	114

Among the various consortia that expressed interest, only 70 were invited to submit applications. Of these, 64 formalized their applications, and only 53 were ultimately selected for assistance. This information is detailed in Table 3.

**Table 2: Expressions of Interest: Mobilizing Projects**

		<b>ELIGIBLE</b>	<b>NON-ELIGIBLE</b>
<b>MOBILIZING GREEN PROJECTS</b>	Nr. of Consortia	8	3
	Nr. of applicant firms	88	33
	Nr. of applicant non-business entities	44	30
<b>MOBILIZING PROJECTS</b>	Nr. of Consortia	25	14
	Nr. of applicant firms	204	108
	Nr. of applicant non-business entities	159	126

**Table 3: Applications: Mobilizing Agendas and Green Agendas**

		<b>ELIGIBLE</b>	<b>NON-ELIGIBLE</b>
<b>MOBILIZING AGENDAS</b>	Nr. of Consortia	31	8
	Nr. of applicant firms	774	106
	Nr. of applicant non-business entities	399	96
<b>GREEN AGENDAS</b>	Nr. of Consortia	22	3
	Nr. of applicant firms	462	49
	Nr. of applicant non-business entities	250	44

## Final evaluation plan

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The approved applications in the phase following the expression of interest, encompassing both green agendas and mobilizing agendas, involve a total of 1 236 companies and 649 non-business entities.

### 3 Theory of change of the aid scheme

In this section, we present the general logic of the policy under analysis, specifically stressing the causal sequence linking the intervention to the desired intermediate and final outcomes, the mechanisms explaining these causal relationships, as well as some of their assumptions and risks. This analysis contributes to identifying the most relevant evaluation issues and defining the most suitable performance and outcome indicators.

The Mobilizing Agendas for business innovation and the Green Agendas for business innovation (part of component C05 of the PRR) constitute an investment incentive system aimed at supporting collaborative innovation projects. The measure is operationalised through support for consortia that include companies, non-business entities from the research and innovation system, managing entities of Competitiveness Clusters, public administration entities, business associations, or other relevant associations.

The implementation of these supports depends, initially, on the preparation of notices and calls for proposals.

The launch of the first Call stimulates contacts between business and non-business entities (universities, research centers, among others), with a view to forming consortia. In this process, formal and informal networks are formed that facilitate the transmission of knowledge and may lead to future collaborations. This is a direct result of the intervention, which is observed in both supported and unsupported companies. However, there is the possibility that consortia may be formed among entities that were already working together, which would mean that the policy is not contributing to expanding existing collaboration networks.

For supported companies, the allocation of grants represents a significant reduction in the financing costs of companies, improving access conditions to financing compared to those offered by the market. The measure may also fund projects that could not obtain private funding and would therefore not be realized.

It should be noted that the submission of a joint application reduces the costs of accessing state support, as companies share the costs of preparing the application. This process also makes it possible for smaller companies to access funding sources that they would hardly access otherwise, as they lack the means to deal with the necessary bureaucratic process.

Finally, the formation of consortia leads to a sharing of the inherent risk in carrying out R&D projects, reducing the individual risk of each supported company. This risk (and cost) sharing leads companies to carry out joint projects that they would not undertake individually. The funding allocated by each company to the project generates spillovers for the other companies, particularly due to the sharing of the results achieved during the research.

Companies, especially smaller ones, can also benefit from certification effects by participating in consortia with distinguished companies. There are also advantages in terms of



contact with new customers and suppliers through other companies in the consortium. Connections to universities and research centers can also facilitate the recruitment of talent for companies.

The considerations of the preceding paragraphs are based on the assumption that high financing costs and coordination difficulties among agents are relevant obstacles to the realization of collaborative innovation projects.

One of the main expected direct results of the Mobilizing Agendas is the increase in innovative production, resulting in the growth of new technologically advanced products, services, and solutions with high added value. Additionally, an increase in the qualifications of supported organizations is expected, particularly regarding internationalization and innovation management capabilities. Similarly, an increase in the capacity of human resources is anticipated.

At an aggregate level, it is expected that the Mobilizing Agendas will contribute to an increase in overall investment in R&D in the Portuguese economy and a change in its specialization profile, particularly through the increase in knowledge-intensive activities and activities with higher added value. It is also anticipated that the measure will have a positive impact on the development and empowerment of the national innovation system and on qualified employment at the national level. Finally, the policy guidelines point to an increase in competitiveness, activities oriented towards international markets, and exports. In the case of the Green Agendas, these should also result in a reduction of CO<sub>2</sub> emissions, contributing to carbon neutrality and environmental sustainability objectives.

## 4 Evaluation questions

In this section, we introduce the key evaluation questions of the final evaluation plan. These questions address both the direct and indirect impacts of aid, placing particular emphasis on evaluating its proportionality, adequacy, and alignment with the overarching objectives of the support scheme.

### 4.1 Evaluation questions

a) Questions related to the direct impact of the aid on beneficiaries:

- How does the incentive affect the gross value added, turnover, export activity, industrial property, operating costs, R&D expenses, number of qualified jobs, and the introduction of new products/processes for supported companies?
- How does the incentive affect the firm's costs with energy inputs by unit of output?
- How do the impacts vary across different economic sectors and company sizes?

b) Questions related to indirect impacts:

- Do supported companies decrease product prices, due to cost reductions induced by the aid, leading to increased competitive pressures on non-supported companies?
- Do knowledge centers change their research priorities as a result of collaborating with supported companies?

c) Questions related to proportionality and adequacy of aid:

- Does the amount of incentive exceed the minimum necessary for companies to shape their investment decisions?
- How do changes in incentive amount impact gross value added, turnover, export activity, industrial property, operating costs, R&D expenses, qualified jobs, and the introduction of new products/processes for supported companies?
- What are the differential impacts of the aid compared to other stimulus policies?
- What are the differential impacts of multiple support configurations in the context of this aid scheme?

### 4.2 Relation to the specific objectives of the aid scheme

- **Economic specialization:** the above questions regarding changes in firms' turnover and gross value added also address the contribution of the aid scheme to changes in the specialization profile of the economy, assuming that supported companies grow faster than the average.

- **Export promotion:** questions regarding changes in exports of goods and services also measure the contribution of the aid scheme to a more export oriented economy.
- **R&D and qualified jobs:** questions regarding changes in R&D expenses and qualified jobs also measure the contribution of the aid scheme to a more qualified and R&D intensive economy.
- **Carbon neutrality and energy resilience:** questions regarding changes in energy inputs costs address the contribution of the aid scheme to carbon neutrality and energy resilience. A reduction in the costs in these inputs (compared to the counterfactual scenario, per unit of output) reflects a lower use of energy, and of the carbon intensity of the process (which is mostly derived by the consumption of fossil fuels).
- **Innovation:** questions regarding the introduction of new products/processes also address the contribution of the aid scheme to supporting the consolidation or emergence of innovative products, processes, or services.

## 5 Evaluation strategy and proposed methodology

### 5.1 General strategy

The way the support regime is designed does not allow for experimental methods: there is no random component in the selection of supported companies, nor are there exogenous factors that induce support for certain companies and not others.

The main distortions created by the selection process are the company's ability and willingness to establish networks with other companies and knowledge centers, export potential, initiatives in R&D, ability to obtain financing, and execute investments.

Causality identification must rely on quasi-experimental observational methodologies. Among these, Regression Discontinuity Design (RDD), methodologies combining propensity score approaches and differences-in-differences, and methods leveraging panel data, namely combining synthetic controls and differences in differences, are preferential.

From the evidence meanwhile collected, the feasibility of the RDD method is very questionable.

Regarding the final application to the aid scheme, Figure 1 makes it clear that not only is the density of companies around the merit evaluation cut-off point discontinuous, but also the number of companies at reasonable distances from this point is manifestly low, especially regarding unsupported consortia.

Therefore, the analysis using RDD at the application level should be discarded, first and foremost because of the small sample size. This conclusion applies to both the green and mobilizing agendas.

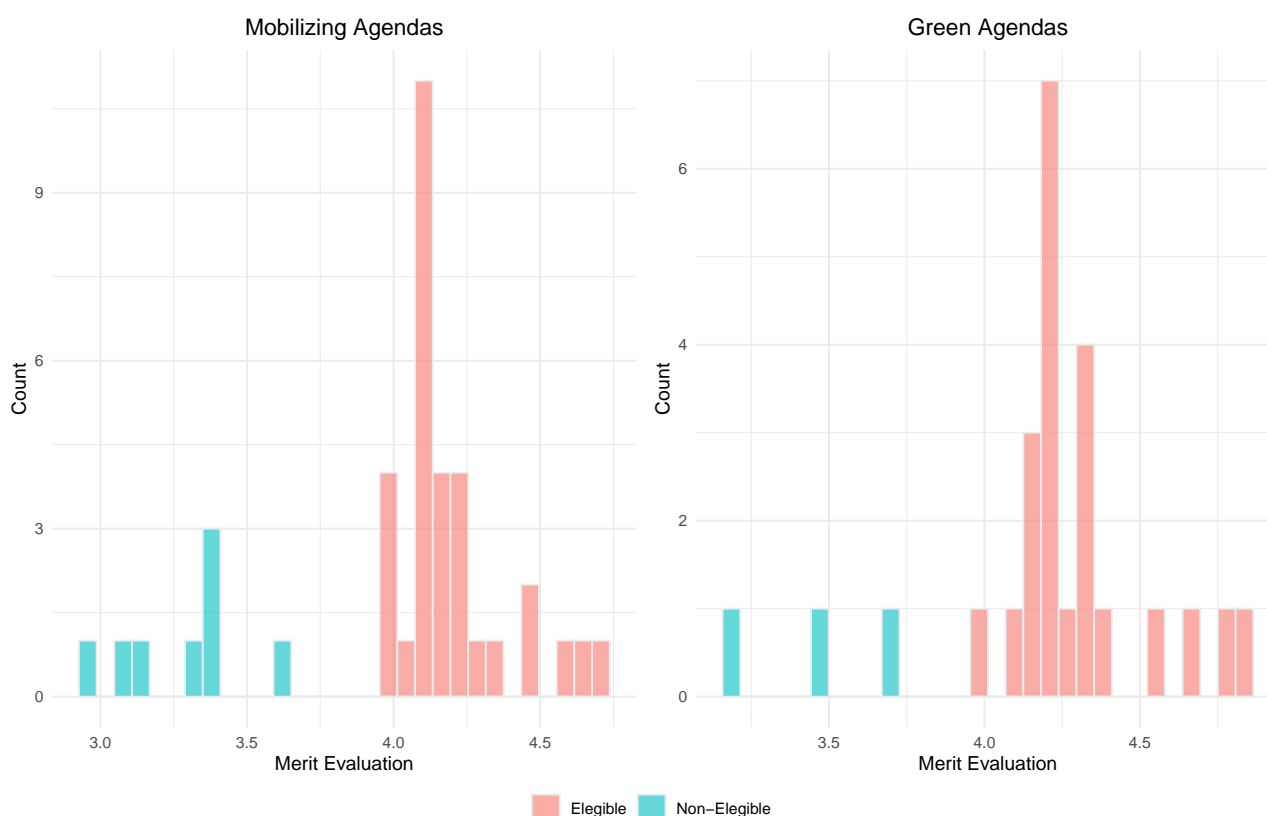
If one is to consider the merit score regarding the expressions of interest in the aid scheme, there are also sample limitations for some of the groups (Figure 2, Green Projects).

For the groups with larger samples (Figure 3, Non-Green Innovation Pacts), there is no relevant pattern of association between the discontinuity variable and the firm size (as measured by turnover and personnel), nor are they equally distributed in the region close to the support discontinuity boundary. This association and similarity of distribution of characteristics should be present in order to ensure the internal validity of the method.

Figure 4 illustrates the above conclusion by cross-referencing the final classification with two relevant variables - as they influence both the selection and the result.

The lack of a pattern of association between the variables on the vertical axis and the horizontal axis, together with the differences in the distribution of characteristics between supported and non-supported firms, implies that the strategy of controlling confounding factors by means of the forcing variable alone is not sufficient, and an important part of the

**Figure 1: Distribution of applications by final merit score**



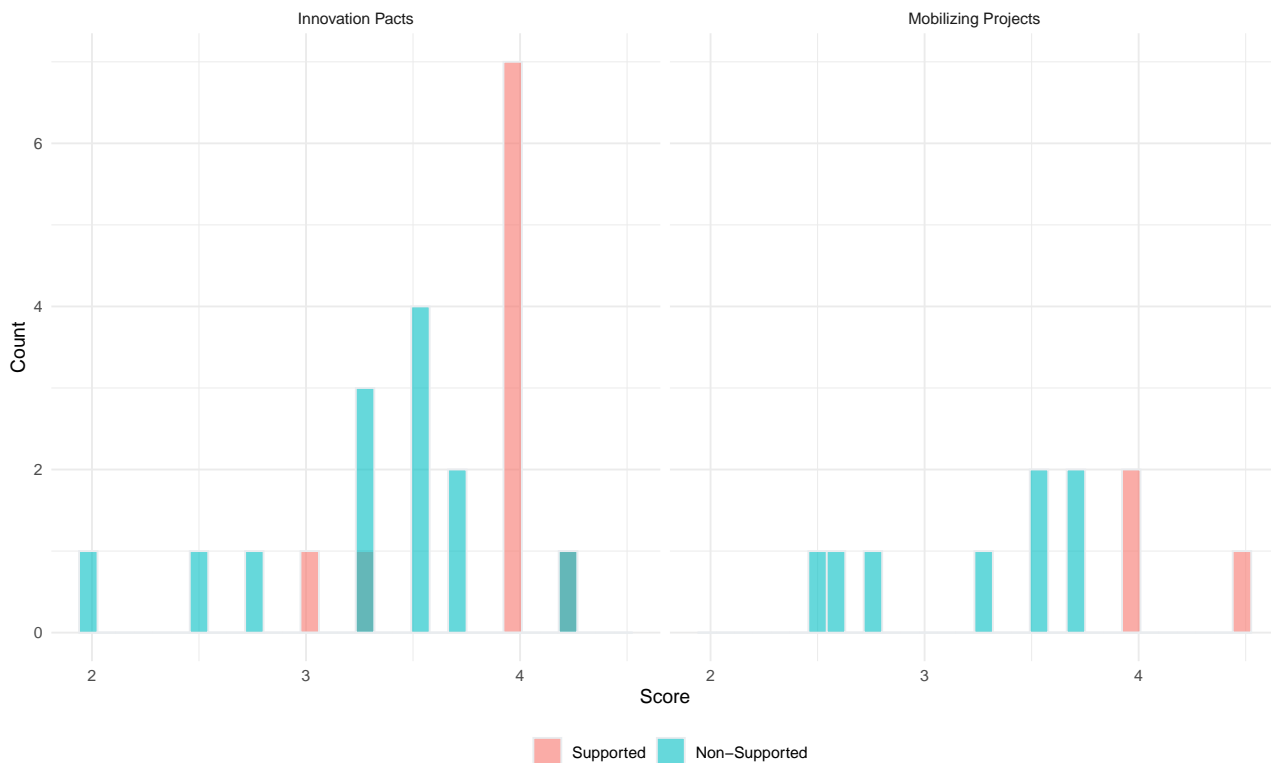
control falls on parametric methods. These, however, are constrained by the small number of observations in this setting, giving them fewer degrees of freedom (in addition to the risks of bias due to omitted variables or specification errors in the parametric form). This means that the number of observable variables to control will have to be smaller, the parametric form simpler, and the accuracy of the estimates and power of the tests will be lower. In other words, the results will be less reliable.

The aforementioned considerations leave us with methods relying in (conditional) unconfoundedness and/or parallel trend assumptions.

Conducting comparative case studies and theory-based assessments, in parallel to the counterfactual evaluation, is strongly recommended. These mix-method methodologies are useful in analyzing the behaviors of supported companies, allowing to understand when, why, and for whom the policy has an effect. In the present context, these qualitative approaches are the only viable way of addressing certain evaluation questions: the ones regarding the minimum necessary aid for companies to shape their investment decisions, as well as the ones aiming to access the indirect effects of the policy.

Regarding the assessment of the minimum necessary aid, the analysis requires a more detailed and qualitative analysis of the circumstances of the firm and their behavior towards the aid to understand if the aid could be reduced. Regarding indirect effects, there is no clear control group available for a counterfactual analysis, since all relevant companies would either be supported or subject to spillover effects. Therefore, a detailed comparative case

**Figure 2: Expressions of Interest: Green Projects**



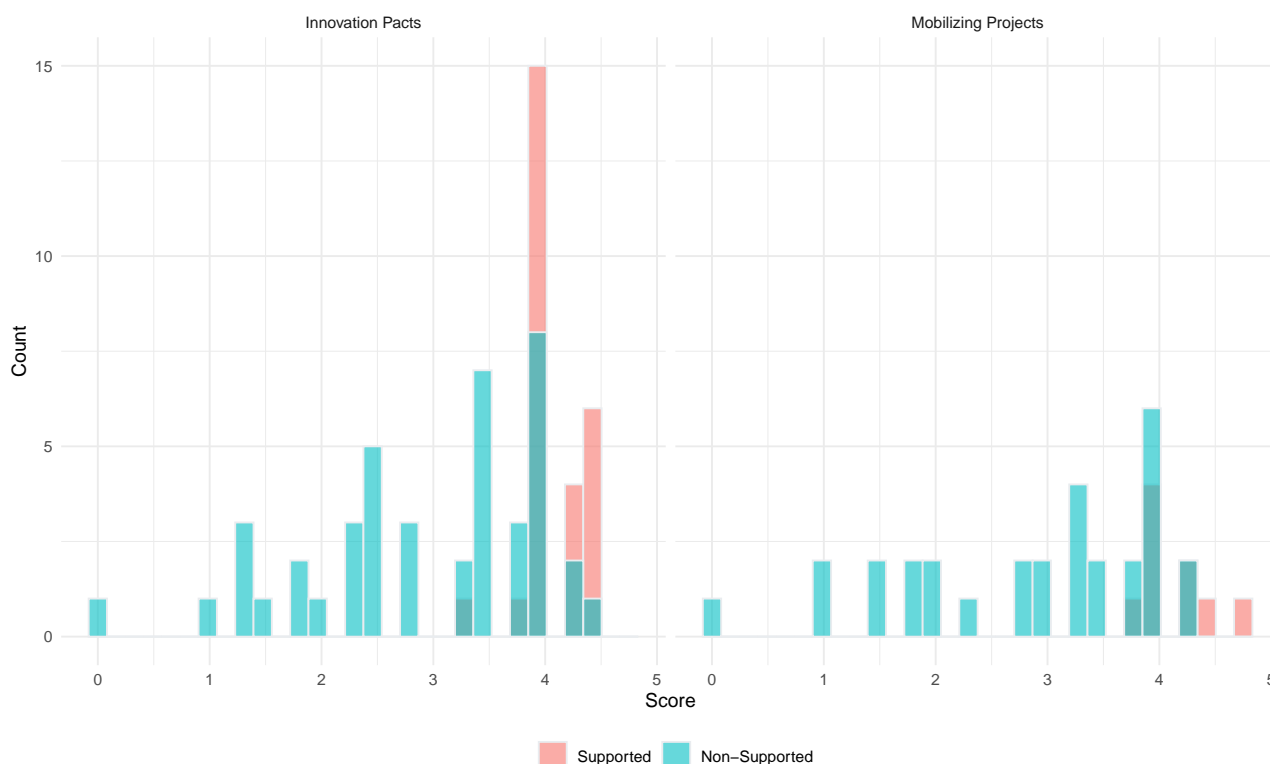
Note: The merit evaluation score presented here pertains to expressions of interest, while the support indicator pertains to the final application and its corresponding evaluation for the consortia invited to participate in the last phase of the selection process. This rationale underlies the fuzzy design depicted in the figure.

study is proposed to outline the effects experienced by competing companies and their behavior in response.

Th envisaged comparative case studies are designed to answer questions of contribution, which makes them a particularly suitable tool for evaluating impacts, particularly indirect impacts. This method makes it possible to understand how policies work in different contexts and configurations and to explain causal relationships in complex contexts. Carrying out comparative case studies involves, first of all, constructing a Theory of Change (ToC), which will guide the choice of cases to be analyzed. One of the criteria to follow could be to choose cases that challenge the mechanisms/assumptions/risks/results contained in the ToC. Since it is assumed that the support has helped to reduce companies’ costs, it is useful to choose a case in which this has not been the case. In addition, supported companies can be compared with non-supported/non-applicant companies and companies of different sizes or sectors. The case studies should also include companies that are related in some way to the supported ones, such as suppliers, clients or competitors.

The selected cases should be analyzed based on direct observation, quantitative and qualitative data analysis and interviews, among other sources. Differences, similarities and patterns between cases are then analyzed and synthesized and, based on this, explanations are formulated as to how the policy contributes to the observed results. These “causal ar-

**Figure 3: Expressions of Interest: non-Green Projects**



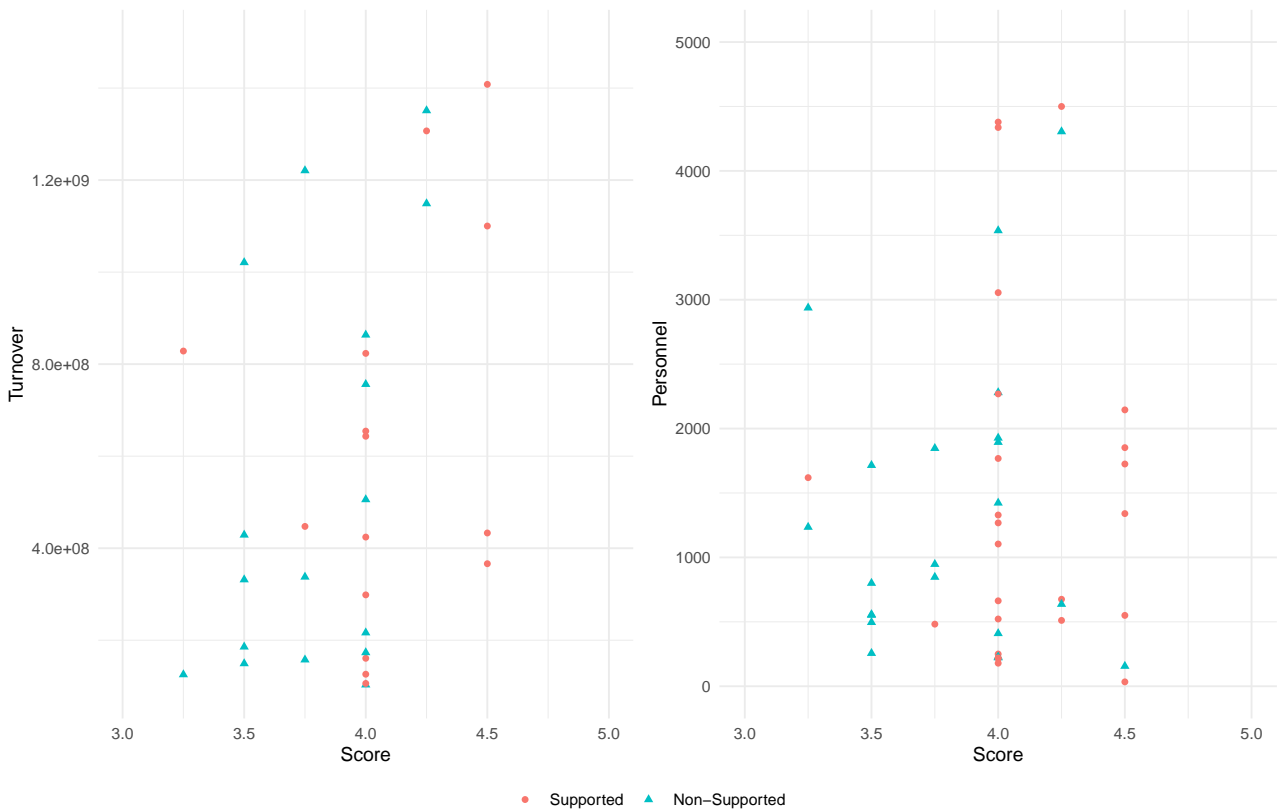
Note: The merit evaluation score presented here pertains to expressions of interest, while the support indicator pertains to the final application and its corresponding evaluation for the consortia invited to participate in the last phase of the selection process. This rationale underlies the fuzzy design depicted in the figure.

guments” are then systematically tested using methods such as qualitative comparative analysis (QCA) or process tracing. The systematic testing of alternative explanations makes it possible to rule out hypotheses and increase researchers’ confidence in the remaining explanations.

We propose the estimation of dose-response functions to assess the proportionality and adequacy of support. The bias correction strategy for the estimation of these functions is based on the same strategies discussed before, namely the use of propensity scores (necessarily adapted for continuous treatments) and synthetic controls combined with differences in differences.

The discontinuity in the amount of support with regard to specific characteristics of firms (namely size and region) could motivate a RDD strategy to address questions related to the proportionality and adequacy of support. However, sample sizes place serious limitations on this strategy when comparisons are to be made between companies in the same class of economic activity. Sample size alone would not be a problem in the specific case of manufacturing firms, given the large number of observations available in this case; however, near the relevant threshold, there are few supported and unsupported firms, which makes an RDD strategy unfeasible.

**Figure 4: Expressions of Interest: non-Green Innovation Pacts**



Note: The merit evaluation score presented here pertains to expressions of interest, while the support indicator pertains to the final application and its corresponding evaluation for the consortia invited to participate in the last phase of the selection process. This rationale underlies the fuzzy design depicted in the figure.

Figures 5 and 6 illustrate the previous argument for manufacturing firms. The bottom left quadrant (delimited by the dashed lines) identifies what are considered medium-sized companies, and the dashed lines correspond to the discontinuity in the amount of support.

It is essential to emphasize companies participating in multiple supported consortia, as their involvement introduces challenges in the evaluation process.

Table 4 summarizes these cases, showing that they assume a relevant dimension in the context of the mobilizing agendas.

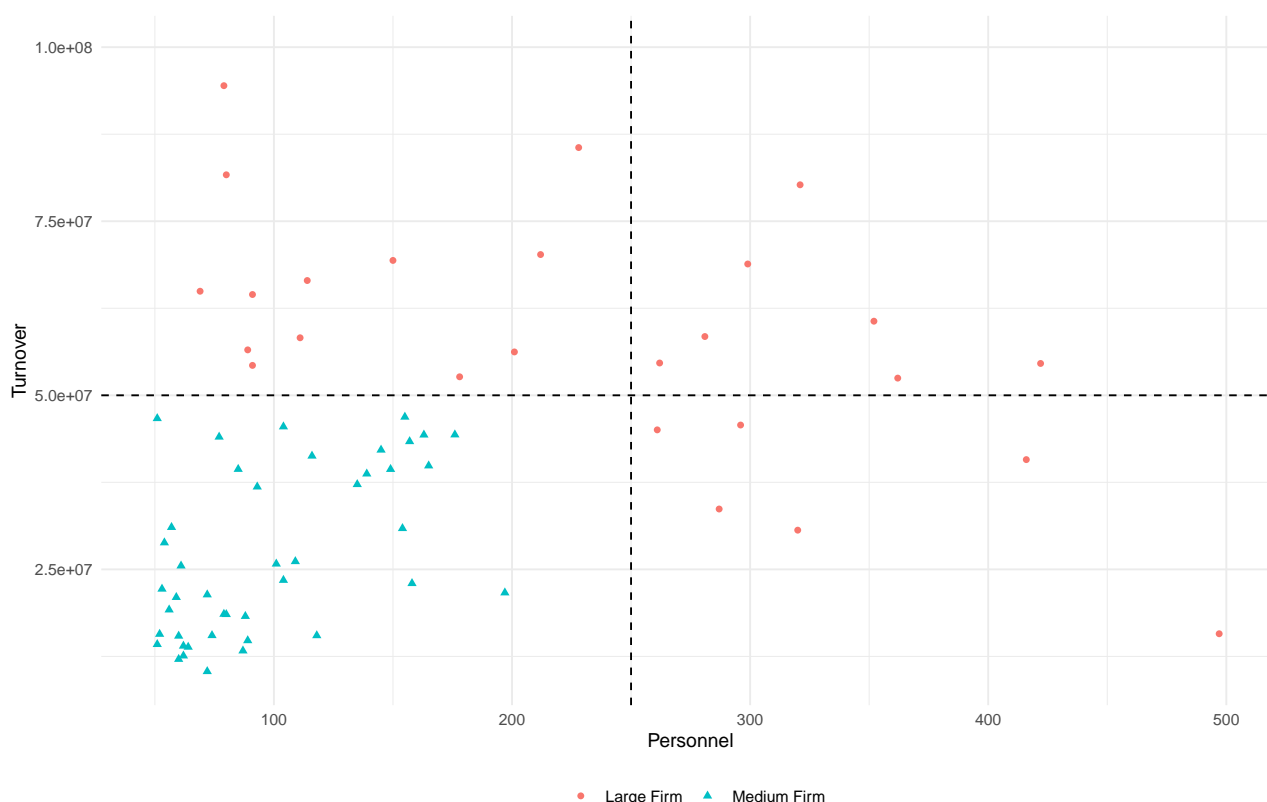
**Table 4: Counts of companies with multiple supports by type of agenda**

	<b>MOBILISING AGENDAS</b>	<b>GREEN AGENDAS</b>
<b>Multiple support</b>	166	21
<b>Single support</b>	488	282

The recommendation is to scrutinize these companies individually by categorizing each unique combination of support characteristics — determined by both the number of consortia they engage in and the type of agenda — as distinct "treatment arms." Essentially,



**Figure 5: Mobilising Agendas: Frontiers of discontinuity treatment**

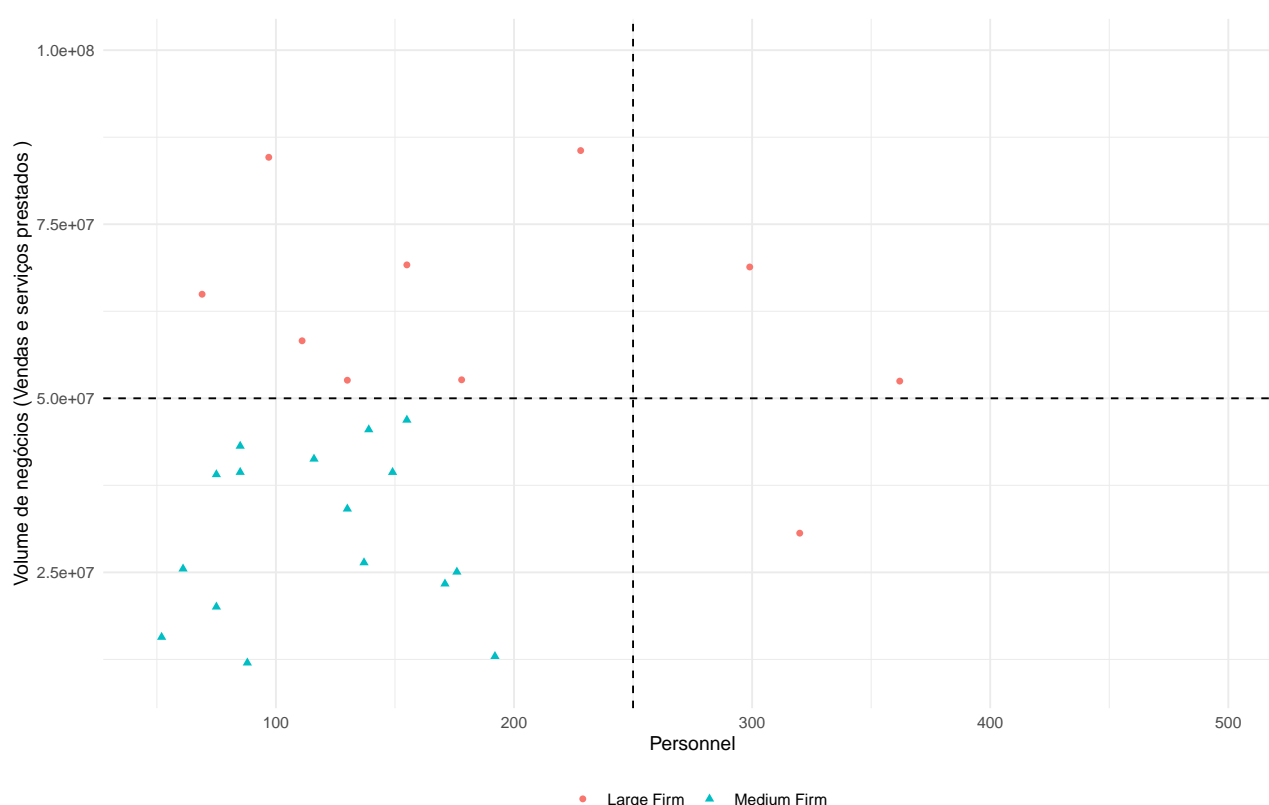


this involves treating each specific subgroup resulting from these unique combinations as a separate category for analysis. The proposed methodology includes the aggregation of incentives associated with each of these treatment arms on an individual basis. This approach aims to offer a more precise and comprehensive understanding of companies involved in multiple consortia by considering the specific combinations of support characteristics they demonstrate.

The comparison between this and other support schemes should be made by comparing the performance of companies supported by the agendas with similar companies supported exclusively by other investment incentive measures with similar objectives (namely from Portugal 2020 and 2030 aid schemes). It is expected that the effects related to the ability to obtain financing and execute investments, as well as the intention to invest, will be better controlled by that control group.

To delve into treatment effect heterogeneity analysis, we recommend employing two distinct strategies. Firstly, a comprehensive analysis across various strata using the aforementioned methods. Secondly, a post-analysis of individual treatment effects achieved through a fusion of the synthetic control method and the causal forest algorithm. The synthetic control method is especially adept at predicting outcome variables, seamlessly fitting into an augmented inverse probability of treatment weighting framework within the causal forest algorithm. It's noteworthy that the causal forest algorithm employs an honest strategy in growing trees, efficiently isolating distinct treatment effect estimates within its leaves, all

**Figure 6: Green Agendas: Frontiers of discontinuity treatment**



while avoiding p-hacking through sample splitting.

Regarding the stratified strategy for addressing heterogeneous effects, the following tables (5 and 6) summarize the support statistics by economic activity. These raise concerns regarding the treated sample size in some strata limiting the conditions for drawing inference on average treatment effects.

For unconfoundedness based methods, a comparison of means and variances between control and treatment groups in variables suspected of carrying confounding effects should be performed, ensuring that relevant observable differences are adequately balanced. Treatment propensities overlap should also be assessed and/or imposed. In the case of con-

**Table 5: Green Agenda Company Counts: Top 10 Activity Categories, relative to the amount of incentive, of supported companies**

GREEN AGENDAS	TREATED	NON-TREATED APPLICANTS	ONLY EXPRESSED INTEREST	SUPPORT (% OF TOTAL)
NON-BUSINESS ENTITY	131	8	41	52%
MANUFACTURING	190	6	38	26%
CONSULTANCY, SCIENTIFIC, TECHNICAL AND SIMILAR ACTIVITIES	65	8	27	5%
INFORMATION AND COMMUNICATION ACTIVITIES	55	1	5	5%
ELECTRICITY, GAS, STEAM, HOT AND COLD WATER AND COLD AIR	10	1	2	3%
WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES AND MOTORCYCLES	26	2	17	3%
ACCOMMODATION, FOOD SERVICE AND SIMILAR ACTIVITIES	11	0	1	1%
TRANSPORT AND STORAGE	11	0	8	1%
CONSTRUCTION	10	0	13	0,5%
ADMINISTRATIVE AND SUPPORT SERVICES ACTIVITIES	8	0	3	0,5%

**Table 6: Mobilising Agendas Company Counts: Top 10 Activity Categories, relative to the incentive amount, of supported companies**

MOBILIZING AGENDAS	TREATED	NON-TREATED APPLICANTS	ONLY EXPRESSED INTEREST	SUPPORT (% OF TOTAL)
NON-BUSINESS ENTITY	187	27	116	47,1
MANUFACTURING	322	23	120	31,0
CONSULTANCY, SCIENTIFIC, TECHNICAL AND SIMILAR ACTIVITIES	107	14	98	7,6
INFORMATION AND COMMUNICATION ACTIVITIES	105	13	75	7,1
WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES AND MOTORCYCLES	51	8	41	3,1
TRANSPORT AND STORAGE	14	0	11	1,2
CONSTRUCTION	11	6	11	0,7
AGRICULTURE, ANIMAL HUSBANDRY, HUNTING, FORESTRY AND FISHING	13	3	29	0,6
ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES	9	2	11	0,5
HUMAN HEALTH AND SOCIAL SUPPORT ACTIVITIES	7	5	11	0,3

tinuous treatments, absolute correlations between treatment quantities and potential confounders should be presented.

Robustness and sensitivity analyses should be conducted. For propensity score-based methods, different functional forms achieving similar balance levels should be tested, as well as different strategies of propensity score use (weighting or matching under different settings); the different tests must yield overlapped confidence intervals for the estimates, given similar treated samples. For synthetic controls a thorough examination of the employed weights and final donor pool should be carried out.

Placebo tests should also be conducted using: 1) outcome variables where no impacts are expected; 2) periods before the policy to assess impacts; and 3) groups of unsupported companies to assess impacts. These should not present sufficient evidence for non-zero estimates.

## 5.2 Control group delimitation

We consider different control group delimitations and propose a separate analysis for each. The following bullet points summarize the main characteristics, pros and cons of each group.

### 5.2.1 Non-Treated applicants

- This group consists of companies that expressed interest but did not receive support.
- Expected to have similarities in self-selection factors with supported companies.
- This strategy overlooks part of the policy effects, as even the non-supported companies have already been affected when they formed consortia and established contacts with knowledge centers to apply. This strategy captures only the additional incentive.

### 5.2.2 Non-treated firms

- Involves both companies that expressed interest (whether or not they applied in the final round) and those that did not express interest at all.
- Likely to have unmeasured confounding characteristics (relative to self-selection factors) more different to treated group.
- No sample size limitations.
- Considered less favorable for control group designation due to increased potential bias.

### 5.2.3 Treated firms from other support schemes

- This group comprises companies that have received support from alternative assistance programs.
- Useful for assessing the unique effects of the specific policy in question.

## 5.3 Outcome indicators

**Table 7: Outcome Indicators**

Indicator	Frequency	Level	Population
Gross Value Added	Annual	Firm	All firms
Turnover	Annual	Firm	All firms
Exports	Annual	Firm	All firms
Exports (in value) / Turnover	Annual	Firm	All firms
Number of trademark registration requests	Annual	Firm	All firms
Number of patent registration requests	Annual	Firm	All firms
Number of industrial design registration requests	Annual	Firm	All firms
Electricity costs / (Production - Electricity costs)	Annual	Firm	All firms
Fuel costs / (Production - Fuel costs)	Annual	Firm	All firms
R&D Expenses	Annual	Firm	All firms
Personnel dedicated to R&D activities	Annual	Firm	All firms
Personnel in service	Annual	Firm	All firms
Personnel in service with Higher Education	Annual	Firm	All firms
Product Innovation (regarding the company) – CIS Question	Biennial	Firm	Applicant firms plus random sample
Product Innovation (regarding the market) – CIS Question	Biennial	Firm	Applicant firms plus random sample
Process Innovation – CIS Question	Biennial	Firm	Applicant firms plus random sample

## 5.4 Data availability

Access to the information sources listed below is legally provided for the purposes of policy evaluation. Prior contact has been established with the entities responsible for the data collection process to ensure that all applicant firms are included in the sampling panel (when sampling is in place) during both pre- and post-treatment periods.

The complete set of data resources will be available during the evaluation period under special anonymity conditions, ensuring the confidentiality and privacy of the entities involved. This sensitive information will be securely stored in a dedicated and protected data center to safeguard against unauthorized access and use of the information.

The infrastructure of the data center (managed by the Portuguese statistical authority) is designed to facilitate the linking of the various data sources, enabling a comprehensive analysis of the information gathered. The secure environment ensures that the data linkage process is conducted in a controlled and protected manner, adhering to stringent privacy and confidentiality protocols.

Due to confidentiality concerns, the preliminary analysis presented in the next section is based on a limited dataset that focused on a subset of financial variables, pertaining only to applicant firms, and spanning from 2018 onward. It is crucial to highlight that during

the actual evaluation phase, the entirety of the data sources outlined below will be at the disposal of the evaluation team. This all-encompassing dataset will include information from both applicant and non-applicant firms, spanning from 2004 onwards.

#### **5.4.1 Integrated Business Accounts System (SCIE)**

The Integrated Business Accounts System (compiled by the Portuguese statistical authority) provides comprehensive balance sheet data at the firm level. It compiles all mandatory financial accounts, according to the national accounting standards, historically and exhaustively. All Portuguese firms report this information on an annual basis. Data is available since 2004.

#### **5.4.2 Linked employer-employee database (Quadros de Pessoal - MTSSS)**

The Quadros de Pessoal (MTSSS) data source contributes with information related to workers' demographics, education and occupation, and related dynamics. Firms with more than two paid workers report this information on an annual basis. Data is available since 1986.

#### **5.4.3 Industrial property application processes from the National Institute of Industrial Property (INPI)**

The National Institute of Industrial Property (INPI) processes data related to all industrial property national applications. This includes patents, trademarks, and other forms of intellectual property, offering valuable insights into firms' innovation and technological advances. All historical applications are available.

#### **5.4.4 Research and Development (R&D) surveys (IPCTN)**

The Research and Development surveys (IPCTN) are instrumental in capturing information about a firms' investment in research and development activities, related humane and financial resources and the establishment of research partnerships and collaboration networks. It is available for all companies known to be engaged in R&D activities

#### **5.4.5 Community Innovation Surveys (CIS)**

Biennial Community Innovation Surveys (CIS) provide a broader perspective on innovation activities at the firm level. This includes information regarding the introduction of new or improved processes and products. Besides the original sampling criteria followed by the Portuguese statistical authority, all applicant firms were specially included in the sampling panel.

## 6 Preliminary analysis

In this section, we delve into the preliminary analysis conducted on the data pertaining to firms that have applied for the support scheme. The results of this analysis can be found in the appendix. Our exploration is guided by three overarching objectives.

Firstly, we aim to provide a comprehensive overview of the characteristics of the treated firms and shed light on the intricacies of the selection process. This involves an examination of the relationship between the treatment indicator and the various features exhibited by the firms.

Secondly, our analysis extends to probing the association between outcome variables and the diverse characteristics of the considered firms.

Lastly, a placebo study is implemented to illuminate the feasibility and potential limitations of our chosen methodologies. T

The methodological choices guiding our analysis adhere to three core criteria: they are entirely data-driven, fully replicable, and human-independent. The decision to adopt a data-driven approach stems from the acknowledgment that the team may lack a comprehensive understanding of the relevant confounding factors. Moreover, this approach facilitates a human-independent analysis that can be fully automated, eliminating unexplained and unreported human decisions common in iterative processes such as specifying a propensity score model. Collectively, these criteria ensure full replicability, reduce human inductive bias, and guard against the possibility of "p-hacking" behaviors. Importantly, the design of this strategy happens under full ignorability of any post-treatment outcome .

Additionally, the strategy followed in the placebo study can be seen as a full research protocol for the final evaluation.

The first two objectives of the preliminary data analysis are instrumental for the third: although some methods proposed do not rely on controlling for confounders (Synthetic DiD), they can benefit from it; at the same time, controlling for confounders is essential for the other methods proposed. Thus, the first two objectives are really a search for observable confounders, and the third is a naïve test for the presence and influence of unobserved ones, in respect for the different methods.

The analysis is carried out separately for each outcome variable, only for the manufacturing industries activity sector. The remainder of this section describes the implementation of the analysis and its outputs.

## 6.1 Data description

The data used for this preliminary analysis regards a subset of the aforementioned Integrated Business Accounts System. As described earlier, this data source compiles firms' financial information. The team had access only to applicant firms' information, ranging from 2018 to 2021.

## 6.2 Data preprocessing

The dataset utilized in this report is devoid of missing values, although it is anticipated that the final database may contain some. Infinite values arising from certain indicators, where the denominator is zero, have been replaced by zero.

Variables with domains featuring values above zero have undergone transformation through logarithmic functions. This adjustment was made due to the observation that the majority exhibited an approximate lognormal distribution. It's worth noting that variables not conforming to a lognormal distribution were not adversely impacted by this transformation.

We identified and eliminated univariate outliers with respect to the outcome variable using Tukey's Interquartile Range (IQR) method, setting the parameter  $k$  to 1.7. This process is applied separately to the logarithm of the outcome variable, the logarithm of positive non-zero differences, and the logarithm of absolute negative non-zero differences concerning the outcome variable compared to the previous period. The rationale behind employing log transformations is to approximate normality, aligning with the fact that Tukey's IQR method is specifically designed to address distributions of this nature.

## 6.3 Search for potential confounders

The search for observable confounders follows a data-driven feature selection process. We employ highly flexible machine learning algorithms, specifically XGBoost, which perform embedded feature selection. This process entails fine-tuning two XGBoost tree models—one for predicting treatment and another for predicting the outcome. To mitigate missing variable bias induced by the sparse feature space solution, inspired by double selection literature, we conduct feature selection separately for treatment and outcome. The union of the features selected gives us the set of covariates that must be controlled for (the potential confounders).

We identified highly correlated pairs of features, characterised by a Pearson's correlation coefficient exceeding 0.9. In such cases, we retained only the feature from the pair for which the mean absolute correlation with other features was smaller.

The hyperparameters of the XGBoost models are automatically tuned using the Iterated Racing algorithm across a specified parameter grid (see Table 8). The tuning is implemented through the "mlr" R package, while the models are built using the "xgboost" R package. Variable importance is derived solely from the finely tuned models after training on the full dataset with the tuned parameters.

To establish a threshold for feature selection, we introduce a random feature with values drawn from a normal distribution. Features with greater importance than this random noise feature are deemed relevant and selected as potential confounders. The feature importance metrics are based on mean Shapley contribution values, as provided by the R XGBoost

**Table 8: Parameter grid for XGBoost hyper-parameter tuning**

Parameter	Type	Range
<b>max_depth</b>	Integer	3 to 10
<b>min_child_weight</b>	Numeric	1 to 10
<b>subsample</b>	Numeric	0.5 to 1
<b>colsample_bytree</b>	Numeric	0.5 to 1
<b>eta</b>	Numeric	0.1 to 1
<b>nrounds</b>	Integer	1 to 1000

package.

For the treatment modeling, the optimization metric is accuracy (for binary treatment indicator) and Mean Squared Error (for continuous treatment values). Similarly, the process is repeated for the outcome variable, with Mean Squared Error serving as the optimization metric. To prevent learning a spurious persistence model, the outcome variable is differenced over one period. The modeling of the outcome spans all periods, including post-treatment ones, but exclusively involves control units. This modeling strategy aligns with the bias reduction strategy outlined in literature, aiming to directly model the counterfactual reality to later extrapolate to treated units. This motivates an out-of-sample prediction strategy, where prediction errors reflect the generalization bias of the model.

## 6.4 Search for functional forms

We employ genetic algorithms to identify appropriate specifications for both outcome and propensity score regressions, drawing inspiration from stepwise regression approaches suggested in propensity score literature. In contrast to stepwise regression approaches, the genetic algorithm offers faster convergence and independence from variable order and stepwise strategies. However, future analysis should explore alternative strategies, ensuring that confidence intervals overlap in the final estimates.

The functional form search is confined to a second-order polynomial, with first-order terms comprising all previously identified confounders. The genetic algorithm focuses on interactions and squared terms in its search. The cost function for the genetic algorithm is out-of-sample accuracy for the propensity score model, while for the outcome model the cost function is out-of-sample mean squared error (MSE).

To mitigate the risk of learning spurious persistence models, the outcome variable is differenced over one period. Again, the modeling incorporates all periods, including post-treatment, but only includes control units. The approach employs yearly fixed effects dummies. Only lags of order 1 are considered for features due to data limitations, with no variations between periods computed.

In the future, the described procedure should be revisited with an expanded timeframe, exploring different lag orders and variations between periods.



## 6.5 Synthetic Differences-in-Differences

We implement synthetic differences-in-differences in two distinct settings: firstly, through a straightforward application of the method employing the `synthdid` R package; and secondly, by fitting pre-treatment residuals of the outcome, derived from Ordinary Least Squares (OLS) applied solely to control units. This model follows the previously identified outcome functional form. The outcome itself is modeled on first-order differences due to their non-stationary nature. As the covariates included in the model consist of lags, the first-order differences mitigate spurious results and persistence models that inaccurately approximate future values as last year's values.

Our primary focus is on estimating the average treatment effect on the treated, employing a bootstrap inference approach. We present these estimates alongside their associated 95% confidence intervals, supplemented by a graphical analysis of the trajectories for both the synthetic control and treatment groups.

Due to data limitations, which are confined to this preliminary analysis and are not applicable to the final evaluation, we limit the analysis to two pre-treatment periods. However, we stress the need to revisit this procedure in the future with an expanded timeframe.

## 6.6 Doubly Robust Difference-in-Differences

We implement the doubly robust differences in differences method largely inspired in the implementation of `DRDD` R package, using simultaneously a weighting and outcome model bias correction procedure. We estimate treatment propensities with logistic regression using the previously identified propensity score model specification. The outcome model is fitted with OLS using the previously identified outcome functional form and considering only control units. The weights employed are the inverse probability of treatment weights tailored for average treatment effects on the treated estimation.

Extreme treatment propensities were trimmed by excluding units with propensity score estimates below 0.1 and above 0.9. This adjustment alters the estimated quantity to the commonly called feasible average treatment effects on the treated. This means that the estimate of the treatment effect regards exclusively the sample where it is feasible (thus, the results may not be directly comparable to other methods, where we don't limit the sample).

Overlap of treatment propensities and covariates was not accessed nor imposed in this analysis. We stress the need to revisit this procedure more carefully.

We present these estimates alongside their associated 95% confidence intervals, supplemented by a graphical analysis of the trajectories for both the treatment and weighted control groups and covariate balancing metrics (standardized differences in means and variance ratios between treated and control units, computed by the `cobalt` R package).

## 6.7 Generalized Propensity Score

When implementing the generalized propensity score method, we employed a continuous treatment model that was fitted using Ordinary Least Squares (OLS). This fitting process utilized the previously identified functional form for the continuous treatment model. Treatment propensities were determined through kernel density estimations, employing automatic bandwidth selection facilitated by the `CausalGPS` R package.

To address confounding variables, we adopted an inverse probability of treatment weights specification for the weighting strategy, focusing on the average treatment effect on the treated. Dose-response functions were estimated parametrically through weighted OLS, considering both linear and quadratic forms for the treatment effect. In our regression analysis, all potential confounders were incorporated, utilizing the functional form identified in the outcome model.

In presenting the results, we provide OLS outputs for the two specified models. Additionally, we report Pearson's correlation coefficients to elucidate the association between the treatment and potential confounders after applying weighting adjustments.

# Appendices

# A Mobilising Agendas

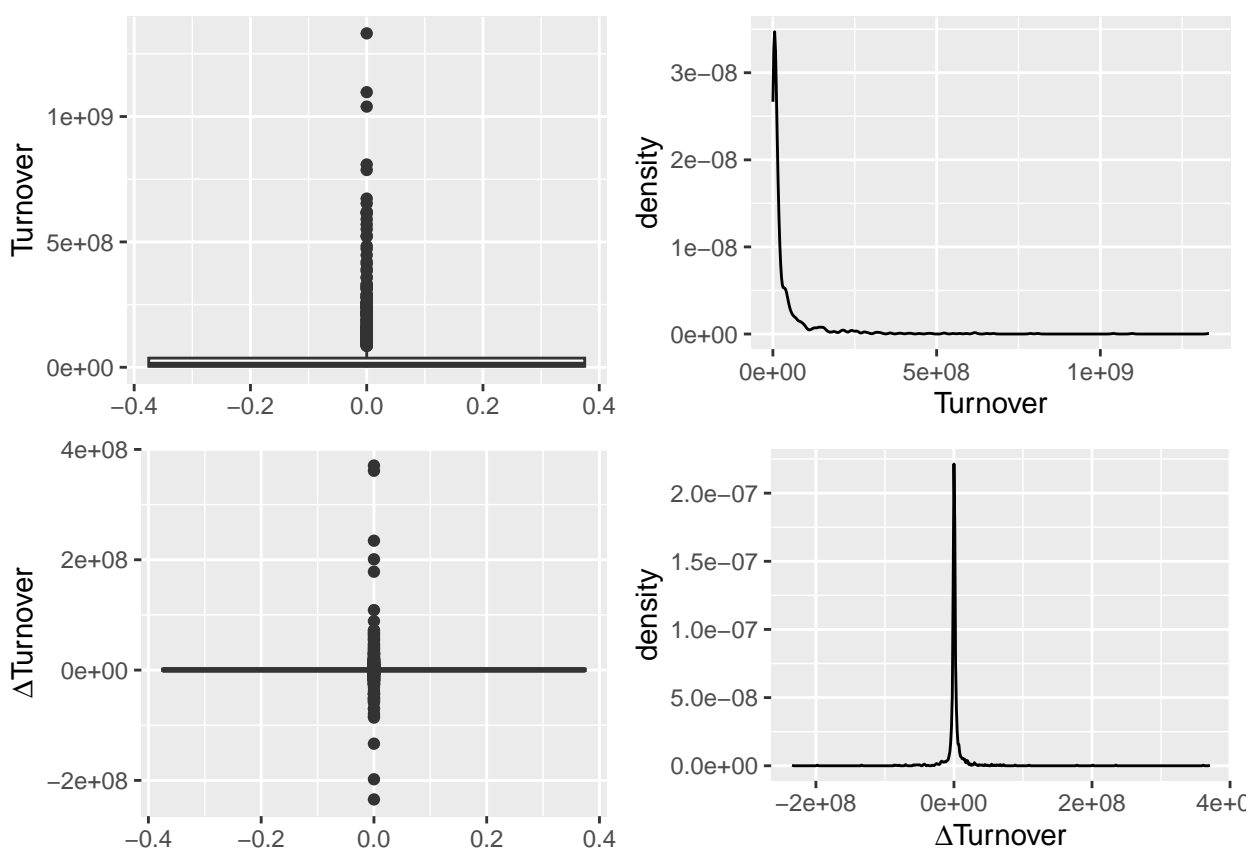
## A.1 Manufacturing Industries

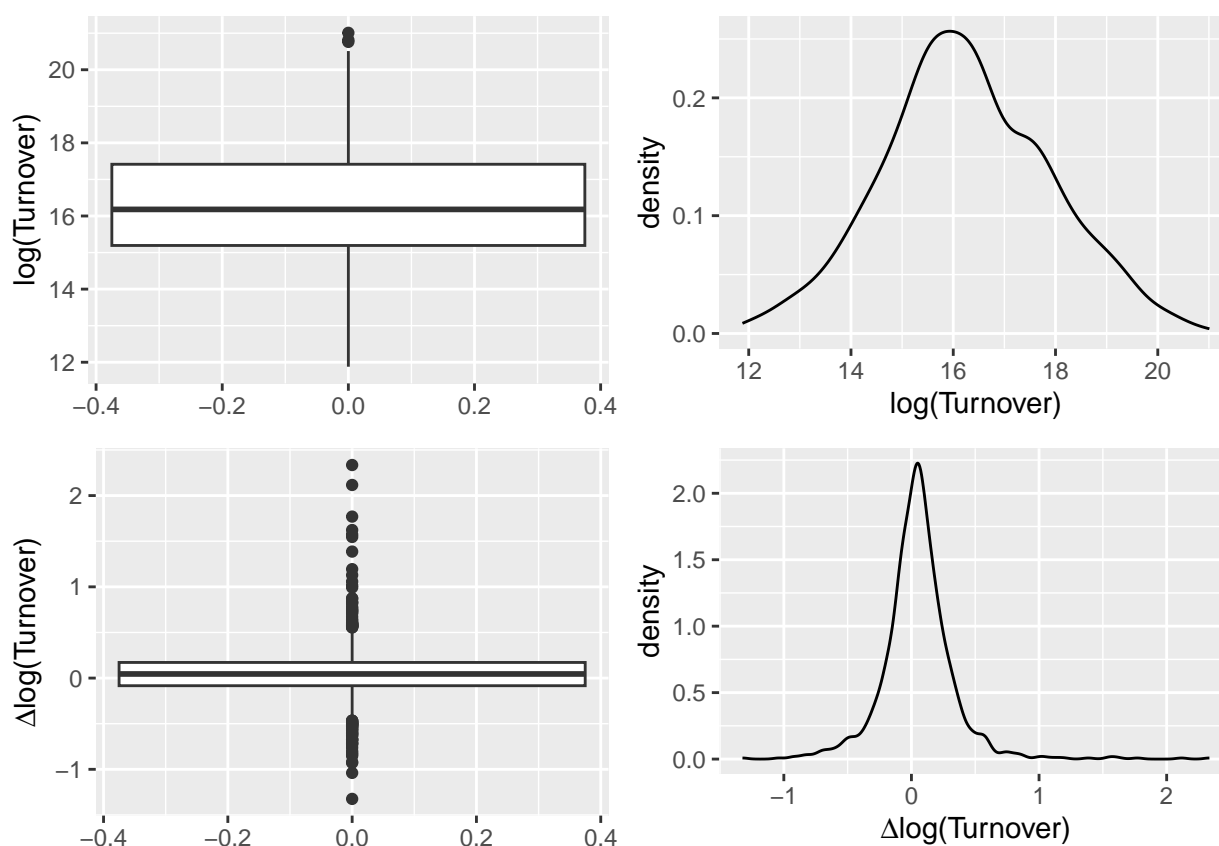
### A.1.1 Outcome Variable: log(Turnover)

#### A.1.1.1 Univariate Outlier Analysis

Univariate outlier firms (regarding the outcome variable): **29**. These will be dropped.

#### A.1.1.2 Graphical Analysis of Outcome Variable (after outlier removal)





### A.1.1.3 Potential Confounder Analysis

List of features deemed as relevant to explain the **binary treatment indicator**:

- |   |  |
|---|--|
| 1. Average personnel expenses               | 9. External supplies and services in the domestic market |
| 2. Water use intensity                      | 10. Subsidies  |
| 3. Return on assets                         | 11. General liquidity                                    |
| 4. External supplies and services for fuels | 12. Sales of products including biological assets        |
| 5. Financial autonomy                       | 13. Purchases in the domestic market                     |
| 6. Return on equity                         | 14. Investment in development projects                   |
| 7. Export intensity                         | 15. Interest and similar income earned                   |
| 8. Purchases in the extracommunity market   | 16. Inventory variation in production                    |

List of features deemed as relevant to explain the **continuous treatment values**:

- |  |  |
|--|--|
| 1. Total current liabilities                   | 5. Investment in industrial property   |
| 2. Current liabilities from obtained financing | 6. Intangible assets   |
| 3. Exports                                     | 7. Total sales in the extracommunity market of goods, products, and biological |
| 4. Service revenues in the domestic market     |  |

- |   |   |
|---|---|
| <p>assets</p> <ol style="list-style-type: none"> <li>8. Total current assets</li> <li>9. Inventory variation in production</li> <li>10. External supplies and services in the extracommunity market</li> <li>11. External supplies and services in the domestic market</li> <li>12. Purchases in the extracommunity market</li> <li>13. External supplies and services for elec-</li> </ol> | <p>tricity</p> <ol style="list-style-type: none"> <li>14. Personnel</li> <li>15. Total net assets</li> <li>16. Financial autonomy</li> <li>17. Net result for the period</li> <li>18. Interest and similar expenses incurred</li> <li>19. Purchases in the domestic market</li> <li>20. Average personnel expenses</li> <li>21. Interest and similar income earned</li> </ol> |
|---|---|

List of features deemed as relevant to explain the **outcome variable**:

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. Total net assets</li> <li>2. Investment in development projects</li> <li>3. Export intensity</li> <li>4. Fuel use intensity</li> <li>5. Cost of goods sold/raw materials consumed</li> <li>6. Return on assets</li> <li>7. Intangible assets</li> <li>8. External supplies and services for water</li> <li>9. Tangible fixed assets</li> <li>10. External supplies and services (FSE)</li> <li>11. External supplies and services for electricity</li> <li>12. Geographic diversification of exports</li> <li>13. Average personnel expenses</li> <li>14. Result before depreciation, financing expenses, and taxes</li> <li>15. Total sales in the domestic market of goods, products, and biological assets</li> <li>16. Return on equity</li> <li>17. Subsidies</li> <li>18. Electricity use intensity</li> <li>19. Purchases in the extracommunity market</li> </ol> | <ol style="list-style-type: none"> <li>20. Investment in industrial property</li> <li>21. Water use intensity</li> <li>22. External supplies and services in the domestic market</li> <li>23. Personnel (women)</li> <li>24. External supplies and services for fuels</li> <li>25. Personnel</li> <li>26. Imports</li> <li>27. Service revenues in the domestic market</li> <li>28. R&amp;D Personnel</li> <li>29. Current liabilities from obtained financing</li> <li>30. Interest and similar income earned</li> <li>31. Result before taxes</li> <li>32. Total sales in the extracommunity market of goods, products, and biological assets</li> <li>33. Inventory variation in production</li> <li>34. Purchases in the domestic market</li> <li>35. General liquidity</li> <li>36. Income tax for the period</li> <li>37. Total sales in the community market of goods, products, and biological assets</li> </ol> |
|--|--|

List of highly correlated relevant features (these will be discarded):

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. Total current assets</li> <li>2. Total current liabilities</li> </ol> | <ol style="list-style-type: none"> <li>3. Current liabilities from obtained financing</li> <li>4. Income tax for the period</li> </ol> |
|---|--|

- |  |  |
|--|--|
| 5. Intangible assets                         | penses, and taxes                            |
| 6. External supplies and services (FSE)      | 9. Result before taxes                       |
| 7. Purchases in the extracommunity market    | 10. Total sales in the extracommunity market |
| 8. Result before depreciation, financing ex- | of goods, products, and biological assets    |

Final list of **potential confounders**:

- |  |   |
|--|---|
| 1. Total net assets  | mestic market   |
| 2. Investment in development projects  | 19. Personnel (women)   |
| 3. Export intensity  | 20. External supplies and services for fuels                                      |
| 4. Fuel use intensity  | 21. Personnel   |
| 5. Cost of goods sold/raw materials consumed                                     | 22. Imports   |
| 6. Return on assets  | 23. Service revenues in the domestic market                                       |
| 7. External supplies and services for water                                      | 24. R&D Personnel   |
| 8. Tangible fixed assets   | 25. Interest and similar income earned  |
| 9. External supplies and services for electricity                                | 26. Inventory variation in production   |
| 10. Geographic diversification of exports  | 27. Purchases in the domestic market  |
| 11. Average personnel expenses   | 28. General liquidity   |
| 12. Total sales in the domestic market of goods, products, and biological assets | 29. Total sales in the community market of goods, products, and biological assets |
| 13. Return on equity   | 30. Financial autonomy  |
| 14. Subsidies  | 31. Sales of products including biological assets                                 |
| 15. Electricity use intensity  | 32. Exports   |
| 16. Investment in industrial property  | 33. External supplies and services in the extracommunity market                   |
| 17. Water use intensity  | 34. Net result for the period   |
| 18. External supplies and services in the do-                                    | 35. Interest and similar expenses incurred  |

**A.1.1.4 Multivariate Outlier Analysis**

Multivariate outlier firms (regarding the potential confounding variables): **1**. These will be dropped.

**Table 9: Firm Count by Group**

	Control	Treated
Original Data	173	261
After Outlier Removal	161	246

**A.1.1.5 Statistics and group comparison before adjustmnet**

**Table 10: Covariate Means and Group Comparison (before adjustment and before outlier removal)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Total net assets	2.22e+07	3.29e+07	-0.186	0.156
Investment in development projects	1.36e+06	1.16e+06	0.014	2.09
Export intensity	0.525	0.547	-0.075	0.794
Fuel use intensity	0.01	0.206	-1.815	0.002
Cost of goods sold/raw materials consumed	5.5e+07	3.67e+07	0.036	7.127
Return on assets	1.011	0.927	0.054	2.55
External supplies and services for water	3.98e+04	1.9e+04	0.077	30.259
Tangible fixed assets	3.39e+06	1.81e+06	0.058	3.118
External supplies and services for electricity	1.65e+05	1.54e+05	0.02	0.703
Geographic diversification of exports	0.424	0.421	0.013	1.014
Average personnel expenses	2.46e+04	3.2e+04	-0.198	0.169
Total sales in the domestic market of goods, products, and biological assets	1.75e+07	2.99e+07	-0.125	0.245
Return on equity	143.125	187.586	-0.036	0.51
Subsidies	2.62e+05	3.08e+05	-0.046	0.173
Electricity use intensity	0.118	1.598	-1.507	0.003
Investment in industrial property	2.72e+06	3.58e+06	-0.077	0.256
Water use intensity	0.081	0.025	0.046	24.782
External supplies and services in the domestic market	8.61e+05	1.38e+06	-0.162	0.347
Personnel (women)	77.176	78.347	-0.007	0.958



**Table 10: Covariate Means and Group Comparison (before adjustment and before outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
External supplies and services for fuels	2.65e+04	2.76e+04	-0.009	0.805
Personnel	198.939	215.792	-0.048	0.48
Imports	1.17e+07	7.38e+06	0.098	7.59
Service revenues in the domestic market	5.53e+05	9.23e+05	-0.156	0.094
R&D Personnel	7.287	8.26	-0.03	0.626
Interest and similar income earned	7.92e+05	4.04e+05	0.053	10.01
Inventory variation in production	-2.09e+05	1.39e+05	-0.176	2.523
Purchases in the domestic market	7.41e+06	1.72e+07	-0.347	0.062
General liquidity	2.375	2.596	-0.073	1.429
Total sales in the community market of goods, products, and biological assets	9.11e+06	4.41e+06	0.058	36.049
Financial autonomy	0.237	0.259	-0.056	0.837
Sales of products including biological assets	2.76e+06	2.43e+06	0.023	1.258
Exports	5.65e+07	2.4e+07	0.054	50.272
External supplies and services in the extracommunity market	7.91e+05	6.76e+05	0.04	1.915
Net result for the period	1.83e+07	1.32e+07	0.059	6.563
Interest and similar expenses incurred	1.46e+06	4.19e+06	-0.262	0.407

**Table 11: Covariate Means and Group Comparison (before adjustment and after outlier removal)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Total net assets	2.04e+07	2.13e+07	-0.02	0.889
Investment in development projects	4.67e+05	1.22e+06	-0.188	0.16
Export intensity	0.526	0.548	-0.074	0.758
Fuel use intensity	0.011	0.219	-1.879	0.002
Cost of goods sold/raw materials consumed	2.33e+07	2.4e+07	-0.009	1.284
Return on assets	1.014	0.898	0.073	3.917
External supplies and services for water	4.1e+04	1.87e+04	0.08	32.766
Tangible fixed assets	2.06e+06	1.9e+06	0.008	1.595
External supplies and services for electricity	1.72e+05	1.64e+05	0.015	0.693
Geographic diversification of exports	0.423	0.418	0.016	0.966
Average personnel expenses	2.24e+04	2.53e+04	-0.088	1.074
Total sales in the domestic market of goods, products, and biological assets	1.09e+07	1.61e+07	-0.177	0.28
Return on equity	150.73	201.131	-0.04	0.504
Subsidies	2.71e+05	3.28e+05	-0.055	0.171
Electricity use intensity	0.125	1.713	-1.57	0.003
Investment in industrial property	2.17e+06	3.37e+06	-0.224	0.056
Water use intensity	0.086	0.027	0.046	24.477
External supplies and services in the domestic market	8.92e+05	1.19e+06	-0.091	0.552
Personnel (women)	77.642	76.019	0.01	1.099

**Table 11: Covariate Means and Group Comparison (before adjustment and after outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
External supplies and services for fuels	2.75e+04	2.74e+04	6.32e-04	0.808
Personnel	198.476	190.404	0.023	1.155
Imports	8.91e+06	6.99e+06	0.088	2.363
Service revenues in the domestic market	5.85e+05	9.8e+05	-0.162	0.092
R&D Personnel	7.602	5.36	0.067	4.089
Interest and similar income earned	3.34e+05	2.5e+05	0.085	0.681
Inventory variation in production	-1.61e+05	1.51e+05	-0.193	1.587
Purchases in the domestic market	7.55e+06	9.59e+06	-0.07	0.524
General liquidity	2.421	2.475	-0.017	2.637
Total sales in the community market of goods, products, and biological assets	4.16e+06	4.67e+06	-0.036	1
Financial autonomy	0.242	0.266	-0.06	0.84
Sales of products including biological assets	2.48e+06	2.39e+06	0.007	1.02
Exports	1.95e+07	1.92e+07	0.007	1.167
External supplies and services in the extracommunity market	8.28e+05	6.58e+05	0.058	2.094
Net result for the period	1.37e+07	1.13e+07	0.078	3.275
Interest and similar expenses incurred	1.94e+06	2.97e+06	-0.147	0.892

**Table 12: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Total net assets	2.04e+07	2.13e+07	-0.02	0.889
Investment in development projects	6.297	5.653	0.117	0.958
Export intensity	0.407	0.416	-0.05	0.759
Fuel use intensity	0.008	0.023	-0.231	0.057
Cost of goods sold/raw materials consumed	15.111	15.274	-0.069	1.103
Return on assets	1.014	0.898	0.073	3.917
External supplies and services for water	8.19	7.613	0.211	0.732
Tangible fixed assets	8.971	8.43	0.113	0.888
External supplies and services for electricity	9.945	10.091	-0.056	1.094
Geographic diversification of exports	0.335	0.331	0.022	0.954
Average personnel expenses	9.425	9.562	-0.123	0.839
Total sales in the domestic market of goods, products, and biological assets	12.257	12.351	-0.016	0.982
Return on equity	1.815	1.849	-0.022	1.036
Subsidies	9.529	8.637	0.209	0.908
Electricity use intensity	0.046	0.08	-0.13	0.231
Investment in industrial property	12.683	12.7	-0.006	0.956
Water use intensity	0.017	0.015	0.008	2.72
External supplies and services in the domestic market	9.643	9.035	0.126	0.805

**Table 12: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Personnel (women)	3.193	3.067	0.082	0.931
External supplies and services for fuels	7.38	7.503	-0.042	0.905
Personnel	4.451	4.426	0.019	1.146
Imports	14.536	14.537	-3.45e-04	1.171
Service revenues in the domestic market	5.763	5.702	0.011	1.049
R&D Personnel	0.798	0.667	0.102	1.103
Interest and similar income earned	9.875	9.672	0.055	1.019
Inventory variation in production	-1.61e+05	1.51e+05	-0.193	1.587
Purchases in the domestic market	12.14	12.215	-0.015	0.956
General liquidity	1.119	1.153	-0.092	0.939
Total sales in the community market of goods, products, and biological assets	9.854	9.786	0.011	0.973
Financial autonomy	0.184	0.197	-0.053	0.814
Sales of products including biological assets	10.539	9.932	0.122	0.899
Exports	15.303	15.388	-0.049	1.063
External supplies and services in the extracommunity market	11.33	11.229	0.038	0.759
Net result for the period	15.008	15.082	-0.039	1.157
Interest and similar expenses incurred	1.94e+06	2.97e+06	-0.147	0.892

### A.1.1.6 Functional Form Search for Regression Models

Added terms for **propensity score model** (besides all potential confounders):

- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1. External supplies and services in the extracommunity market * Total sales in the domestic market of goods, products, and biological assets</li> <li>2. Sales of products including biological assets * Imports</li> </ol> | <ol style="list-style-type: none"> <li>3. Interest and similar expenses incurred * Sales of products including biological assets</li> <li>4. Purchases in the domestic market * Purchases in the domestic market</li> </ol> |
|---|---|

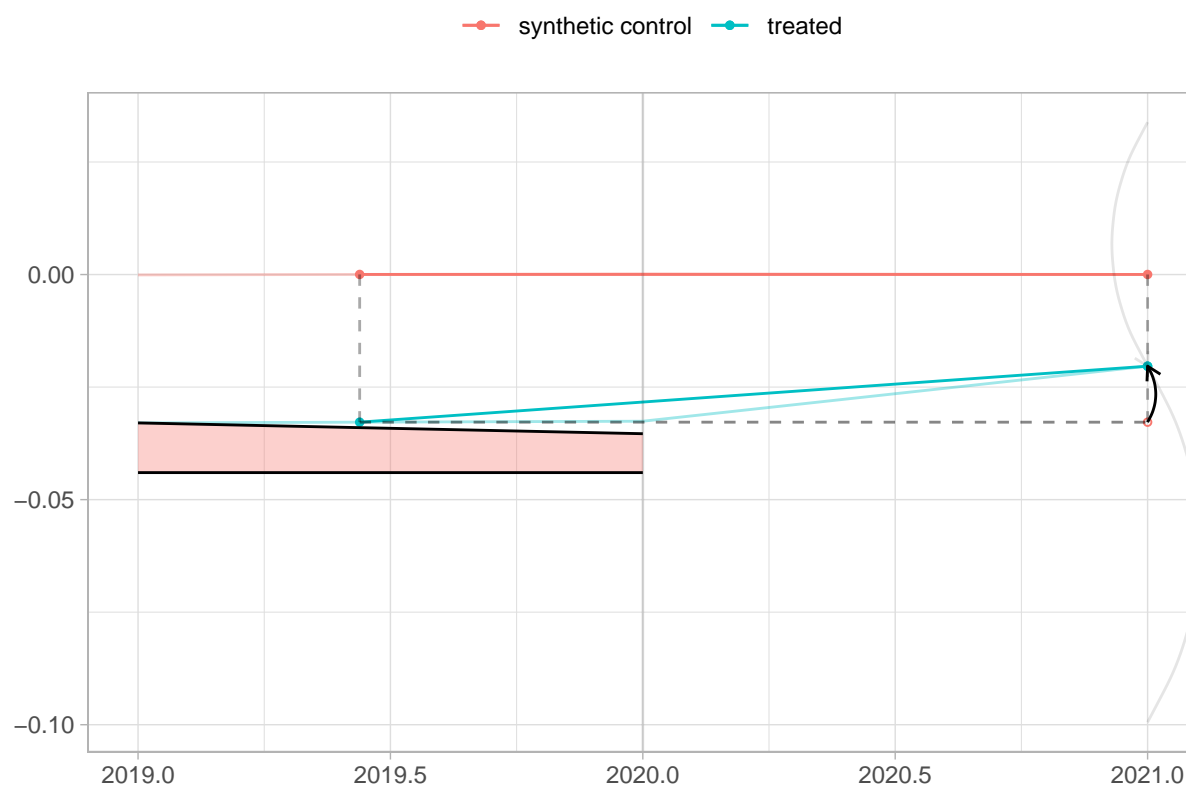
Added terms for **generalized propensity score model** (besides all potential confounders):

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. squared(Cost of goods sold/raw materials consumed)</li> <li>2. squared(Total sales in the community market of goods, products, and biological assets)</li> <li>3. squared(Personnel (women))</li> <li>4. Geographic diversification of exports * Water use intensity</li> </ol> | <ol style="list-style-type: none"> <li>5. squared(Export intensity)</li> <li>6. squared(Return on assets)</li> <li>7. squared(Exports)</li> <li>8. squared(Service revenues in the domestic market)</li> <li>9. squared(Investment in development projects)</li> </ol> |
|---|--|

Added terms for **outcome model** (besides all potential confounders):

1. Export intensity \* Electricity use intensity

### A.1.1.7 Synthetic Differences in Differences - With Bias Correction

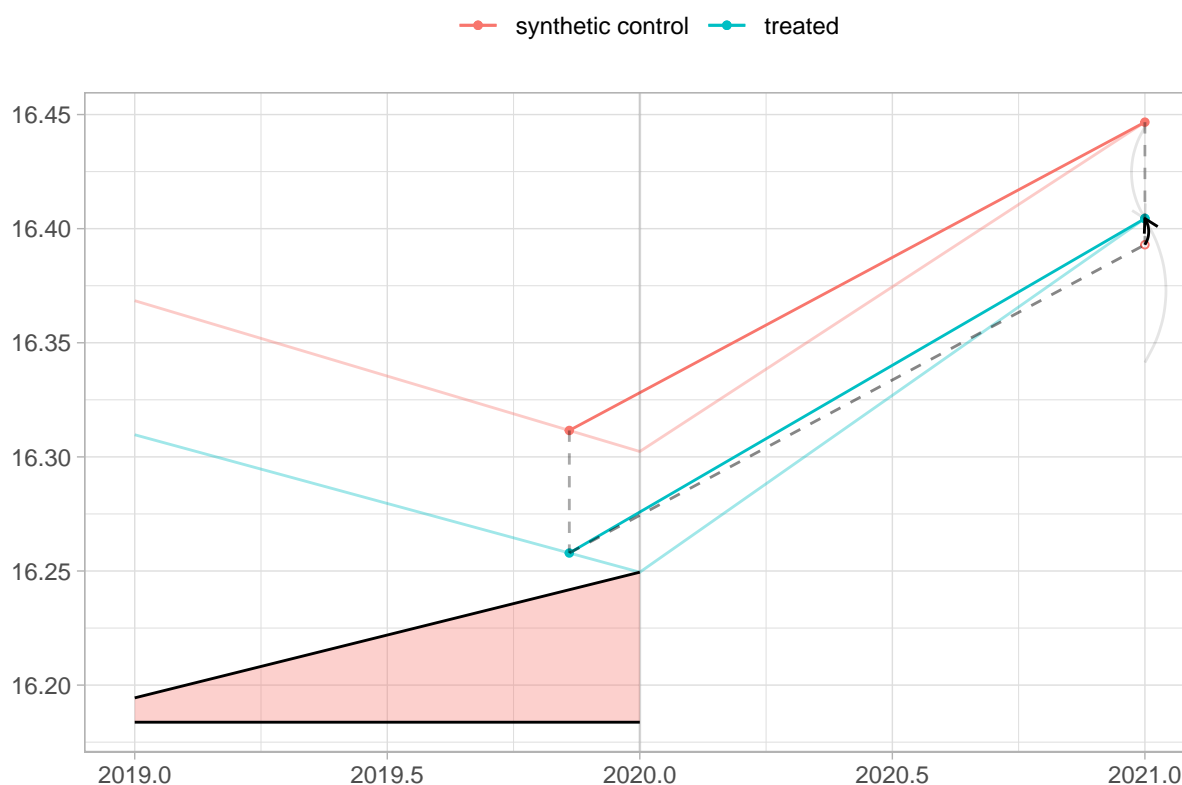


ATT Estimate: 0.012

Standard Error: 0.033

95% CI (-0.053 , 0.078 )

### A.1.1.8 Synthetic Differences in Differences - Without Bias Correction



ATT Estimate: 0.011

Standard Error: 0.026

95% CI (-0.04 , 0.063 )

### A.1.1.9 Weighted Differences in Differences

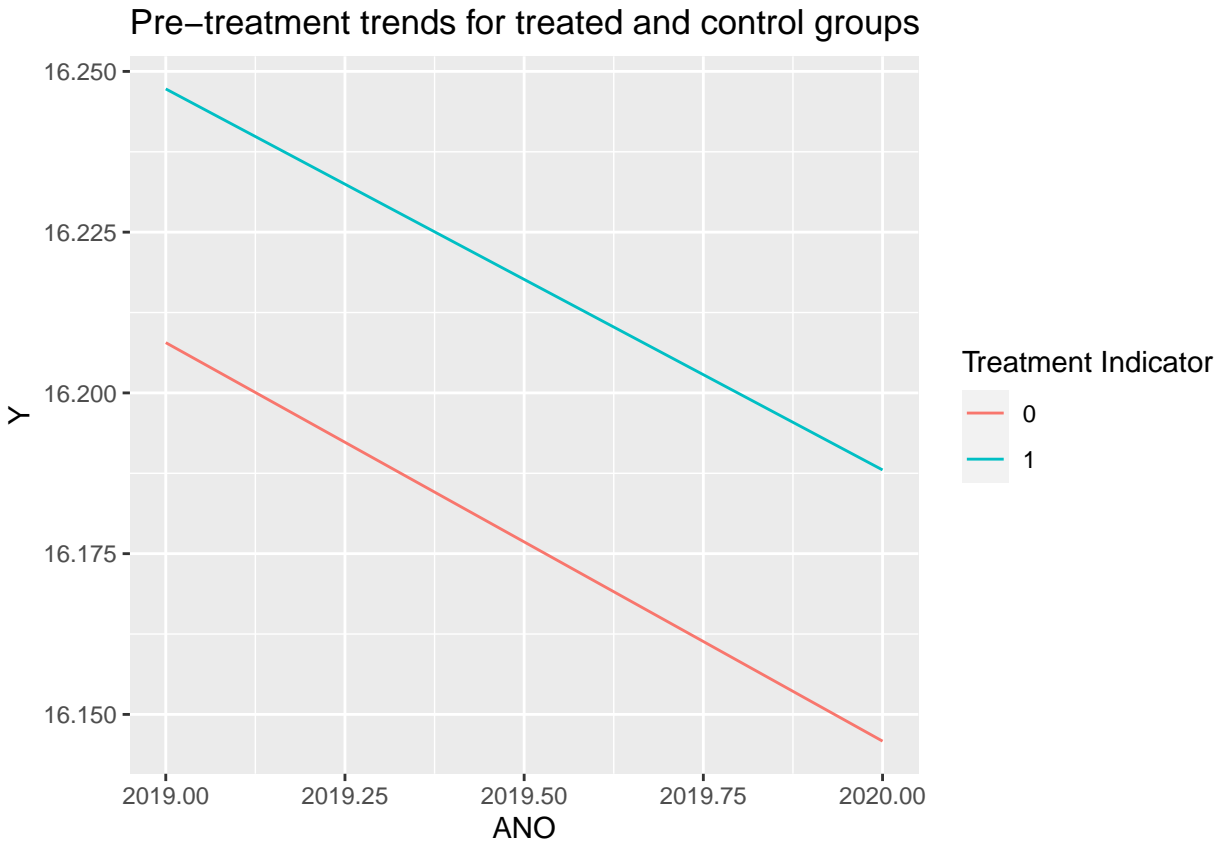
**Table 13: Covariate Balance after IPTW Adjustment**

	Diff.Adj	V.Ratio.Adj
Total net assets	-0.004	0.644
Investment in development projects	-0.048	0.9
Export intensity	0.008	0.918
Fuel use intensity	0.025	0.396
Cost of goods sold/raw materials consumed	0.022	1.174
Return on assets	-0.015	2.948
External supplies and services for water	-0.024	0.878
Tangible fixed assets	-0.097	1.002
External supplies and services for electricity	-0.078	0.918
Geographic diversification of exports	-0.019	1.02
Average personnel expenses	0.053	0.676



**Table 13: Covariate Balance after IPTW Adjustment (continued)**

	Diff.Adj	V.Ratio.Adj
Total sales in the domestic market of goods, products, and biological assets	0.008	1.01
Return on equity	0.088	1.658
Subsidies	0.042	1.065
Electricity use intensity	0.04	0.649
Investment in industrial property	-0.007	1.068
Water use intensity	0.031	0.253
External supplies and services in the domestic market	0.001	0.95
Personnel (women)	0.053	0.978
External supplies and services for fuels	-0.013	0.92
Personnel	0.021	1.118
Imports	0.05	0.914
Service revenues in the domestic market	0.013	1.024
R&D Personnel	0.067	1.048
Interest and similar income earned	-0.017	1.055
Inventory variation in production	0.014	0.95
Purchases in the domestic market	0.015	0.985
General liquidity	0.021	0.986
Total sales in the community market of goods, products, and biological assets	-0.012	1.163
Financial autonomy	-0.057	0.926
Sales of products including biological assets	0.052	0.926
Exports	0.048	0.956
External supplies and services in the extracommunity market	-0.001	1.11
Net result for the period	0.01	0.956
Interest and similar expenses incurred	0.017	1.179
Pre-treatment variation of outcome variable	0.013	0.975



**Table 14: Firm Count by Group**

Treatment	Count
0	144
1	201

ATT Estimate: 0.052 Standard Error: 0.043 95% CI (-0.029, 0.13)

**A.1.1.10 Generalized Propensity Score**

**Table 15: Covariate Balance after GPS Adjustment**

	Type	Corr.Adj
Total net assets	Contin.	-0.014
Investment in development projects	Contin.	-0.007
Export intensity	Contin.	0.01
Fuel use intensity	Contin.	0.025
Cost of goods sold/raw materials consumed	Contin.	-0.008
Return on assets	Contin.	4.55e-04
External supplies and services for water	Contin.	-0.002

**Table 15: Covariate Balance after GPS Adjustment (continued)**

	Type	Corr.Adj
Tangible fixed assets	Contin.	-0.019
External supplies and services for electricity	Contin.	-0.007
Geographic diversification of exports	Contin.	0.012
Average personnel expenses	Contin.	0.008
Total sales in the domestic market of goods, products, and biological assets	Contin.	-0.014
Return on equity	Contin.	0.001
Subsidies	Contin.	0.008
Electricity use intensity	Contin.	-0.004
Investment in industrial property	Contin.	5.55e-05
Water use intensity	Contin.	0.002
External supplies and services in the domestic market	Contin.	-0.008
Personnel (women)	Contin.	-0.017
External supplies and services for fuels	Contin.	-4.77e-04
Personnel	Contin.	-0.014
Imports	Contin.	-0.009
Service revenues in the domestic market	Contin.	-0.006
R&D Personnel	Contin.	-0.012
Interest and similar income earned	Contin.	0.006
Inventory variation in production	Contin.	-0.004
Purchases in the domestic market	Contin.	-0.013
General liquidity	Contin.	-0.016
Total sales in the community market of goods, products, and biological assets	Contin.	-0.012
Financial autonomy	Contin.	-0.008
Sales of products including biological assets	Contin.	0.007
Exports	Contin.	-0.009
External supplies and services in the extracommunity market	Contin.	-0.001
Net result for the period	Contin.	-0.009
Interest and similar expenses incurred	Contin.	-4.6e-04

## A.1.2 Outcome Variable: R&D Personnel

### A.1.2.1 Univariate Outlier Analysis

Univariate outlier firms (regarding the outcome variable): **2**. These will be dropped.

**Table 16: Regression Outputs (Continuous treatment)**

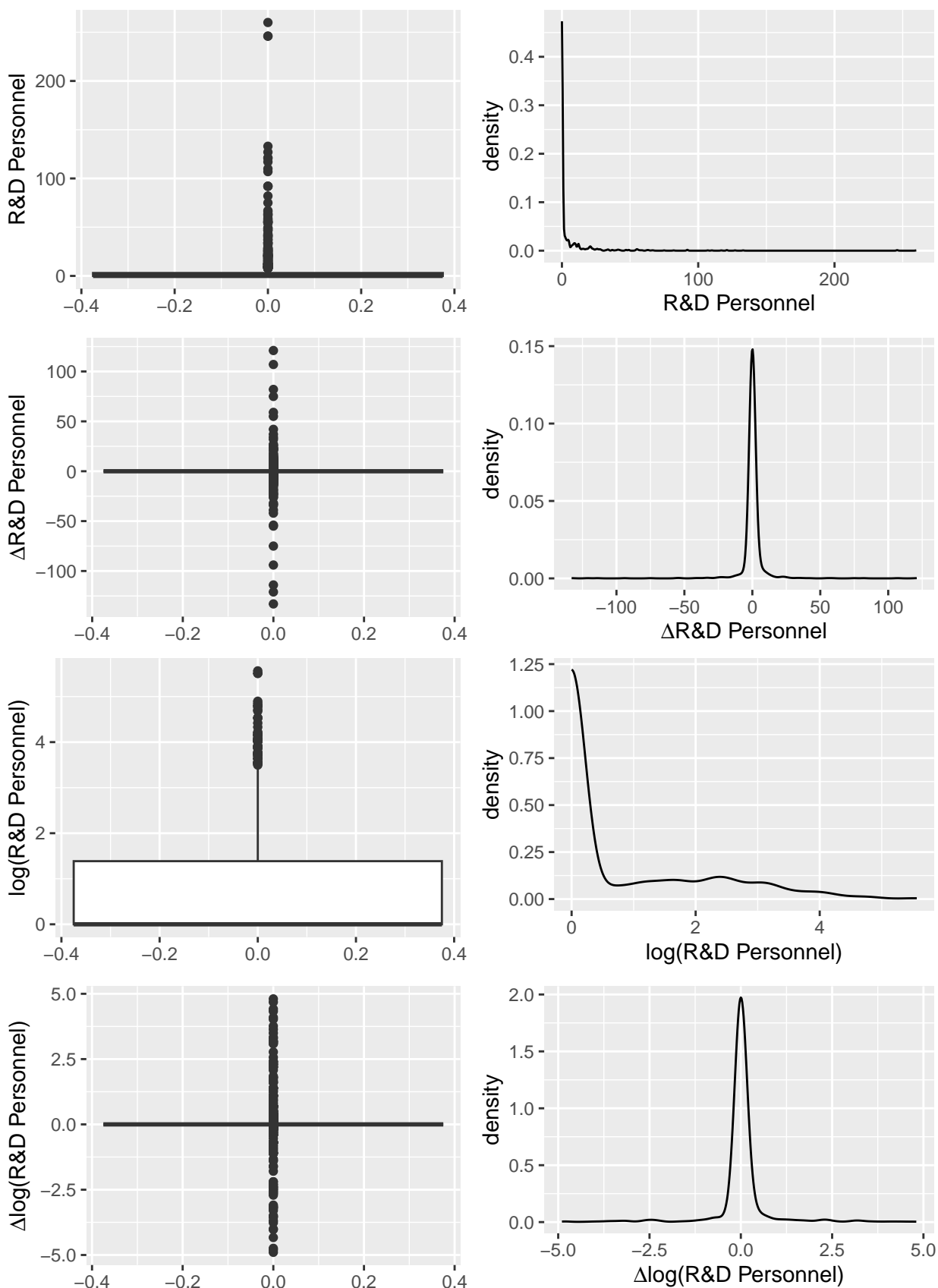
	Outcome Variable	
	(1)	(2)
w	6.32e-08 (-4.4e-08, 1.7e-07)	8.3e-08 (-6.65e-08, 2.33e-07)
I(w <sup>2</sup> )		-5.27e-15 (-3.3e-14, 2.24e-14)
Observations	402	402
R <sup>2</sup>	0.758	0.758
Adjusted R <sup>2</sup>	0.734	0.733
Residual Std. Error	8.67e-04 (df = 364)	8.68e-04 (df = 363)
F Statistic	30.853*** (df = 37; 364)	29.974*** (df = 38; 363)

*Note:*

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Potential confounders' coefficients were omitted from the table.

### A.1.2.2 Graphical Analysis of Outcome Variable (after outlier removal)



### A.1.2.3 Potential Confounder Analysis

List of features deemed as relevant to explain the **binary treatment indicator**:

- |   |  |
|---|--|
| 1. Average personnel expenses                     | 11. Geographic diversification of exports                          |
| 2. Subsidies                                      | 12. External supplies and services in the extracommunity market    |
| 3. Purchases in the domestic market               | 13. Export intensity   |
| 4. External supplies and services for fuels       | 14. Return on assets   |
| 5. Purchases in the extracommunity market         | 15. Total current liabilities                                      |
| 6. External supplies and services for electricity | 16. Total sales of goods, finished products, and biological assets |
| 7. Interest and similar expenses incurred         | 17. External supplies and services for water                       |
| 8. Electricity use intensity                      | 18. Exports  |
| 9. Water use intensity                            | 19. Total current assets   |
| 10. Purchases in the community market             | 20. General liquidity  |

List of features deemed as relevant to explain the **continuous treatment values**:

- |  |  |
|--|--|
| 1. Exports   | 14. Total sales in the domestic market of goods, products, and biological assets |
| 2. Personnel   | 15. Fuel use intensity   |
| 3. External supplies and services in the domestic market                               | 16. Total current assets   |
| 4. Sales of products including biological assets                                       | 17. Investment in tangible fixed assets  |
| 5. Geographic diversification of exports   | 18. Personnel (women)  |
| 6. R&D Personnel   | 19. Return on equity   |
| 7. Result before depreciation, financing expenses, and taxes                           | 20. Intangible assets  |
| 8. Subsidies   | 21. General liquidity  |
| 9. Net result for the period   | 22. Personnel expenses   |
| 10. Investment in industrial property  | 23. Investment in development projects   |
| 11. Operating result   | 24. Service revenues in the domestic market                                      |
| 12. External supplies and services for electricity                                     | 25. Service revenues in the community market                                     |
| 13. Total sales in the extracommunity market of goods, products, and biological assets | 26. External supplies and services for fuels                                     |
|  | 27. Turnover   |
|  | 28. Cost of goods sold/raw materials consumed                                    |

List of features deemed as relevant to explain the **outcome variable**:

- |   |   |
|---|---|
| 1. R&D Personnel                        | 4. Total equity   |
| 2. Investment in intangible assets      | 5. External supplies and services in the community market |
| 3. External supplies and services (FSE) |   |

- |   |   |
|---|---|
| 6. Result before taxes                            | 19. External supplies and services for electricity        |
| 7. Service revenues in the community market       | 20. Average personnel expenses                            |
| 8. Total liabilities                              | 21. External supplies and services in the domestic market |
| 9. Income tax for the period                      | 22. Tangible fixed assets                                 |
| 10. Return on sales                               | 23. Sales of products including biological assets         |
| 11. Return on equity                              | 24. Purchases in the domestic market                      |
| 12. Service revenues in the domestic market       | 25. Exports   |
| 13. Personnel                                     | 26. Operating result                                      |
| 14. Turnover                                      | 27. Investment in development projects                    |
| 15. Subsidies                                     | 28. Purchases in the community market                     |
| 16. Service revenues in the extracommunity market | 29. Inventory variation in production                     |
| 17. Net result for the period                     | 30. Total net assets                                      |
| 18. General liquidity                             | 31. Effect of interest incurred                           |

List of highly correlated relevant features (these will be discarded):

- |   |   |
|---|---|
| 1. Total current assets                 | 6. Interest and similar expenses incurred   |
| 2. Turnover                             | 7. Result before taxes  |
| 3. Intangible assets                    | 8. Total sales in the extracommunity market of goods, products, and biological assets |
| 4. External supplies and services (FSE) | 9. Inventory variation in production  |
| 5. Personnel                            |   |

Final list of **potential confounders**:

- |   |   |
|---|---|
| 1. R&D Personnel  | 13. Net result for the period                             |
| 2. Investment in intangible assets                        | 14. General liquidity                                     |
| 3. Total equity   | 15. External supplies and services for electricity        |
| 4. External supplies and services in the community market | 16. Average personnel expenses                            |
| 5. Service revenues in the community market               | 17. External supplies and services in the domestic market |
| 6. Total liabilities                                      | 18. Tangible fixed assets                                 |
| 7. Income tax for the period                              | 19. Sales of products including biological assets         |
| 8. Return on sales  | 20. Purchases in the domestic market                      |
| 9. Return on equity                                       | 21. Exports   |
| 10. Service revenues in the domestic market               | 22. Operating result                                      |
| 11. Subsidies   | 23. Investment in development projects                    |
| 12. Service revenues in the extracommunity market         | 24. Purchases in the community market                     |

- |   |   |
|---|---|
| 25. Total net assets                          | and biological assets                         |
| 26. Effect of interest incurred               | 37. External supplies and services for water  |
| 27. External supplies and services for fuels  | 38. Result before depreciation, financing ex- |
| 28. Purchases in the extracommunity market    | penses, and taxes                             |
| 29. Electricity use intensity                 | 39. Investment in industrial property         |
| 30. Water use intensity                       | 40. Total sales in the domestic market of     |
| 31. Geographic diversification of exports     | goods, products, and biological assets        |
| 32. External supplies and services in the ex- | 41. Fuel use intensity                        |
| tracommunity market                           | 42. Investment in tangible fixed assets       |
| 33. Export intensity                          | 43. Personnel (women)                         |
| 34. Return on assets                          | 44. Personnel expenses                        |
| 35. Total current liabilities                 | 45. Cost of goods sold/raw materials con-     |
| 36. Total sales of goods, finished products,  | sumed   |

#### A.1.2.4 Multivariate Outlier Analysis

Multivariate outlier firms (regarding the potential confounding variables): **1**. These will be dropped.

**Table 17: Firm Count by Group**

	Control	Treated
Original Data	173	261
After Outlier Removal	172	260

#### A.1.2.5 Statistics and group comparison before adjustmnet



**Table 18: Covariate Means and Group Comparison (before adjustment and before outlier removal)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
R&D Personnel	7.287	8.26	-0.03	0.626
Investment in intangible assets	8.12e+04	6.72e+05	-0.782	0.015
Total equity	3.45e+06	2.85e+06	0.065	1.382
External supplies and services in the community market	1.85e+05	2.89e+05	-0.102	0.256
Service revenues in the community market	8.51e+04	3.99e+05	-0.826	0.015
Total liabilities	2.14e+04	1.71e+04	0.026	0.75
Income tax for the period	5.58e+06	5.96e+06	-0.028	0.656
Return on sales	235.975	4093.828	-2.106	0.002
Return on equity	143.125	187.586	-0.036	0.51
Service revenues in the domestic market	5.53e+05	9.23e+05	-0.156	0.094
Subsidies	2.62e+05	3.08e+05	-0.046	0.173
Service revenues in the extracommunity market	4.52e+07	1.8e+07	0.053	40.762
Net result for the period	1.83e+07	1.32e+07	0.059	6.563
General liquidity	2.375	2.596	-0.073	1.429
External supplies and services for electricity	1.65e+05	1.54e+05	0.02	0.703
Average personnel expenses	2.46e+04	3.2e+04	-0.198	0.169
External supplies and services in the domestic market	8.61e+05	1.38e+06	-0.162	0.347
Tangible fixed assets	3.39e+06	1.81e+06	0.058	3.118
Sales of products including biological assets	2.76e+06	2.43e+06	0.023	1.258

**Table 18: Covariate Means and Group Comparison (before adjustment and before outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Purchases in the domestic market	7.41e+06	1.72e+07	-0.347	0.062
Exports	5.65e+07	2.4e+07	0.054	50.272
Operating result	1.38e+05	5.54e+04	0.058	13.455
Investment in development projects	1.36e+06	1.16e+06	0.014	2.09
Purchases in the community market	2.72e+06	1.77e+06	0.075	3.282
Total net assets	2.22e+07	3.29e+07	-0.186	0.156
Effect of interest incurred	-1.75e+05	6798.816	-0.066	2092.913
External supplies and services for fuels	2.65e+04	2.76e+04	-0.009	0.805
Purchases in the extracommunity market	8.96e+06	5.6e+06	0.084	10.095
Electricity use intensity	0.118	1.598	-1.507	0.003
Water use intensity	0.081	0.025	0.046	24.782
Geographic diversification of exports	0.424	0.421	0.013	1.014
External supplies and services in the extracommunity market	7.91e+05	6.76e+05	0.04	1.915
Export intensity	0.525	0.547	-0.075	0.794
Return on assets	1.011	0.927	0.054	2.55
Total current liabilities	3.76e+07	2.92e+07	0.035	5.182
Total sales of goods, finished products, and biological assets	4.34e+07	4.85e+06	0.068	1039.221
External supplies and services for water	3.98e+04	1.9e+04	0.077	30.259
Result before depreciation, financing expenses, and taxes	2.12e+06	4.54e+06	-0.338	0.152

**Table 18: Covariate Means and Group Comparison (before adjustment and before outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Investment in industrial property	2.72e+06	3.58e+06	-0.077	0.256
Total sales in the domestic market of goods, products, and biological assets	1.75e+07	2.99e+07	-0.125	0.245
Fuel use intensity	0.01	0.206	-1.815	0.002
Investment in tangible fixed assets	-2.1e+05	1.39e+05	-0.177	2.524
Personnel (women)	77.176	78.347	-0.007	0.958
Personnel expenses	5.44e+06	6.91e+06	-0.07	0.838
Cost of goods sold/raw materials consumed	5.5e+07	3.67e+07	0.036	7.127

**Table 19: Covariate Means and Group Comparison (before adjustment and after outlier removal)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
R&D Personnel	5.677	5.366	0.016	1.483
Investment in intangible assets	8.15e+04	6.76e+05	-0.785	0.015
Total equity	3.46e+06	2.47e+06	0.106	2.319
External supplies and services in the community market	1.86e+05	2.9e+05	-0.101	0.256
Service revenues in the community market	8.54e+04	4.02e+05	-0.83	0.015
Total liabilities	2.15e+04	1.72e+04	0.026	0.749
Income tax for the period	5.24e+06	4.98e+06	0.021	1.363
Return on sales	236.817	4117.629	-2.114	0.002
Return on equity	142.969	188.643	-0.037	0.509
Service revenues in the domestic market	4.57e+05	9.28e+05	-0.26	0.054
Subsidies	2.22e+05	3.1e+05	-0.117	0.098
Service revenues in the extracommunity market	4.36e+07	1.26e+07	0.06	186.289
Net result for the period	1.75e+07	1.1e+07	0.076	26.11
General liquidity	2.379	2.599	-0.072	1.426
External supplies and services for electricity	1.65e+05	1.55e+05	0.019	0.701
Average personnel expenses	2.46e+04	3.2e+04	-0.197	0.168
External supplies and services in the domestic market	7.54e+05	1.13e+06	-0.138	0.395
Tangible fixed assets	3.39e+06	1.8e+06	0.058	3.112
Sales of products including biological assets	2.67e+06	2.44e+06	0.016	1.244

**Table 19: Covariate Means and Group Comparison (before adjustment and after outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Purchases in the domestic market	6.07e+06	9.08e+06	-0.164	0.223
Exports	5.49e+07	1.86e+07	0.06	164.643
Operating result	1.39e+05	5.52e+04	0.059	13.429
Investment in development projects	1.36e+06	1.15e+06	0.015	2.086
Purchases in the community market	2.36e+06	1.55e+06	0.072	3.125
Total net assets	2.2e+07	3.06e+07	-0.151	0.162
Effect of interest incurred	-1.76e+05	6835.371	-0.066	2088.878
External supplies and services for fuels	2.61e+04	2.62e+04	-8.72e-04	0.816
Purchases in the extracommunity market	8.9e+06	5.22e+06	0.092	11.971
Electricity use intensity	0.118	1.607	-1.513	0.003
Water use intensity	0.082	0.025	0.046	24.734
Geographic diversification of exports	0.424	0.421	0.011	1.012
External supplies and services in the extracommunity market	7.82e+05	6.28e+05	0.054	2.11
Export intensity	0.525	0.548	-0.078	0.794
Return on assets	1.005	0.927	0.05	2.537
Total current liabilities	3.66e+07	2.73e+07	0.039	5.482
Total sales of goods, finished products, and biological assets	4.35e+07	4.88e+06	0.068	1037.62
External supplies and services for water	3.93e+04	1.79e+04	0.079	32.915
Result before depreciation, financing expenses, and taxes	2.11e+06	4.25e+06	-0.298	0.158

**Table 19: Covariate Means and Group Comparison (before adjustment and after outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Investment in industrial property	2.68e+06	3.25e+06	-0.051	0.265
Total sales in the domestic market of goods, products, and biological assets	1.7e+07	1.53e+07	0.018	3.269
Fuel use intensity	0.01	0.207	-1.822	0.002
Investment in tangible fixed assets	-1.61e+05	1.4e+05	-0.166	2.122
Personnel (women)	71.123	73.372	-0.017	0.737
Personnel expenses	5.31e+06	6.08e+06	-0.037	1.068
Cost of goods sold/raw materials consumed	5.17e+07	2.29e+07	0.056	66.009

**Table 20: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
R&D Personnel	0.753	0.664	0.072	1
Investment in intangible assets	1.14	1.046	0.028	0.982
Total equity	11.412	11.287	0.024	0.983
External supplies and services in the community market	5.52	4.692	0.157	0.964
Service revenues in the community market	3.514	3.74	-0.045	0.972
Total liabilities	1.143	0.703	0.133	1.562
Income tax for the period	14.378	14.361	0.011	0.811
Return on sales	1.788	1.636	0.068	0.902
Return on equity	1.806	1.804	0.002	1.02
Service revenues in the domestic market	5.596	5.676	-0.014	1.026
Subsidies	9.45	8.458	0.231	0.886
Service revenues in the extracommunity market	14.508	14.705	-0.076	1.808
Net result for the period	14.962	15.037	-0.035	1.298
General liquidity	1.11	1.163	-0.144	0.782
External supplies and services for electricity	9.828	10.059	-0.084	1.286
Average personnel expenses	9.454	9.548	-0.073	0.789
External supplies and services in the domestic market	9.558	8.857	0.144	0.79
Tangible fixed assets	8.975	8.495	0.098	0.926

**Table 20: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Sales of products including biological assets	10.366	10.027	0.067	0.958
Purchases in the domestic market	11.931	11.949	-0.004	0.939
Exports	15.245	15.343	-0.051	1.224
Operating result	2.504	2.948	-0.102	0.937
Investment in development projects	6.345	5.815	0.095	0.982
Purchases in the community market	7.274	6.506	0.122	0.945
Total net assets	2.2e+07	3.06e+07	-0.151	0.162
Effect of interest incurred	-1.76e+05	6835.371	-0.066	2088.878
External supplies and services for fuels	7.211	7.47	-0.083	0.992
Purchases in the extracommunity market	14.345	14.324	0.012	1.32
Electricity use intensity	0.044	0.078	-0.137	0.233
Water use intensity	0.016	0.014	0.011	2.751
Geographic diversification of exports	0.335	0.333	0.011	0.999
External supplies and services in the extracommunity market	11.153	11.103	0.017	0.836
Export intensity	0.405	0.416	-0.059	0.798
Return on assets	1.005	0.927	0.05	2.537
Total current liabilities	15.705	15.707	-0.002	1.103
Total sales of goods, finished products, and biological assets	8.812	8.539	0.041	0.982



**Table 20: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
External supplies and services for water	8.104	7.469	0.225	0.723
Result before depreciation, financing expenses, and taxes	2.11e+06	4.25e+06	-0.298	0.158
Investment in industrial property	12.673	12.628	0.016	0.922
Total sales in the domestic market of goods, products, and biological assets	12.272	12.28	-0.001	0.984
Fuel use intensity	0.007	0.023	-0.243	0.058
Investment in tangible fixed assets	-1.61e+05	1.4e+05	-0.166	2.122
Personnel (women)	3.16	3.029	0.085	0.923
Personnel expenses	13.847	13.973	-0.066	1.035
Cost of goods sold/raw materials consumed	15.085	15.192	-0.044	1.187

### A.1.2.6 Functional Form Search for Regression Models

Added terms for **propensity score model** (besides all potential confounders):

- |  |   |
|--|---|
| 1. Water use intensity * Fuel use intensity            | 3. External supplies and services for elec- |
| 2. Purchases in the domestic market * Total net assets | tricity * Total current liabilities         |
|  | 4. squared(Total net assets)                |

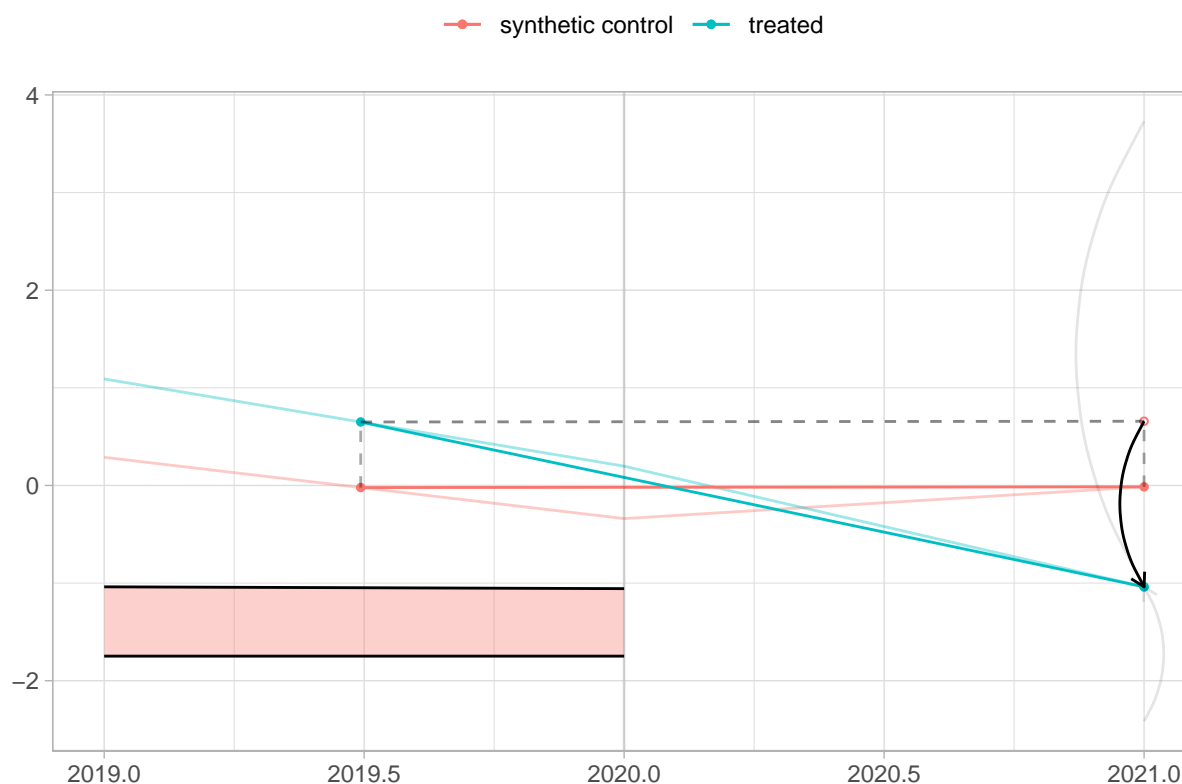
Added terms for **generalized propensity score model** (besides all potential confounders):

- squared(Subsidies)
- Geographic diversification of exports \* Return on sales

Added terms for **outcome model** (besides all potential confounders):

- squared(Investment in tangible fixed assets)

### A.1.2.7 Synthetic Differences in Differences - With Bias Correction

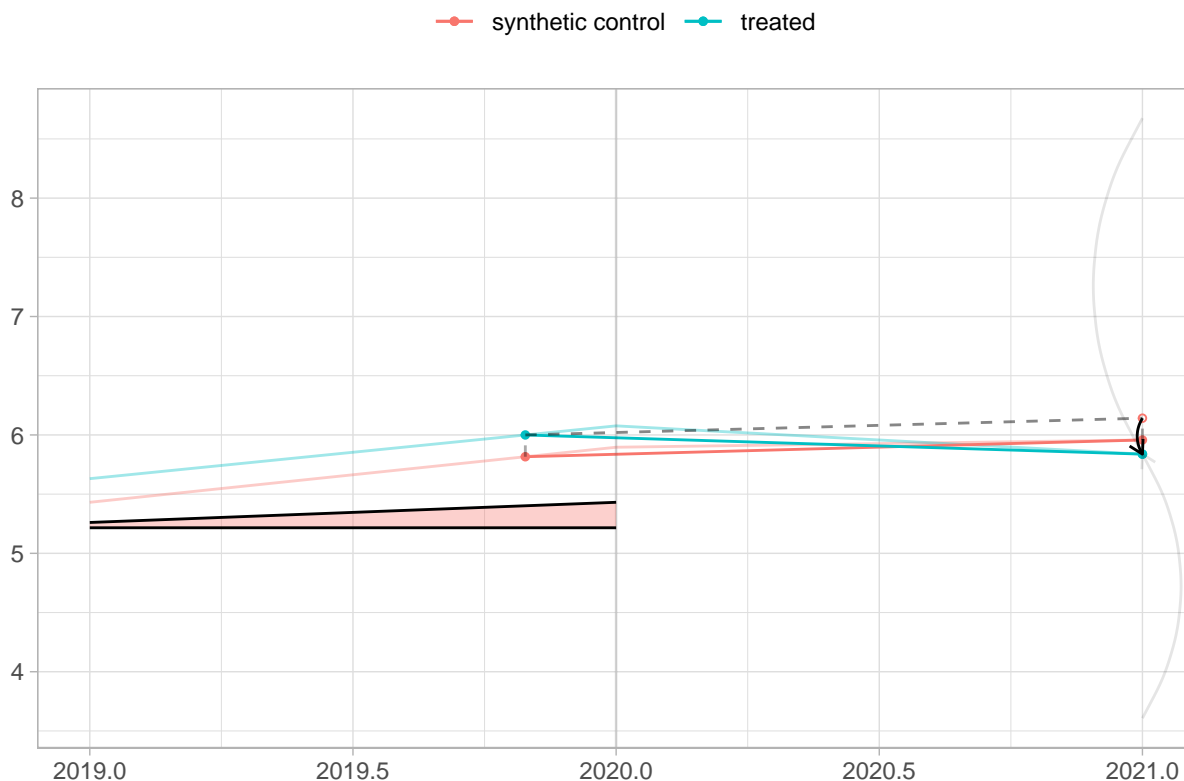


ATT Estimate: -1.7

Standard Error: 1.6

95% CI (-4.9 , 1.5)

### A.1.2.8 Synthetic Differences in Differences - Without Bias Correction



ATT Estimate: -0.3

Standard Error: 1.4

95% CI (-3 , 2.4 )

### A.1.2.9 Weighted Differences in Differences

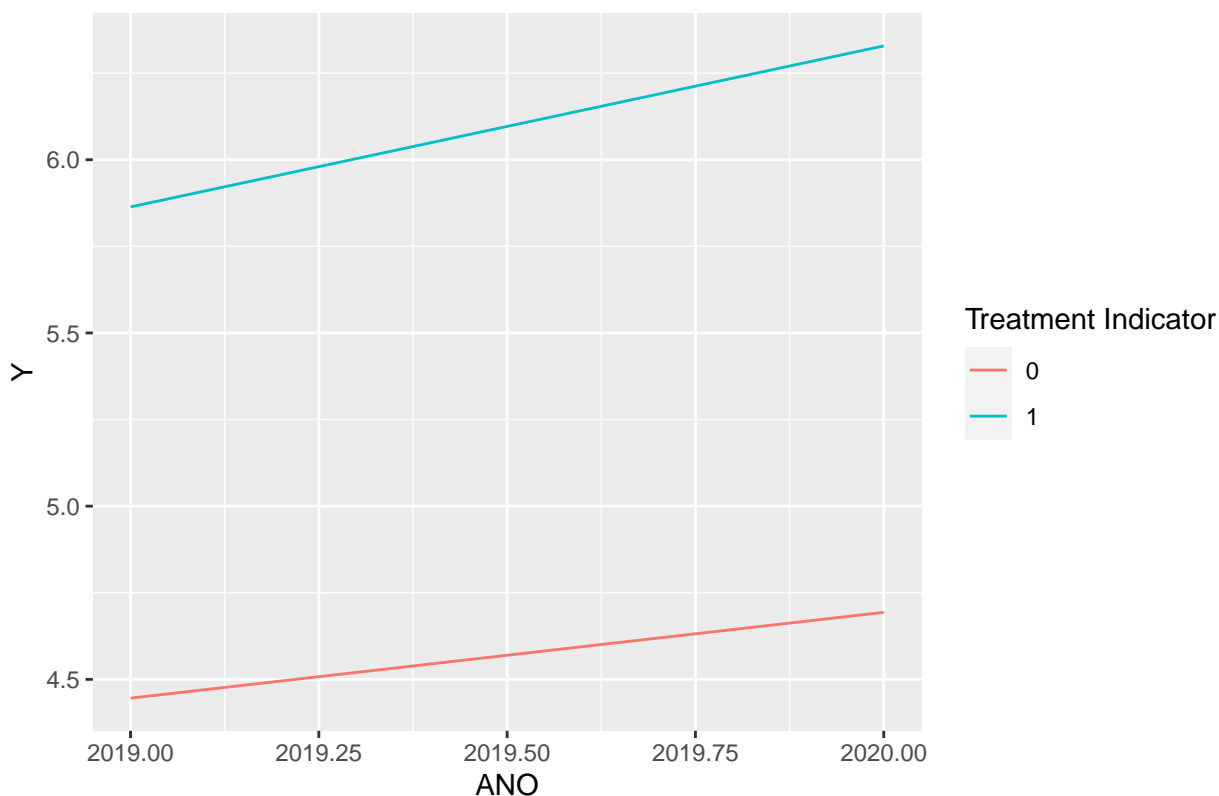
**Table 21: Covariate Balance after IPTW Adjustment**

	Diff.Adj	V.Ratio.Adj
R&D Personnel	-0.022	1.109
Investment in intangible assets	0.005	0.849
Total equity	0.051	0.871
External supplies and services in the community market	-0.009	0.975
Service revenues in the community market	-0.027	1.102
Total liabilities	-0.023	0.893
Income tax for the period	0.008	1.051
Return on sales	-0.094	0.754
Return on equity	0.03	0.936
Service revenues in the domestic market	2.96e-04	1.054
Subsidies	-0.042	1.288

**Table 21: Covariate Balance after IPTW Adjustment (continued)**

	Diff.Adj	V.Ratio.Adj
Service revenues in the extracommunity market	0.024	1.124
Net result for the period	-0.008	0.828
General liquidity	0.03	0.957
External supplies and services for electricity	0.074	0.649
Average personnel expenses	-0.029	0.933
External supplies and services in the domestic market	-0.048	0.957
Tangible fixed assets	-0.068	1.041
Sales of products including biological assets	-0.047	1.243
Purchases in the domestic market	-0.035	1.055
Exports	0.029	1.045
Operating result	0.076	1.11
Investment in development projects	-0.081	0.955
Purchases in the community market	-0.05	1.057
Total net assets	0.06	1.636
Effect of interest incurred	0.019	0.364
External supplies and services for fuels	0.122	0.734
Purchases in the extracommunity market	0.02	1.104
Electricity use intensity	0.064	15.087
Water use intensity	0.06	2.307
Geographic diversification of exports	0.006	0.987
External supplies and services in the extracommunity market	0.094	0.548
Export intensity	-0.004	0.837
Return on assets	-0.027	2.32
Total current liabilities	0.021	0.968
Total sales of goods, finished products, and biological assets	0.023	1.035
External supplies and services for water	0.042	0.944
Result before depreciation, financing expenses, and taxes	0.009	0.768
Investment in industrial property	-0.036	0.787
Total sales in the domestic market of goods, products, and biological assets	0.067	0.765
Fuel use intensity	0.055	12.193
Investment in tangible fixed assets	2.87e-04	0.745
Personnel (women)	0.02	0.998
Personnel expenses	0.008	0.888
Cost of goods sold/raw materials consumed	0.036	0.882
Pre-treatment variation of outcome variable	-0.034	1.309

Pre-treatment trends for treated and control groups



**Table 22: Firm Count by Group**

Treatment	Count
0	151
1	213

ATT Estimate: -1.5 Standard Error: 1.3 95% CI (-4.1, 1.2)

### A.1.2.10 Generalized Propensity Score

**Table 23: Covariate Balance after GPS Adjustment**

	Type	Corr.Adj
R&D Personnel	Contin.	-0.002
Investment in intangible assets	Contin.	-8.02e-04
Total equity	Contin.	-0.019
External supplies and services in the community market	Contin.	-0.009
Service revenues in the community market	Contin.	-0.004
Total liabilities	Contin.	-0.003
Income tax for the period	Contin.	0.001

**Table 23: Covariate Balance after GPS Adjustment (continued)**

	Type	Corr.Adj
Return on sales	Contin.	0.022
Return on equity	Contin.	-0.003
Service revenues in the domestic market	Contin.	0.006
Subsidies	Contin.	0.002
Service revenues in the extracommunity market	Contin.	-0.004
Net result for the period	Contin.	0.004
General liquidity	Contin.	-0.011
External supplies and services for electricity	Contin.	0.006
Average personnel expenses	Contin.	0.012
External supplies and services in the domestic market	Contin.	0.009
Tangible fixed assets	Contin.	0.003
Sales of products including biological assets	Contin.	0.01
Purchases in the domestic market	Contin.	-0.009
Exports	Contin.	0.004
Operating result	Contin.	0.005
Investment in development projects	Contin.	-7.5e-04
Purchases in the community market	Contin.	-0.016
Total net assets	Contin.	0.006
Effect of interest incurred	Contin.	-3.62e-04
External supplies and services for fuels	Contin.	0.009
Purchases in the extracommunity market	Contin.	0.009
Electricity use intensity	Contin.	0.001
Water use intensity	Contin.	4.77e-04
Geographic diversification of exports	Contin.	0.011
External supplies and services in the extracommunity market	Contin.	0.004
Export intensity	Contin.	0.011
Return on assets	Contin.	0.004
Total current liabilities	Contin.	0.004
Total sales of goods, finished products, and biological assets	Contin.	-0.007
External supplies and services for water	Contin.	-0.009
Result before depreciation, financing expenses, and taxes	Contin.	0.012
Investment in industrial property	Contin.	0.008
Total sales in the domestic market of goods, products, and biological assets	Contin.	-0.003
Fuel use intensity	Contin.	1.68e-04
Investment in tangible fixed assets	Contin.	-0.014
Personnel (women)	Contin.	-0.005
Personnel expenses	Contin.	0.009
Cost of goods sold/raw materials consumed	Contin.	-0.012

**Table 24: Regression Outputs (Continuous treatment)**

	Outcome Variable	
	(1)	(2)
w	2.32e-07 (-2.53e-06, 2.99e-06)	2.72e-07 (-3.41e-06, 3.96e-06)
I(w <sup>2</sup> )		-1.1e-14 (-6.86e-13, 6.64e-13)
Observations	427	427
R <sup>2</sup>	0.597	0.597
Adjusted R <sup>2</sup>	0.547	0.546
Residual Std. Error	0.025 (df = 379)	0.025 (df = 378)
F Statistic	11.956*** (df = 47; 379)	11.676*** (df = 48; 378)

*Note:*

\*p&lt;0.1; \*\*p&lt;0.05; \*\*\*p&lt;0.01

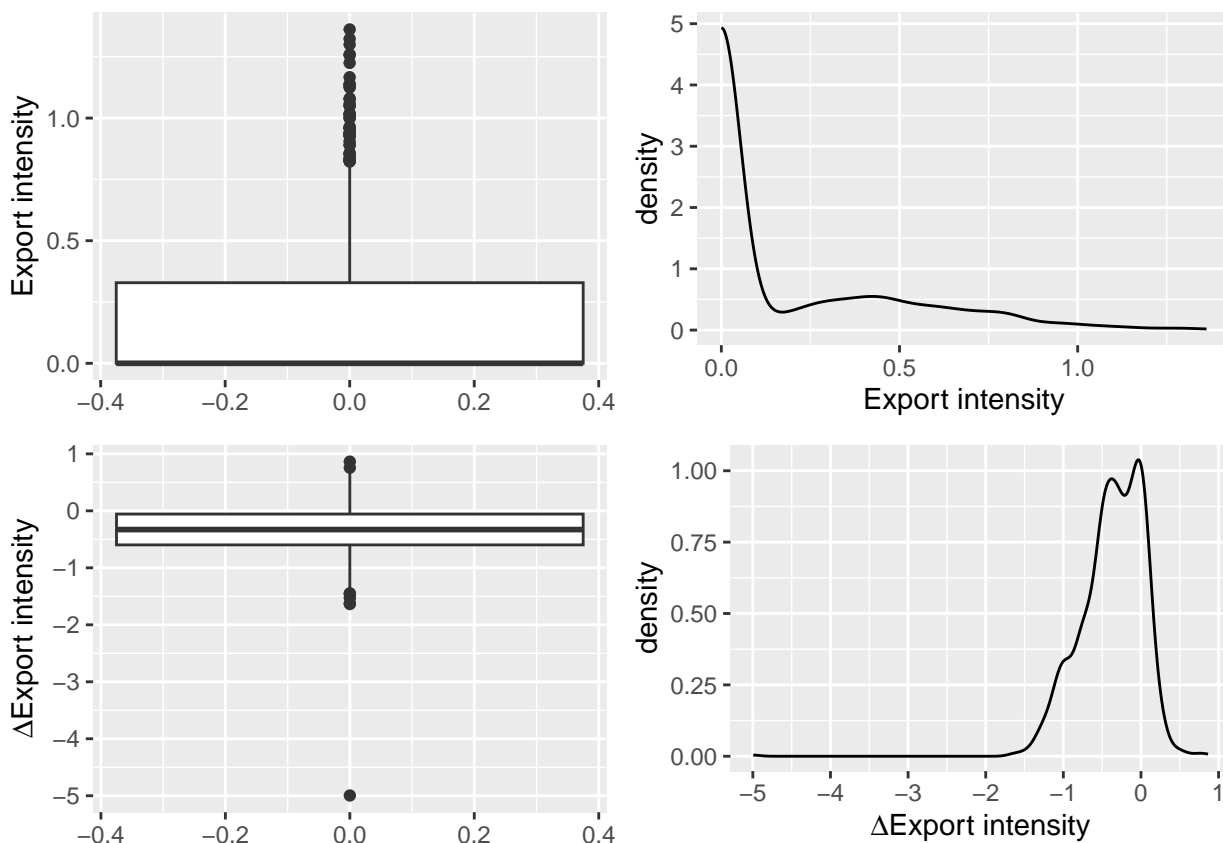
Potential confounders' coefficients were omitted from the table.

### A.1.3 Outcome Variable: Export intensity

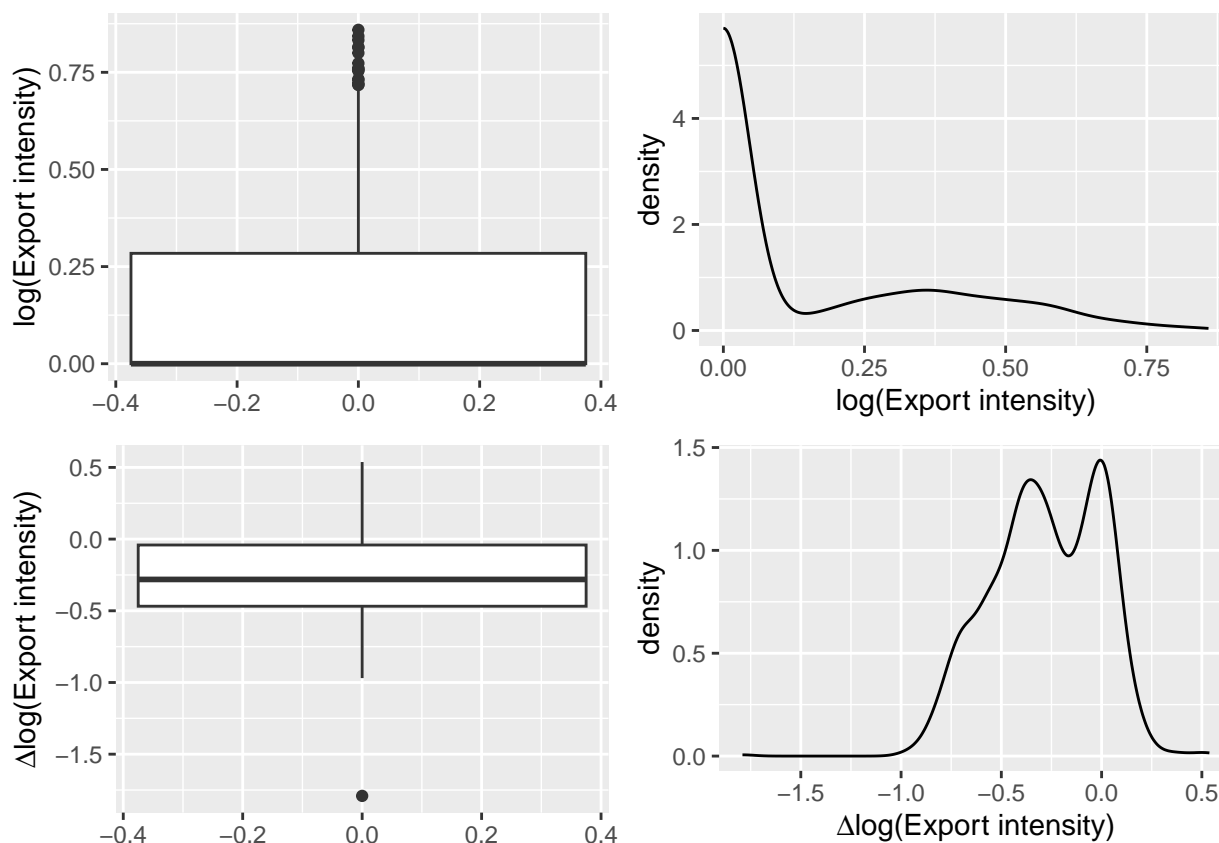
#### A.1.3.1 Univariate Outlier Analysis

Univariate outlier firms (regarding the outcome variable): **56**. These will be dropped.

#### A.1.3.2 Graphical Analysis of Outcome Variable (after outlier removal)







### A.1.3.3 Potential Confounder Analysis

List of features deemed as relevant to explain the **binary treatment indicator**:

- |                        |   |
|------------------------|---|
| 1. Subsidies           | 6. External supplies and services for water       |
| 2. Water use intensity | 7. External supplies and services for fuels       |
| 3. General liquidity   | 8. Exports  |
| 4. Return on sales     | 9. External supplies and services for electricity |
| 5. Export intensity    |   |

List of features deemed as relevant to explain the **continuous treatment values**:

- |   |   |
|---|---|
| 1. Personnel expenses   | 9. Total net assets   |
| 2. Total sales in the domestic market of goods, products, and biological assets       | 10. Imports   |
| 3. Return on assets 2   | 11. Average personnel expenses  |
| 4. Investment in industrial property  | 12. Effect of interest incurred   |
| 5. Total sales in the extracommunity market of goods, products, and biological assets | 13. Current liabilities from obtained financing                                   |
| 6. Service revenues   | 14. Sales of products including biological assets                                 |
| 7. External supplies and services (FSE)   | 15. Total sales in the community market of goods, products, and biological assets |
| 8. Net result for the period  | 16. Exports   |

- |  |   |
|--|---|
| 17. Intangible assets                                      | 40. Result before depreciation, financing expenses, and taxes   |
| 18. Interest and similar income earned                     | 41. Fuel use intensity  |
| 19. External supplies and services for water               | 42. Operating result (EBIT)                                     |
| 20. Operating result                                       | 43. External supplies and services in the domestic market       |
| 21. Personnel  | 44. Subsidies   |
| 22. Investment in development projects                     | 45. Investment in tangible fixed assets                         |
| 23. Tangible fixed assets                                  | 46. Return on assets  |
| 24. Turnover   | 47. Service revenues in the extracommunity market               |
| 25. Inventory variation in production                      | 48. Geographic diversification of exports                       |
| 26. Total current assets                                   | 49. Export intensity  |
| 27. Interest and similar expenses incurred                 | 50. Return on sales   |
| 28. External supplies and services for fuels               | 51. Financial autonomy  |
| 29. Service revenues in the domestic market                | 52. Business volume   |
| 30. Result before taxes                                    | 53. External supplies and services in the extracommunity market |
| 31. External supplies and services in the community market | 54. Personnel (women)   |
| 32. General liquidity                                      | 55. Electricity use intensity                                   |
| 33. Extra-EU exports                                       | 56. Cost of goods sold/raw materials consumed                   |
| 34. Water use intensity                                    | 57. Sales of goods  |
| 35. Total equity   | 58. Net result  |
| 36. Total current liabilities                              |   |
| 37. Purchases in the domestic market                       |   |
| 38. Income tax for the period                              |   |
| 39. Purchases in the extracommunity market                 |   |

List of features deemed as relevant to explain the **outcome variable**:

- |   |   |
|---|---|
| 1. Export intensity   | 9. Inventory variation in production                            |
| 2. Geographic diversification of exports  | 10. Subsidies   |
| 3. Service revenues in the domestic market  | 11. Fuel use intensity  |
| 4. Service revenues in the community market   | 12. External supplies and services for water                    |
| 5. Total sales in the community market of goods, products, and biological assets      | 13. External supplies and services in the extracommunity market |
| 6. Water use intensity  | 14. Sales of products including biological assets               |
| 7. Production   | 15. General liquidity   |
| 8. Total sales in the extracommunity market of goods, products, and biological assets | 16. Total net assets  |

List of highly correlated relevant features (these will be discarded):

- |  |  |
|--|--|
| 1. Total current assets                        | 10. Personnel  |
| 2. Turnover                                    | 11. Net result for the period  |
| 3. Business volume                             | 12. Operating result   |
| 4. Total current liabilities                   | 13. Interest and similar expenses incurred   |
| 5. Intangible assets                           | 14. Result before taxes  |
| 6. Current liabilities from obtained financing | 15. Inventory variation in production  |
| 7. External supplies and services (FSE)        | 16. Total sales in the extracommunity market of goods, products, and biological assets |
| 8. Purchases in the extracommunity market      | 17. Fuel use intensity   |
| 9. Exports                                     |  |

Final list of **potential confounders**:

- |  |   |
|--|---|
| 1. Export intensity  | 23. Average personnel expenses                                |
| 2. Geographic diversification of exports   | 24. Effect of interest incurred                               |
| 3. Service revenues in the domestic market                                       | 25. Interest and similar income earned                        |
| 4. Service revenues in the community market                                      | 26. Investment in development projects                        |
| 5. Total sales in the community market of goods, products, and biological assets | 27. Tangible fixed assets                                     |
| 6. Water use intensity   | 28. External supplies and services in the community market    |
| 7. Production  | 29. Extra-EU exports  |
| 8. Subsidies   | 30. Total equity  |
| 9. External supplies and services for water                                      | 31. Purchases in the domestic market                          |
| 10. External supplies and services in the extracommunity market                  | 32. Income tax for the period                                 |
| 11. Sales of products including biological assets                                | 33. Result before depreciation, financing expenses, and taxes |
| 12. General liquidity  | 34. Operating result (EBIT)                                   |
| 13. Total net assets   | 35. External supplies and services in the domestic market     |
| 14. Return on sales  | 36. Investment in tangible fixed assets                       |
| 15. External supplies and services for fuels                                     | 37. Return on assets  |
| 16. External supplies and services for electricity                               | 38. Service revenues in the extracommunity market             |
| 17. Personnel expenses   | 39. Financial autonomy  |
| 18. Total sales in the domestic market of goods, products, and biological assets | 40. Personnel (women)   |
| 19. Return on assets 2   | 41. Electricity use intensity                                 |
| 20. Investment in industrial property  | 42. Cost of goods sold/raw materials consumed                 |
| 21. Service revenues   | 43. Sales of goods  |
| 22. Imports  | 44. Net result  |

#### A.1.3.4 Multivariate Outlier Analysis

Multivariate outlier firms (regarding the potential confounding variables): **1**. These will be dropped.

**Table 25: Firm Count by Group**

	Control	Treated
Original Data	173	261
After Outlier Removal	151	232

#### A.1.3.5 Statistics and group comparison before adjustment

**Table 26: Covariate Means and Group Comparison (before adjustment and before outlier removal)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Export intensity	0.525	0.547	-0.075	0.794
Geographic diversification of exports	0.424	0.421	0.013	1.014
Service revenues in the domestic market	5.53e+05	9.23e+05	-0.156	0.094
Service revenues in the community market	8.51e+04	3.99e+05	-0.826	0.015
Total sales in the community market of goods, products, and biological assets	9.11e+06	4.41e+06	0.058	36.049
Water use intensity	0.081	0.025	0.046	24.782
Production	7.27e+07	5.19e+07	0.036	6.326
Subsidies	2.62e+05	3.08e+05	-0.046	0.173
External supplies and services for water	3.98e+04	1.9e+04	0.077	30.259
External supplies and services in the extracommunity market	7.91e+05	6.76e+05	0.04	1.915
Sales of products including biological assets	2.76e+06	2.43e+06	0.023	1.258
General liquidity	2.375	2.596	-0.073	1.429
Total net assets	2.22e+07	3.29e+07	-0.186	0.156
Return on sales	235.975	4093.828	-2.106	0.002
External supplies and services for fuels	2.65e+04	2.76e+04	-0.009	0.805
External supplies and services for electricity	1.65e+05	1.54e+05	0.02	0.703
Personnel expenses	5.44e+06	6.91e+06	-0.07	0.838
Total sales in the domestic market of goods, products, and biological assets	1.75e+07	2.99e+07	-0.125	0.245
Return on assets 2	0.001	9.75e-04	0.05	2.722

**Table 26: Covariate Means and Group Comparison (before adjustment and before outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Investment in industrial property	2.72e+06	3.58e+06	-0.077	0.256
Service revenues	4.6e+07	1.76e+07	0.072	66.037
Imports	1.17e+07	7.38e+06	0.098	7.59
Average personnel expenses	2.46e+04	3.2e+04	-0.198	0.169
Effect of interest incurred	-1.75e+05	6798.816	-0.066	2092.913
Interest and similar income earned	7.92e+05	4.04e+05	0.053	10.01
Investment in development projects	1.36e+06	1.16e+06	0.014	2.09
Tangible fixed assets	3.39e+06	1.81e+06	0.058	3.118
External supplies and services in the community market	1.85e+05	2.89e+05	-0.102	0.256
Extra-EU exports	4.73e+07	1.91e+07	0.054	41.627
Total equity	3.45e+06	2.85e+06	0.065	1.382
Purchases in the domestic market	7.41e+06	1.72e+07	-0.347	0.062
Income tax for the period	5.58e+06	5.96e+06	-0.028	0.656
Result before depreciation, financing expenses, and taxes	2.12e+06	4.54e+06	-0.338	0.152
Operating result (EBIT)	1.38e+05	5.54e+04	0.058	13.455
External supplies and services in the domestic market	8.61e+05	1.38e+06	-0.162	0.347
Investment in tangible fixed assets	-2.1e+05	1.39e+05	-0.177	2.524
Return on assets	1.011	0.927	0.054	2.55
Service revenues in the extracommunity market	4.52e+07	1.8e+07	0.053	40.762

**Table 26: Covariate Means and Group Comparison (before adjustment and before outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Financial autonomy	0.237	0.259	-0.056	0.837
Personnel (women)	77.176	78.347	-0.007	0.958
Electricity use intensity	0.118	1.598	-1.507	0.003
Cost of goods sold/raw materials consumed	5.5e+07	3.67e+07	0.036	7.127
Sales of goods	2.92e+07	4.71e+07	-0.209	0.143
Net result	1.83e+07	1.32e+07	0.059	6.563

**Table 27: Covariate Means and Group Comparison (before adjustment and after outlier removal)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Export intensity	0.532	0.561	-0.1	0.775
Geographic diversification of exports	0.433	0.433	9.75e-05	0.973
Service revenues in the domestic market	4.2e+05	1.03e+06	-0.285	0.068
Service revenues in the community market	4.2e+04	4.55e+05	-1.921	0.004
Total sales in the community market of goods, products, and biological assets	9.34e+06	4.74e+06	0.053	35.641
Water use intensity	0.006	0.028	-0.906	0.009
Production	7.46e+07	5.57e+07	0.031	6.211
Subsidies	2.57e+05	3.37e+05	-0.077	0.164
External supplies and services for water	4.06e+04	1.88e+04	0.076	30.487
External supplies and services in the extracommunity market	7.02e+05	7.31e+05	-0.011	1.42
Sales of products including biological assets	2.69e+06	2.69e+06	-3.78e-04	1.221
General liquidity	2.413	2.615	-0.063	1.468
Total net assets	2.18e+07	3.53e+07	-0.226	0.148
Return on sales	214.613	4659.929	-2.347	0.002
External supplies and services for fuels	2.35e+04	3.05e+04	-0.057	0.715
External supplies and services for electricity	1.68e+05	1.61e+05	0.013	0.676
Personnel expenses	5.13e+06	7.34e+06	-0.102	0.798
Total sales in the domestic market of goods, products, and biological assets	1.74e+07	3.29e+07	-0.148	0.24
Return on assets 2	0.001	8.97e-04	0.059	3.666



**Table 27: Covariate Means and Group Comparison (before adjustment and after outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Investment in industrial property	2.71e+06	3.74e+06	-0.087	0.248
Service revenues	4.79e+07	1.8e+07	0.071	66.489
Imports	1.12e+07	7.39e+06	0.085	7.499
Average personnel expenses	2.41e+04	3.26e+04	-0.231	0.146
Effect of interest incurred	-1.97e+05	3904.99	-0.068	3966.058
Interest and similar income earned	8.45e+05	4.39e+05	0.052	9.836
Investment in development projects	1.24e+06	1.31e+06	-0.005	1.908
Tangible fixed assets	3.17e+06	2.02e+06	0.042	2.799
External supplies and services in the community market	1.36e+05	2.69e+05	-0.22	0.081
Extra-EU exports	5.17e+07	2.09e+07	0.056	41.043
Total equity	2.84e+06	2.96e+06	-0.016	0.832
Purchases in the domestic market	6.37e+06	1.89e+07	-0.471	0.048
Income tax for the period	5.1e+06	6.31e+06	-0.093	0.541
Result before depreciation, financing expenses, and taxes	1.73e+06	4.8e+06	-0.456	0.118
Operating result (EBIT)	1.42e+05	6.06e+04	0.055	13.117
External supplies and services in the domestic market	7.61e+05	1.48e+06	-0.225	0.302
Investment in tangible fixed assets	-1.92e+05	9.81e+04	-0.141	3.139
Return on assets	1.05	0.937	0.069	2.552
Service revenues in the extracommunity market	4.95e+07	1.97e+07	0.055	40.177

**Table 27: Covariate Means and Group Comparison (before adjustment and after outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Financial autonomy	0.242	0.27	-0.071	0.805
Personnel (women)	69.237	82.596	-0.088	0.706
Electricity use intensity	0.069	1.829	-4.166	4.61e-04
Cost of goods sold/raw materials consumed	5.82e+07	4.01e+07	0.033	7.005
Sales of goods	2.81e+07	5.09e+07	-0.258	0.134
Net result	1.81e+07	1.37e+07	0.048	6.421

**Table 28: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Export intensity	0.41	0.424	-0.079	0.787
Geographic diversification of exports	0.342	0.341	0.002	0.98
Service revenues in the domestic market	5.009	5.189	-0.032	0.985
Service revenues in the community market	2.852	3.224	-0.079	0.849
Total sales in the community market of goods, products, and biological assets	9.522	9.22	0.047	0.931
Water use intensity	0.005	0.016	-0.465	0.036
Production	15.227	15.369	-0.04	1.054
Subsidies	9.311	8.218	0.248	0.867
External supplies and services for water	7.98	7.352	0.217	0.746
External supplies and services in the extracommunity market	11.029	11.03	-1.93e-04	0.788
Sales of products including biological assets	10.096	9.674	0.081	0.912
General liquidity	1.111	1.162	-0.133	0.809
Total net assets	2.18e+07	3.53e+07	-0.226	0.148
Return on sales	1.745	1.558	0.086	0.828
External supplies and services for fuels	7.108	7.5	-0.126	0.943
External supplies and services for electricity	9.767	9.865	-0.036	1.088
Personnel expenses	13.743	13.922	-0.094	0.944
Total sales in the domestic market of goods, products, and biological assets	12.065	12.147	-0.014	0.963

**Table 28: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Return on assets 2	0.001	8.93e-04	0.058	3.59
Investment in industrial property	12.614	12.564	0.017	0.983
Service revenues	14.166	14.158	0.002	1.01
Imports	14.439	14.471	-0.017	1.239
Average personnel expenses	9.417	9.494	-0.058	0.759
Effect of interest incurred	-1.97e+05	3904.99	-0.068	3966.058
Interest and similar income earned	9.881	9.349	0.143	0.83
Investment in development projects	5.991	5.573	0.075	0.982
Tangible fixed assets	8.714	8.392	0.064	0.96
External supplies and services in the community market	5.185	4.239	0.181	0.982
Extra-EU exports	14.869	15.055	-0.091	1.264
Total equity	11.282	11.051	0.044	0.92
Purchases in the domestic market	11.761	11.745	0.003	0.889
Income tax for the period	14.295	14.346	-0.032	0.729
Result before depreciation, financing expenses, and taxes	1.73e+06	4.8e+06	-0.456	0.118
Operating result (EBIT)	2.514	3.031	-0.119	0.891
External supplies and services in the domestic market	9.315	8.687	0.127	0.776
Investment in tangible fixed assets	-1.92e+05	9.81e+04	-0.141	3.139

**Table 28: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Return on assets	1.05	0.937	0.069	2.552
Service revenues in the extracommunity market	14.445	14.726	-0.104	1.713
Financial autonomy	0.183	0.197	-0.058	0.763
Personnel (women)	3.109	3.004	0.069	0.826
Electricity use intensity	0.037	0.087	-0.258	0.124
Cost of goods sold/raw materials consumed	15.002	15.179	-0.069	1.118
Sales of goods	13.718	13.608	0.02	0.827
Net result	14.889	14.988	-0.045	1.213

### A.1.3.6 Functional Form Search for Regression Models

Added terms for **propensity score model** (besides all potential confounders):

1. Personnel expenses \* Purchases in the domestic market
2. squared(Sales of goods)
3. squared(Cost of goods sold/raw materials consumed)

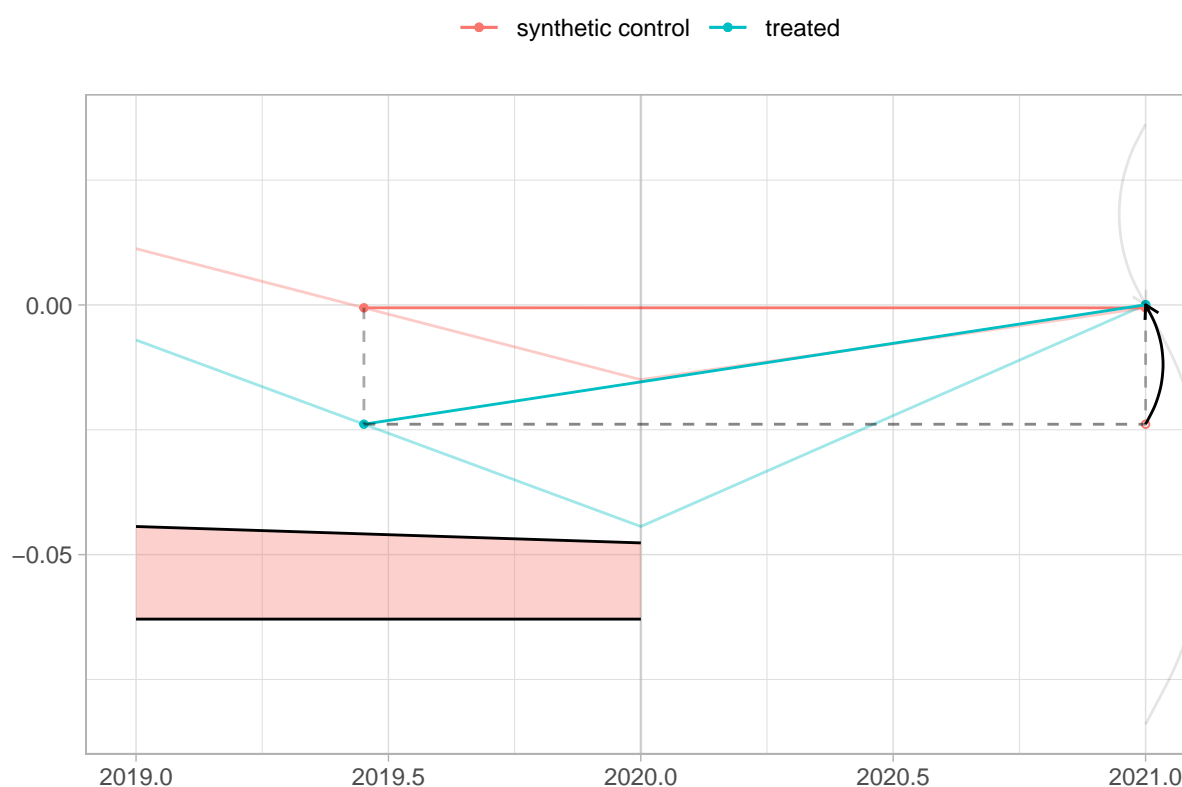
Added terms for **generalized propensity score model** (besides all potential confounders):

1. Geographic diversification of exports \* Return on sales
2. squared(Service revenues in the extracommunity market)

Added terms for **outcome model** (besides all potential confounders):

1. squared(External supplies and services for water)

### A.1.3.7 Synthetic Differences in Differences - With Bias Correction

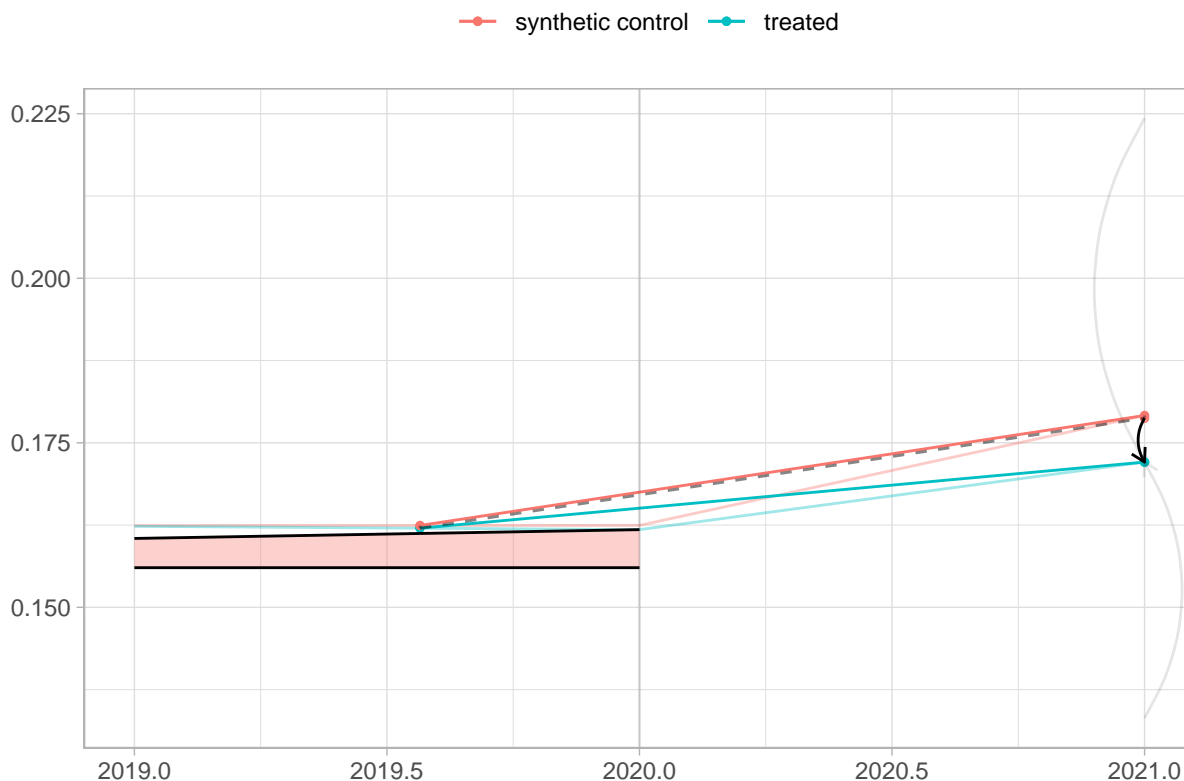


ATT Estimate: 0.024

Standard Error: 0.031

95% CI (-0.037 , 0.085 )

### A.1.3.8 Synthetic Differences in Differences - Without Bias Correction



ATT Estimate: -0.0067  
 Standard Error: 0.021  
 95% CI (-0.049 , 0.035 )

### A.1.3.9 Weighted Differences in Differences

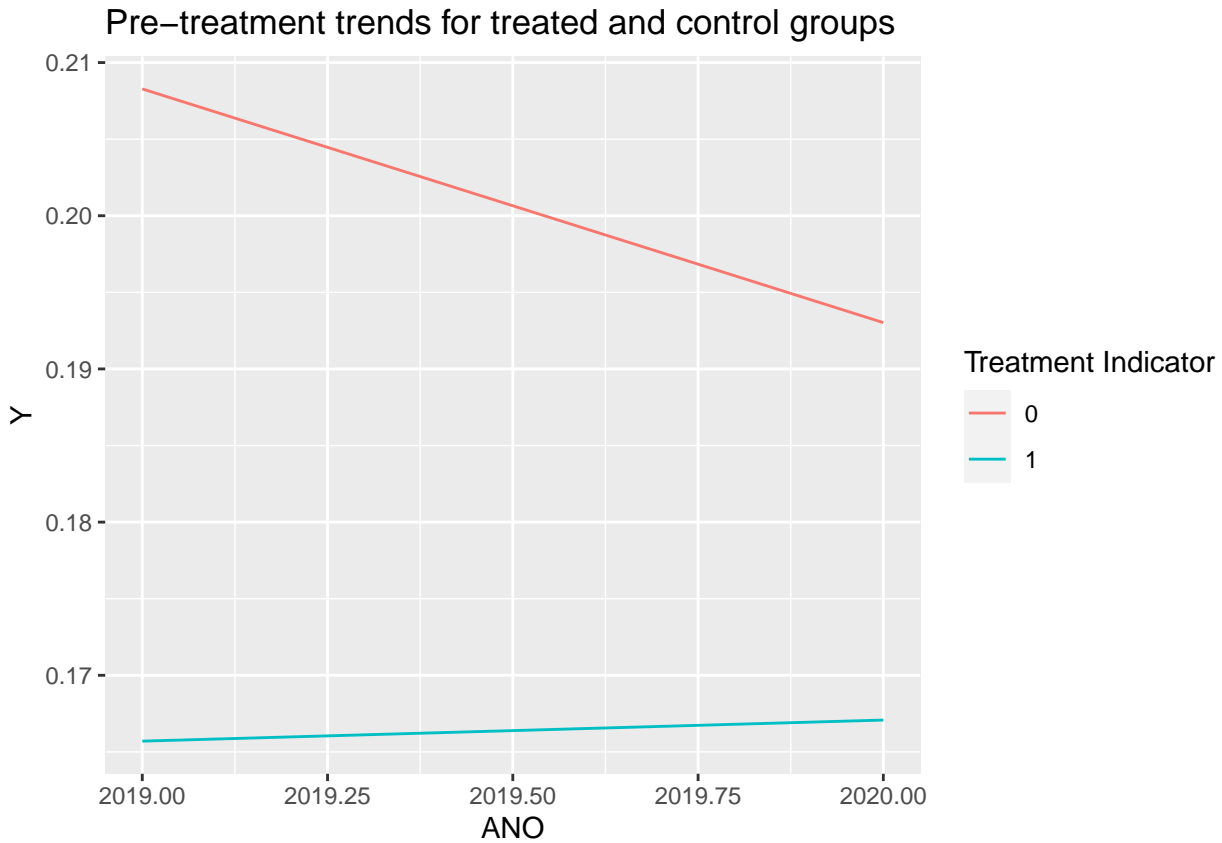
**Table 29: Covariate Balance after IPTW Adjustment**

	Diff.Adj	V.Ratio.Adj
Export intensity	0.053	0.858
Geographic diversification of exports	0.062	0.988
Service revenues in the domestic market	-0.014	1.071
Service revenues in the community market	-0.037	0.935
Total sales in the community market of goods, products, and biological assets	0.052	0.963
Water use intensity	0.058	0.243
Production	0.059	0.879
Subsidies	0.14	0.89
External supplies and services for water	0.078	0.938
External supplies and services in the extracommunity market	0.107	0.558
Sales of products including biological assets	-0.067	1.301

**Table 29: Covariate Balance after IPTW Adjustment (continued)**

	Diff.Adj	V.Ratio.Adj
General liquidity	0.063	1.157
Total net assets	0.067	1.441
Return on sales	0.04	0.991
External supplies and services for fuels	0.078	0.71
External supplies and services for electricity	7.14e-04	0.951
Personnel expenses	0.06	0.923
Total sales in the domestic market of goods, products, and biological assets	0.057	0.986
Return on assets 2	0.104	3.715
Investment in industrial property	0.065	1.083
Service revenues	0.007	0.949
Imports	0.054	1.097
Average personnel expenses	-0.052	0.85
Effect of interest incurred	0.034	0.341
Interest and similar income earned	0.01	0.946
Investment in development projects	-0.062	0.888
Tangible fixed assets	-0.087	1.096
External supplies and services in the community market	0.052	0.914
Extra-EU exports	0.111	1.058
Total equity	0.129	0.793
Purchases in the domestic market	0.003	1.066
Income tax for the period	0.067	0.928
Result before depreciation, financing expenses, and taxes	0.035	0.796
Operating result (EBIT)	0.13	1.144
External supplies and services in the domestic market	0.109	0.862
Investment in tangible fixed assets	-0.07	2.19
Return on assets	-0.035	1.547
Service revenues in the extracommunity market	0.13	0.968
Financial autonomy	0.017	1.035
Personnel (women)	0.134	0.892
Electricity use intensity	0.061	0.642
Cost of goods sold/raw materials consumed	0.106	0.893
Sales of goods	0.035	1.026
Net result	0.078	0.764
Pre-treatment variation of outcome variable	0.04	0.811





**Table 30: Firm Count by Group**

Treatment	Count
0	130
1	186

ATT Estimate: 0.03 Standard Error: 0.029 95% CI (-0.028, 0.087)

**A.1.3.10 Generalized Propensity Score**

**Table 31: Covariate Balance after GPS Adjustment**

	Type	Corr.Adj
Export intensity	Contin.	-0.012
Geographic diversification of exports	Contin.	-0.012
Service revenues in the domestic market	Contin.	-0.02
Service revenues in the community market	Contin.	-0.004
Total sales in the community market of goods, products, and biological assets	Contin.	-0.005
Water use intensity	Contin.	-8.33e-04
Production	Contin.	-0.004

**Table 31: Covariate Balance after GPS Adjustment (continued)**

	Type	Corr.Adj
Subsidies	Contin.	0.005
External supplies and services for water	Contin.	-0.02
External supplies and services in the extracommunity market	Contin.	-0.009
Sales of products including biological assets	Contin.	-0.004
General liquidity	Contin.	0.026
Total net assets	Contin.	0.003
Return on sales	Contin.	-0.003
External supplies and services for fuels	Contin.	-0.027
External supplies and services for electricity	Contin.	-0.013
Personnel expenses	Contin.	0.002
Total sales in the domestic market of goods, products, and biological assets	Contin.	-0.015
Return on assets 2	Contin.	0.005
Investment in industrial property	Contin.	-0.01
Service revenues	Contin.	-0.009
Imports	Contin.	-0.009
Average personnel expenses	Contin.	0.016
Effect of interest incurred	Contin.	-0.001
Interest and similar income earned	Contin.	-0.016
Investment in development projects	Contin.	-0.02
Tangible fixed assets	Contin.	-0.036
External supplies and services in the community market	Contin.	0.009
Extra-EU exports	Contin.	-0.013
Total equity	Contin.	-0.033
Purchases in the domestic market	Contin.	0.002
Income tax for the period	Contin.	-0.009
Result before depreciation, financing expenses, and taxes	Contin.	0.016
Operating result (EBIT)	Contin.	0.024
External supplies and services in the domestic market	Contin.	-0.004
Investment in tangible fixed assets	Contin.	-0.003
Return on assets	Contin.	0.002
Service revenues in the extracommunity market	Contin.	-0.01
Financial autonomy	Contin.	-0.017
Personnel (women)	Contin.	-0.019
Electricity use intensity	Contin.	-0.001
Cost of goods sold/raw materials consumed	Contin.	-0.012
Sales of goods	Contin.	-0.002
Net result	Contin.	-0.007

#### **A.1.4 Outcome Variable: Fuel use intensity**

##### **A.1.4.1 Univariate Outlier Analysis**

Univariate outlier firms (regarding the outcome variable): **69**. These will be dropped.

**Table 32: Regression Outputs (Continuous treatment)**

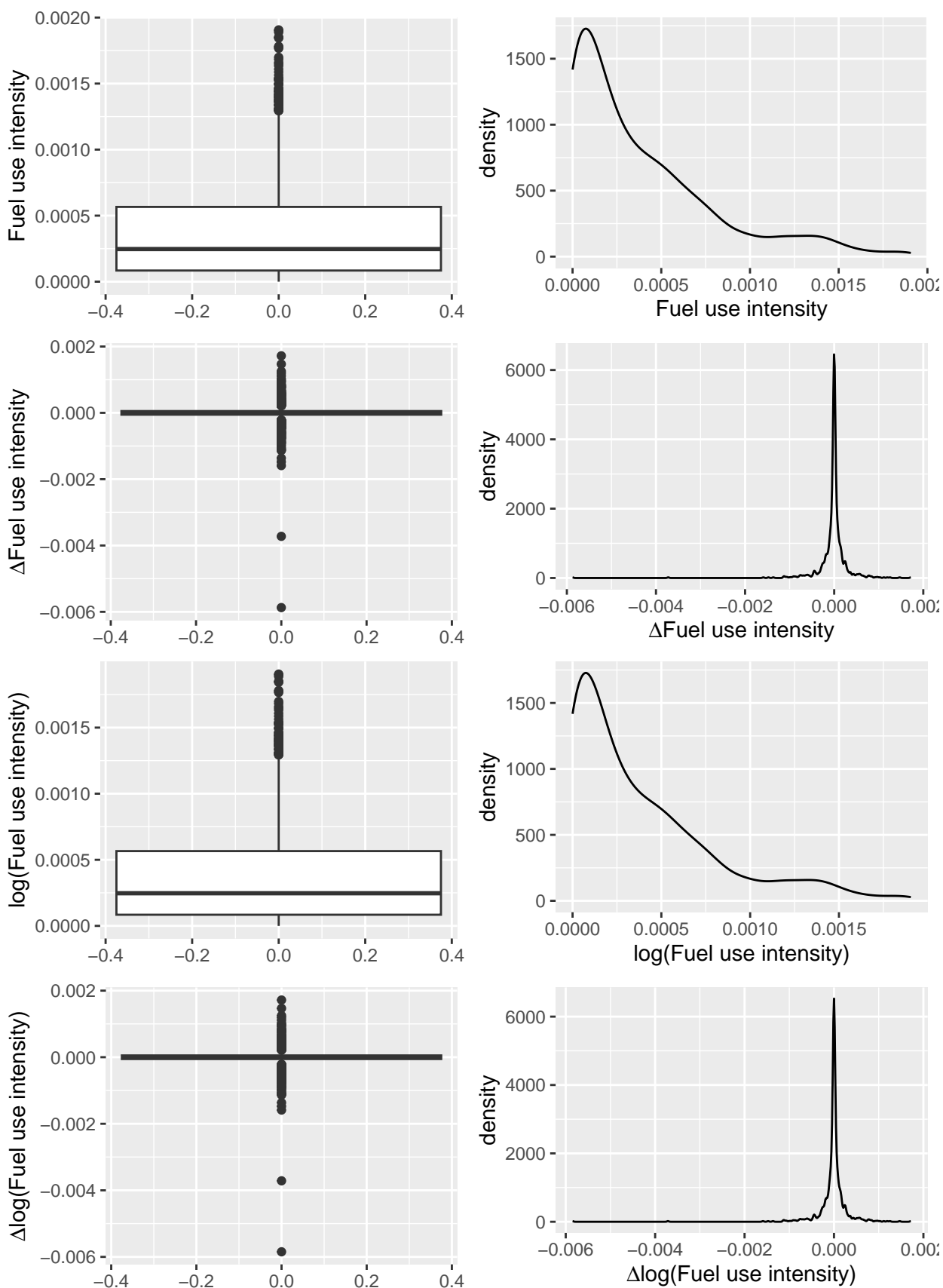
	Outcome Variable	
	(1)	(2)
w	1.56e-08 (-6.97e-08, 1.01e-07)	3e-08 (-8.41e-08, 1.44e-07)
I(w <sup>2</sup> )		-4.41e-15 (-2.76e-14, 1.87e-14)
Observations	379	379
R <sup>2</sup>	0.834	0.834
Adjusted R <sup>2</sup>	0.811	0.811
Residual Std. Error	7.08e-04 (df = 332)	7.09e-04 (df = 331)
F Statistic	36.298*** (df = 46; 332)	35.436*** (df = 47; 331)

*Note:*

\*p&lt;0.1; \*\*p&lt;0.05; \*\*\*p&lt;0.01

Potential confounders' coefficients were omitted from the table.

### A.1.4.2 Graphical Analysis of Outcome Variable (after outlier removal)



### A.1.4.3 Potential Confounder Analysis

List of features deemed as relevant to explain the **binary treatment indicator**:

1. Subsidies
2. Export intensity
3. Personnel (women)

List of features deemed as relevant to explain the **continuous treatment values**:

- |   |  |
|---|--|
| 1. Operating result   | 25. Interest and similar expenses incurred   |
| 2. Investment in industrial property  | 26. Own-entity works   |
| 3. Current liabilities from obtained financing                                    | 27. Fuel use intensity   |
| 4. Result before depreciation, financing expenses, and taxes                      | 28. R&D Personnel  |
| 5. Sales of products including biological assets                                  | 29. Purchases in the community market  |
| 6. Personnel expenses   | 30. External supplies and services for electricity                                     |
| 7. Personnel  | 31. Total sales in the extracommunity market of goods, products, and biological assets |
| 8. Total equity   | 32. Interest and similar income earned   |
| 9. Return on assets 2   | 33. Effect of interest incurred  |
| 10. Income tax for the period   | 34. Turnover   |
| 11. Inventory variation in production   | 35. Average personnel expenses   |
| 12. Profitability of business volume  | 36. Result before taxes  |
| 13. Net result for the period   | 37. External supplies and services for fuels   |
| 14. External supplies and services in the extracommunity market                   | 38. Extra-EU exports   |
| 15. Service revenues in the domestic market                                       | 39. Purchases in the domestic market   |
| 16. Business volume   | 40. Return on equity   |
| 17. Personnel (women)   | 41. Total current liabilities  |
| 18. Electricity use intensity   | 42. Return on sales  |
| 19. Imports   | 43. Financial autonomy   |
| 20. Total sales in the community market of goods, products, and biological assets | 44. Exports  |
| 21. General liquidity   | 45. EU exports   |
| 22. Tangible fixed assets   | 46. Subsidies  |
| 23. Service revenues  | 47. Purchases in the extracommunity market   |
| 24. Cost of goods sold/raw materials consumed                                     | 48. Investment in development projects   |

List of features deemed as relevant to explain the **outcome variable**:

- |   |  |
|---|--|
| 1. Fuel use intensity                       | 4. Service revenues in the domestic market |
| 2. External supplies and services for fuels | 5. Average personnel expenses              |
| 3. Personnel (women)                        | 6. Total current liabilities               |

- |  |  |
|--|--|
| 7. Service revenues                            | 18. Purchases in the extracommunity market     |
| 8. Water use intensity                         | 19. Sales of products including biological as- |
| 9. Total current assets                        | sets   |
| 10. Geographic diversification of exports      | 20. Financial autonomy                         |
| 11. Electricity use intensity                  | 21. Subsidies                                  |
| 12. Inventory variation in production          | 22. Business volume                            |
| 13. Net result for the period                  | 23. Export intensity                           |
| 14. Investment in tangible fixed assets        | 24. Service revenues in the extracommunity     |
| 15. Total net assets                           | market   |
| 16. Production                                 | 25. External supplies and services (FSE)       |
| 17. External supplies and services in the com- | 26. Exports                                    |
| munity market                                  | 27. Purchases in the community market          |

List of highly correlated relevant features (these will be discarded):

- |  |  |
|--|--|
| 1. Total current assets                        | 9. Exports                                   |
| 2. Business volume                             | 10. Total sales in the community market of   |
| 3. Turnover                                    | goods, products, and biological assets       |
| 4. Total current liabilities                   | 11. Interest and similar expenses incurred   |
| 5. Income tax for the period                   | 12. Result before taxes                      |
| 6. Current liabilities from obtained financing | 13. Inventory variation in production        |
| 7. External supplies and services (FSE)        | 14. Total sales in the extracommunity market |
| 8. Purchases in the extracommunity market      | of goods, products, and biological assets    |
|  | 15. Water use intensity                      |

Final list of **potential confounders**:

- |  |   |
|--|---|
| 1. Fuel use intensity                          | sets  |
| 2. External supplies and services for fuels    | 15. Financial autonomy                        |
| 3. Personnel (women)                           | 16. Subsidies                                 |
| 4. Service revenues in the domestic market     | 17. Export intensity                          |
| 5. Average personnel expenses                  | 18. Service revenues in the extracommunity    |
| 6. Service revenues                            | market  |
| 7. Geographic diversification of exports       | 19. Purchases in the community market         |
| 8. Electricity use intensity                   | 20. Operating result                          |
| 9. Net result for the period                   | 21. Investment in industrial property         |
| 10. Investment in tangible fixed assets        | 22. Result before depreciation, financing ex- |
| 11. Total net assets                           | penses, and taxes                             |
| 12. Production                                 | 23. Personnel expenses                        |
| 13. External supplies and services in the com- | 24. Personnel                                 |
| munity market                                  | 25. Total equity                              |
| 14. Sales of products including biological as- | 26. Return on assets 2                        |

- |  |   |
|--|---|
| 27. Profitability of business volume                                 | 35. External supplies and services for elec-<br>tricity |
| 28. External supplies and services in the ex-<br>tracommunity market | 36. Interest and similar income earned                  |
| 29. Imports  | 37. Effect of interest incurred                         |
| 30. General liquidity  | 38. Extra-EU exports                                    |
| 31. Tangible fixed assets  | 39. Purchases in the domestic market                    |
| 32. Cost of goods sold/raw materials con-<br>sumed                   | 40. Return on equity                                    |
| 33. Own-entity works   | 41. Return on sales                                     |
| 34. R&D Personnel  | 42. EU exports  |
|  | 43. Investment in development projects                  |

#### A.1.4.4 Multivariate Outlier Analysis

Multivariate outlier firms (regarding the potential confounding variables): **1**. These will be dropped.

**Table 33: Firm Count by Group**

	Control	Treated
Original Data	173	261
After Outlier Removal	147	223

#### A.1.4.5 Statistics and group comparison before adjustmnet

**Table 34: Covariate Means and Group Comparison (before adjustment and before outlier removal)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Fuel use intensity	0.01	0.206	-1.815	0.002
External supplies and services for fuels	2.65e+04	2.76e+04	-0.009	0.805
Personnel (women)	77.176	78.347	-0.007	0.958
Service revenues in the domestic market	5.53e+05	9.23e+05	-0.156	0.094
Average personnel expenses	2.46e+04	3.2e+04	-0.198	0.169
Service revenues	4.6e+07	1.76e+07	0.072	66.037
Geographic diversification of exports	0.424	0.421	0.013	1.014
Electricity use intensity	0.118	1.598	-1.507	0.003
Net result for the period	1.83e+07	1.32e+07	0.059	6.563
Investment in tangible fixed assets	-2.1e+05	1.39e+05	-0.177	2.524
Total net assets	2.22e+07	3.29e+07	-0.186	0.156
Production	7.27e+07	5.19e+07	0.036	6.326
External supplies and services in the community market	1.85e+05	2.89e+05	-0.102	0.256
Sales of products including biological assets	2.76e+06	2.43e+06	0.023	1.258
Financial autonomy	0.237	0.259	-0.056	0.837
Subsidies	2.62e+05	3.08e+05	-0.046	0.173
Export intensity	0.525	0.547	-0.075	0.794
Service revenues in the extracommunity market	4.52e+07	1.8e+07	0.053	40.762
Purchases in the community market	2.72e+06	1.77e+06	0.075	3.282



**Table 34: Covariate Means and Group Comparison (before adjustment and before outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Operating result	1.38e+05	5.54e+04	0.058	13.455
Investment in industrial property	2.72e+06	3.58e+06	-0.077	0.256
Result before depreciation, financing expenses, and taxes	2.12e+06	4.54e+06	-0.338	0.152
Personnel expenses	5.44e+06	6.91e+06	-0.07	0.838
Personnel	198.939	215.792	-0.048	0.48
Total equity	3.45e+06	2.85e+06	0.065	1.382
Return on assets 2	0.001	9.75e-04	0.05	2.722
Profitability of business volume	6.9e-04	0.001	-0.114	0.441
External supplies and services in the extracommunity market	7.91e+05	6.76e+05	0.04	1.915
Imports	1.17e+07	7.38e+06	0.098	7.59
General liquidity	2.375	2.596	-0.073	1.429
Tangible fixed assets	3.39e+06	1.81e+06	0.058	3.118
Cost of goods sold/raw materials consumed	5.5e+07	3.67e+07	0.036	7.127
Own-entity works	7.65e+04	1.02e+05	-0.066	0.189
R&D Personnel	7.287	8.26	-0.03	0.626
External supplies and services for electricity	1.65e+05	1.54e+05	0.02	0.703
Interest and similar income earned	7.92e+05	4.04e+05	0.053	10.01
Effect of interest incurred	-1.75e+05	6798.816	-0.066	2092.913
Extra-EU exports	4.73e+07	1.91e+07	0.054	41.627

**Table 34: Covariate Means and Group Comparison (before adjustment and before outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Purchases in the domestic market	7.41e+06	1.72e+07	-0.347	0.062
Return on equity	143.125	187.586	-0.036	0.51
Return on sales	235.975	4093.828	-2.106	0.002
EU exports	9.2e+06	4.81e+06	0.054	28.409
Investment in development projects	1.36e+06	1.16e+06	0.014	2.09

**Table 35: Covariate Means and Group Comparison (before adjustment and after outlier removal)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Fuel use intensity	3.94e-04	4.23e-04	-0.072	0.969
External supplies and services for fuels	1.21e+04	1.36e+04	-0.037	1.388
Personnel (women)	82.413	73.367	0.051	1.041
Service revenues in the domestic market	5.57e+05	1.01e+06	-0.184	0.085
Average personnel expenses	2.33e+04	3.4e+04	-0.299	0.133
Service revenues	5.03e+07	1.48e+07	0.083	157.365
Geographic diversification of exports	0.38	0.406	-0.107	0.777
Electricity use intensity	0.02	0.234	-0.953	0.01
Net result for the period	1.83e+07	1.26e+07	0.062	6.663
Investment in tangible fixed assets	-2.13e+05	1.3e+05	-0.173	2.29
Total net assets	2.16e+07	3.3e+07	-0.194	0.143
Production	7.81e+07	4.87e+07	0.048	6.797
External supplies and services in the community market	1.75e+05	3.31e+05	-0.146	0.235
Sales of products including biological assets	1.9e+06	2.33e+06	-0.054	0.343
Financial autonomy	0.244	0.267	-0.058	0.838
Subsidies	2.43e+05	3.4e+05	-0.114	0.106
Export intensity	0.482	0.542	-0.239	0.606
Service revenues in the extracommunity market	4.94e+07	1.63e+07	0.06	48.269
Purchases in the community market	3.02e+06	1.9e+06	0.082	3.273

**Table 35: Covariate Means and Group Comparison (before adjustment and after outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Operating result	1.53e+05	5.3e+04	0.065	13.983
Investment in industrial property	2.63e+06	3.84e+06	-0.103	0.241
Result before depreciation, financing expenses, and taxes	2.08e+06	4.85e+06	-0.481	0.085
Personnel expenses	5.4e+06	7.2e+06	-0.082	0.802
Personnel	205.789	205.837	-1.28e-04	0.493
Total equity	3.48e+06	2.77e+06	0.075	1.302
Return on assets 2	0.001	7.78e-04	0.098	3.783
Profitability of business volume	7.49e-04	7.32e-04	0.005	0.868
External supplies and services in the extracommunity market	7.46e+05	6.33e+05	0.041	1.784
Imports	1.16e+07	6.89e+06	0.103	9.718
General liquidity	2.426	2.396	0.009	3.064
Tangible fixed assets	3.91e+06	2.1e+06	0.062	3.099
Cost of goods sold/raw materials consumed	6e+07	3.39e+07	0.047	7.669
Own-entity works	7.85e+04	1.15e+05	-0.09	0.18
R&D Personnel	8.045	9.408	-0.039	0.618
External supplies and services for electricity	1.42e+05	8.99e+04	0.122	2.685
Interest and similar income earned	8.89e+05	4.42e+05	0.056	9.969
Effect of interest incurred	-2.05e+05	7951.71	-0.071	2083.54
Extra-EU exports	5.06e+07	1.71e+07	0.059	49.235

**Table 35: Covariate Means and Group Comparison (before adjustment and after outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Purchases in the domestic market	7.93e+06	1.61e+07	-0.27	0.066
Return on equity	164.496	219.708	-0.041	0.507
Return on sales	231.265	888.369	-0.338	0.082
EU exports	9.99e+06	4.85e+06	0.058	29.919
Investment in development projects	1.53e+06	1.35e+06	0.012	2.076

**Table 36: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Fuel use intensity	3.93e-04	4.23e-04	-0.072	0.969
External supplies and services for fuels	7.012	7.323	-0.102	1.015
Personnel (women)	3.226	3.001	0.143	1.035
Service revenues in the domestic market	5.519	5.402	0.021	1.039
Average personnel expenses	9.424	9.636	-0.164	1.047
Service revenues	14.493	14.515	-0.006	1.186
Geographic diversification of exports	0.309	0.324	-0.094	0.822
Electricity use intensity	0.012	0.044	-0.327	0.093
Net result for the period	14.941	15.043	-0.047	1.445
Investment in tangible fixed assets	-2.13e+05	1.3e+05	-0.173	2.29
Total net assets	2.16e+07	3.3e+07	-0.194	0.143
Production	15.552	15.68	-0.038	1.23
External supplies and services in the community market	5.441	5.041	0.076	0.927
Sales of products including biological assets	10.19	9.762	0.085	0.912
Financial autonomy	0.185	0.196	-0.049	0.807
Subsidies	9.541	8.405	0.265	0.89
Export intensity	0.38	0.413	-0.2	0.646
Service revenues in the extracommunity market	14.521	14.829	-0.115	2.234

**Table 36: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Purchases in the community market	7.632	6.904	0.115	0.969
Operating result	2.515	2.785	-0.062	0.982
Investment in industrial property	12.602	12.722	-0.04	1.191
Result before depreciation, financing expenses, and taxes	2.08e+06	4.85e+06	-0.481	0.085
Personnel expenses	13.855	14.001	-0.077	1.038
Personnel	4.436	4.39	0.033	1.24
Total equity	11.468	11.422	0.009	1.014
Return on assets 2	0.001	7.74e-04	0.097	3.725
Profitability of business volume	7.43e-04	7.25e-04	0.005	0.866
External supplies and services in the extracommunity market	11.095	11.072	0.008	0.895
Imports	14.526	14.509	0.01	1.36
General liquidity	1.114	1.137	-0.058	1.065
Tangible fixed assets	9.112	8.663	0.093	0.93
Cost of goods sold/raw materials consumed	15.135	15.281	-0.057	1.289
Own-entity works	2.445	1.81	0.131	1.276
R&D Personnel	0.817	0.738	0.06	0.925
External supplies and services for electricity	9.71	9.881	-0.06	1.242
Interest and similar income earned	10.027	9.627	0.112	0.886

**Table 36: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Effect of interest incurred	-2.05e+05	7951.71	-0.071	2083.54
Extra-EU exports	14.888	15.043	-0.078	1.458
Purchases in the domestic market	12.08	12.052	0.006	0.971
Return on equity	1.847	1.871	-0.015	1.012
Return on sales	1.74	1.542	0.092	0.981
EU exports	10.536	10.128	0.068	0.92
Investment in development projects	6.301	6.127	0.031	0.995



### A.1.4.6 Functional Form Search for Regression Models

Added terms for **propensity score model** (besides all potential confounders):

1. Sales of products including biological assets \* Personnel expenses

Added terms for **generalized propensity score model** (besides all potential confounders):

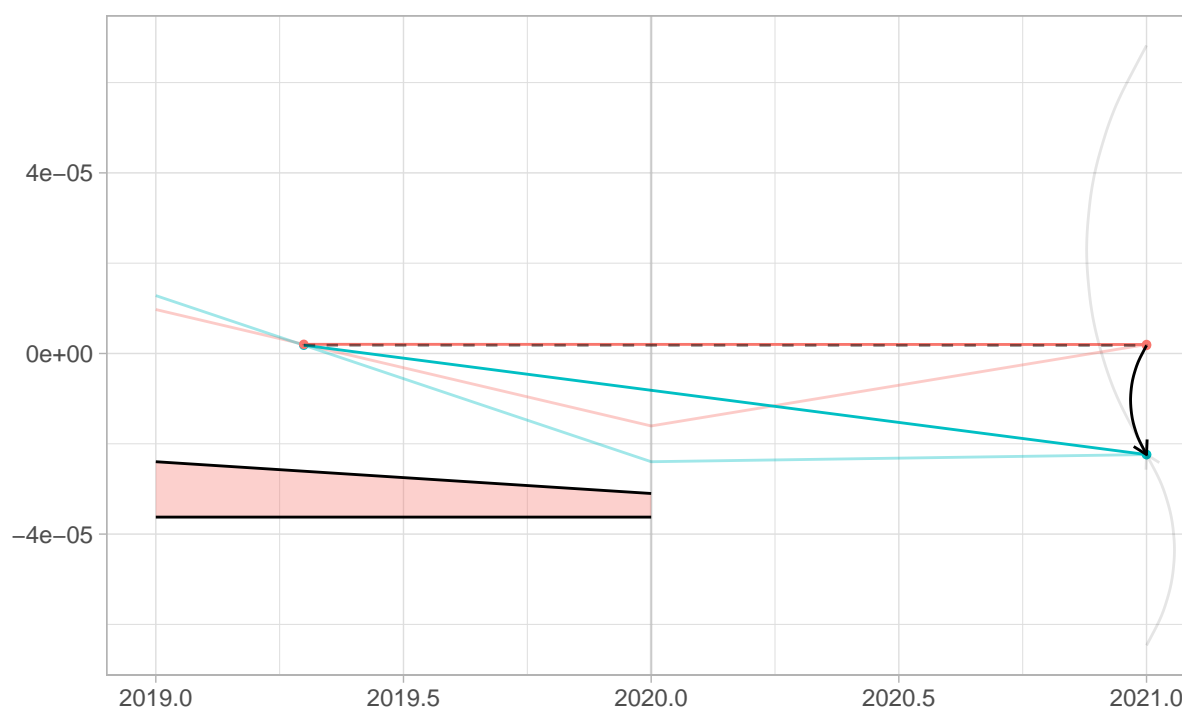
- |  |  |
|--|--|
| 1. squared(External supplies and services for fuels) | 3. Electricity use intensity * Cost of goods sold/raw materials consumed |
| 2. Return on sales * Total equity                    |  |

Added terms for **outcome model** (besides all potential confounders):

- |   |         |                                |
|---|---------|--------------------------------|
| 1. squared(Investment in tangible fixed assets) | earned) | 3. squared(Fuel use intensity) |
| 2. squared(Interest and similar income          |         |                                |

### A.1.4.7 Synthetic Differences in Differences - With Bias Correction

— synthetic control — treated

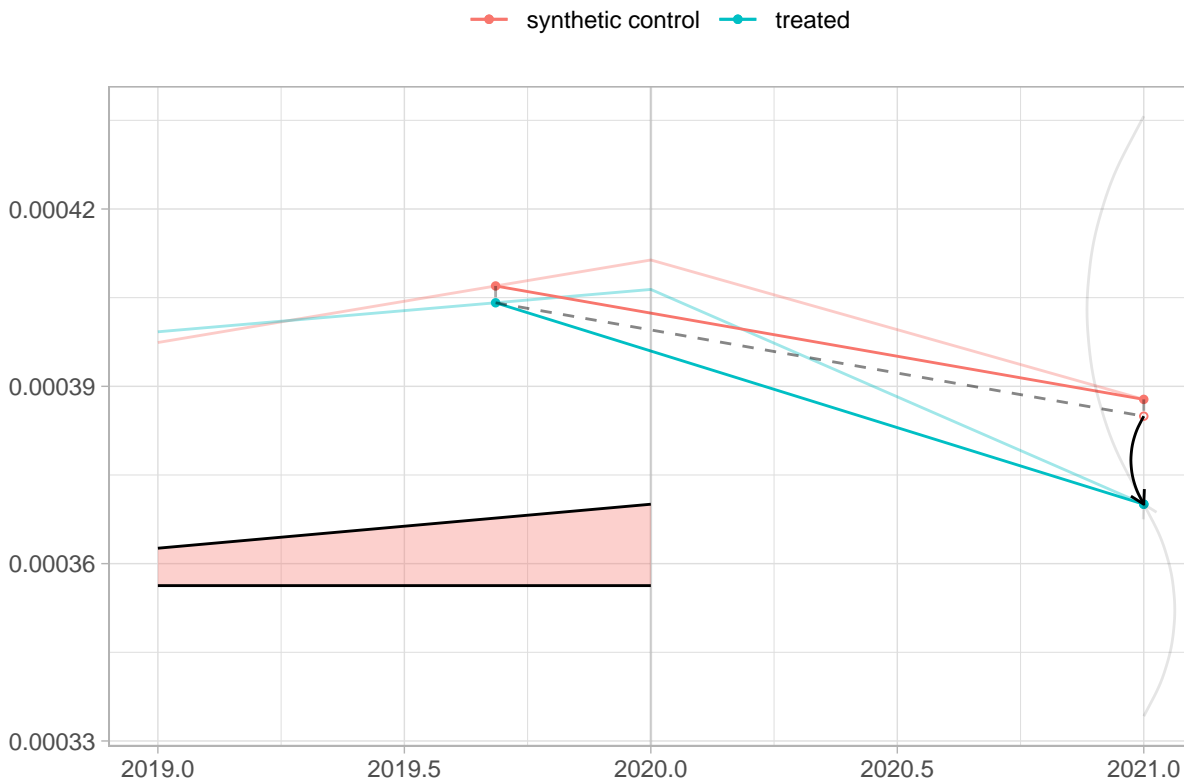


ATT Estimate:  $-2.4e-05$

Standard Error:  $3.2e-05$

95% CI ( $-8.7e-05$ ,  $3.9e-05$ )

### A.1.4.8 Synthetic Differences in Differences - Without Bias Correction



ATT Estimate:  $-1.5e-05$   
 Standard Error:  $2.6e-05$   
 95% CI ( $-6.6e-05$  ,  $3.6e-05$  )

### A.1.4.9 Weighted Differences in Differences

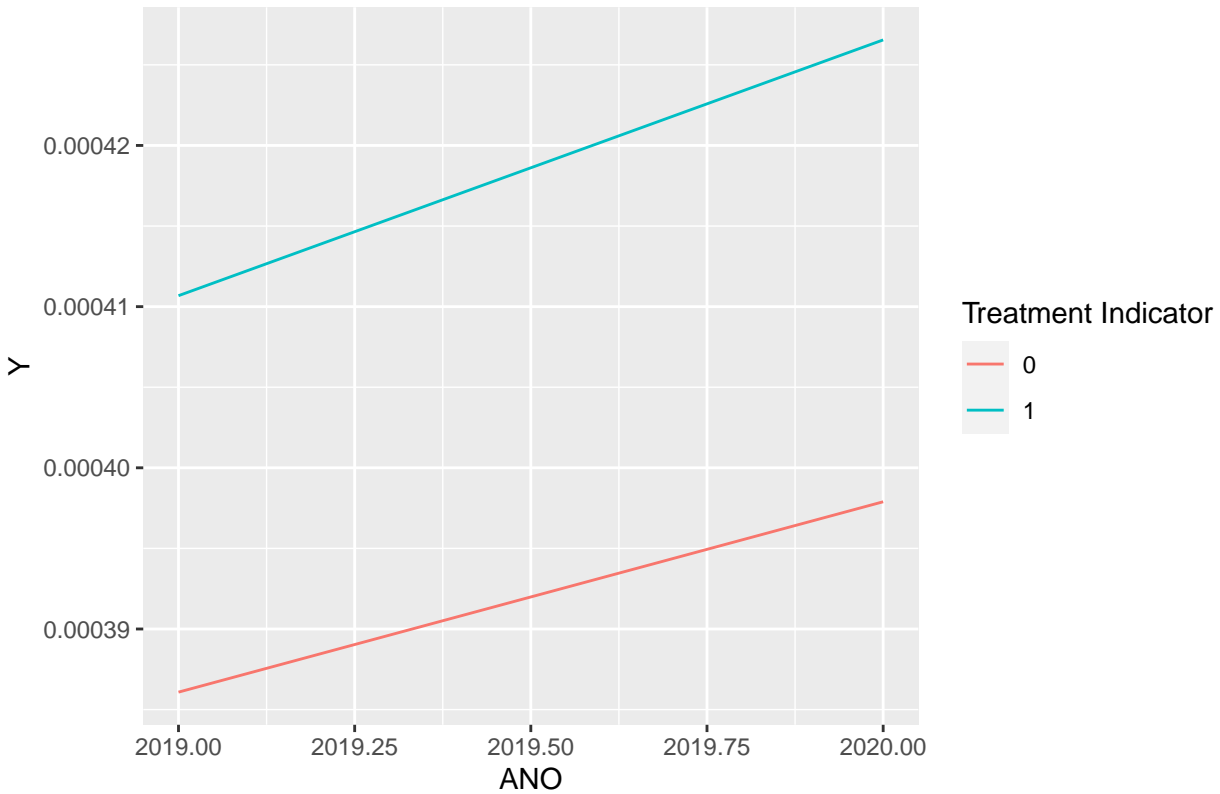
**Table 37: Covariate Balance after IPTW Adjustment**

	Diff.Adj	V.Ratio.Adj
Fuel use intensity	0.07	1.13
External supplies and services for fuels	0.007	1.027
Personnel (women)	0.063	0.931
Service revenues in the domestic market	-0.079	1.028
Average personnel expenses	0.038	0.677
Service revenues	-0.005	0.992
Geographic diversification of exports	0.089	0.86
Electricity use intensity	-0.28	0.443
Net result for the period	0.049	0.891
Investment in tangible fixed assets	0.068	0.514
Total net assets	0.056	1.426

**Table 37: Covariate Balance after IPTW Adjustment (continued)**

	Diff.Adj	V.Ratio.Adj
Production	0.012	0.954
External supplies and services in the community market	0.086	0.855
Sales of products including biological assets	0.005	1.008
Financial autonomy	0.042	1.112
Subsidies	0.028	1.117
Export intensity	0.109	0.777
Service revenues in the extracommunity market	0.057	1.01
Purchases in the community market	0.042	0.93
Operating result	0.056	1.047
Investment in industrial property	0.076	0.875
Result before depreciation, financing expenses, and taxes	0.034	1.232
Personnel expenses	0.063	0.796
Personnel	0.046	0.976
Total equity	0.156	0.755
Return on assets 2	0.07	3.376
Profitability of business volume	0.073	2.171
External supplies and services in the extracommunity market	-0.005	0.995
Imports	-0.007	0.97
General liquidity	-0.014	0.885
Tangible fixed assets	-0.057	1.065
Cost of goods sold/raw materials consumed	0.02	0.919
Own-entity works	0.107	1.399
R&D Personnel	0.016	0.907
External supplies and services for electricity	-0.067	0.912
Interest and similar income earned	0.124	0.773
Effect of interest incurred	0.033	0.396
Extra-EU exports	0.061	0.929
Purchases in the domestic market	-0.059	1.076
Return on equity	0.112	1.106
Return on sales	0.09	1.045
EU exports	0.006	1.155
Investment in development projects	-0.034	0.927
Pre-treatment variation of outcome variable	0.016	0.856

Pre-treatment trends for treated and control groups



**Table 38: Firm Count by Group**

Treatment	Count
0	125
1	168

ATT Estimate:  $-1.8e-05$  Standard Error:  $3.5e-05$  95% CI ( $-8.4e-05$ ,  $4.9e-05$ )

**A.1.4.10 Generalized Propensity Score**

**Table 39: Covariate Balance after GPS Adjustment**

	Type	Corr.Adj
Fuel use intensity	Contin.	-0.014
External supplies and services for fuels	Contin.	-0.013
Personnel (women)	Contin.	-0.003
Service revenues in the domestic market	Contin.	-0.005
Average personnel expenses	Contin.	-0.008
Service revenues	Contin.	0.002
Geographic diversification of exports	Contin.	0.021

**Table 39: Covariate Balance after GPS Adjustment (continued)**

	Type	Corr.Adj
Electricity use intensity	Contin.	0.002
Net result for the period	Contin.	0.01
Investment in tangible fixed assets	Contin.	-0.03
Total net assets	Contin.	-0.006
Production	Contin.	-0.003
External supplies and services in the community market	Contin.	-0.009
Sales of products including biological assets	Contin.	0.011
Financial autonomy	Contin.	0.016
Subsidies	Contin.	0.009
Export intensity	Contin.	0.016
Service revenues in the extracommunity market	Contin.	0.007
Purchases in the community market	Contin.	-0.018
Operating result	Contin.	-0.009
Investment in industrial property	Contin.	0.005
Result before depreciation, financing expenses, and taxes	Contin.	-0.006
Personnel expenses	Contin.	-0.005
Personnel	Contin.	-2.57e-04
Total equity	Contin.	0.002
Return on assets 2	Contin.	0.001
Profitability of business volume	Contin.	-0.006
External supplies and services in the extracommunity market	Contin.	7.72e-04
Imports	Contin.	-0.005
General liquidity	Contin.	-0.047
Tangible fixed assets	Contin.	0.014
Cost of goods sold/raw materials consumed	Contin.	-0.004
Own-entity works	Contin.	0.037
R&D Personnel	Contin.	0.014
External supplies and services for electricity	Contin.	0.006
Interest and similar income earned	Contin.	0.028
Effect of interest incurred	Contin.	-0.001
Extra-EU exports	Contin.	0.008
Purchases in the domestic market	Contin.	-0.007
Return on equity	Contin.	0.008
Return on sales	Contin.	0.014
EU exports	Contin.	-6.59e-04
Investment in development projects	Contin.	-0.003

## A.1.5 Outcome Variable: Electricity use intensity

### A.1.5.1 Univariate Outlier Analysis

Univariate outlier firms (regarding the outcome variable): **75**. These will be dropped.

**Table 40: Regression Outputs (Continuous treatment)**

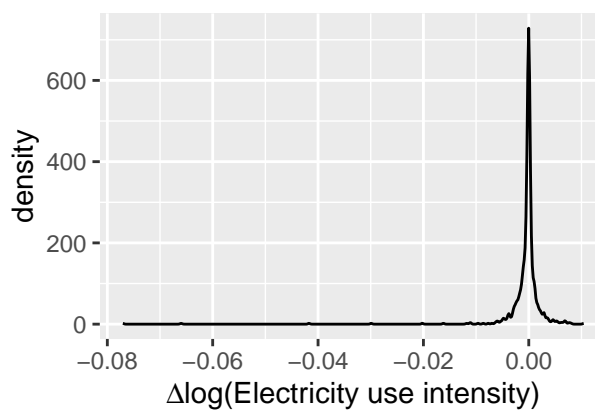
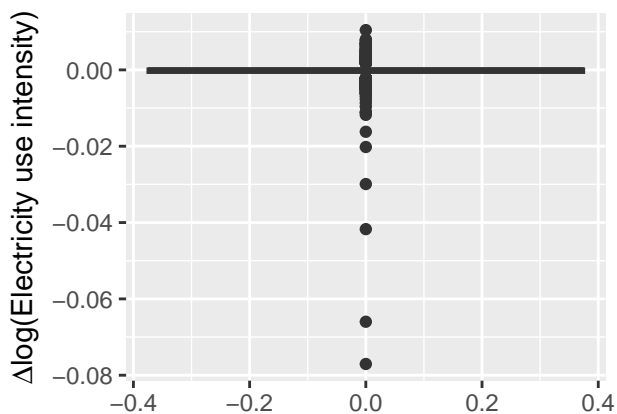
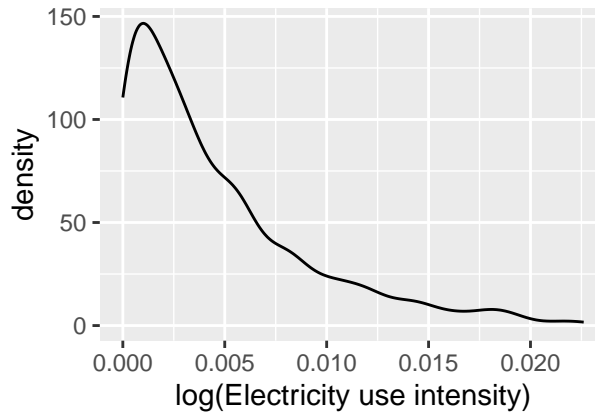
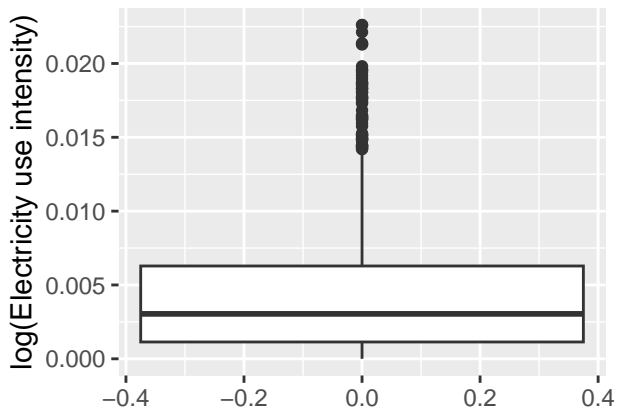
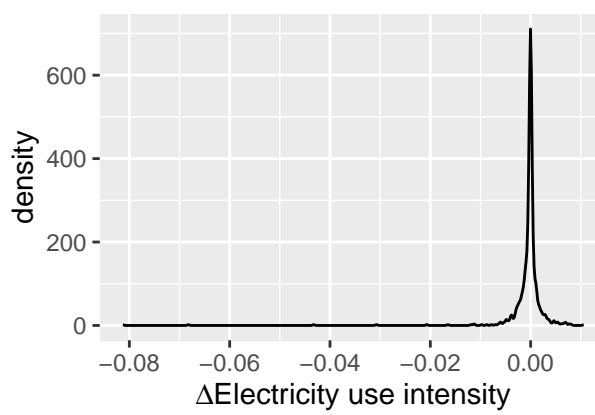
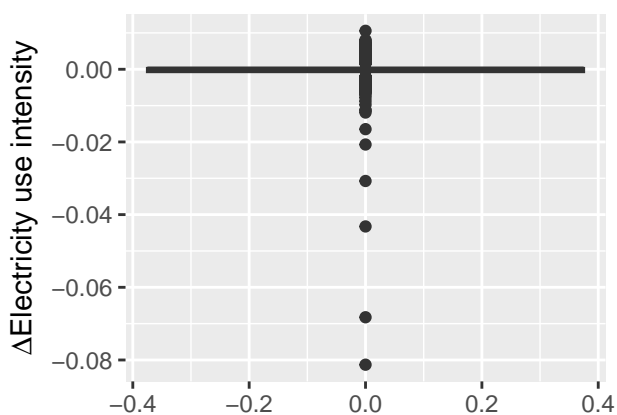
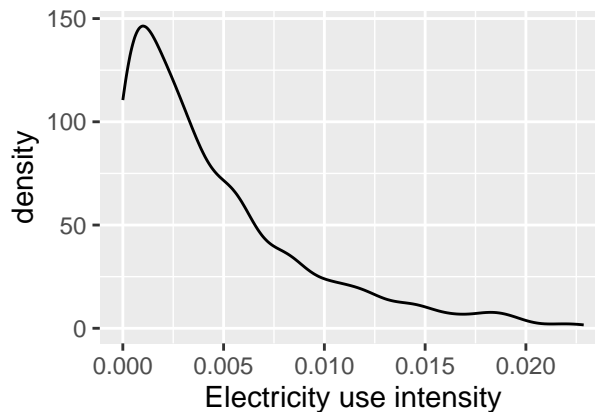
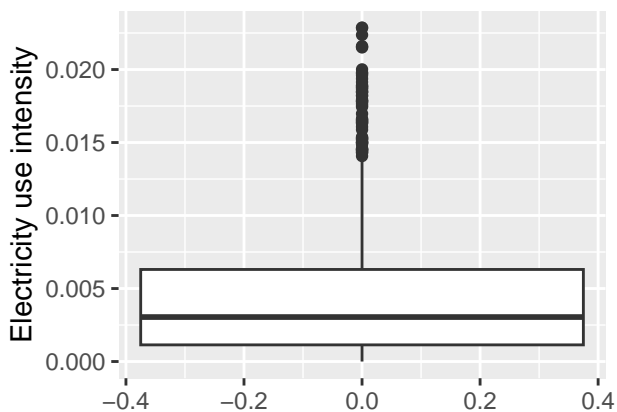
	Outcome Variable	
	(1)	(2)
w	3.14e-11 (-1.85e-11, 8.14e-11)	5.03e-11 (-1.73e-11, 1.18e-10)
I(w <sup>2</sup> )		-4.83e-18 (-1.65e-17, 6.83e-18)
Observations	366	366
R <sup>2</sup>	0.72	0.72
Adjusted R <sup>2</sup>	0.678	0.678
Residual Std. Error	4.37e-07 (df = 318)	4.38e-07 (df = 317)
F Statistic	17.385*** (df = 47; 318)	17.019*** (df = 48; 317)

*Note:*

\*p&lt;0.1; \*\*p&lt;0.05; \*\*\*p&lt;0.01

Potential confounders' coefficients were omitted from the table.

**A.1.5.2 Graphical Analysis of Outcome Variable (after outlier removal)**



### A.1.5.3 Potential Confounder Analysis

List of features deemed as relevant to explain the **binary treatment indicator**:

- |  |  |
|--|--|
| 1. Subsidies   | 16. Return on sales  |
| 2. Cost of goods sold/raw materials consumed                                     | 17. Personnel (women)  |
| 3. Return on assets  | 18. Sales of products including biological assets                                |
| 4. Total sales of goods, finished products, and biological assets                | 19. External supplies and services (FSE)   |
| 5. External supplies and services for electricity                                | 20. Total current liabilities  |
| 6. Export intensity  | 21. Total sales in the domestic market of goods, products, and biological assets |
| 7. Water use intensity   | 22. Interest and similar income earned   |
| 8. Personnel expenses  | 23. Total current assets   |
| 9. Total sales in the community market of goods, products, and biological assets | 24. Electricity use intensity  |
| 10. Sales of goods   | 25. Purchases in the extracommunity market                                       |
| 11. Personnel  | 26. Result before taxes  |
| 12. Financial autonomy   | 27. Net result for the period  |
| 13. External supplies and services for fuels                                     | 28. Return on equity   |
| 14. Average personnel expenses   | 29. Tangible fixed assets  |
| 15. Interest and similar expenses incurred                                       | 30. External supplies and services in the domestic market                        |
|  | 31. Inventory variation in production  |

List of features deemed as relevant to explain the **continuous treatment values**:

- |  |  |
|--|--|
| 1. Investment in industrial property             | 5. Return on assets 2  |
| 2. Sales of products including biological assets | 6. Net result for the period   |
| 3. Intangible assets                             | 7. Operating result  |
| 4. External supplies and services for fuels      | 8. Total sales in the community market of goods, products, and biological assets |

List of features deemed as relevant to explain the **outcome variable**:

- |   |  |
|---|--|
| 1. Electricity use intensity                      | 8. Return on equity                        |
| 2. External supplies and services for electricity | 9. Turnover                                |
| 3. Fuel use intensity                             | 10. Extra-EU exports                       |
| 4. Water use intensity                            | 11. Purchases in the extracommunity market |
| 5. Cost of goods sold/raw materials consumed      | 12. Result before taxes                    |
| 6. Subsidies                                      | 13. Inventory variation in production      |
| 7. Geographic diversification of exports          | 14. Total current liabilities              |
|   | 15. Production                             |
|   | 16. Service revenues                       |



- |   |   |
|---|---|
| 17. External supplies and services in the extracommunity market | 25. Income tax for the period   |
| 18. Personnel (women)   | 26. Intangible assets   |
| 19. Tangible fixed assets                                       | 27. Average personnel expenses  |
| 20. Interest and similar income earned                          | 28. Net result for the period   |
| 21. Return on assets  | 29. Investment in industrial property   |
| 22. Personnel   | 30. Total sales in the community market of goods, products, and biological assets |
| 23. External supplies and services (FSE)                        | 31. Export intensity  |
| 24. Current liabilities from obtained financing                 |   |

List of highly correlated relevant features (these will be discarded):

- |                              |  |
|------------------------------|--|
| 1. Total current assets      | 5. External supplies and services (FSE)        |
| 2. Turnover                  | 6. Current liabilities from obtained financing |
| 3. Intangible assets         | 7. Personnel                                   |
| 4. Total current liabilities | 8. Result before taxes                         |

Final list of **potential confounders**:

- |   |   |
|---|---|
| 1. Electricity use intensity                                    | 20. Average personnel expenses  |
| 2. External supplies and services for electricity               | 21. Net result for the period   |
| 3. Fuel use intensity   | 22. Investment in industrial property   |
| 4. Water use intensity  | 23. Total sales in the community market of goods, products, and biological assets |
| 5. Cost of goods sold/raw materials consumed                    | 24. Export intensity  |
| 6. Subsidies  | 25. Total sales of goods, finished products, and biological assets                |
| 7. Geographic diversification of exports                        | 26. Personnel expenses  |
| 8. Return on equity   | 27. Sales of goods  |
| 9. Extra-EU exports   | 28. Financial autonomy  |
| 10. Purchases in the extracommunity market                      | 29. External supplies and services for fuels                                      |
| 11. Inventory variation in production                           | 30. Interest and similar expenses incurred  |
| 12. Production  | 31. Return on sales   |
| 13. Service revenues  | 32. Sales of products including biological assets                                 |
| 14. External supplies and services in the extracommunity market | 33. Total sales in the domestic market of goods, products, and biological assets  |
| 15. Personnel (women)   | 34. External supplies and services in the domestic market                         |
| 16. Tangible fixed assets                                       | 35. Return on assets 2  |
| 17. Interest and similar income earned                          | 36. Operating result  |
| 18. Return on assets  |   |
| 19. Income tax for the period                                   |   |

#### A.1.5.4 Multivariate Outlier Analysis

Multivariate outlier firms (regarding the potential confounding variables): **0**. These will be dropped.

**Table 41: Firm Count by Group**

	Control	Treated
Original Data	173	261
After Outlier Removal	143	224

#### A.1.5.5 Statistics and group comparison before adjustment

**Table 42: Covariate Means and Group Comparison (before adjustment and before outlier removal)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Electricity use intensity	0.118	1.598	-1.507	0.003
External supplies and services for electricity	1.65e+05	1.54e+05	0.02	0.703
Fuel use intensity	0.01	0.206	-1.815	0.002
Water use intensity	0.081	0.025	0.046	24.782
Cost of goods sold/raw materials consumed	5.5e+07	3.67e+07	0.036	7.127
Subsidies	2.62e+05	3.08e+05	-0.046	0.173
Geographic diversification of exports	0.424	0.421	0.013	1.014
Return on equity	143.125	187.586	-0.036	0.51
Extra-EU exports	4.73e+07	1.91e+07	0.054	41.627
Purchases in the extracommunity market	8.96e+06	5.6e+06	0.084	10.095
Inventory variation in production	-2.09e+05	1.39e+05	-0.176	2.523
Production	7.27e+07	5.19e+07	0.036	6.326
Service revenues	4.6e+07	1.76e+07	0.072	66.037
External supplies and services in the extracommunity market	7.91e+05	6.76e+05	0.04	1.915
Personnel (women)	77.176	78.347	-0.007	0.958
Tangible fixed assets	3.39e+06	1.81e+06	0.058	3.118
Interest and similar income earned	7.92e+05	4.04e+05	0.053	10.01
Return on assets	1.011	0.927	0.054	2.55
Income tax for the period	5.58e+06	5.96e+06	-0.028	0.656

**Table 42: Covariate Means and Group Comparison (before adjustment and before outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Average personnel expenses	2.46e+04	3.2e+04	-0.198	0.169
Net result for the period	1.83e+07	1.32e+07	0.059	6.563
Investment in industrial property	2.72e+06	3.58e+06	-0.077	0.256
Total sales in the community market of goods, products, and biological assets	9.11e+06	4.41e+06	0.058	36.049
Export intensity	0.525	0.547	-0.075	0.794
Total sales of goods, finished products, and biological assets	4.34e+07	4.85e+06	0.068	1039.221
Personnel expenses	5.44e+06	6.91e+06	-0.07	0.838
Sales of goods	2.92e+07	4.71e+07	-0.209	0.143
Financial autonomy	0.237	0.259	-0.056	0.837
External supplies and services for fuels	2.65e+04	2.76e+04	-0.009	0.805
Interest and similar expenses incurred	1.46e+06	4.19e+06	-0.262	0.407
Return on sales	235.975	4093.828	-2.106	0.002
Sales of products including biological assets	2.76e+06	2.43e+06	0.023	1.258
Total sales in the domestic market of goods, products, and biological assets	1.75e+07	2.99e+07	-0.125	0.245
External supplies and services in the domestic market	8.61e+05	1.38e+06	-0.162	0.347
Return on assets 2	0.001	9.75e-04	0.05	2.722
Operating result	1.38e+05	5.54e+04	0.058	13.455

**Table 43: Covariate Means and Group Comparison (before adjustment and after outlier removal)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Electricity use intensity	0.004	0.005	-0.049	1.125
External supplies and services for electricity	1.32e+05	9.75e+04	0.086	1.453
Fuel use intensity	6.16e-04	6.11e-04	0.004	1.384
Water use intensity	0.002	0.001	0.083	7.479
Cost of goods sold/raw materials consumed	6.27e+07	3.81e+07	0.045	7.267
Subsidies	2.87e+05	3.61e+05	-0.069	0.166
Geographic diversification of exports	0.374	0.377	-0.015	0.872
Return on equity	163.868	224.917	-0.046	0.491
Extra-EU exports	5.27e+07	2.05e+07	0.057	40.783
Purchases in the extracommunity market	9.19e+06	5.89e+06	0.079	10.187
Inventory variation in production	-2e+05	1.71e+05	-0.18	2.388
Production	8.28e+07	5.48e+07	0.045	6.39
Service revenues	5.22e+07	1.87e+07	0.078	67.806
External supplies and services in the extracommunity market	8.28e+05	6.81e+05	0.049	1.955
Personnel (women)	86.826	87.888	-0.006	0.932
Tangible fixed assets	3.92e+06	2.13e+06	0.061	3.002
Interest and similar income earned	9e+05	4.71e+05	0.054	9.672
Return on assets	0.998	0.933	0.04	2.509
Income tax for the period	6.13e+06	6.41e+06	-0.02	0.635

**Table 43: Covariate Means and Group Comparison (before adjustment and after outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Average personnel expenses	2.5e+04	3.41e+04	-0.243	0.141
Net result for the period	1.95e+07	1.34e+07	0.066	6.693
Investment in industrial property	2.74e+06	4.11e+06	-0.12	0.222
Total sales in the community market of goods, products, and biological assets	1.05e+07	5.04e+06	0.062	35.353
Export intensity	0.475	0.51	-0.14	0.649
Total sales of goods, finished products, and biological assets	4.97e+07	4.58e+06	0.074	1489.642
Personnel expenses	6.02e+06	7.64e+06	-0.072	0.813
Sales of goods	3.31e+07	5.02e+07	-0.188	0.142
Financial autonomy	0.245	0.266	-0.051	0.905
External supplies and services for fuels	2.87e+04	3.06e+04	-0.015	0.77
Interest and similar expenses incurred	1.54e+06	4.65e+06	-0.28	0.389
Return on sales	226.008	390.532	-0.085	0.387
Sales of products including biological assets	1.79e+06	2.22e+06	-0.054	0.333
Total sales in the domestic market of goods, products, and biological assets	2.01e+07	3.11e+07	-0.103	0.248
External supplies and services in the domestic market	9.6e+05	1.62e+06	-0.191	0.334
Return on assets 2	0.001	6.36e-04	0.114	6.56
Operating result	1.55e+05	5.23e+04	0.067	13.932

**Table 44: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Electricity use intensity	0.004	0.005	-0.049	1.123
External supplies and services for electricity	9.737	9.883	-0.053	1.115
Fuel use intensity	6.15e-04	6.11e-04	0.004	1.383
Water use intensity	0.002	0.001	0.083	7.094
Cost of goods sold/raw materials consumed	15.214	15.456	-0.094	1.325
Subsidies	9.571	8.546	0.239	0.899
Geographic diversification of exports	0.305	0.306	-0.007	0.914
Return on equity	1.857	1.882	-0.016	1.028
Extra-EU exports	14.932	15.101	-0.083	1.367
Purchases in the extracommunity market	14.37	14.426	-0.032	1.365
Inventory variation in production	-2e+05	1.71e+05	-0.18	2.388
Production	15.661	15.945	-0.085	1.361
Service revenues	14.58	14.735	-0.045	1.202
External supplies and services in the extracommunity market	11.21	11.224	-0.005	0.914
Personnel (women)	3.275	3.212	0.039	1.043
Tangible fixed assets	9.19	8.681	0.104	0.917
Interest and similar income earned	10.093	9.956	0.038	0.944
Return on assets	0.998	0.933	0.04	2.509

**Table 44: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Income tax for the period	14.448	14.456	-0.005	0.818
Average personnel expenses	9.482	9.579	-0.075	0.76
Net result for the period	15.036	15.16	-0.057	1.412
Investment in industrial property	12.752	12.878	-0.043	1.114
Total sales in the community market of goods, products, and biological assets	10.298	10.27	0.004	1.006
Export intensity	0.376	0.393	-0.108	0.699
Total sales of goods, finished products, and biological assets	9.047	8.625	0.063	0.969
Personnel expenses	13.957	14.122	-0.085	1.103
Sales of goods	14.356	14.865	-0.099	1.155
Financial autonomy	0.187	0.199	-0.051	0.855
External supplies and services for fuels	7.28	7.726	-0.143	1.114
Interest and similar expenses incurred	1.54e+06	4.65e+06	-0.28	0.389
Return on sales	1.751	1.466	0.131	1.169
Sales of products including biological assets	9.994	9.702	0.058	0.947
Total sales in the domestic market of goods, products, and biological assets	12.93	13.178	-0.047	1.078
External supplies and services in the domestic market	9.586	9.123	0.093	0.805
Return on assets 2	0.001	6.33e-04	0.113	6.418
Operating result	2.434	2.888	-0.103	0.992



### A.1.5.6 Functional Form Search for Regression Models

Added terms for **propensity score model** (besides all potential confounders):

1. Sales of products including biological assets \* Personnel expenses

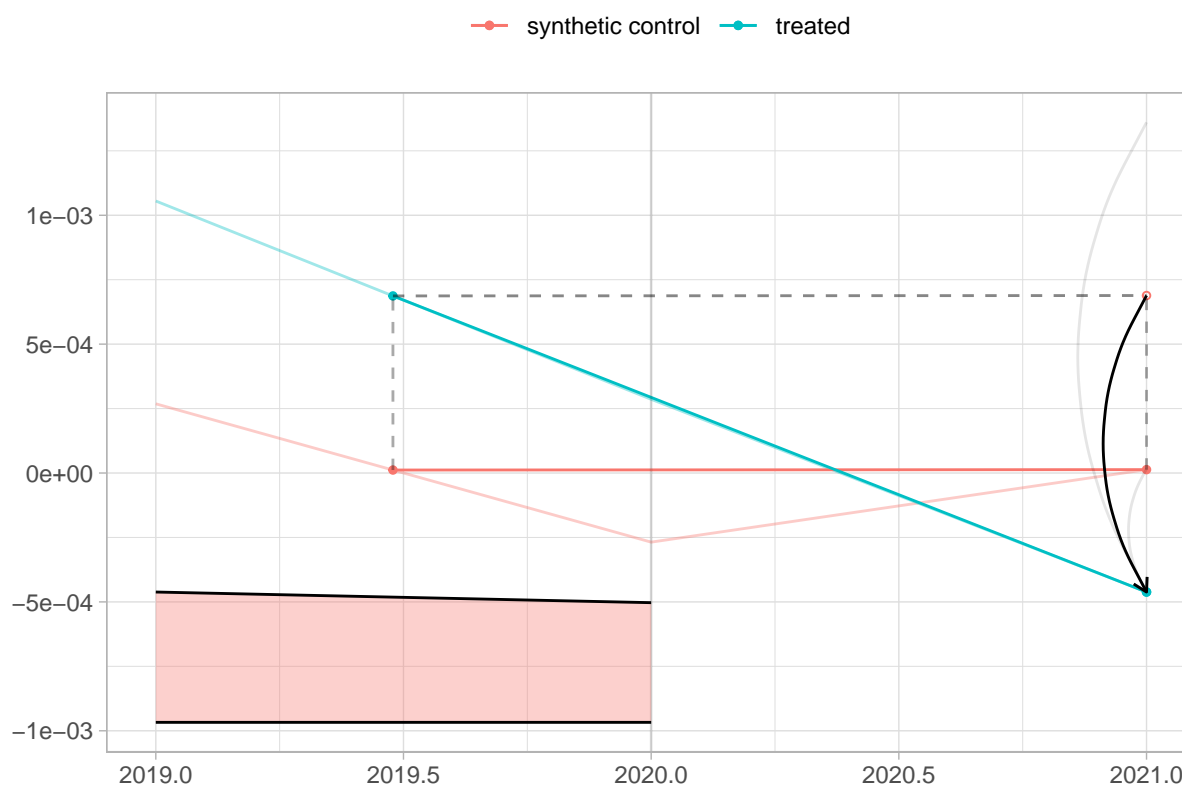
Added terms for **generalized propensity score model** (besides all potential confounders):

1. squared(Subsidies)
2. Fuel use intensity \* Return on assets 2

Added terms for **outcome model** (besides all potential confounders):

1. squared(Electricity use intensity)

### A.1.5.7 Synthetic Differences in Differences - With Bias Correction

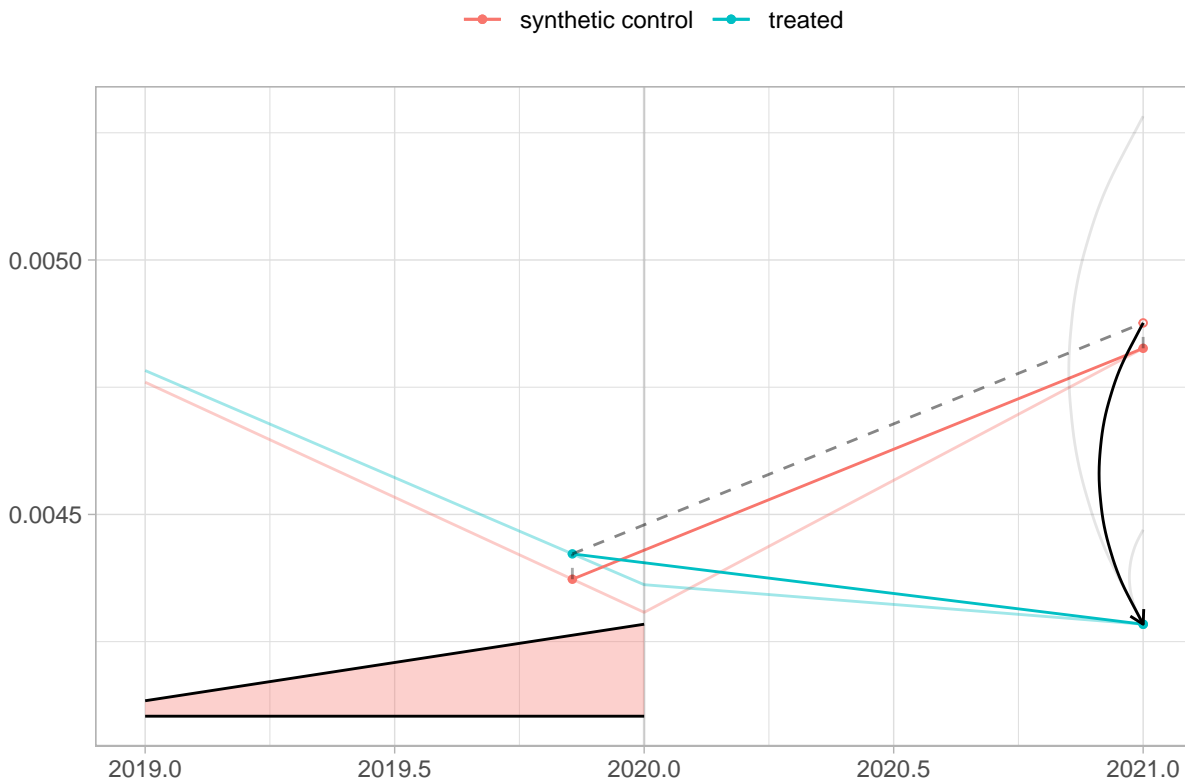


ATT Estimate: -0.0012

Standard Error: 0.00036

95% CI (-0.0019 , -0.00045 )

### A.1.5.8 Synthetic Differences in Differences - Without Bias Correction



ATT Estimate: -0.00059

Standard Error: 0.00021

95% CI (-0.001 , -0.00018 )

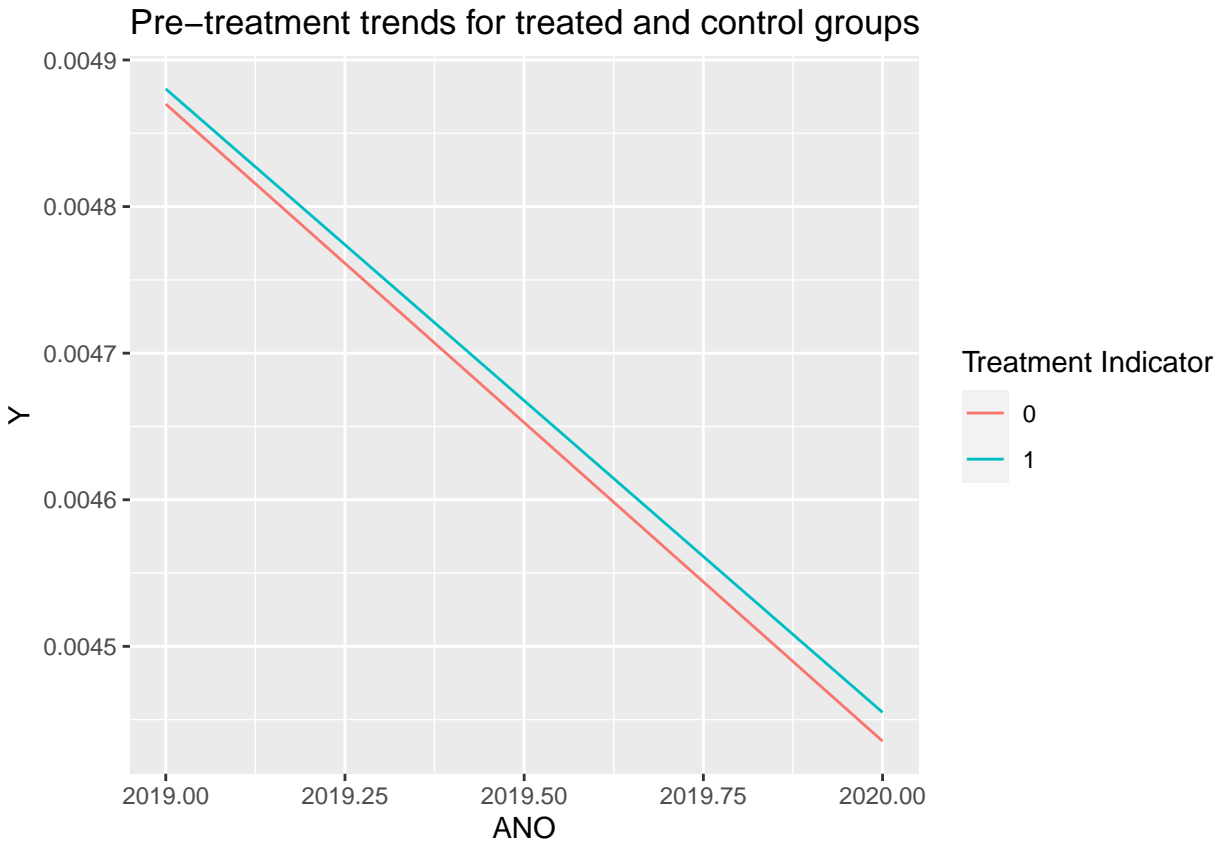
### A.1.5.9 Weighted Differences in Differences

**Table 45: Covariate Balance after IPTW Adjustment**

	Diff.Adj	V.Ratio.Adj
Electricity use intensity	0.003	1.51
External supplies and services for electricity	-0.047	1.232
Fuel use intensity	-0.011	1.056
Water use intensity	0.054	8.124
Cost of goods sold/raw materials consumed	0.013	1.254
Subsidies	0.011	1.103
Geographic diversification of exports	-0.033	0.885
Return on equity	0.061	1.565
Extra-EU exports	0.009	1.117
Purchases in the extracommunity market	0.014	1.234
Inventory variation in production	-0.028	1.278

**Table 45: Covariate Balance after IPTW Adjustment (*continued*)**

	Diff.Adj	V.Ratio.Adj
Production	0.006	1.049
Service revenues	-0.022	0.964
External supplies and services in the extracommunity market	-0.016	0.997
Personnel (women)	0.017	1.347
Tangible fixed assets	-0.087	1.044
Interest and similar income earned	0.03	0.849
Return on assets	-0.073	1.656
Income tax for the period	6.9e-04	1.242
Average personnel expenses	0.043	0.651
Net result for the period	0.013	1.024
Investment in industrial property	-0.013	0.946
Total sales in the community market of goods, products, and biological assets	-0.038	1.291
Export intensity	0.006	0.806
Total sales of goods, finished products, and biological assets	-0.029	1.012
Personnel expenses	0.045	1.014
Sales of goods	0.046	0.882
Financial autonomy	-0.015	0.963
External supplies and services for fuels	-7.43e-04	0.953
Interest and similar expenses incurred	0.025	0.716
Return on sales	-0.043	0.793
Sales of products including biological assets	0.028	0.959
Total sales in the domestic market of goods, products, and biological assets	-0.041	1.189
External supplies and services in the domestic market	-0.046	1.029
Return on assets 2	0.063	2.718
Operating result	0.01	1.032
Pre-treatment variation of outcome variable	0.005	1.211



**Table 46: Firm Count by Group**

Treatment	Count
0	129
1	187

ATT Estimate: -0.00038 Standard Error: 0.0002 95% CI (-0.00079, 3.4e-05)

**A.1.5.10 Generalized Propensity Score**

**Table 47: Covariate Balance after GPS Adjustment**

	Type	Corr.Adj
Electricity use intensity	Contin.	-0.002
External supplies and services for electricity	Contin.	-0.008
Fuel use intensity	Contin.	-0.003
Water use intensity	Contin.	7.64e-04
Cost of goods sold/raw materials consumed	Contin.	-0.005
Subsidies	Contin.	-0.016
Geographic diversification of exports	Contin.	0.009

**Table 47: Covariate Balance after GPS Adjustment (continued)**

	Type	Corr.Adj
Return on equity	Contin.	0.001
Extra-EU exports	Contin.	0.004
Purchases in the extracommunity market	Contin.	0.002
Inventory variation in production	Contin.	-0.009
Production	Contin.	-9.24e-04
Service revenues	Contin.	0.003
External supplies and services in the extracommunity market	Contin.	0.005
Personnel (women)	Contin.	-0.006
Tangible fixed assets	Contin.	-0.005
Interest and similar income earned	Contin.	2.68e-04
Return on assets	Contin.	0.012
Income tax for the period	Contin.	3.64e-04
Average personnel expenses	Contin.	0.003
Net result for the period	Contin.	0.003
Investment in industrial property	Contin.	0.005
Total sales in the community market of goods, products, and biological assets	Contin.	-0.023
Export intensity	Contin.	0.004
Total sales of goods, finished products, and biological assets	Contin.	-5.85e-04
Personnel expenses	Contin.	0.002
Sales of goods	Contin.	-9.38e-04
Financial autonomy	Contin.	0.003
External supplies and services for fuels	Contin.	-0.015
Interest and similar expenses incurred	Contin.	-0.006
Return on sales	Contin.	0.004
Sales of products including biological assets	Contin.	-6.34e-05
Total sales in the domestic market of goods, products, and biological assets	Contin.	-0.01
External supplies and services in the domestic market	Contin.	-0.003
Return on assets 2	Contin.	-0.001
Operating result	Contin.	-0.01

**Table 48: Regression Outputs (Continuous treatment)**

	Outcome Variable	
	(1)	(2)
w	−8.48e-11 (−6.27e-10, 4.57e-10)	−9.44e-11 (−8.22e-10, 6.33e-10)
I(w <sup>2</sup> )		2.92e-18 (−1.44e-16, 1.5e-16)
Observations	363	363
R <sup>2</sup>	0.389	0.389
Adjusted R <sup>2</sup>	0.317	0.315
Residual Std. Error	4.71e-06 (df = 324)	4.72e-06 (df = 323)
F Statistic	5.426*** (df = 38; 324)	5.271*** (df = 39; 323)

*Note:*

\*p&lt;0.1; \*\*p&lt;0.05; \*\*\*p&lt;0.01

Potential confounders' coefficients were omitted from the table.

## B Green Agendas

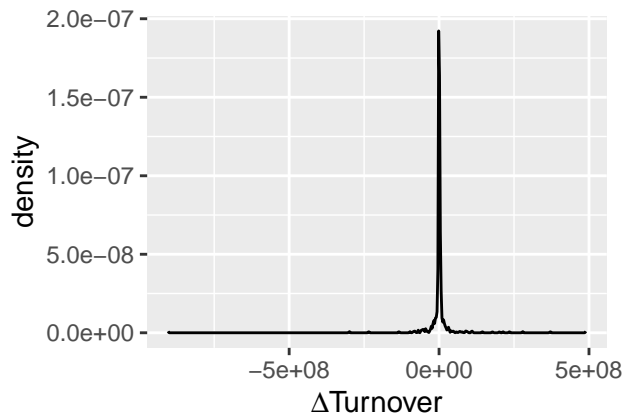
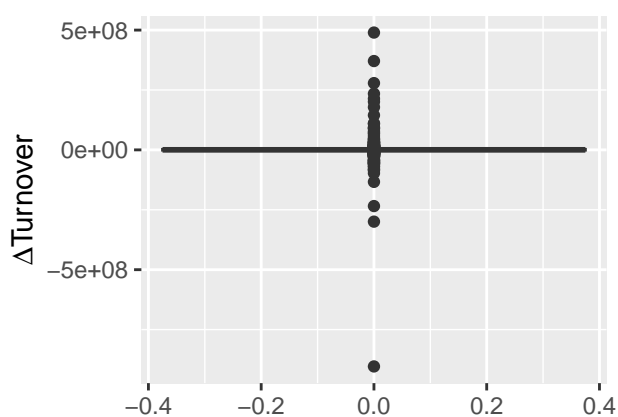
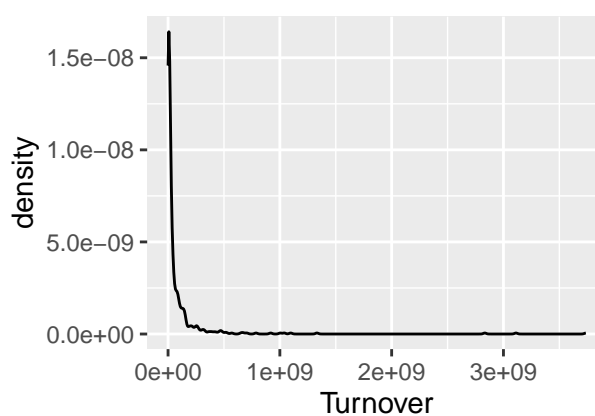
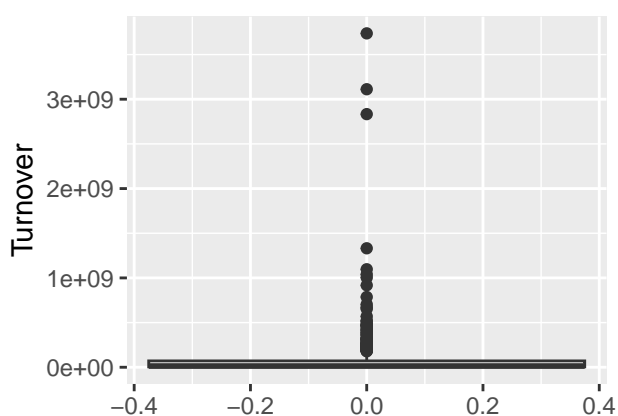
### B.1 Manufacturing Industries

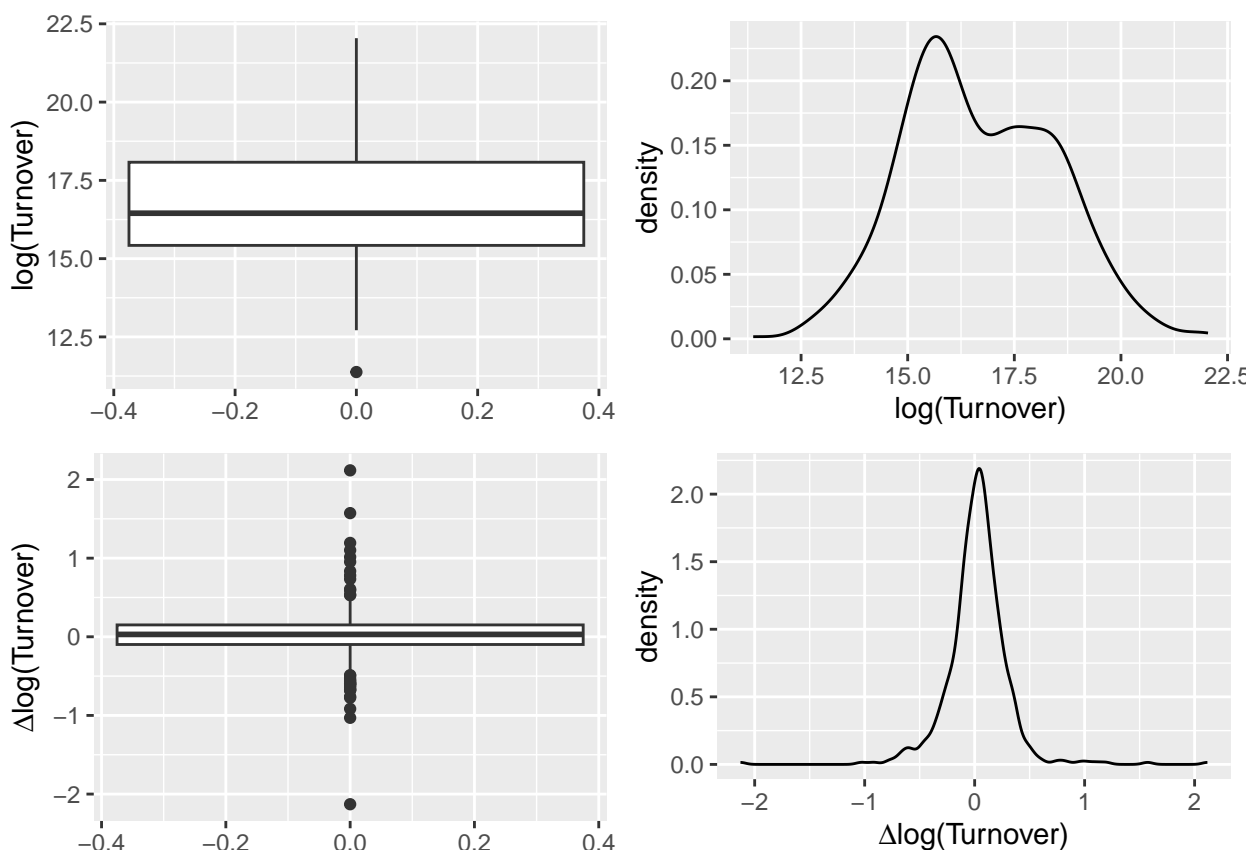
#### B.1.1 Outcome Variable: log(Turnover)

##### B.1.1.1 Univariate Outlier Analysis

Univariate outlier firms (regarding the outcome variable): **11**. These will be dropped.

##### B.1.1.2 Graphical Analysis of Outcome Variable (after outlier removal)





### B.1.1.3 Potential Confounder Analysis

List of features deemed as relevant to explain the **binary treatment indicator**:

- |  |   |
|--|---|
| 1. Total sales in the community market of goods, products, and biological assets | 7. Return on assets                               |
| 2. Result before depreciation, financing expenses, and taxes                     | 8. Purchases in the extracommunity market         |
| 3. Purchases in the domestic market  | 9. Export intensity                               |
| 4. Service revenues in the domestic market                                       | 10. Service revenues in the extracommunity market |
| 5. Return on equity  | 11. Investment in development projects            |
| 6. Investment in industrial property   | 12. Intangible assets                             |

List of features deemed as relevant to explain the **continuous treatment values**:

- |   |  |
|---|--|
| 1. Total sales in the domestic market of goods, products, and biological assets | 5. Return on assets                            |
| 2. Sales of products including biological assets                                | 6. Fuel use intensity                          |
| 3. External supplies and services in the community market                       | 7. Service revenues in the domestic market     |
| 4. Return on sales  | 8. Water use intensity                         |
|   | 9. Current liabilities from obtained financing |
|   | 10. Tangible fixed assets                      |
|   | 11. External supplies and services (FSE)       |



- |  |   |
|--|---|
| 12. Total sales of goods, finished products, and biological assets | 27. Own-entity works  |
| 13. Geographic diversification of exports                          | 28. Service revenues  |
| 14. Intangible assets  | 29. External supplies and services in the extracommunity market |
| 15. External supplies and services for electricity                 | 30. Personnel expenses  |
| 16. R&D Personnel  | 31. Imports   |
| 17. Coverage of interest charges                                   | 32. Investment in tangible fixed assets                         |
| 18. Return on equity   | 33. Total current assets  |
| 19. Purchases in the extracommunity market                         | 34. Purchases in the domestic market                            |
| 20. Total net assets   | 35. Personnel (women)   |
| 21. Financial autonomy   | 36. EU exports  |
| 22. Interest and similar income earned                             | 37. Export intensity  |
| 23. Electricity use intensity                                      | 38. Net result for the period                                   |
| 24. Result before taxes  | 39. Service revenues in the extracommunity market               |
| 25. Purchases in the community market                              | 40. External supplies and services for water                    |
| 26. Operating result (EBIT)  | 41. Investment in development projects                          |

List of features deemed as relevant to explain the **outcome variable**:

- |   |   |
|---|---|
| 1. Geographic diversification of exports  | 13. External supplies and services in the extracommunity market |
| 2. Total sales in the domestic market of goods, products, and biological assets | 14. Return on equity  |
| 3. Service revenues in the domestic market                                      | 15. General liquidity   |
| 4. Investment in industrial property  | 16. Subsidies   |
| 5. Tangible fixed assets  | 17. Result before depreciation, financing expenses, and taxes   |
| 6. Total equity   | 18. Investment in development projects                          |
| 7. Production   | 19. Water use intensity   |
| 8. Personnel expenses   | 20. Fuel use intensity  |
| 9. Average personnel expenses   | 21. Return on sales   |
| 10. Service revenues  | 22. Export intensity  |
| 11. Interest and similar income earned  | 23. External supplies and services for water                    |
| 12. Electricity use intensity   |   |

List of highly correlated relevant features (these will be discarded):

- |  |  |
|--|--|
| 1. Total current assets                        | 5. External supplies and services (FSE)  |
| 2. Intangible assets                           | 6. Result before taxes   |
| 3. Current liabilities from obtained financing | 7. Total sales in the community market of goods, products, and biological assets |
| 4. Imports                                     | 8. Water use intensity   |

Final list of **potential confounders**:



1. Geographic diversification of exports
2. Total sales in the domestic market of goods, products, and biological assets
3. Service revenues in the domestic market
4. Investment in industrial property
5. Tangible fixed assets
6. Total equity
7. Production
8. Personnel expenses
9. Average personnel expenses
10. Service revenues
11. Interest and similar income earned
12. Electricity use intensity
13. External supplies and services in the extracommunity market
14. Return on equity
15. General liquidity
16. Subsidies
17. Result before depreciation, financing expenses, and taxes
18. Investment in development projects
19. Fuel use intensity
20. Return on sales
21. Export intensity
22. External supplies and services for water
23. Purchases in the domestic market
24. Return on assets
25. Purchases in the extracommunity market
26. Service revenues in the extracommunity market
27. Sales of products including biological assets
28. External supplies and services in the community market
29. Total sales of goods, finished products, and biological assets
30. External supplies and services for electricity
31. R&D Personnel
32. Coverage of interest charges
33. Total net assets
34. Financial autonomy
35. Purchases in the community market
36. Operating result (EBIT)
37. Own-entity works
38. Investment in tangible fixed assets
39. Personnel (women)
40. EU exports
41. Net result for the period

#### B.1.1.4 Multivariate Outlier Analysis

Multivariate outlier firms (regarding the potential confounding variables): **1**. These will be dropped.

**Table 49: Firm Count by Group**

	Control	Treated
Original Data	47	160
After Outlier Removal	41	156

#### B.1.1.5 Statistics and group comparison before adjustment

**Table 50: Covariate Means and Group Comparison (before adjustment and before outlier removal)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Geographic diversification of exports	0.377	0.489	-0.433	0.641
Total sales in the domestic market of goods, products, and biological assets	4.15e+07	1.85e+07	0.096	53.715
Service revenues in the domestic market	1.31e+06	5.06e+05	0.097	17.973
Investment in industrial property	4.27e+06	8.94e+06	-0.313	0.127
Tangible fixed assets	2.31e+06	5.86e+06	-0.15	1.139
Total equity	4.25e+06	5.42e+06	-0.094	0.797
Production	1.3e+08	5.64e+07	0.096	92.087
Personnel expenses	8.86e+06	1.19e+07	-0.108	1.673
Average personnel expenses	3.42e+04	4.79e+04	-0.265	0.752
Service revenues	7.53e+07	3.18e+07	0.086	63.679
Interest and similar income earned	1.01e+06	8.4e+05	0.019	16.173
Electricity use intensity	0.066	0.039	0.044	9.855
External supplies and services in the extracommunity market	1.46e+06	2.16e+06	-0.167	0.758
Return on equity	370.244	17.001	0.154	3203.345
General liquidity	2.395	2.902	-0.29	0.417
Subsidies	2.43e+05	8.59e+05	-0.642	0.045

**Table 50: Covariate Means and Group Comparison (before adjustment and before outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Result before depreciation, financing expenses, and taxes	2.99e+06	8.55e+06	-0.681	0.274
Investment in development projects	1.6e+06	4.44e+06	-0.165	0.777
Fuel use intensity	0.003	8.87e-04	0.071	171.55
Return on sales	3651.599	41.69	0.08	9.56e+04
Export intensity	0.477	0.602	-0.453	0.644
External supplies and services for water	4.92e+04	3.86e+04	0.031	22.391
Purchases in the domestic market	2.13e+07	7.61e+06	0.112	49.165
Return on assets	0.922	0.724	0.252	1.902
Purchases in the extracommunity market	1.21e+07	1.24e+07	-0.007	6.386
Service revenues in the extracommunity market	8.05e+07	2.24e+07	0.088	253.598
Sales of products including biological assets	3.96e+06	4.06e+06	-0.006	1.299
External supplies and services in the community market	2.11e+05	1.57e+05	0.067	6.839
Total sales of goods, finished products, and biological assets	7.04e+07	1.46e+07	0.077	277.378
External supplies and services for electricity	3.25e+05	3.51e+05	-0.018	1.969
R&D Personnel	11.738	4.66	0.126	20.033
Coverage of interest charges	0.009	0.019	-0.16	0.995

**Table 50: Covariate Means and Group Comparison (before adjustment and before outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Total net assets	3.1e+07	3.97e+07	-0.115	1.576
Financial autonomy	0.199	0.234	-0.12	0.436
Purchases in the community market	2.29e+06	7.07e+05	0.156	54.586
Operating result (EBIT)	2.06e+05	2.97e+05	-0.05	3.236
Own-entity works	1.37e+05	1.76e+05	-0.042	1.233
Investment in tangible fixed assets	-2.01e+05	-5.44e+05	0.146	1.342
Personnel (women)	91.162	62.596	0.14	4.655
EU exports	1.31e+07	7.87e+06	0.05	43.497
Net result for the period	2.96e+07	1.98e+07	0.087	15.533

**Table 51: Covariate Means and Group Comparison (before adjustment and after outlier removal)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Geographic diversification of exports	0.376	0.468	-0.356	0.67
Total sales in the domestic market of goods, products, and biological assets	3.28e+07	1.88e+07	0.067	41.569
Service revenues in the domestic market	1.34e+06	5.09e+05	0.099	16.684
Investment in industrial property	3.3e+06	1.01e+07	-0.838	0.033
Tangible fixed assets	4.31e+05	4.98e+06	-3.295	0.004
Total equity	4.19e+06	6.16e+06	-0.157	0.715
Production	7.44e+07	6.08e+07	0.053	9.988
Personnel expenses	7.13e+06	1.29e+07	-0.34	0.535
Average personnel expenses	3.3e+04	5.06e+04	-0.344	0.673
Service revenues	3.66e+07	3.52e+07	0.014	2.677
Interest and similar income earned	2.79e+05	8.3e+05	-0.872	0.071
Electricity use intensity	0.068	0.044	0.038	8.825
External supplies and services in the extracommunity market	1.49e+06	2.44e+06	-0.221	0.69
Return on equity	379.242	12.823	0.157	4506.014
General liquidity	2.415	2.959	-0.307	0.411
Subsidies	2.42e+05	9.74e+05	-0.754	0.04

**Table 51: Covariate Means and Group Comparison (before adjustment and after outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Result before depreciation, financing expenses, and taxes	3.24e+06	9.38e+06	-0.784	0.225
Investment in development projects	2.47e+05	4.56e+06	-5.07	0.002
Fuel use intensity	0.003	9.34e-04	0.071	154.305
Return on sales	3717.611	45.964	0.08	8.61e+04
Export intensity	0.478	0.594	-0.425	0.637
External supplies and services for water	5.04e+04	4.04e+04	0.029	21.155
Purchases in the domestic market	2.18e+07	8.7e+06	0.106	45.075
Return on assets	0.913	0.717	0.248	2.206
Purchases in the extracommunity market	8.54e+06	1.36e+07	-0.253	0.905
Service revenues in the extracommunity market	2.94e+07	2.31e+07	0.061	5.91
Sales of products including biological assets	3.37e+06	4.27e+06	-0.058	0.913
External supplies and services in the community market	2.16e+05	1.62e+05	0.066	6.655
Total sales of goods, finished products, and biological assets	1.36e+07	1.66e+07	-0.041	2.304
External supplies and services for electricity	3.33e+05	3.94e+05	-0.04	1.776
R&D Personnel	11.897	5.244	0.117	18.159
Coverage of interest charges	0.011	0.021	-0.165	0.851



**Table 51: Covariate Means and Group Comparison (before adjustment and after outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Total net assets	2.76e+07	4.35e+07	-0.268	0.867
Financial autonomy	0.2	0.209	-0.031	0.589
Purchases in the community market	2.35e+06	7.62e+05	0.155	51.138
Operating result (EBIT)	6.62e+04	3.33e+05	-0.901	0.076
Own-entity works	1.4e+05	6.63e+04	0.077	12.445
Investment in tangible fixed assets	-8.32e+04	-7.17e+05	0.348	0.782
Personnel (women)	90.673	64.366	0.128	4.456
EU exports	5.08e+06	8.84e+06	-0.222	1.033
Net result for the period	2.19e+07	2.2e+07	-0.003	2.522

**Table 52: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Geographic diversification of exports	0.304	0.363	-0.346	0.728
Total sales in the domestic market of goods, products, and biological assets	12.908	12.862	0.009	0.858
Service revenues in the domestic market	6.129	3.737	0.397	1.105
Investment in industrial property	12.868	13.734	-0.251	2.875
Tangible fixed assets	9.642	8.314	0.315	0.461
Total equity	11.245	10.374	0.163	0.652
Production	15.825	16.71	-0.265	2.733
Personnel expenses	14.333	15.041	-0.391	0.982
Average personnel expenses	9.743	10.201	-0.373	1.166
Service revenues	14.598	15.746	-0.302	2.546
Interest and similar income earned	9.548	10.504	-0.228	1.34
Electricity use intensity	0.029	0.031	-0.012	1.874
External supplies and services in the extracommunity market	11.777	11.699	0.026	0.545
Return on equity	2.024	1.403	0.321	2.052
General liquidity	1.144	1.24	-0.258	0.632

**Table 52: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Subsidies	8.984	8.219	0.169	0.686
Result before depreciation, financing expenses, and taxes	3.24e+06	9.38e+06	-0.784	0.225
Investment in development projects	6.962	4.87	0.384	0.715
Fuel use intensity	0.003	9.31e-04	0.07	114.089
Return on sales	1.702	1.473	0.104	1.389
Export intensity	0.375	0.444	-0.395	0.708
External supplies and services for water	8.104	8.799	-0.244	1.076
Purchases in the domestic market	12.574	12.088	0.097	0.694
Return on assets	0.913	0.717	0.248	2.206
Purchases in the extracommunity market	14.648	15.249	-0.367	0.868
Service revenues in the extracommunity market	14.818	15.597	-0.292	1.554
Sales of products including biological assets	10.312	10.046	0.048	0.851
External supplies and services in the community market	5.791	5.724	0.012	0.853
Total sales of goods, finished products, and biological assets	8.461	11.065	-0.375	1.08
External supplies and services for electricity	10.263	10.675	-0.164	0.95

**Table 52: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
R&D Personnel	0.824	0.788	0.026	1.197
Coverage of interest charges	0.011	0.021	-0.165	0.851
Total net assets	2.76e+07	4.35e+07	-0.268	0.867
Financial autonomy	0.2	0.209	-0.031	0.589
Purchases in the community market	7.778	7.66	0.019	0.901
Operating result (EBIT)	3.032	3.675	-0.133	0.769
Own-entity works	3.053	3.647	-0.113	1.008
Investment in tangible fixed assets	-8.32e+04	-7.17e+05	0.348	0.782
Personnel (women)	3.188	3.248	-0.038	1.241
EU exports	10.119	10.5	-0.063	0.716
Net result for the period	15.426	15.914	-0.257	1.363

### B.1.1.6 Functional Form Search for Regression Models

Added terms for **propensity score model** (besides all potential confounders):

- |   |   |
|---|---|
| 1. squared(Tangible fixed assets)                                     | 4. Total equity * R&D Personnel                                       |
| 2. squared(Fuel use intensity)  | 5. squared(Production)  |
| 3. Financial autonomy * Service revenues in the extracommunity market | 6. Subsidies * External supplies and services in the community market |

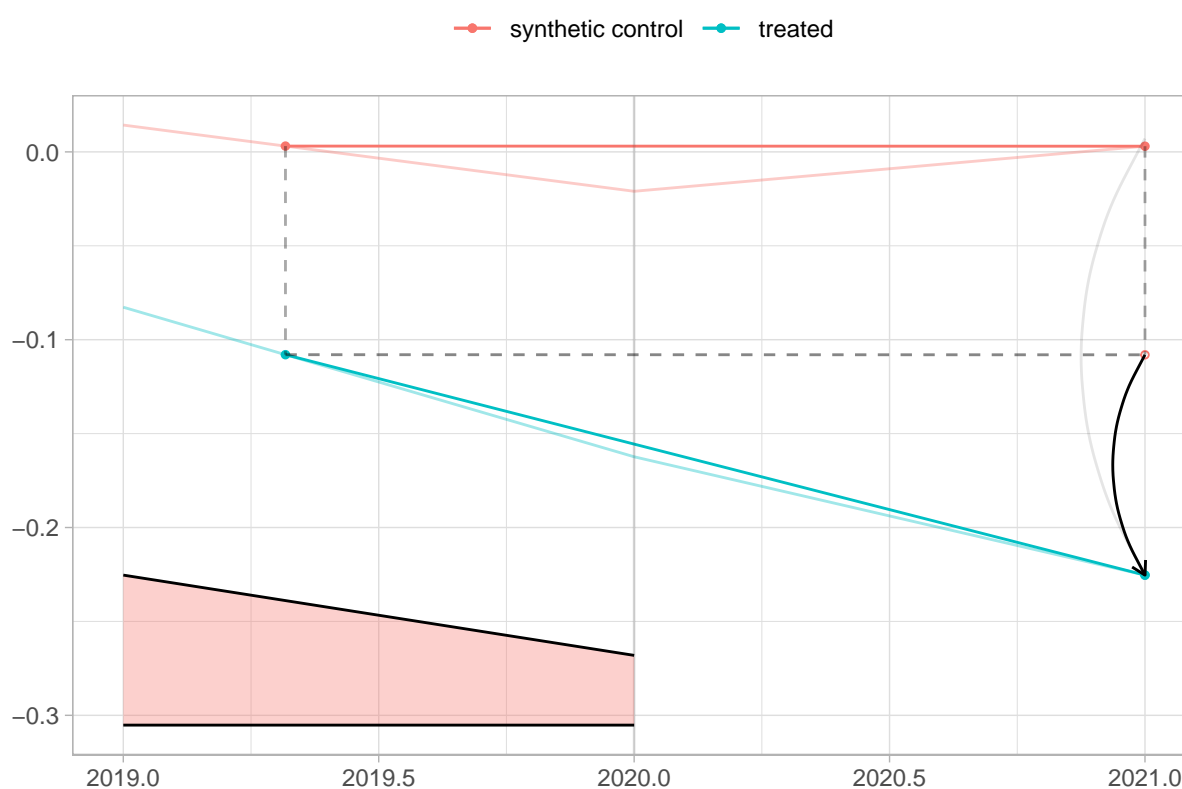
Added terms for **generalized propensity score model** (besides all potential confounders):

1. squared(Export intensity)
2. Subsidies \* Operating result (EBIT)

Added terms for **outcome model** (besides all potential confounders):

1. Sales of products including biological assets \* Purchases in the community market

### B.1.1.7 Synthetic Differences in Differences - With Bias Correction

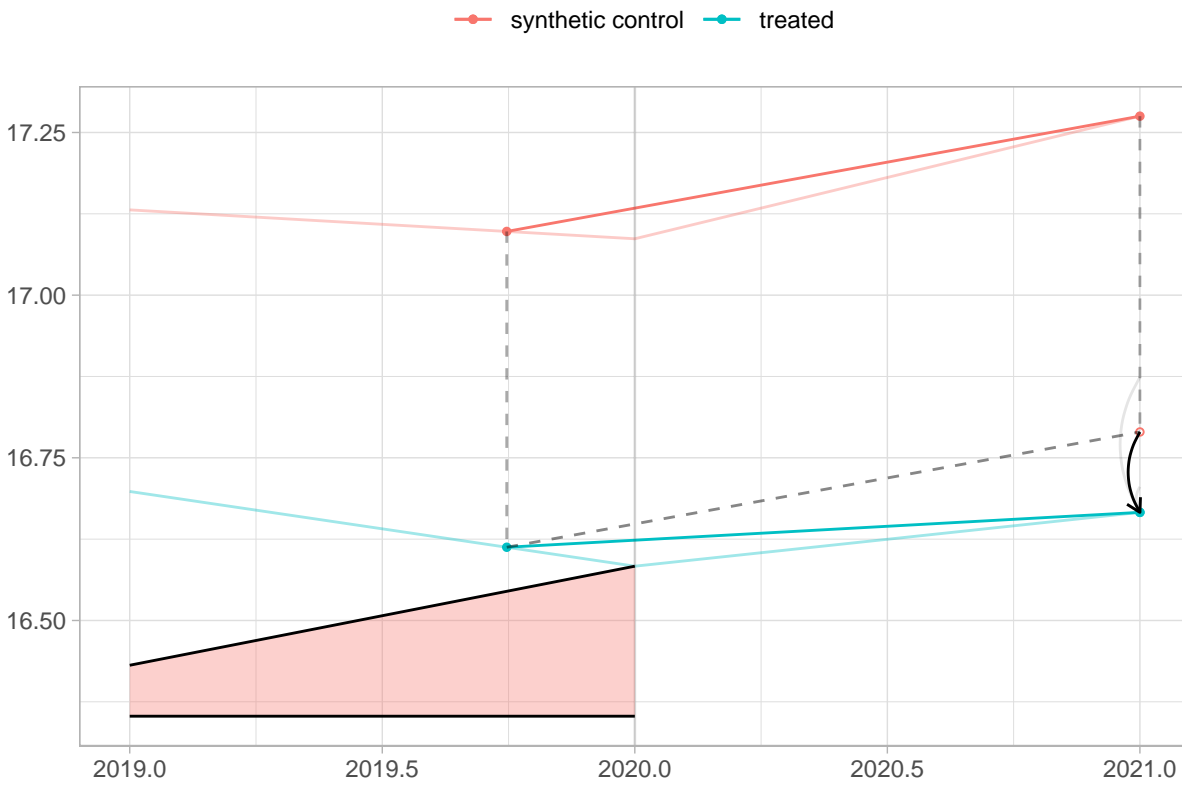


ATT Estimate: -0.12

Standard Error: 0.065

95% CI (-0.24 , 0.01 )

**B.1.1.8 Synthetic Differences in Differences - Without Bias Correction**



ATT Estimate: -0.12

Standard Error: 0.04

95% CI (-0.2 , -0.045 )

**B.1.1.9 Weighted Differences in Differences**

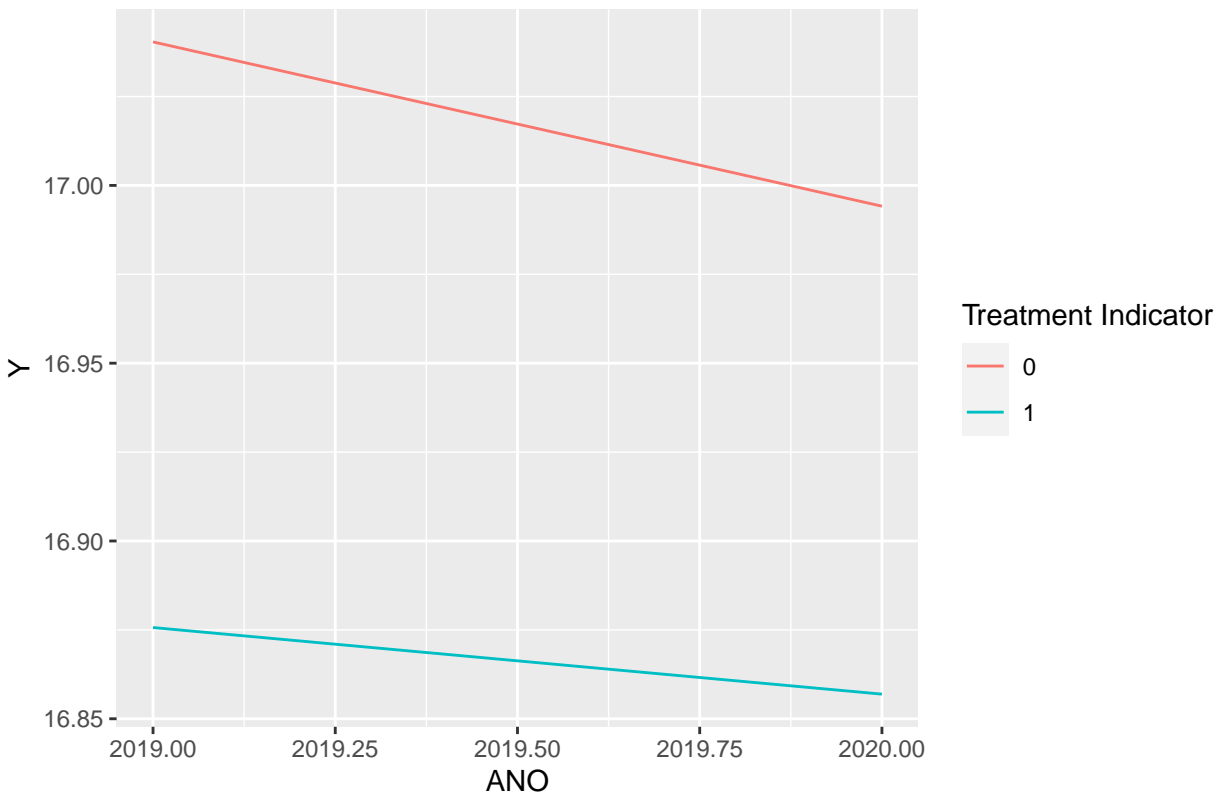
**Table 53: Covariate Balance after IPTW Adjustment**

	Diff.Adj	V.Ratio.Adj
Geographic diversification of exports	0.351	1.154
Total sales in the domestic market of goods, products, and biological assets	-0.296	1.701
Service revenues in the domestic market	0.06	0.975
Investment in industrial property	-0.06	4.235
Tangible fixed assets	-0.174	1.531
Total equity	-0.407	2.472
Production	-0.121	1.081
Personnel expenses	-0.151	1.092
Average personnel expenses	-0.017	1.01

**Table 53: Covariate Balance after IPTW Adjustment (continued)**

	Diff.Adj	V.Ratio.Adj
Service revenues	-0.061	2.104
Interest and similar income earned	0.158	0.703
Electricity use intensity	0.122	2.034
External supplies and services in the extracommunity market	-0.079	1.877
Return on equity	-0.339	1.55
General liquidity	-0.106	1.489
Subsidies	-0.127	1.46
Result before depreciation, financing expenses, and taxes	-0.038	1.686
Investment in development projects	-0.093	1.239
Fuel use intensity	-0.027	0.497
Return on sales	-0.227	1.487
Export intensity	0.152	0.684
External supplies and services for water	-0.202	2.735
Purchases in the domestic market	-0.116	1.14
Return on assets	0.23	1.236
Purchases in the extracommunity market	-0.199	0.946
Service revenues in the extracommunity market	-0.031	1.168
Sales of products including biological assets	-0.079	1.545
External supplies and services in the community market	-0.322	1.055
Total sales of goods, finished products, and biological assets	-0.226	1.849
External supplies and services for electricity	-0.126	1.369
R&D Personnel	-0.434	0.493
Coverage of interest charges	-0.059	38.587
Total net assets	0.102	1.745
Financial autonomy	0.165	2.833
Purchases in the community market	-0.168	0.807
Operating result (EBIT)	0.108	1.243
Own-entity works	-0.065	1.05
Investment in tangible fixed assets	-0.094	0.436
Personnel (women)	-0.005	1.548
EU exports	0.038	0.535
Net result for the period	-0.049	1.124
Pre-treatment variation of outcome variable	0.147	1.383

Pre-treatment trends for treated and control groups



**Table 54: Firm Count by Group**

Treatment	Count
0	22
1	30

ATT Estimate: -0.061 Standard Error: 0.31 95% CI (-0.64, 0.52)

**B.1.1.10 Generalized Propensity Score**

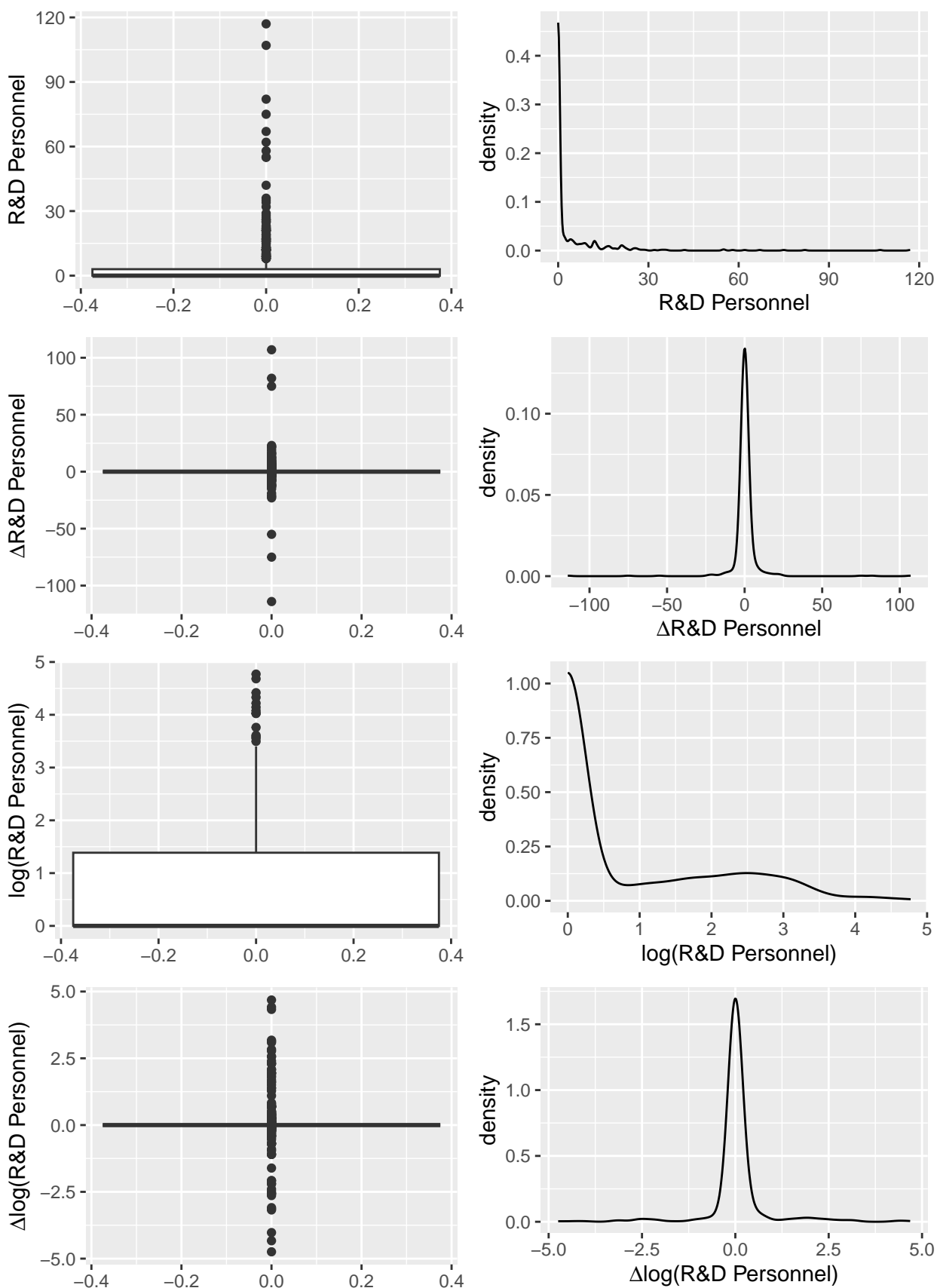
**B.1.2 Outcome Variable: R&D Personnel**

**B.1.2.1 Univariate Outlier Analysis**

Univariate outlier firms (regarding the outcome variable): **3**. These will be dropped.



**B.1.2.2 Graphical Analysis of Outcome Variable (after outlier removal)**



### B.1.2.3 Potential Confounder Analysis

List of features deemed as relevant to explain the **binary treatment indicator**:

- |  |                              |
|--|------------------------------|
| 1. Service revenues in the extracommunity market             | 3. Total current liabilities |
| 2. Result before depreciation, financing expenses, and taxes | 4. Return on equity          |
|  | 5. Tangible fixed assets     |
|  | 6. Export intensity          |

List of features deemed as relevant to explain the **continuous treatment values**:

- |  |   |
|--|---|
| 1. Personnel   | 14. Net result for the period   |
| 2. Return on sales   | 15. Exports   |
| 3. Interest and similar income earned                          | 16. Result before taxes   |
| 4. Sales of goods  | 17. Return on equity  |
| 5. Average personnel expenses                                  | 18. Water use intensity   |
| 6. External supplies and services in the extracommunity market | 19. Tangible fixed assets   |
| 7. Service revenues in the domestic market                     | 20. Investment in industrial property   |
| 8. Total current liabilities                                   | 21. External supplies and services for fuels                                      |
| 9. Income tax for the period                                   | 22. Imports   |
| 10. Export intensity   | 23. Total sales in the community market of goods, products, and biological assets |
| 11. Service revenues in the extracommunity market              | 24. Production  |
| 12. External supplies and services in the domestic market      | 25. Personnel (women)   |
| 13. R&D Personnel  | 26. Investment in development projects  |
|  | 27. Total sales of goods, finished products, and biological assets                |

List of features deemed as relevant to explain the **outcome variable**:

- |   |   |
|---|---|
| 1. R&D Personnel                            | 11. Turnover  |
| 2. Personnel                                | 12. Investment in industrial property                           |
| 3. External supplies and services for water | 13. External supplies and services in the extracommunity market |
| 4. Return on sales                          | 14. Subsidies   |
| 5. Personnel (women)                        | 15. Personnel expenses  |
| 6. Income tax for the period                | 16. Extra-EU exports  |
| 7. Average personnel expenses               | 17. Investment in intangible assets                             |
| 8. Service revenues in the domestic market  | 18. Own-entity works  |
| 9. Electricity use intensity                | 19. Purchases in the community market                           |
| 10. Water use intensity                     |   |

List of highly correlated relevant features (these will be discarded):

- |                              |                        |
|------------------------------|------------------------|
| 1. Income tax for the period | 3. Exports             |
| 2. Turnover                  | 4. Water use intensity |

Final list of **potential confounders**:

- |  |  |
|--|--|
| 1. R&D Personnel   | 18. Result before depreciation, financing ex-<br>penses, and taxes                   |
| 2. Personnel   | 19. Total current liabilities  |
| 3. External supplies and services for water                          | 20. Return on equity   |
| 4. Return on sales   | 21. Tangible fixed assets  |
| 5. Personnel (women)   | 22. Export intensity   |
| 6. Average personnel expenses  | 23. Interest and similar income earned   |
| 7. Service revenues in the domestic market                           | 24. Sales of goods   |
| 8. Electricity use intensity   | 25. External supplies and services in the do-<br>mestic market                       |
| 9. Investment in industrial property                                 | 26. Net result for the period  |
| 10. External supplies and services in the ex-<br>tracommunity market | 27. Result before taxes  |
| 11. Subsidies  | 28. External supplies and services for fuels   |
| 12. Personnel expenses   | 29. Imports  |
| 13. Extra-EU exports   | 30. Total sales in the community market of<br>goods, products, and biological assets |
| 14. Investment in intangible assets                                  | 31. Production   |
| 15. Own-entity works   | 32. Investment in development projects   |
| 16. Purchases in the community market                                | 33. Total sales of goods, finished products,<br>and biological assets                |
| 17. Service revenues in the extracommunity<br>market                 |  |

**B.1.2.4 Multivariate Outlier Analysis**

Multivariate outlier firms (regarding the potential confounding variables): **0**. These will be dropped.

**B.1.2.5 Statistics and group comparison before adjustmnet**

**Table 55: Covariate Balance after GPS Adjustment**

	Type	Corr.Adj
Geographic diversification of exports	Contin.	0.017
Total sales in the domestic market of goods, products, and biological assets	Contin.	0.028
Service revenues in the domestic market	Contin.	0.04
Investment in industrial property	Contin.	0.009
Tangible fixed assets	Contin.	0.006
Total equity	Contin.	-0.03
Production	Contin.	0.012
Personnel expenses	Contin.	0.017
Average personnel expenses	Contin.	-0.013
Service revenues	Contin.	-0.001
Interest and similar income earned	Contin.	-0.035
Electricity use intensity	Contin.	0.004
External supplies and services in the extracommunity market	Contin.	0.004
Return on equity	Contin.	-0.024
General liquidity	Contin.	0.019
Subsidies	Contin.	0.021
Result before depreciation, financing expenses, and taxes	Contin.	0.008
Investment in development projects	Contin.	0.015
Fuel use intensity	Contin.	-0.001
Return on sales	Contin.	0.021
Export intensity	Contin.	0.021
External supplies and services for water	Contin.	0.015
Purchases in the domestic market	Contin.	0.029
Return on assets	Contin.	-0.066
Purchases in the extracommunity market	Contin.	0.026
Service revenues in the extracommunity market	Contin.	0.021
Sales of products including biological assets	Contin.	0.004
External supplies and services in the community market	Contin.	0.002
Total sales of goods, finished products, and biological assets	Contin.	0.022
External supplies and services for electricity	Contin.	-0.001
R&D Personnel	Contin.	0.004
Coverage of interest charges	Contin.	5.91e-04
Total net assets	Contin.	0.016
Financial autonomy	Contin.	-2.74e-04
Purchases in the community market	Contin.	0.003
Operating result (EBIT)	Contin.	0.012
Own-entity works	Contin.	-0.012
Investment in tangible fixed assets	Contin.	0.006
Personnel (women)	Contin.	0.044
EU exports	Contin.	0.008
Net result for the period	Contin.	0.01

**Table 56: Regression Outputs (Continuous treatment)**

	Outcome Variable	
	(1)	(2)
w	4.55e-09 (−4.35e-08, 5.26e-08)	−1.75e-08 (−9.41e-08, 5.91e-08)
I(w <sup>2</sup> )		2.99e-15 (−5.08e-15, 1.11e-14)
Observations	195	195
R <sup>2</sup>	0.493	0.495
Adjusted R <sup>2</sup>	0.349	0.347
Residual Std. Error	3.4e-04 (df = 151)	3.4e-04 (df = 150)
F Statistic	3.417*** (df = 43; 151)	3.341*** (df = 44; 150)

*Note:*

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Potential confounders' coefficients were omitted from the table.

**Table 57: Firm Count by Group**

	Control	Treated
Original Data	47	160
After Outlier Removal	47	157

**Table 58: Covariate Means and Group Comparison (before adjustment and before outlier removal)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
R&D Personnel	11.738	4.66	0.126	20.033
Personnel	266.444	241.064	0.043	4.523
External supplies and services for water	4.92e+04	3.86e+04	0.031	22.391
Return on sales	3651.599	41.69	0.08	9.56e+04
Personnel (women)	91.162	62.596	0.14	4.655
Average personnel expenses	3.42e+04	4.79e+04	-0.265	0.752
Service revenues in the domestic market	1.31e+06	5.06e+05	0.097	17.973
Electricity use intensity	0.066	0.039	0.044	9.855
Investment in industrial property	4.27e+06	8.94e+06	-0.313	0.127
External supplies and services in the extracommunity market	1.46e+06	2.16e+06	-0.167	0.758
Subsidies	2.43e+05	8.59e+05	-0.642	0.045
Personnel expenses	8.86e+06	1.19e+07	-0.108	1.673
Extra-EU exports	8.3e+07	2.42e+07	0.088	253.032
Investment in intangible assets	3.97e+04	1.8e+06	-5.037	0.001
Own-entity works	1.37e+05	1.76e+05	-0.042	1.233
Purchases in the community market	2.29e+06	7.07e+05	0.156	54.586

Final evaluation plan

**Table 58: Covariate Means and Group Comparison (before adjustment and before outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Service revenues in the extracommunity market	8.05e+07	2.24e+07	0.088	253.598
Result before depreciation, financing expenses, and taxes	2.99e+06	8.55e+06	-0.681	0.274
Total current liabilities	5.27e+07	4.67e+07	0.02	11.634
Return on equity	370.244	17.001	0.154	3203.345
Tangible fixed assets	2.31e+06	5.86e+06	-0.15	1.139
Export intensity	0.477	0.602	-0.453	0.644
Interest and similar income earned	1.01e+06	8.4e+05	0.019	16.173
Sales of goods	5.93e+07	4.18e+07	0.071	12.703
External supplies and services in the domestic market	1.72e+06	8.49e+05	0.162	13.991
Net result for the period	2.96e+07	1.98e+07	0.087	15.533
Result before taxes	1.95e+06	6.81e+06	-0.459	0.702
External supplies and services for fuels	3.17e+04	3.29e+04	-0.009	2.692
Imports	1.44e+07	1.31e+07	0.024	6.398
Total sales in the community market of goods, products, and biological assets	1.29e+07	6.1e+06	0.066	106.753
Production	1.3e+08	5.64e+07	0.096	92.087
Investment in development projects	1.6e+06	4.44e+06	-0.165	0.777

Final evaluation plan

**Table 58: Covariate Means and Group Comparison (before adjustment and before outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Total sales of goods, finished products, and biological assets	7.04e+07	1.46e+07	0.077	277.378



**Table 59: Covariate Means and Group Comparison (before adjustment and after outlier removal)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
R&D Personnel	4.459	4.66	-0.017	0.918
Personnel	206.204	241.064	-0.11	1.311
External supplies and services for water	4.76e+04	3.86e+04	0.026	22.773
Return on sales	3721.25	41.69	0.081	9.74e+04
Personnel (women)	74.911	62.596	0.084	2.434
Average personnel expenses	3.45e+04	4.79e+04	-0.256	0.765
Service revenues in the domestic market	1.11e+06	5.06e+05	0.074	17.202
Electricity use intensity	0.068	0.039	0.045	10.042
Investment in industrial property	3.89e+06	8.94e+06	-0.352	0.118
External supplies and services in the extracommunity market	1.39e+06	2.16e+06	-0.181	0.756
Subsidies	1.66e+05	8.59e+05	-1.572	0.009
Personnel expenses	7.76e+06	1.19e+07	-0.158	1.438
Extra-EU exports	7.54e+07	2.42e+07	0.076	254.608
Investment in intangible assets	4.04e+04	1.8e+06	-4.988	0.001
Own-entity works	5.54e+04	1.76e+05	-0.728	0.039
Purchases in the community market	1.44e+06	7.07e+05	0.123	18.995

Final evaluation plan

**Table 59: Covariate Means and Group Comparison (before adjustment and after outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Service revenues in the extracommunity market	7.29e+07	2.24e+07	0.076	255.067
Result before depreciation, financing expenses, and taxes	2.62e+06	8.55e+06	-0.834	0.208
Total current liabilities	4.88e+07	4.67e+07	0.007	11.722
Return on equity	376.107	17.001	0.155	3263.746
Tangible fixed assets	2.32e+06	5.86e+06	-0.148	1.161
Export intensity	0.48	0.602	-0.441	0.653
Interest and similar income earned	9.91e+05	8.4e+05	0.016	16.479
Sales of goods	3.52e+07	4.18e+07	-0.084	1.276
External supplies and services in the domestic market	1.26e+06	8.49e+05	0.117	6.028
Net result for the period	2.61e+07	1.98e+07	0.058	14.463
Result before taxes	1.57e+06	6.81e+06	-0.524	0.626
External supplies and services for fuels	2.96e+04	3.29e+04	-0.024	2.68
Imports	1.3e+07	1.31e+07	-0.002	6.197
Total sales in the community market of goods, products, and biological assets	1.31e+07	6.1e+06	0.067	108.783
Production	1.07e+08	5.64e+07	0.069	85.41
Investment in development projects	1.61e+06	4.44e+06	-0.163	0.792

**Table 59: Covariate Means and Group Comparison (before adjustment and after outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Total sales of goods, finished products, and biological assets	7.16e+07	1.46e+07	0.078	282.67

**Table 60: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
R&D Personnel	0.725	0.722	0.003	0.97
Personnel	4.551	4.69	-0.111	0.695
External supplies and services for water	7.993	8.651	-0.229	0.976
Return on sales	1.727	1.419	0.137	1.517
Personnel (women)	3.137	3.157	-0.013	1.031
Average personnel expenses	9.779	9.951	-0.138	0.444
Service revenues in the domestic market	5.947	3.99	0.33	1.047
Electricity use intensity	0.029	0.028	0.005	2.131
Investment in industrial property	12.868	13.256	-0.112	1.381
External supplies and services in the extracommunity market	11.635	11.45	0.059	0.544
Subsidies	8.974	8.495	0.107	0.748
Personnel expenses	14.307	14.743	-0.244	0.602
Extra-EU exports	15.198	15.724	-0.272	0.786
Investment in intangible assets	0.944	1.468	-0.173	0.461
Own-entity works	2.916	3.512	-0.117	0.923

Final evaluation plan

**Table 60: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Purchases in the community market	7.462	7.158	0.05	0.876
Service revenues in the extracommunity market	14.766	15.303	-0.201	1.034
Result before depreciation, financing expenses, and taxes	2.62e+06	8.55e+06	-0.834	0.208
Total current liabilities	15.982	16.215	-0.145	0.705
Return on equity	2.025	1.523	0.262	1.694
Tangible fixed assets	9.614	8.474	0.263	0.498
Export intensity	0.376	0.449	-0.412	0.731
Interest and similar income earned	9.535	10.138	-0.144	1.056
Sales of goods	14.036	13.738	0.053	0.751
External supplies and services in the domestic market	10.087	9.717	0.075	0.782
Net result for the period	15.399	15.472	-0.039	0.447
Result before taxes	1.57e+06	6.81e+06	-0.524	0.626
External supplies and services for fuels	7.332	7.658	-0.102	0.831
Imports	14.767	15.042	-0.163	0.593
Total sales in the community market of goods, products, and biological assets	9.801	10.005	-0.033	0.758

**Table 60: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Production	15.78	16.253	-0.143	1.115
Investment in development projects	6.946	5.18	0.32	0.736
Total sales of goods, finished products, and biological assets	8.486	10.518	-0.291	1.035

Final evaluation plan

### B.1.2.6 Functional Form Search for Regression Models

Added terms for **propensity score model** (besides all potential confounders):

1. squared(Tangible fixed assets)
2. squared(Extra-EU exports)

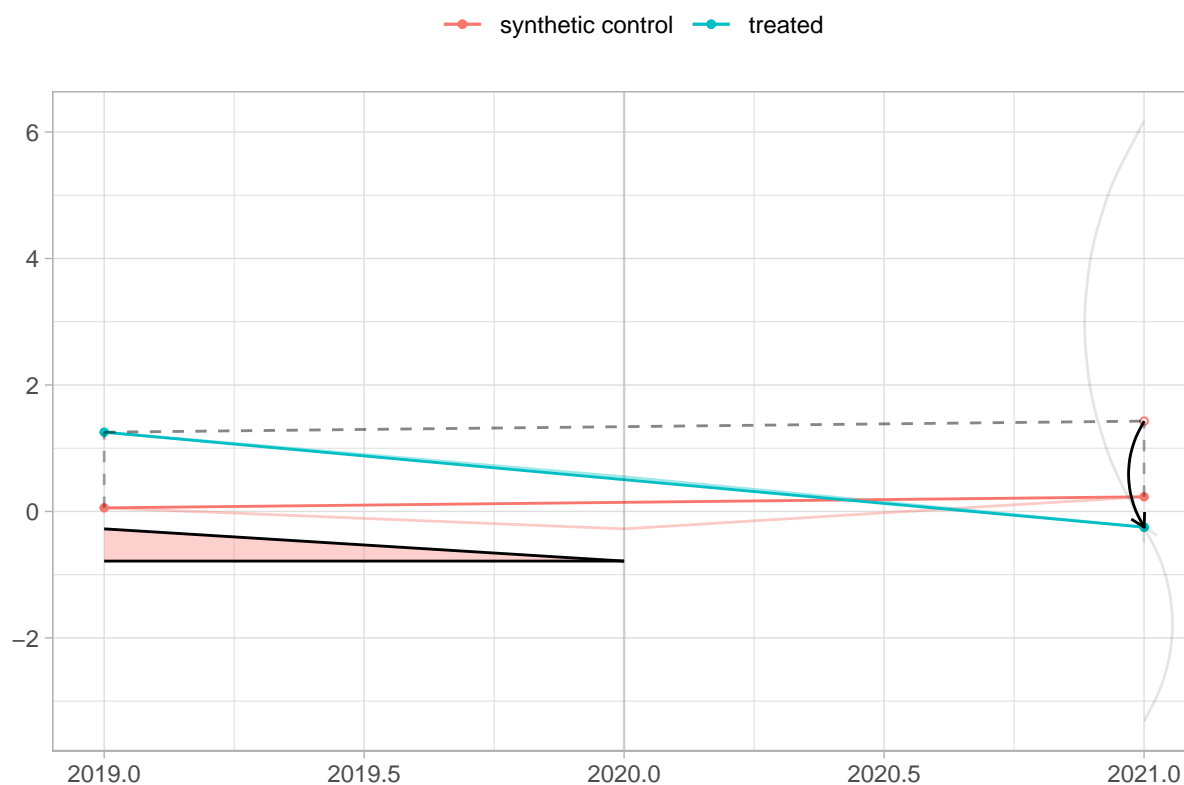
Added terms for **generalized propensity score model** (besides all potential confounders):

- |  |  |
|--|--|
| 1. squared(Export intensity)   | 3. Net result for the period * Total current liabilities |
| 2. Total sales of goods, finished products, and biological assets * Extra-EU exports | 4. squared(Investment in industrial property)            |

Added terms for **outcome model** (besides all potential confounders):

1. Subsidies \* investimento\_Intangible assets

### B.1.2.7 Synthetic Differences in Differences - With Bias Correction

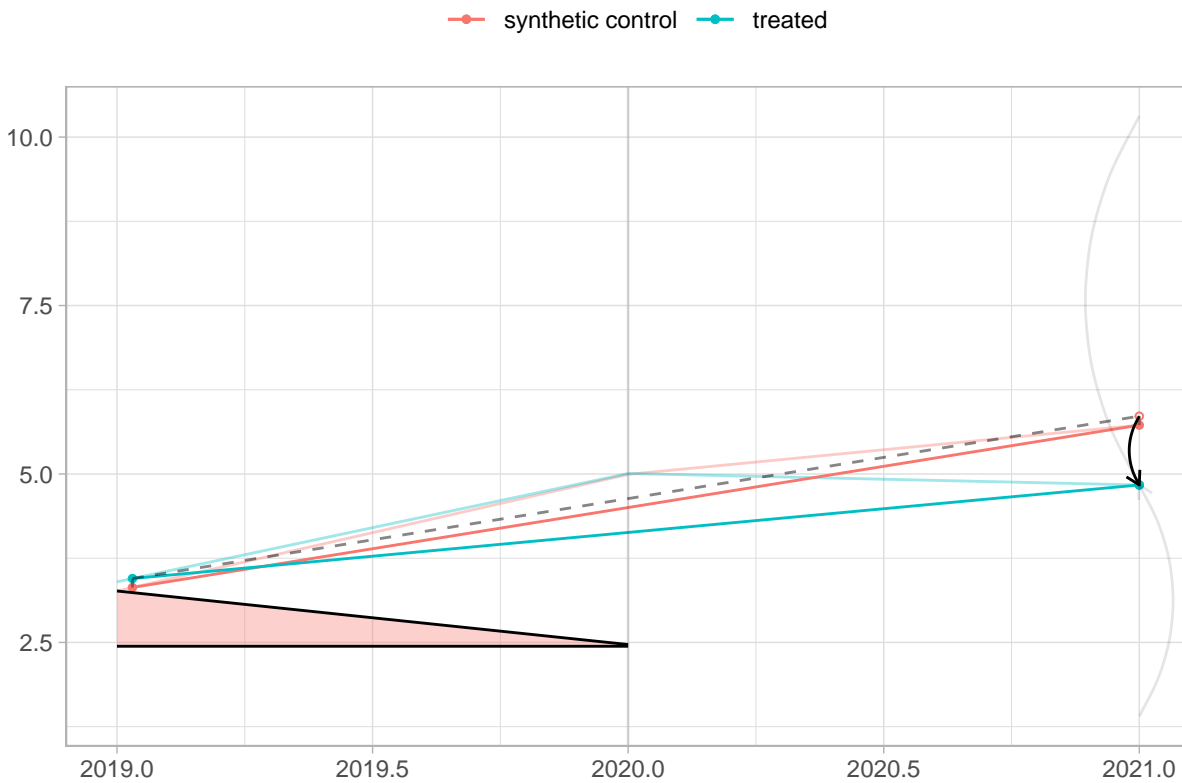


ATT Estimate: -1.7

Standard Error: 2.5

95% CI (-6.5 , 3.2)

### B.1.2.8 Synthetic Differences in Differences - Without Bias Correction



ATT Estimate: -1

Standard Error: 2.4

95% CI (-5.6 , 3.6 )

### B.1.2.9 Weighted Differences in Differences

**Table 61: Covariate Balance after IPTW Adjustment**

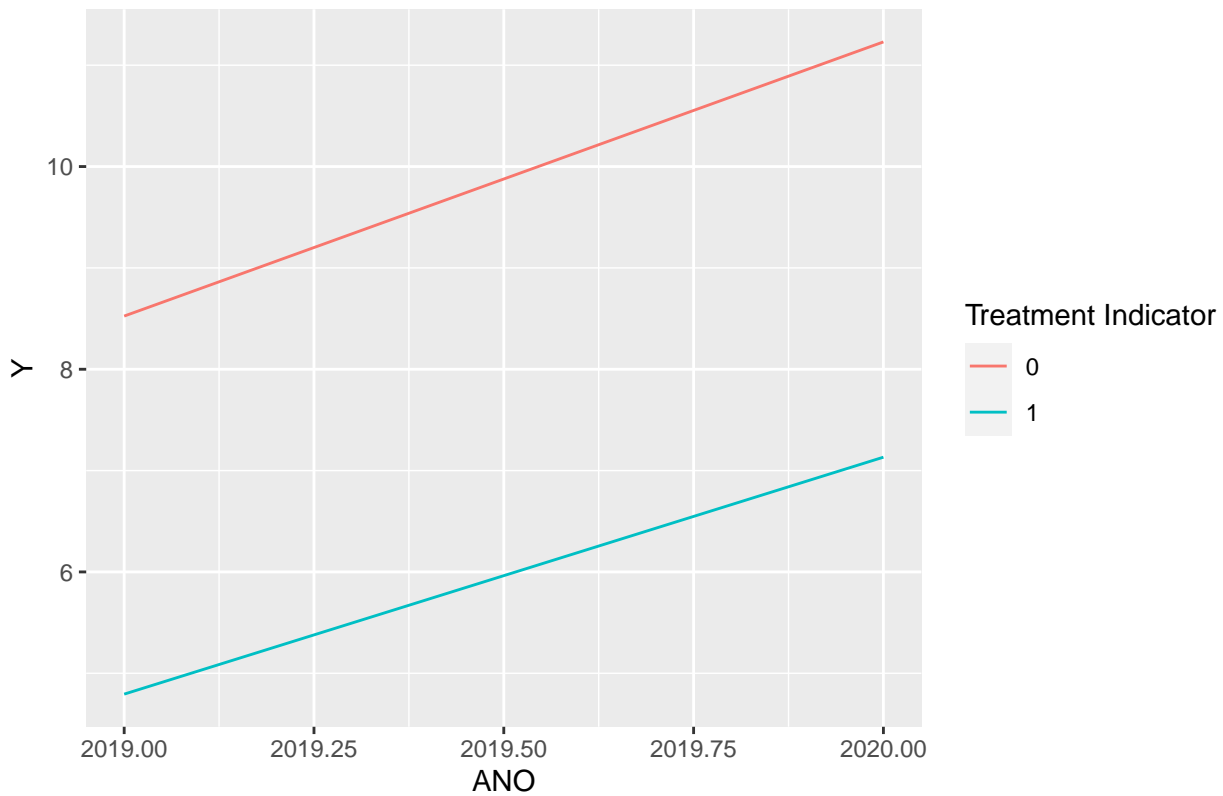
	Diff.Adj	V.Ratio.Adj
R&D Personnel	-0.331	0.759
Personnel	-0.235	1.169
External supplies and services for water	-0.115	1.206
Return on sales	-0.083	0.861
Personnel (women)	-0.155	2.425
Average personnel expenses	-0.062	1.415
Service revenues in the domestic market	-0.244	0.782
Electricity use intensity	0.077	3.554
Investment in industrial property	-0.103	3.31



**Table 61: Covariate Balance after IPTW Adjustment (continued)**

	Diff.Adj	V.Ratio.Adj
External supplies and services in the extracommunity market	-0.121	1.231
Subsidies	-0.084	1.242
Personnel expenses	-0.225	1.257
Extra-EU exports	-0.327	1.577
Investment in intangible assets	0.162	1.477
Own-entity works	-0.113	1.041
Purchases in the community market	-0.29	1.204
Service revenues in the extracommunity market	-0.28	2.879
Result before depreciation, financing expenses, and taxes	-0.18	1.436
Total current liabilities	-0.277	1.866
Return on equity	0.054	2.148
Tangible fixed assets	-0.179	1.27
Export intensity	-0.365	0.68
Interest and similar income earned	-0.095	0.866
Sales of goods	0.149	0.608
External supplies and services in the domestic market	-0.044	0.984
Net result for the period	-0.098	2.152
Result before taxes	-0.166	1.28
External supplies and services for fuels	-0.195	2.104
Imports	-0.247	1.254
Total sales in the community market of goods, products, and biological assets	-0.307	1.123
Production	-0.2	3.566
Investment in development projects	0.051	0.874
Total sales of goods, finished products, and biological assets	-0.272	1.391
Pre-treatment variation of outcome variable	0.067	1.125

Pre-treatment trends for treated and control groups



**Table 62: Firm Count by Group**

Treatment	Count
0	34
1	68

ATT Estimate:  $-2.4e+03$  Standard Error:  $3.9e+03$  95% CI ( $-1e+04, 5.3e+03$ )

**B.1.2.10 Generalized Propensity Score**

**B.1.3 Outcome Variable: Export intensity**

**B.1.3.1 Univariate Outlier Analysis**

Univariate outlier firms (regarding the outcome variable): **19**. These will be dropped.

**Table 63: Covariate Balance after GPS Adjustment**

	Type	Corr.Adj
R&D Personnel	Contin.	0.058
Personnel	Contin.	0.054
External supplies and services for water	Contin.	0.006
Return on sales	Contin.	0.023
Personnel (women)	Contin.	0.097
Average personnel expenses	Contin.	0.008
Service revenues in the domestic market	Contin.	0.049
Electricity use intensity	Contin.	-0.075
Investment in industrial property	Contin.	0.018
External supplies and services in the extracommunity market	Contin.	0.052
Subsidies	Contin.	0.047
Personnel expenses	Contin.	0.044
Extra-EU exports	Contin.	0.027
Investment in intangible assets	Contin.	-0.012
Own-entity works	Contin.	-0.02
Purchases in the community market	Contin.	0.088
Service revenues in the extracommunity market	Contin.	0.022
Result before depreciation, financing expenses, and taxes	Contin.	0.001
Total current liabilities	Contin.	0.058
Return on equity	Contin.	0.019
Tangible fixed assets	Contin.	0.137
Export intensity	Contin.	-0.091
Interest and similar income earned	Contin.	0.053
Sales of goods	Contin.	0.016
External supplies and services in the domestic market	Contin.	0.037
Net result for the period	Contin.	0.041
Result before taxes	Contin.	0.001
External supplies and services for fuels	Contin.	0.007
Imports	Contin.	0.056
Total sales in the community market of goods, products, and biological assets	Contin.	-0.008
Production	Contin.	0.043
Investment in development projects	Contin.	0.087
Total sales of goods, finished products, and biological assets	Contin.	0.073

**Table 64: Regression Outputs (Continuous treatment)**

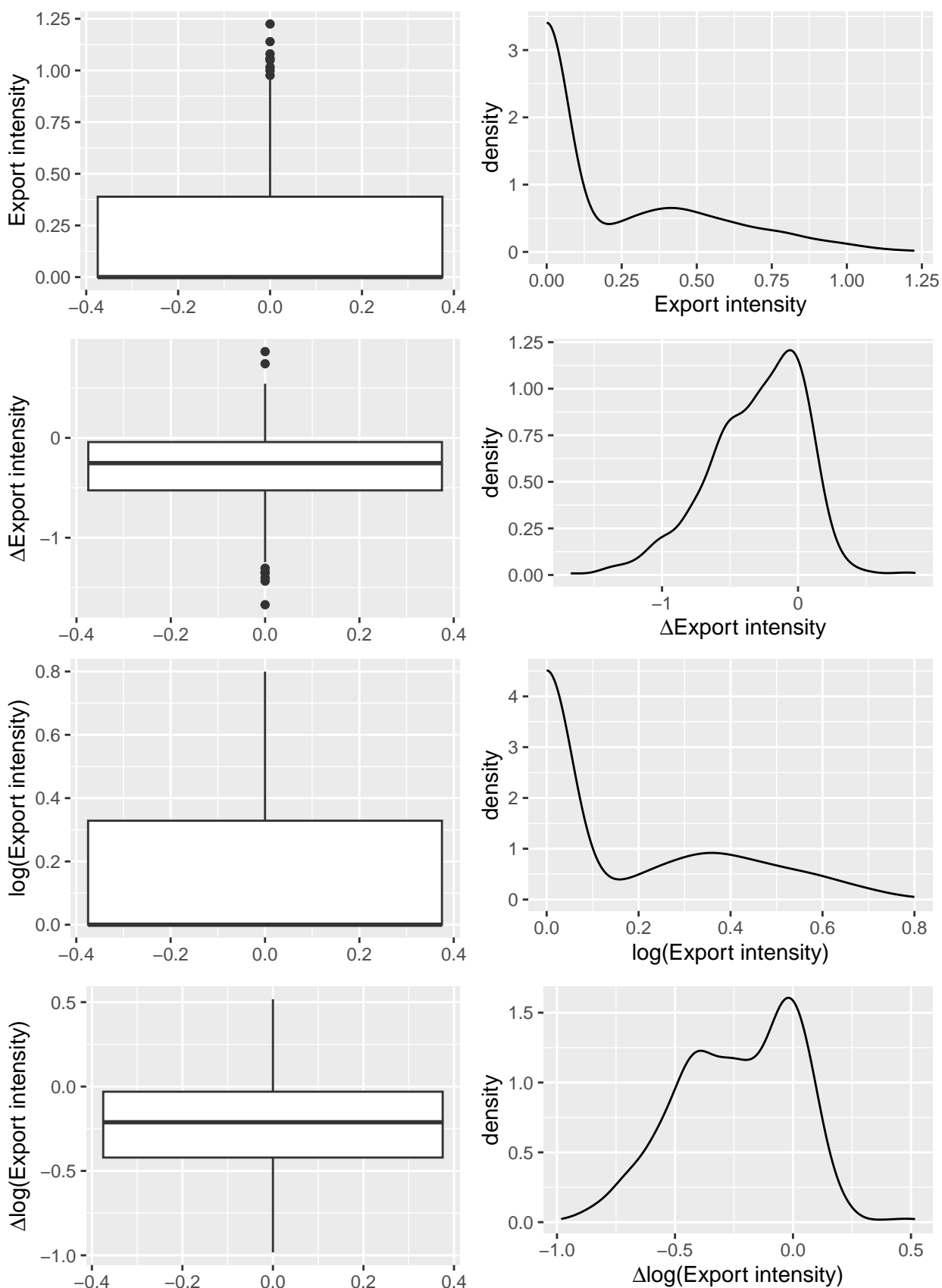
	Outcome Variable	
	(1)	(2)
w	−1.21e-07 (−1.24e-06, 9.99e-07)	−2.53e-08 (−1.9e-06, 1.85e-06)
I(w <sup>2</sup> )		−1.75e-14 (−2.91e-13, 2.56e-13)
Observations	201	201
R <sup>2</sup>	0.474	0.474
Adjusted R <sup>2</sup>	0.362	0.359
Residual Std. Error	6.94e-03 (df = 165)	6.96e-03 (df = 164)
F Statistic	4.247*** (df = 35; 165)	4.105*** (df = 36; 164)

*Note:*

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Potential confounders' coefficients were omitted from the table.

### B.1.3.2 Graphical Analysis of Outcome Variable (after outlier removal)



### B.1.3.3 Potential Confounder Analysis

List of features deemed as relevant to explain the **binary treatment indicator**:

- |  |                              |
|--|------------------------------|
| 1. Result before depreciation, financing expenses, and taxes | 3. Tangible fixed assets     |
| 2. Income tax for the period                                 | 4. Export intensity          |
|  | 5. Net result for the period |

List of features deemed as relevant to explain the **continuous treatment values**:

- |  |   |
|--|---|
| 1. Investment in industrial property   | 17. Total net assets  |
| 2. Return on assets  | 18. Intangible assets   |
| 3. Inventory variation in production   | 19. Subsidies   |
| 4. Sales of products including biological assets                                 | 20. Personnel   |
| 5. Total current assets  | 21. Water use intensity   |
| 6. Imports   | 22. External supplies and services in the extracommunity market                   |
| 7. Service revenues in the domestic market                                       | 23. Result before taxes   |
| 8. External supplies and services in the community market                        | 24. Net result for the period   |
| 9. Operating result (EBIT)   | 25. External supplies and services for electricity                                |
| 10. Average personnel expenses   | 26. Purchases in the domestic market  |
| 11. Interest and similar expenses incurred                                       | 27. Extra-EU exports  |
| 12. Return on sales  | 28. Total sales in the community market of goods, products, and biological assets |
| 13. Operating result   | 29. R&D Personnel   |
| 14. Total sales in the domestic market of goods, products, and biological assets | 30. Service revenues  |
| 15. Electricity use intensity  | 31. Fuel use intensity  |
| 16. Result before depreciation, financing expenses, and taxes                    | 32. Own-entity works  |
|  | 33. Production  |

List of features deemed as relevant to explain the **outcome variable**:

- |  |  |
|--|--|
| 1. Export intensity                              | tracommunity market                        |
| 2. Geographic diversification of exports         | 10. Water use intensity                    |
| 3. Return on assets                              | 11. Investment in industrial property      |
| 4. Result before taxes                           | 12. Turnover                               |
| 5. Extra-EU exports                              | 13. Total net assets                       |
| 6. Service revenues in the domestic market       | 14. Average personnel expenses             |
| 7. Sales of products including biological assets | 15. General liquidity                      |
| 8. Fuel use intensity                            | 16. Financial autonomy                     |
| 9. External supplies and services in the ex-     | 17. Return on equity                       |
|  | 18. Interest and similar expenses incurred |

- |                               |  |
|-------------------------------|--|
| 19. Intangible assets         | 21. External supplies and services for electricity |
| 20. Electricity use intensity | 22. Service revenues                               |

List of highly correlated relevant features (these will be discarded):

- |                              |                            |
|------------------------------|----------------------------|
| 1. Total current assets      | 5. Operating result (EBIT) |
| 2. Turnover                  | 6. Result before taxes     |
| 3. Intangible assets         | 7. Water use intensity     |
| 4. Income tax for the period |                            |

Final list of **potential confounders**:

- |  |   |
|--|---|
| 1. Export intensity  | 18. Service revenues  |
| 2. Geographic diversification of exports                       | 19. Result before depreciation, financing expenses, and taxes                     |
| 3. Return on assets  | 20. Tangible fixed assets   |
| 4. Extra-EU exports  | 21. Net result for the period   |
| 5. Service revenues in the domestic market                     | 22. Inventory variation in production   |
| 6. Sales of products including biological assets               | 23. Imports   |
| 7. Fuel use intensity  | 24. External supplies and services in the community market                        |
| 8. External supplies and services in the extracommunity market | 25. Return on sales   |
| 9. Investment in industrial property                           | 26. Operating result  |
| 10. Total net assets   | 27. Total sales in the domestic market of goods, products, and biological assets  |
| 11. Average personnel expenses                                 | 28. Subsidies   |
| 12. General liquidity  | 29. Personnel   |
| 13. Financial autonomy   | 30. Purchases in the domestic market  |
| 14. Return on equity   | 31. Total sales in the community market of goods, products, and biological assets |
| 15. Interest and similar expenses incurred                     | 32. R&D Personnel   |
| 16. Electricity use intensity                                  | 33. Own-entity works  |
| 17. External supplies and services for electricity             | 34. Production  |

#### **B.1.3.4 Multivariate Outlier Analysis**

Multivariate outlier firms (regarding the potential confounding variables): **1**. These will be dropped.

#### **B.1.3.5 Statistics and group comparison before adjustment**

**Table 65: Firm Count by Group**

	Control	Treated
Original Data	47	160
After Outlier Removal	44	145



**Table 66: Covariate Means and Group Comparison (before adjustment and before outlier removal)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Export intensity	0.477	0.602	-0.453	0.644
Geographic diversification of exports	0.377	0.489	-0.433	0.641
Return on assets	0.922	0.724	0.252	1.902
Extra-EU exports	8.3e+07	2.42e+07	0.088	253.032
Service revenues in the domestic market	1.31e+06	5.06e+05	0.097	17.973
Sales of products including biological assets	3.96e+06	4.06e+06	-0.006	1.299
Fuel use intensity	0.003	8.87e-04	0.071	171.55
External supplies and services in the extracommunity market	1.46e+06	2.16e+06	-0.167	0.758
Investment in industrial property	4.27e+06	8.94e+06	-0.313	0.127
Total net assets	3.1e+07	3.97e+07	-0.115	1.576
Average personnel expenses	3.42e+04	4.79e+04	-0.265	0.752
General liquidity	2.395	2.902	-0.29	0.417
Financial autonomy	0.199	0.234	-0.12	0.436
Return on equity	370.244	17.001	0.154	3203.345
Interest and similar expenses incurred	2.18e+06	8.01e+06	-0.459	0.734
Electricity use intensity	0.066	0.039	0.044	9.855

Final evaluation plan

**Table 66: Covariate Means and Group Comparison (before adjustment and before outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
External supplies and services for electricity	3.25e+05	3.51e+05	-0.018	1.969
Service revenues	7.53e+07	3.18e+07	0.086	63.679
Result before depreciation, financing expenses, and taxes	2.99e+06	8.55e+06	-0.681	0.274
Tangible fixed assets	2.31e+06	5.86e+06	-0.15	1.139
Net result for the period	2.96e+07	1.98e+07	0.087	15.533
Inventory variation in production	-2.01e+05	-5.38e+05	0.143	1.343
Imports	1.44e+07	1.31e+07	0.024	6.398
External supplies and services in the community market	2.11e+05	1.57e+05	0.067	6.839
Return on sales	3651.599	41.69	0.08	9.56e+04
Operating result	2.06e+05	2.97e+05	-0.05	3.236
Total sales in the domestic market of goods, products, and biological assets	4.15e+07	1.85e+07	0.096	53.715
Subsidies	2.43e+05	8.59e+05	-0.642	0.045
Personnel	266.444	241.064	0.043	4.523
Purchases in the domestic market	2.13e+07	7.61e+06	0.112	49.165
Total sales in the community market of goods, products, and biological assets	1.29e+07	6.1e+06	0.066	106.753
R&D Personnel	11.738	4.66	0.126	20.033

Final evaluation plan

**Table 66: Covariate Means and Group Comparison (before adjustment and before outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Own-entity works	1.37e+05	1.76e+05	-0.042	1.233
Production	1.3e+08	5.64e+07	0.096	92.087

**Table 67: Covariate Means and Group Comparison (before adjustment and after outlier removal)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Export intensity	0.485	0.604	-0.432	0.69
Geographic diversification of exports	0.386	0.506	-0.468	0.613
Return on assets	0.928	0.729	0.25	1.841
Extra-EU exports	9.1e+07	2.42e+07	0.095	265.465
Service revenues in the domestic market	1.32e+06	2.63e+05	0.122	93.598
Sales of products including biological assets	4.14e+06	2.01e+06	0.118	22.414
Fuel use intensity	0.003	9.22e-04	0.073	178.047
External supplies and services in the extracommunity market	1.53e+06	2.2e+06	-0.15	0.779
Investment in industrial property	4.44e+06	9.46e+06	-0.322	0.131
Total net assets	3.25e+07	3.94e+07	-0.087	1.623
Average personnel expenses	3.42e+04	4.95e+04	-0.291	0.734
General liquidity	2.45	2.819	-0.202	0.45
Financial autonomy	0.2	0.249	-0.166	0.437
Return on equity	403.408	13.784	0.161	4738.204
Interest and similar expenses incurred	2.08e+06	8.15e+06	-0.458	0.755
Electricity use intensity	0.071	0.042	0.044	10.186

Final evaluation plan

**Table 67: Covariate Means and Group Comparison (before adjustment and after outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
External supplies and services for electricity	3.48e+05	3.73e+05	-0.016	2.038
Service revenues	8.2e+07	3.3e+07	0.092	66.118
Result before depreciation, financing expenses, and taxes	2.95e+06	8.72e+06	-0.681	0.278
Tangible fixed assets	2.46e+06	6.22e+06	-0.151	1.178
Net result for the period	3.14e+07	1.94e+07	0.101	16.196
Inventory variation in production	-1.58e+05	-4.88e+05	0.137	1.388
Imports	1.53e+07	1.23e+07	0.054	7.217
External supplies and services in the community market	1.88e+05	1.62e+05	0.035	5.608
Return on sales	3996.627	39.399	0.084	1.01e+05
Operating result	2.03e+05	3.06e+05	-0.054	3.317
Total sales in the domestic market of goods, products, and biological assets	4.44e+07	1.77e+07	0.107	58.896
Subsidies	2.42e+05	8.88e+05	-0.648	0.045
Personnel	267.993	226.705	0.068	4.85
Purchases in the domestic market	2.25e+07	6.63e+06	0.124	61.318
Total sales in the community market of goods, products, and biological assets	1.37e+07	5.91e+06	0.072	111.334
R&D Personnel	10.214	4.886	0.096	18.365

Final evaluation plan

**Table 67: Covariate Means and Group Comparison (before adjustment and after outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Own-entity works	1.42e+05	1.83e+05	-0.041	1.266
Production	1.4e+08	5.66e+07	0.105	95.962

**Table 68: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Export intensity	0.379	0.452	-0.407	0.774
Geographic diversification of exports	0.312	0.388	-0.45	0.694
Return on assets	0.928	0.729	0.25	1.841
Extra-EU exports	15.308	15.668	-0.174	0.866
Service revenues in the domestic market	5.801	3.891	0.318	1.139
Sales of products including biological assets	10.194	10.529	-0.06	1.112
Fuel use intensity	0.003	9.19e-04	0.071	131.595
External supplies and services in the extracommunity market	11.653	11.263	0.12	0.555
Investment in industrial property	12.966	13.212	-0.073	1.254
Total net assets	3.25e+07	3.94e+07	-0.087	1.623
Average personnel expenses	9.753	9.956	-0.161	0.433
General liquidity	1.149	1.199	-0.13	0.652
Financial autonomy	0.2	0.249	-0.166	0.437
Return on equity	2.024	1.436	0.305	1.98
Interest and similar expenses incurred	2.08e+06	8.15e+06	-0.458	0.755

**Table 68: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Electricity use intensity	0.029	0.03	-0.004	2.153
External supplies and services for electricity	10.195	10.443	-0.096	0.746
Service revenues	14.597	15.3	-0.178	1.421
Result before depreciation, financing expenses, and taxes	2.95e+06	8.72e+06	-0.681	0.278
Tangible fixed assets	9.581	8.429	0.262	0.517
Net result for the period	15.453	15.371	0.042	0.463
Inventory variation in production	-1.58e+05	-4.88e+05	0.137	1.388
Imports	14.82	14.927	-0.061	0.642
External supplies and services in the community market	5.402	5.37	0.006	0.826
Return on sales	1.67	1.284	0.174	1.566
Operating result	2.946	3.375	-0.089	0.793
Total sales in the domestic market of goods, products, and biological assets	12.976	12.797	0.034	0.897
Subsidies	8.918	8.489	0.094	0.803
Personnel	4.598	4.597	7.72e-04	0.785
Purchases in the domestic market	12.371	11.588	0.153	0.733



**Table 68: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Total sales in the community market of goods, products, and biological assets	9.454	9.604	-0.023	0.784
R&D Personnel	0.736	0.724	0.01	1.083
Own-entity works	3.046	3.288	-0.046	1
Production	15.823	16.17	-0.1	1.157

Final evaluation plan

### B.1.3.6 Functional Form Search for Regression Models

Added terms for **propensity score model** (besides all potential confounders):

- |  |  |
|--|--|
| 1. squared(Tangible fixed assets)  | External supplies and services in the com- |
| 2. Total sales in the community market of goods, products, and biological assets * | munity market                              |
|  | 3. squared(Own-entity works)               |

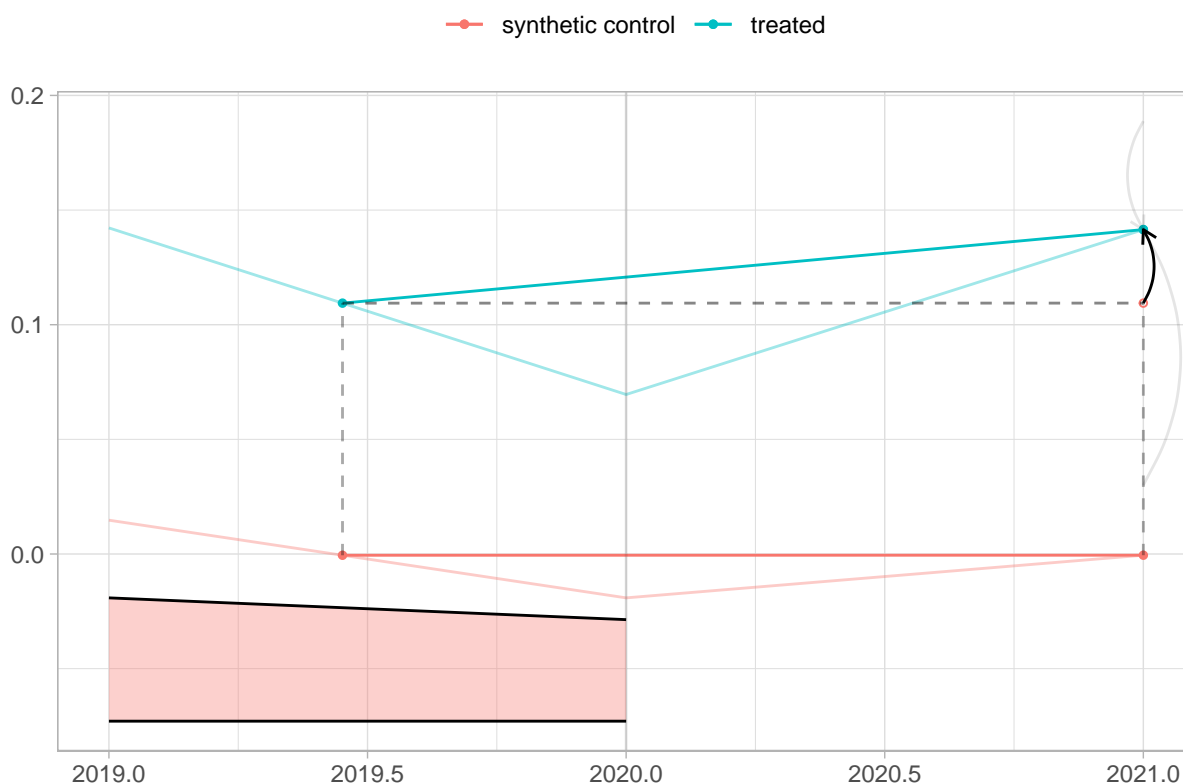
Added terms for **generalized propensity score model** (besides all potential confounders):

- |  |                                |
|--|--------------------------------|
| 1. R&D Personnel * Financial autonomy              | Average personnel expenses     |
| 2. squared(Geographic diversification of ex-ports) | 4. squared(Fuel use intensity) |
| 3. Geographic diversification of exports *         | 5. squared(General liquidity)  |

Added terms for **outcome model** (besides all potential confounders):

- General liquidity \* Personnel

### B.1.3.7 Synthetic Differences in Differences - With Bias Correction

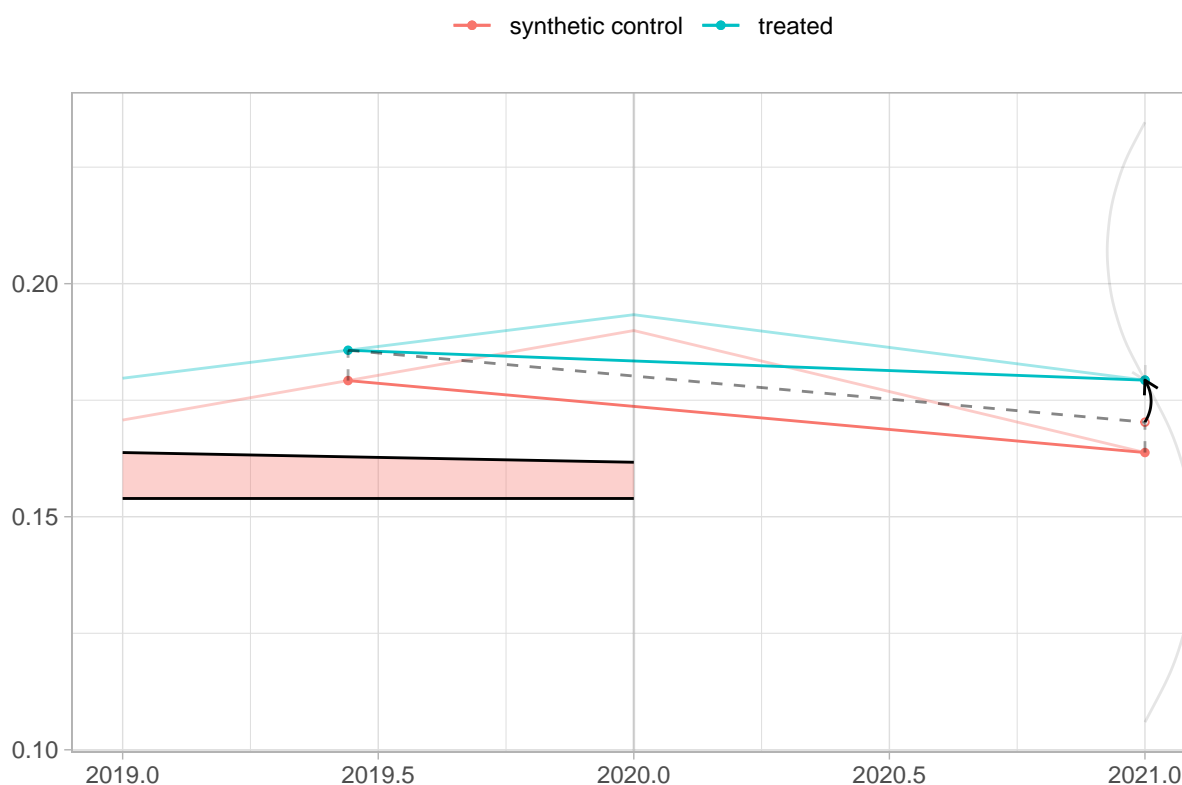


ATT Estimate: 0.032

Standard Error: 0.038

95% CI (-0.042 , 0.11 )

### B.1.3.8 Synthetic Differences in Differences - Without Bias Correction



ATT Estimate: 0.009

Standard Error: 0.032

95% CI (-0.053 , 0.071 )

### B.1.3.9 Weighted Differences in Differences

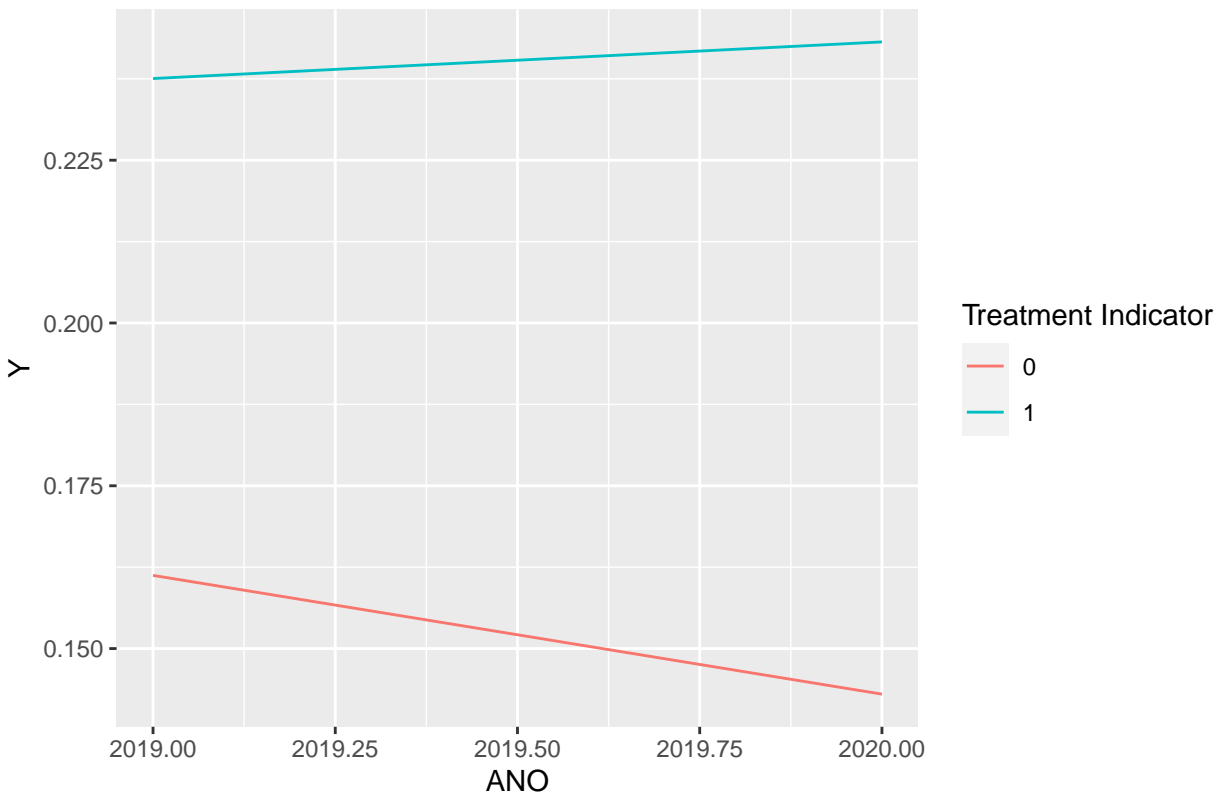
**Table 69: Covariate Balance after IPTW Adjustment**

	Diff.Adj	V.Ratio.Adj
Export intensity	0.235	0.527
Geographic diversification of exports	0.067	0.693
Return on assets	-0.356	0.535
Extra-EU exports	0.3	0.725
Service revenues in the domestic market	-0.135	0.959
Sales of products including biological assets	-0.188	1.775
Fuel use intensity	-0.039	0.575
External supplies and services in the extracommunity market	0.166	1.98
Investment in industrial property	0.17	2.212

**Table 69: Covariate Balance after IPTW Adjustment (continued)**

	Diff.Adj	V.Ratio.Adj
Total net assets	0.224	1.549
Average personnel expenses	0.138	1.062
General liquidity	0.032	0.897
Financial autonomy	-0.61	0.194
Return on equity	-0.068	1.656
Interest and similar expenses incurred	0.116	5.048
Electricity use intensity	-0.161	2.395
External supplies and services for electricity	-0.034	1.108
Service revenues	0.098	2.979
Result before depreciation, financing expenses, and taxes	0.13	4.834
Tangible fixed assets	0.038	1.284
Net result for the period	0.247	1.28
Inventory variation in production	-0.024	2.501
Imports	0.262	1.006
External supplies and services in the community market	0.097	0.907
Return on sales	0.196	1.001
Operating result	0.013	1.195
Total sales in the domestic market of goods, products, and biological assets	-0.074	1.361
Subsidies	0.089	1.088
Personnel	0.374	1
Purchases in the domestic market	-0.007	1.292
Total sales in the community market of goods, products, and biological assets	0.273	0.71
R&D Personnel	0.193	1.434
Own-entity works	0.349	1.716
Production	0.323	0.841
Pre-treatment variation of outcome variable	0.354	0.666

Pre-treatment trends for treated and control groups



**Table 70: Firm Count by Group**

Treatment	Count
0	29
1	40

ATT Estimate: -0.18 Standard Error: 0.65 95% CI (-1.5, 1.1)

**B.1.3.10 Generalized Propensity Score**

**B.1.4 Outcome Variable: Fuel use intensity**

**B.1.4.1 Univariate Outlier Analysis**

Univariate outlier firms (regarding the outcome variable): **29**. These will be dropped.

**Table 71: Covariate Balance after GPS Adjustment**

	Type	Corr.Adj
Export intensity	Contin.	0.017
Geographic diversification of exports	Contin.	0.023
Return on assets	Contin.	0.021
Extra-EU exports	Contin.	0.007
Service revenues in the domestic market	Contin.	0.011
Sales of products including biological assets	Contin.	0.007
Fuel use intensity	Contin.	-1.25e-04
External supplies and services in the extracommunity market	Contin.	0.038
Investment in industrial property	Contin.	-0.002
Total net assets	Contin.	0.014
Average personnel expenses	Contin.	0.003
General liquidity	Contin.	0.017
Financial autonomy	Contin.	-0.029
Return on equity	Contin.	0.042
Interest and similar expenses incurred	Contin.	0.004
Electricity use intensity	Contin.	0.005
External supplies and services for electricity	Contin.	0.027
Service revenues	Contin.	-0.016
Result before depreciation, financing expenses, and taxes	Contin.	0.002
Tangible fixed assets	Contin.	0.009
Net result for the period	Contin.	0.001
Inventory variation in production	Contin.	0.042
Imports	Contin.	-0.002
External supplies and services in the community market	Contin.	-0.029
Return on sales	Contin.	0.022
Operating result	Contin.	-0.008
Total sales in the domestic market of goods, products, and biological assets	Contin.	-0.021
Subsidies	Contin.	0.04
Personnel	Contin.	-0.012
Purchases in the domestic market	Contin.	-0.012
Total sales in the community market of goods, products, and biological assets	Contin.	-0.025
R&D Personnel	Contin.	0.017
Own-entity works	Contin.	0.018
Production	Contin.	-0.013

**Table 72: Regression Outputs (Continuous treatment)**

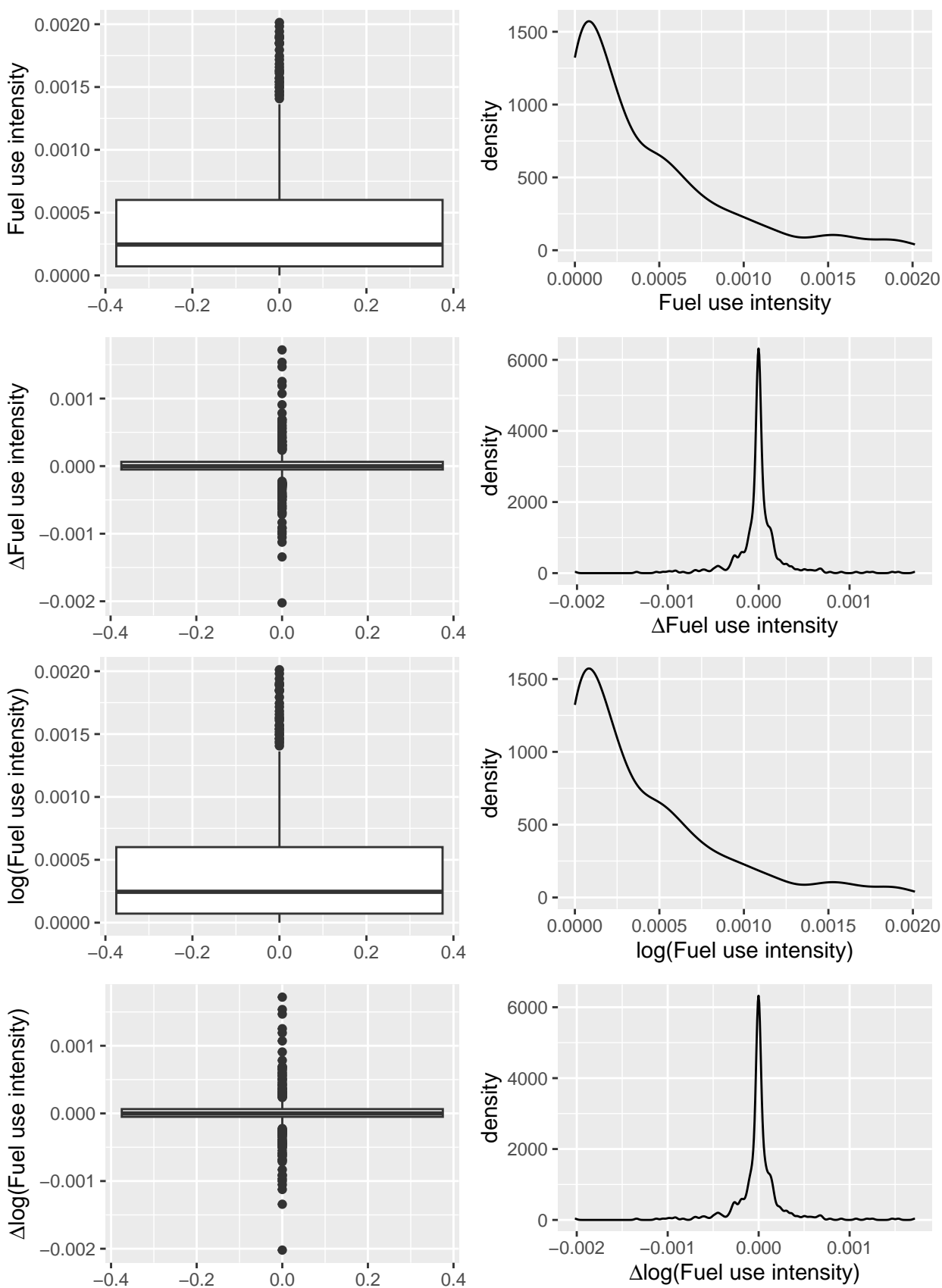
	Outcome Variable	
	(1)	(2)
w	3.98e-08* (-2.95e-09, 8.25e-08)	5.11e-08 (-1.67e-08, 1.19e-07)
I(w <sup>2</sup> )		-1.67e-15 (-9.39e-15, 6.05e-15)
Observations	187	187
R <sup>2</sup>	0.81	0.811
Adjusted R <sup>2</sup>	0.765	0.764
Residual Std. Error	2.76e-04 (df = 150)	2.77e-04 (df = 149)
F Statistic	17.801*** (df = 36; 150)	17.23*** (df = 37; 149)

*Note:*

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Potential confounders' coefficients were omitted from the table.

**B.1.4.2 Graphical Analysis of Outcome Variable (after outlier removal)**





### B.1.4.3 Potential Confounder Analysis

List of features deemed as relevant to explain the **binary treatment indicator**:

- |  |  |
|--|--|
| 1. Result before depreciation, financing expenses, and taxes   | goods, products, and biological assets     |
| 2. External supplies and services in the extracommunity market | 5. Service revenues in the domestic market |
| 3. Total current liabilities                                   | 6. Tangible fixed assets                   |
| 4. Total sales in the community market of                      | 7. Purchases in the extracommunity market  |
|  | 8. Income tax for the period               |

List of features deemed as relevant to explain the **continuous treatment values**:

- |  |   |
|--|---|
| 1. External supplies and services in the domestic market                               | sumed   |
| 2. Sales of products including biological assets                                       | 21. Water use intensity   |
| 3. Coverage of interest charges  | 22. External supplies and services in the community market                        |
| 4. Service revenues  | 23. External supplies and services for electricity                                |
| 5. Tangible fixed assets   | 24. Total net assets  |
| 6. Exports   | 25. Total current liabilities   |
| 7. Operating result  | 26. Export intensity  |
| 8. Total sales in the domestic market of goods, products, and biological assets        | 27. Personnel (women)   |
| 9. Net result for the period   | 28. Service revenues in the extracommunity market                                 |
| 10. Interest and similar income earned   | 29. External supplies and services for water                                      |
| 11. Total sales in the extracommunity market of goods, products, and biological assets | 30. Return on assets  |
| 12. Result before taxes  | 31. External supplies and services (FSE)  |
| 13. Service revenues in the domestic market  | 32. R&D Personnel   |
| 14. Own-entity works   | 33. Effect of interest incurred   |
| 15. Personnel  | 34. Subsidies   |
| 16. Total sales of goods, finished products, and biological assets                     | 35. Total sales in the community market of goods, products, and biological assets |
| 17. Electricity use intensity  | 36. Turnover  |
| 18. Inventory variation in production  | 37. Imports   |
| 19. EU exports   | 38. Total current assets  |
| 20. Cost of goods sold/raw materials con-  | 39. Return on equity  |

List of features deemed as relevant to explain the **outcome variable**:

- |   |  |
|---|--|
| 1. Fuel use intensity                       | 3. Export intensity                      |
| 2. External supplies and services for fuels | 4. Geographic diversification of exports |

- |   |   |
|---|---|
| 5. External supplies and services for water | 8. Return on sales  |
| 6. Water use intensity                      | 9. Total sales in the domestic market of goods, products, and biological assets |
| 7. Total equity                             | 10. Effect of interest incurred   |

List of highly correlated relevant features (these will be discarded):

- |   |   |
|---|---|
| 1. Total current assets                 | 6. Exports  |
| 2. Income tax for the period            | 7. Total sales in the community market of goods, products, and biological assets      |
| 3. Turnover                             | 8. Total sales in the extracommunity market of goods, products, and biological assets |
| 4. Imports                              | 9. Water use intensity  |
| 5. External supplies and services (FSE) |   |

Final list of **potential confounders**:

- |   |  |
|---|--|
| 1. Fuel use intensity   | 21. Net result for the period                                      |
| 2. External supplies and services for fuels                                     | 22. Interest and similar income earned                             |
| 3. Export intensity   | 23. Result before taxes  |
| 4. Geographic diversification of exports  | 24. Own-entity works   |
| 5. External supplies and services for water                                     | 25. Personnel  |
| 6. Total equity   | 26. Total sales of goods, finished products, and biological assets |
| 7. Return on sales  | 27. Electricity use intensity                                      |
| 8. Total sales in the domestic market of goods, products, and biological assets | 28. Inventory variation in production                              |
| 9. Effect of interest incurred  | 29. EU exports   |
| 10. Result before depreciation, financing expenses, and taxes                   | 30. Cost of goods sold/raw materials consumed                      |
| 11. External supplies and services in the extracommunity market                 | 31. External supplies and services in the community market         |
| 12. Total current liabilities   | 32. External supplies and services for electricity                 |
| 13. Service revenues in the domestic market                                     | 33. Total net assets   |
| 14. Tangible fixed assets   | 34. Personnel (women)  |
| 15. Purchases in the extracommunity market                                      | 35. Service revenues in the extracommunity market                  |
| 16. External supplies and services in the domestic market                       | 36. Return on assets   |
| 17. Sales of products including biological assets                               | 37. R&D Personnel  |
| 18. Coverage of interest charges  | 38. Subsidies  |
| 19. Service revenues  | 39. Return on equity   |
| 20. Operating result  |  |

#### **B.1.4.4 Multivariate Outlier Analysis**

Multivariate outlier firms (regarding the potential confounding variables): **1**. These will be dropped.

**Table 73: Firm Count by Group**

	Control	Treated
Original Data	47	160
After Outlier Removal	38	140

#### **B.1.4.5 Statistics and group comparison before adjustment**

**Table 74: Covariate Means and Group Comparison (before adjustment and before outlier removal)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Fuel use intensity	0.003	8.87e-04	0.071	171.55
External supplies and services for fuels	3.17e+04	3.29e+04	-0.009	2.692
Export intensity	0.477	0.602	-0.453	0.644
Geographic diversification of exports	0.377	0.489	-0.433	0.641
External supplies and services for water	4.92e+04	3.86e+04	0.031	22.391
Total equity	4.25e+06	5.42e+06	-0.094	0.797
Return on sales	3651.599	41.69	0.08	9.56e+04
Total sales in the domestic market of goods, products, and biological assets	4.15e+07	1.85e+07	0.096	53.715
Effect of interest incurred	2640.368	9845.955	-0.001	1.36e+04
Result before depreciation, financing expenses, and taxes	2.99e+06	8.55e+06	-0.681	0.274
External supplies and services in the extracommunity market	1.46e+06	2.16e+06	-0.167	0.758
Total current liabilities	5.27e+07	4.67e+07	0.02	11.634
Service revenues in the domestic market	1.31e+06	5.06e+05	0.097	17.973
Tangible fixed assets	2.31e+06	5.86e+06	-0.15	1.139
Purchases in the extracommunity market	1.21e+07	1.24e+07	-0.007	6.386
External supplies and services in the domestic market	1.72e+06	8.49e+05	0.162	13.991

**Table 74: Covariate Means and Group Comparison (before adjustment and before outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Sales of products including biological assets	3.96e+06	4.06e+06	-0.006	1.299
Coverage of interest charges	0.009	0.019	-0.16	0.995
Service revenues	7.53e+07	3.18e+07	0.086	63.679
Operating result	2.06e+05	2.97e+05	-0.05	3.236
Net result for the period	2.96e+07	1.98e+07	0.087	15.533
Interest and similar income earned	1.01e+06	8.4e+05	0.019	16.173
Result before taxes	1.95e+06	6.81e+06	-0.459	0.702
Own-entity works	1.37e+05	1.76e+05	-0.042	1.233
Personnel	266.444	241.064	0.043	4.523
Total sales of goods, finished products, and biological assets	7.04e+07	1.46e+07	0.077	277.378
Electricity use intensity	0.066	0.039	0.044	9.855
Inventory variation in production	-2.01e+05	-5.38e+05	0.143	1.343
EU exports	1.31e+07	7.87e+06	0.05	43.497
Cost of goods sold/raw materials consumed	1.04e+08	3.06e+07	0.107	228.818
External supplies and services in the community market	2.11e+05	1.57e+05	0.067	6.839
External supplies and services for electricity	3.25e+05	3.51e+05	-0.018	1.969

**Table 74: Covariate Means and Group Comparison (before adjustment and before outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Total net assets	3.1e+07	3.97e+07	-0.115	1.576
Personnel (women)	91.162	62.596	0.14	4.655
Service revenues in the extracommunity market	8.05e+07	2.24e+07	0.088	253.598
Return on assets	0.922	0.724	0.252	1.902
R&D Personnel	11.738	4.66	0.126	20.033
Subsidies	2.43e+05	8.59e+05	-0.642	0.045
Return on equity	370.244	17.001	0.154	3203.345

**Table 75: Covariate Means and Group Comparison (before adjustment and after outlier removal)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Fuel use intensity	4.11e-04	3.92e-04	0.041	0.994
External supplies and services for fuels	1.58e+04	2.27e+04	-0.161	0.77
Export intensity	0.473	0.562	-0.336	0.738
Geographic diversification of exports	0.37	0.454	-0.351	0.711
External supplies and services for water	5.23e+04	4.47e+04	0.021	21.511
Total equity	3.68e+06	5.92e+06	-0.213	0.47
Return on sales	82.637	49.067	0.082	6.484
Total sales in the domestic market of goods, products, and biological assets	4.03e+07	1.85e+07	0.087	56.983
Effect of interest incurred	1696.371	1.22e+04	-0.002	1.27e+04
Result before depreciation, financing expenses, and taxes	2.65e+06	7.95e+06	-0.687	0.226
External supplies and services in the extracommunity market	1.43e+06	1.91e+06	-0.113	0.767
Total current liabilities	5.24e+07	5.13e+07	0.003	10.816
Service revenues in the domestic market	1.31e+06	2.78e+05	0.118	84.714
Tangible fixed assets	2.59e+06	6.27e+06	-0.145	1.107
Purchases in the extracommunity market	1.2e+07	1.06e+07	0.027	8.089
External supplies and services in the domestic market	1.68e+06	8.81e+05	0.148	12.506

**Table 75: Covariate Means and Group Comparison (before adjustment and after outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Sales of products including biological assets	4.09e+06	1.8e+06	0.125	21.512
Coverage of interest charges	0.007	0.018	-0.183	0.881
Service revenues	8.18e+07	2.46e+07	0.105	189.398
Operating result	2.29e+05	3.41e+05	-0.058	3.013
Net result for the period	2.99e+07	2.09e+07	0.076	14.815
Interest and similar income earned	1.13e+06	9.48e+05	0.018	15.138
Result before taxes	1.58e+06	6.42e+06	-0.451	0.649
Own-entity works	1.52e+05	2.15e+05	-0.063	1.141
Personnel	261.564	243.211	0.03	4.343
Total sales of goods, finished products, and biological assets	7.96e+07	1.75e+07	0.08	260.294
Electricity use intensity	0.065	0.009	0.084	2649.656
Inventory variation in production	-2.66e+05	-6.29e+05	0.147	1.282
EU exports	1.4e+07	6.53e+06	0.067	94.932
Cost of goods sold/raw materials consumed	1.1e+08	2.4e+07	0.118	724.367
External supplies and services in the community market	2.14e+05	1.73e+05	0.049	6.363
External supplies and services for electricity	3.08e+05	2.46e+05	0.04	6.087



**Table 75: Covariate Means and Group Comparison (before adjustment and after outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Total net assets	3.09e+07	3.98e+07	-0.113	1.459
Personnel (women)	91.329	64.289	0.126	4.906
Service revenues in the extracommunity market	8.81e+07	1.73e+07	0.1	926.729
Return on assets	0.925	0.755	0.212	1.91
R&D Personnel	11.379	4.579	0.12	17.69
Subsidies	2.35e+05	1.01e+06	-0.767	0.041
Return on equity	421.474	16.024	0.165	4284.951

**Table 76: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Fuel use intensity	4.11e-04	3.92e-04	0.041	0.994
External supplies and services for fuels	7.169	7.499	-0.103	0.844
Export intensity	0.372	0.427	-0.321	0.798
Geographic diversification of exports	0.301	0.357	-0.345	0.775
External supplies and services for water	7.945	8.735	-0.263	0.929
Total equity	11.049	10.252	0.146	0.71
Return on sales	1.616	1.421	0.097	1.105
Total sales in the domestic market of goods, products, and biological assets	13.036	13.572	-0.106	1.082
Effect of interest incurred	1696.371	1.22e+04	-0.002	1.27e+04
Result before depreciation, financing expenses, and taxes	2.65e+06	7.95e+06	-0.687	0.226
External supplies and services in the extracommunity market	11.571	11.148	0.129	0.531
Total current liabilities	15.963	16.198	-0.143	0.696
Service revenues in the domestic market	5.886	3.385	0.424	1.144
Tangible fixed assets	9.781	9.268	0.121	0.537
Purchases in the extracommunity market	14.591	14.849	-0.153	0.606

**Table 76: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
External supplies and services in the domestic market	10.055	10.06	-0.001	0.888
Sales of products including biological assets	10.274	9.601	0.125	0.917
Coverage of interest charges	0.007	0.018	-0.183	0.881
Service revenues	14.819	15.265	-0.121	1.217
Operating result	3.004	2.781	0.046	0.933
Net result for the period	15.387	15.416	-0.015	0.418
Interest and similar income earned	9.679	9.86	-0.044	0.909
Result before taxes	1.58e+06	6.42e+06	-0.451	0.649
Own-entity works	3.238	3.27	-0.006	1.006
Personnel	4.561	4.607	-0.035	0.697
Total sales of goods, finished products, and biological assets	8.684	10.771	-0.297	1.047
Electricity use intensity	0.024	0.009	0.083	210.919
Inventory variation in production	-2.66e+05	-6.29e+05	0.147	1.282
EU exports	10.089	9.841	0.041	0.676
Cost of goods sold/raw materials consumed	15.317	15.754	-0.142	1.479

**Table 76: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
External supplies and services in the community market	5.672	5.35	0.059	0.814
External supplies and services for electricity	10.11	10.399	-0.107	0.841
Total net assets	3.09e+07	3.98e+07	-0.113	1.459
Personnel (women)	3.149	3.164	-0.01	1.039
Service revenues in the extracommunity market	14.832	15.218	-0.139	1.138
Return on assets	0.925	0.755	0.212	1.91
R&D Personnel	0.834	0.681	0.113	1.348
Subsidies	8.921	7.824	0.246	0.658
Return on equity	2.038	1.508	0.263	1.846

### B.1.4.6 Functional Form Search for Regression Models

Added terms for **propensity score model** (besides all potential confounders):

1. squared(Tangible fixed assets)
2. Total sales of goods, finished products, and biological assets \* Net result for the period

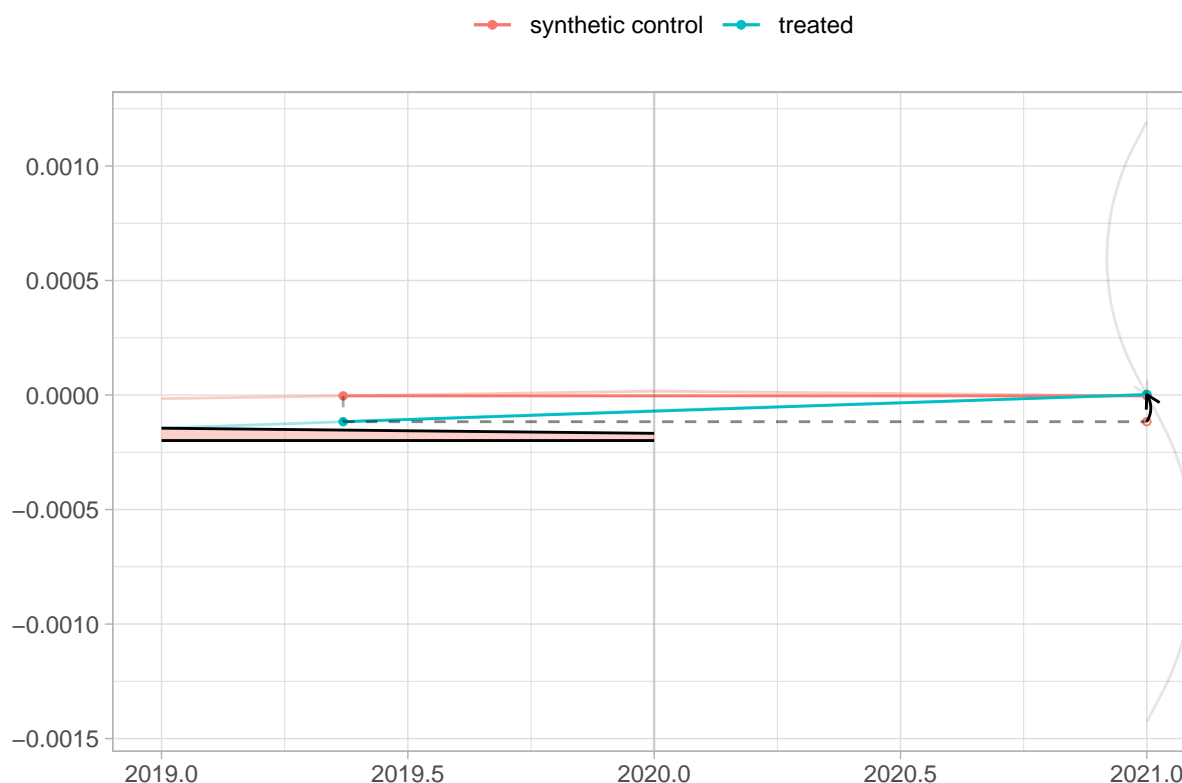
Added terms for **generalized propensity score model** (besides all potential confounders):

- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1. External supplies and services for fuels * Personnel</li> </ol> | <ol style="list-style-type: none"> <li>2. squared(Total current liabilities)</li> <li>3. Personnel * Subsidies</li> </ol> |
|---|---|

Added terms for **outcome model** (besides all potential confounders):

1. Result before taxes \* Service revenues in the domestic market

### B.1.4.7 Synthetic Differences in Differences - With Bias Correction

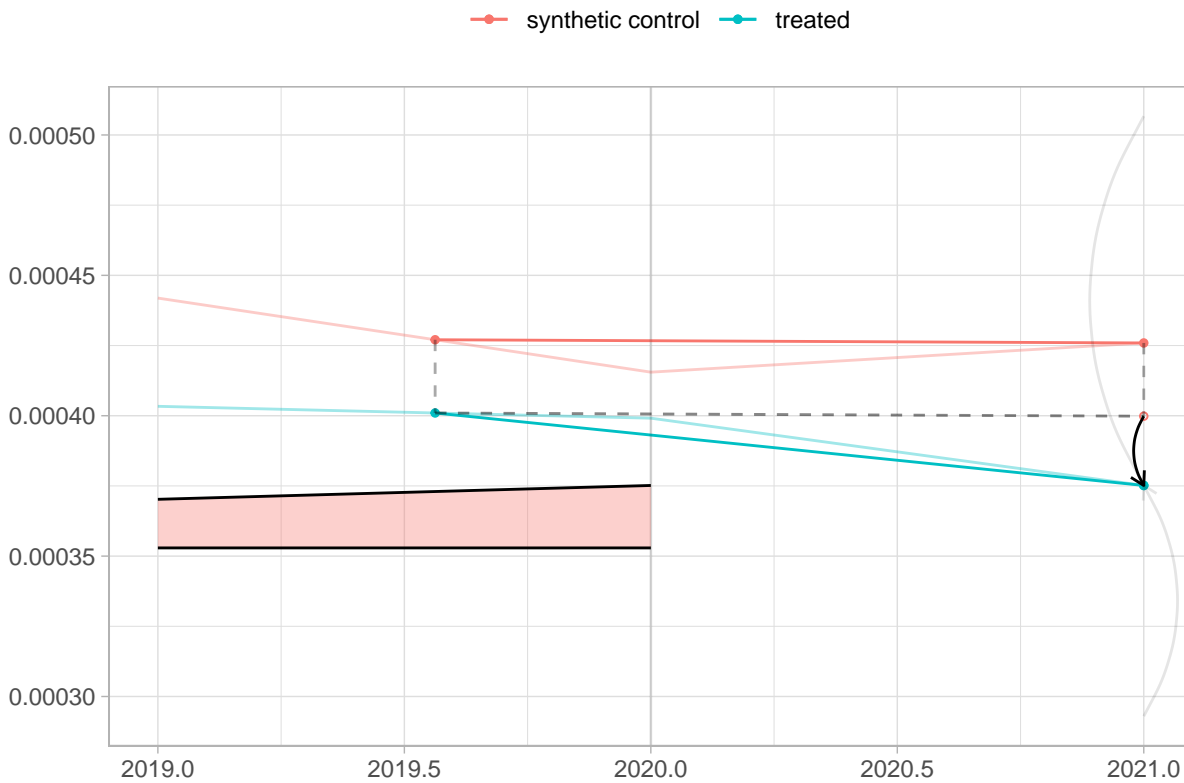


ATT Estimate: 0.00012

Standard Error: 0.00065

95% CI (-0.0012 , 0.0014 )

### B.1.4.8 Synthetic Differences in Differences - Without Bias Correction



ATT Estimate:  $-2.5e-05$

Standard Error:  $5.3e-05$

95% CI ( $-0.00013$  ,  $7.9e-05$  )

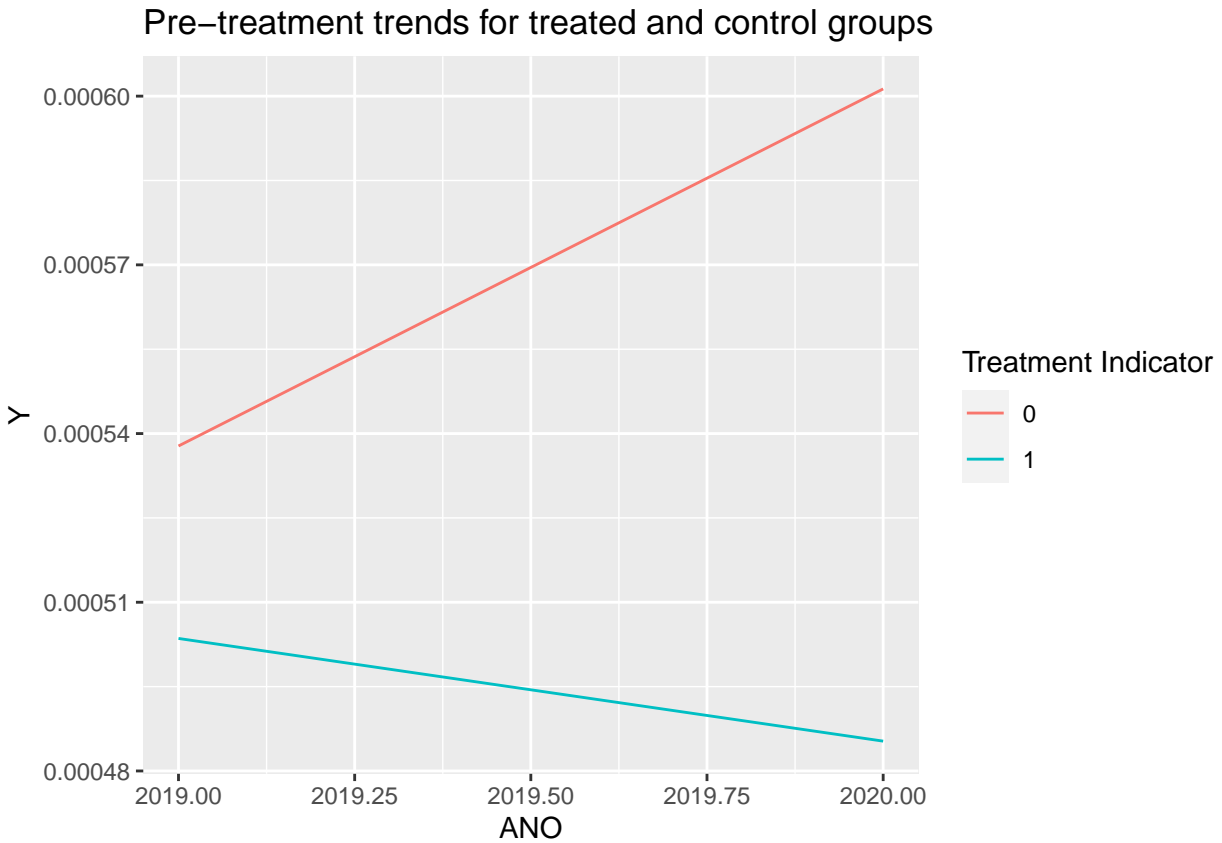
### B.1.4.9 Weighted Differences in Differences

**Table 77: Covariate Balance after IPTW Adjustment**

	Diff.Adj	V.Ratio.Adj
Fuel use intensity	-0.232	0.377
External supplies and services for fuels	0.238	0.631
Export intensity	-0.075	1.276
Geographic diversification of exports	0.143	1.337
External supplies and services for water	0.143	1.096
Total equity	0.331	0.699
Return on sales	-0.126	0.606
Total sales in the domestic market of goods, products, and biological assets	0.519	0.454
Effect of interest incurred	$-7.39e-04$	$1.27e+05$

**Table 77: Covariate Balance after IPTW Adjustment (continued)**

	Diff.Adj	V.Ratio.Adj
Result before depreciation, financing expenses, and taxes	0.195	3.489
External supplies and services in the extracommunity market	0.17	2.224
Total current liabilities	0.079	1.531
Service revenues in the domestic market	0.086	1.018
Tangible fixed assets	0.264	0.632
Purchases in the extracommunity market	0.334	0.761
External supplies and services in the domestic market	0.335	0.743
Sales of products including biological assets	0.07	1.527
Coverage of interest charges	0.201	13.384
Service revenues	0.056	4.077
Operating result	0.181	3.562
Net result for the period	-0.015	1.445
Interest and similar income earned	-0.039	1.879
Result before taxes	0.203	3.566
Own-entity works	0.196	1.387
Personnel	0.196	0.656
Total sales of goods, finished products, and biological assets	0.024	0.906
Electricity use intensity	-0.091	0.965
Inventory variation in production	-0.291	0.69
EU exports	-0.153	0.855
Cost of goods sold/raw materials consumed	0.454	0.4
External supplies and services in the community market	0.332	0.823
External supplies and services for electricity	0.309	0.856
Total net assets	0.138	1.472
Personnel (women)	0.242	0.887
Service revenues in the extracommunity market	0.212	0.851
Return on assets	0.212	1.38
R&D Personnel	0.03	0.596
Subsidies	-0.02	1.354
Return on equity	0.175	1.415
Pre-treatment variation of outcome variable	-0.268	1.067



**Table 78: Firm Count by Group**

Treatment	Count
0	21
1	38

ATT Estimate: 5.3e-05 Standard Error: 0.0015 95% CI (-0.016, 0.016)

**B.1.4.10 Generalized Propensity Score**

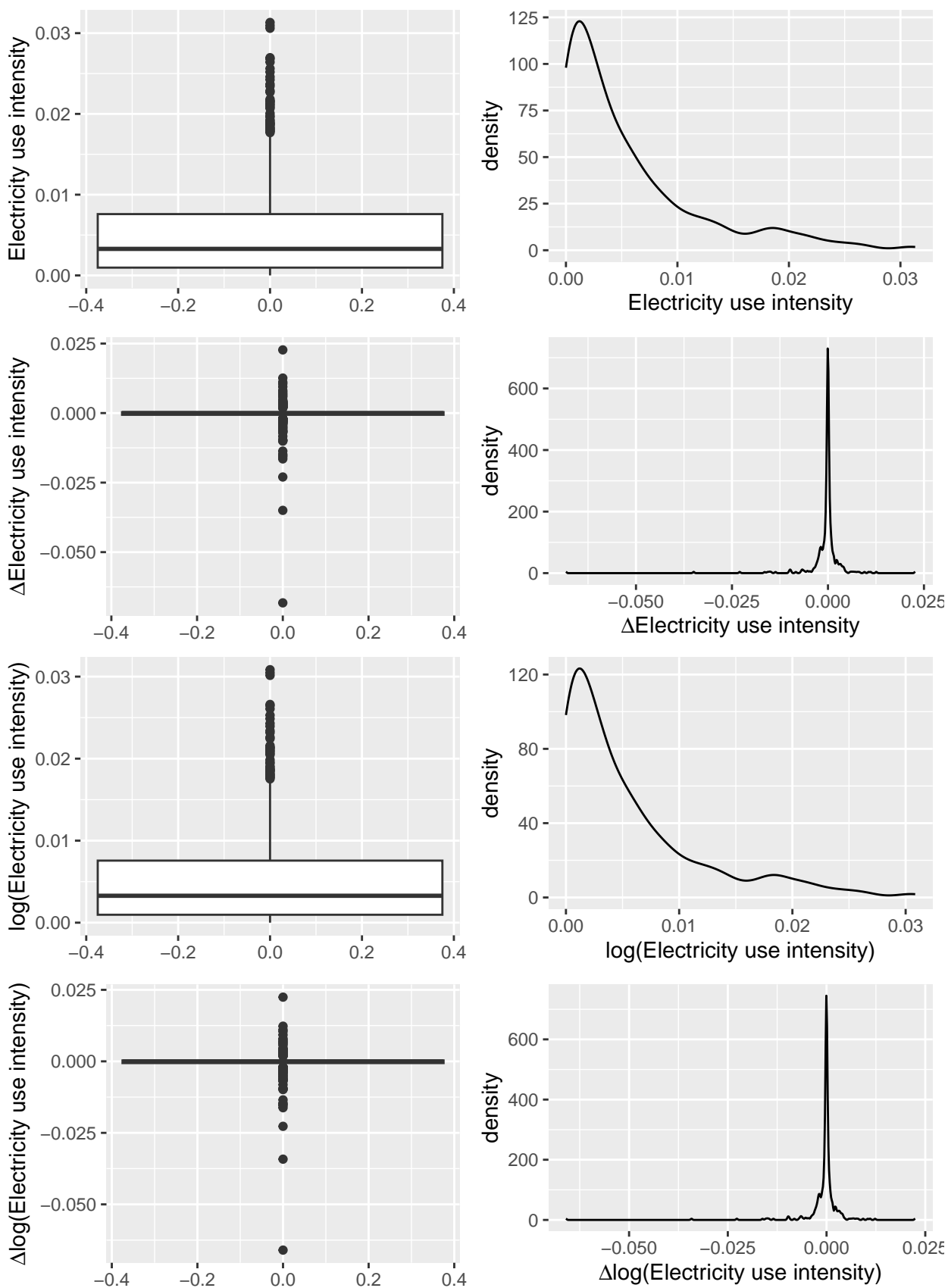
**B.1.5 Outcome Variable: Electricity use intensity**

**B.1.5.1 Univariate Outlier Analysis**

Univariate outlier firms (regarding the outcome variable): **35**. These will be dropped.



**B.1.5.2 Graphical Analysis of Outcome Variable (after outlier removal)**



### B.1.5.3 Potential Confounder Analysis

List of features deemed as relevant to explain the **binary treatment indicator**:

- |  |  |
|--|--|
| 1. Total sales in the community market of goods, products, and biological assets | penses, and taxes                        |
| 2. Result before depreciation, financing ex-                                     | 3. Geographic diversification of exports |
|  | 4. Return on equity                      |

List of features deemed as relevant to explain the **continuous treatment values**:

- |   |   |
|---|---|
| 1. Total sales in the domestic market of goods, products, and biological assets       | 7. Return on assets 2   |
| 2. Service revenues in the domestic market  | 8. Turnover   |
| 3. Sales of products including biological as-   | 9. External supplies and services (FSE)   |
| sets  | 10. Subsidies   |
| 4. Interest and similar expenses incurred   | 11. Service revenues  |
| 5. Coverage of interest charges   | 12. Total sales in the community market of goods, products, and biological assets |
| 6. Total sales in the extracommunity market of goods, products, and biological assets | 13. External supplies and services in the community market                        |

List of features deemed as relevant to explain the **outcome variable**:

- |   |  |
|---|--|
| 1. Electricity use intensity                  | 8. Purchases in the extracommunity market                          |
| 2. Cost of goods sold/raw materials consumed  | 9. Coverage of interest charges                                    |
| 3. Income tax for the period                  | 10. External supplies and services for fuels                       |
| 4. Fuel use intensity                         | 11. Total sales of goods, finished products, and biological assets |
| 5. Sales of products including biological as- | 12. Result before taxes  |
| sets  | 13. Own-entity works   |
| 6. Water use intensity                        | 14. Average personnel expenses                                     |
| 7. Intangible assets                          |  |

List of highly correlated relevant features (these will be discarded):

- |   |   |
|---|---|
| 1. Intangible assets                    | 4. Income tax for the period  |
| 2. Turnover                             | 5. Result before taxes  |
| 3. External supplies and services (FSE) | 6. Total sales in the extracommunity market of goods, products, and biological assets |

Final list of **potential confounders**:

- |  |   |
|--|---|
| 1. Electricity use intensity                 | 3. Fuel use intensity                         |
| 2. Cost of goods sold/raw materials consumed | 4. Sales of products including biological as- |
|  | sets  |

- |   |  |
|---|--|
| 5. Water use intensity  | 14. Geographic diversification of exports  |
| 6. Purchases in the extracommunity market   | 15. Return on equity   |
| 7. Coverage of interest charges   | 16. Total sales in the domestic market of goods, products, and biological assets |
| 8. External supplies and services for fuels                                       | 17. Service revenues in the domestic market                                      |
| 9. Total sales of goods, finished products, and biological assets                 | 18. Interest and similar expenses incurred                                       |
| 10. Own-entity works  | 19. Return on assets 2   |
| 11. Average personnel expenses  | 20. Subsidies  |
| 12. Total sales in the community market of goods, products, and biological assets | 21. Service revenues   |
| 13. Result before depreciation, financing expenses, and taxes                     | 22. External supplies and services in the community market                       |

#### **B.1.5.4 Multivariate Outlier Analysis**

Multivariate outlier firms (regarding the potential confounding variables): **1**. These will be dropped.

#### **B.1.5.5 Statistics and group comparison before adjustment**

**Table 79: Covariate Balance after GPS Adjustment**

	Type	Corr.Adj
Fuel use intensity	Contin.	-0.006
External supplies and services for fuels	Contin.	9.57e-05
Export intensity	Contin.	-3.25e-04
Geographic diversification of exports	Contin.	-0.011
External supplies and services for water	Contin.	-0.011
Total equity	Contin.	1.74e-04
Return on sales	Contin.	0.03
Total sales in the domestic market of goods, products, and biological assets	Contin.	0.006
Effect of interest incurred	Contin.	-0.003
Result before depreciation, financing expenses, and taxes	Contin.	0.015
External supplies and services in the extracommunity market	Contin.	0.009
Total current liabilities	Contin.	0.033
Service revenues in the domestic market	Contin.	0.012
Tangible fixed assets	Contin.	0.009
Purchases in the extracommunity market	Contin.	0.035
External supplies and services in the domestic market	Contin.	0.056
Sales of products including biological assets	Contin.	0.008
Coverage of interest charges	Contin.	0.01
Service revenues	Contin.	-0.022
Operating result	Contin.	0.032
Net result for the period	Contin.	0.016
Interest and similar income earned	Contin.	0.009
Result before taxes	Contin.	0.015
Own-entity works	Contin.	0.02
Personnel	Contin.	0.03
Total sales of goods, finished products, and biological assets	Contin.	0.021
Electricity use intensity	Contin.	0.005
Inventory variation in production	Contin.	-0.004
EU exports	Contin.	0.019
Cost of goods sold/raw materials consumed	Contin.	0.004
External supplies and services in the community market	Contin.	0.034
External supplies and services for electricity	Contin.	-0.007
Total net assets	Contin.	0.022
Personnel (women)	Contin.	0.021
Service revenues in the extracommunity market	Contin.	0.002
Return on assets	Contin.	-0.026
R&D Personnel	Contin.	-0.002
Subsidies	Contin.	0.009
Return on equity	Contin.	0.003

**Table 80: Regression Outputs (Continuous treatment)**

	Outcome Variable	
	(1)	(2)
w	−3.42e-11 (−1.04e-10, 3.54e-11)	−8.02e-11 (−1.87e-10, 2.64e-11)
I(w <sup>2</sup> )		7.44e-18 (−5.64e-18, 2.05e-17)
Observations	176	176
R <sup>2</sup>	0.601	0.604
Adjusted R <sup>2</sup>	0.479	0.48
Residual Std. Error	4.3e-07 (df = 134)	4.29e-07 (df = 133)
F Statistic	4.919*** (df = 41; 134)	4.84*** (df = 42; 133)

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Potential confounders' coefficients were omitted from the table.

**Table 81: Firm Count by Group**

	Control	Treated
Original Data	47	160
After Outlier Removal	35	137

**Table 82: Covariate Means and Group Comparison (before adjustment and before outlier removal)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Electricity use intensity	0.066	0.039	0.044	9.855
Cost of goods sold/raw materials consumed	1.04e+08	3.06e+07	0.107	228.818
Fuel use intensity	0.003	8.87e-04	0.071	171.55
Sales of products including biological assets	3.96e+06	4.06e+06	-0.006	1.299
Water use intensity	0.005	0.007	-0.05	0.97
Purchases in the extracommunity market	1.21e+07	1.24e+07	-0.007	6.386
Coverage of interest charges	0.009	0.019	-0.16	0.995
External supplies and services for fuels	3.17e+04	3.29e+04	-0.009	2.692
Total sales of goods, finished products, and biological assets	7.04e+07	1.46e+07	0.077	277.378
Own-entity works	1.37e+05	1.76e+05	-0.042	1.233
Average personnel expenses	3.42e+04	4.79e+04	-0.265	0.752
Total sales in the community market of goods, products, and biological assets	1.29e+07	6.1e+06	0.066	106.753
Result before depreciation, financing expenses, and taxes	2.99e+06	8.55e+06	-0.681	0.274
Geographic diversification of exports	0.377	0.489	-0.433	0.641
Return on equity	370.244	17.001	0.154	3203.345
Total sales in the domestic market of goods, products, and biological assets	4.15e+07	1.85e+07	0.096	53.715

Final evaluation plan

**Table 82: Covariate Means and Group Comparison (before adjustment and before outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Service revenues in the domestic market	1.31e+06	5.06e+05	0.097	17.973
Interest and similar expenses incurred	2.18e+06	8.01e+06	-0.459	0.734
Return on assets 2	0.002	0.003	-0.292	0.378
Subsidies	2.43e+05	8.59e+05	-0.642	0.045
Service revenues	7.53e+07	3.18e+07	0.086	63.679
External supplies and services in the community market	2.11e+05	1.57e+05	0.067	6.839

Final evaluation plan

**Table 83: Covariate Means and Group Comparison (before adjustment and after outlier removal)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Electricity use intensity	0.006	0.004	0.195	1.122
Cost of goods sold/raw materials consumed	1.08e+08	3.47e+07	0.101	210.645
Fuel use intensity	5.24e-04	6.14e-04	-0.139	0.66
Sales of products including biological assets	3.39e+06	1.74e+06	0.102	17.945
Water use intensity	0.002	0.002	-0.097	1.422
Purchases in the extracommunity market	1.22e+07	1.22e+07	-0.001	6.509
Coverage of interest charges	0.008	0.018	-0.146	0.931
External supplies and services for fuels	3.49e+04	4.04e+04	-0.036	2.381
Total sales of goods, finished products, and biological assets	7.57e+07	1.9e+07	0.073	246.255
Own-entity works	1.58e+05	2.34e+05	-0.075	1.077
Average personnel expenses	3.24e+04	4.39e+04	-0.251	0.595
Total sales in the community market of goods, products, and biological assets	1.5e+07	7.45e+06	0.067	102.86
Result before depreciation, financing expenses, and taxes	3.26e+06	9.07e+06	-0.672	0.246
Geographic diversification of exports	0.334	0.47	-0.671	0.399
Return on equity	430.546	16.099	0.167	4051.111
Total sales in the domestic market of goods, products, and biological assets	4.32e+07	2.28e+07	0.081	50.549

Final evaluation plan



**Table 83: Covariate Means and Group Comparison (before adjustment and after outlier removal) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Service revenues in the domestic market	1.42e+06	3.05e+05	0.126	80.766
Interest and similar expenses incurred	2.33e+06	8.37e+06	-0.443	0.679
Return on assets 2	0.002	0.003	-0.203	0.434
Subsidies	2.72e+05	1.11e+06	-0.814	0.039
Service revenues	7.82e+07	3.44e+07	0.08	57.908
External supplies and services in the community market	2.38e+05	1.96e+05	0.048	6.495

Final evaluation plan

**Table 84: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Electricity use intensity	0.006	0.004	0.196	1.119
Cost of goods sold/raw materials consumed	15.367	16.05	-0.223	1.461
Fuel use intensity	5.24e-04	6.13e-04	-0.139	0.66
Sales of products including biological assets	9.94	9.311	0.111	0.894
Water use intensity	0.002	0.002	-0.101	1.373
Purchases in the extracommunity market	14.676	14.935	-0.153	0.562
Coverage of interest charges	0.008	0.018	-0.146	0.931
External supplies and services for fuels	7.551	7.828	-0.09	0.781
Total sales of goods, finished products, and biological assets	8.465	11.665	-0.451	1.257
Own-entity works	3.317	4.128	-0.15	0.931
Average personnel expenses	9.726	9.789	-0.05	0.387
Total sales in the community market of goods, products, and biological assets	10.213	10.98	-0.123	0.761
Result before depreciation, financing expenses, and taxes	3.26e+06	9.07e+06	-0.672	0.246
Geographic diversification of exports	0.277	0.364	-0.604	0.476
Return on equity	2.133	1.506	0.315	1.963

Final evaluation plan

**Table 84: Covariate Means and Group Comparison (before Adjustment, after outlier removal and with log transformations when possible) (continued)**

	Means Treated	Means Control	Std. Mean Diff.	Var. Ratio
Total sales in the domestic market of goods, products, and biological assets	13.529	13.5	0.006	0.738
Service revenues in the domestic market	6.159	4.5	0.273	1.104
Interest and similar expenses incurred	2.33e+06	8.37e+06	-0.443	0.679
Return on assets 2	0.002	0.003	-0.203	0.437
Subsidies	8.998	8.535	0.099	0.795
Service revenues	14.829	15.462	-0.174	1.198
External supplies and services in the community market	5.937	6.52	-0.107	0.819

### B.1.5.6 Functional Form Search for Regression Models

Added terms for **propensity score model** (besides all potential confounders):

1. Service revenues \* Geographic diversification of exports

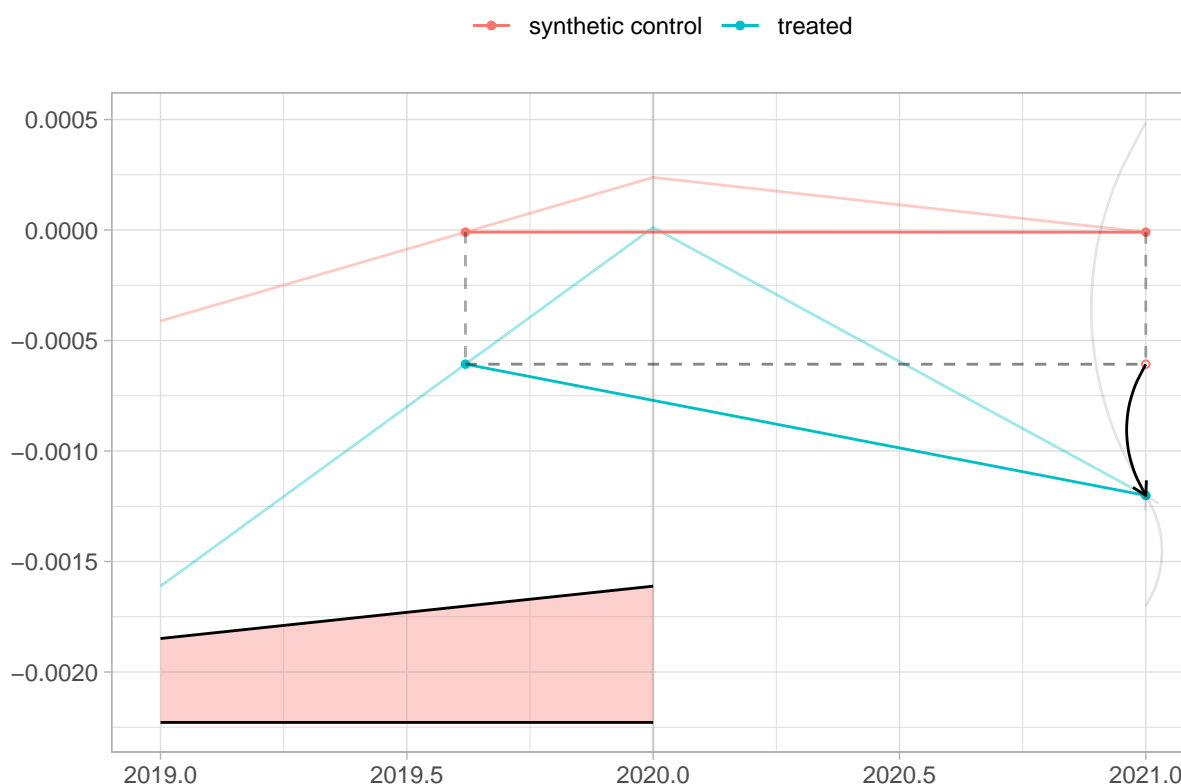
Added terms for **generalized propensity score model** (besides all potential confounders):

1. Fuel use intensity \* Average personnel expenses
2. squared(Geographic diversification of exports)
3. squared(Purchases in the extracommunity market)

Added terms for **outcome model** (besides all potential confounders):

1. squared(External supplies and services in the community market)

### B.1.5.7 Synthetic Differences in Differences - With Bias Correction

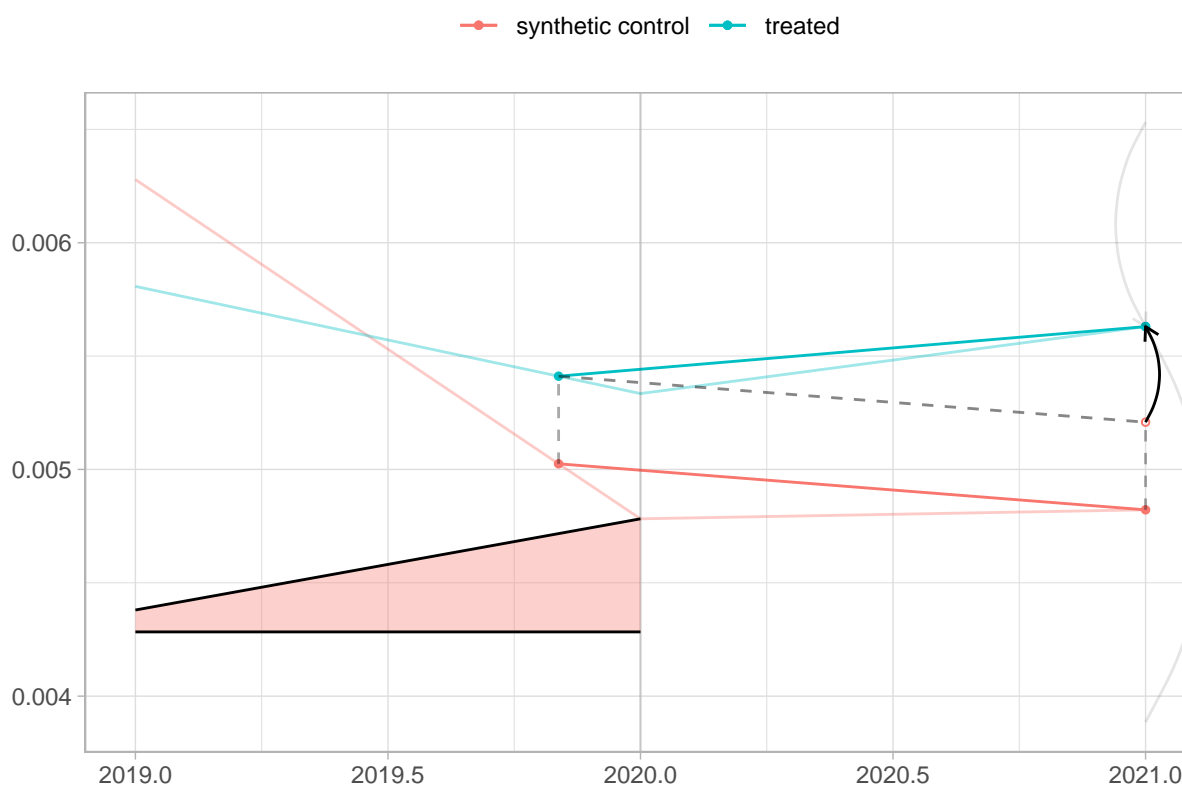


ATT Estimate: -0.00059

Standard Error: 0.0006

95% CI (-0.0018 , 0.00058 )

### B.1.5.8 Synthetic Differences in Differences - Without Bias Correction



ATT Estimate: 0.00042

Standard Error: 0.00069

95% CI (-0.00093 , 0.0018 )

### B.1.5.9 Weighted Differences in Differences

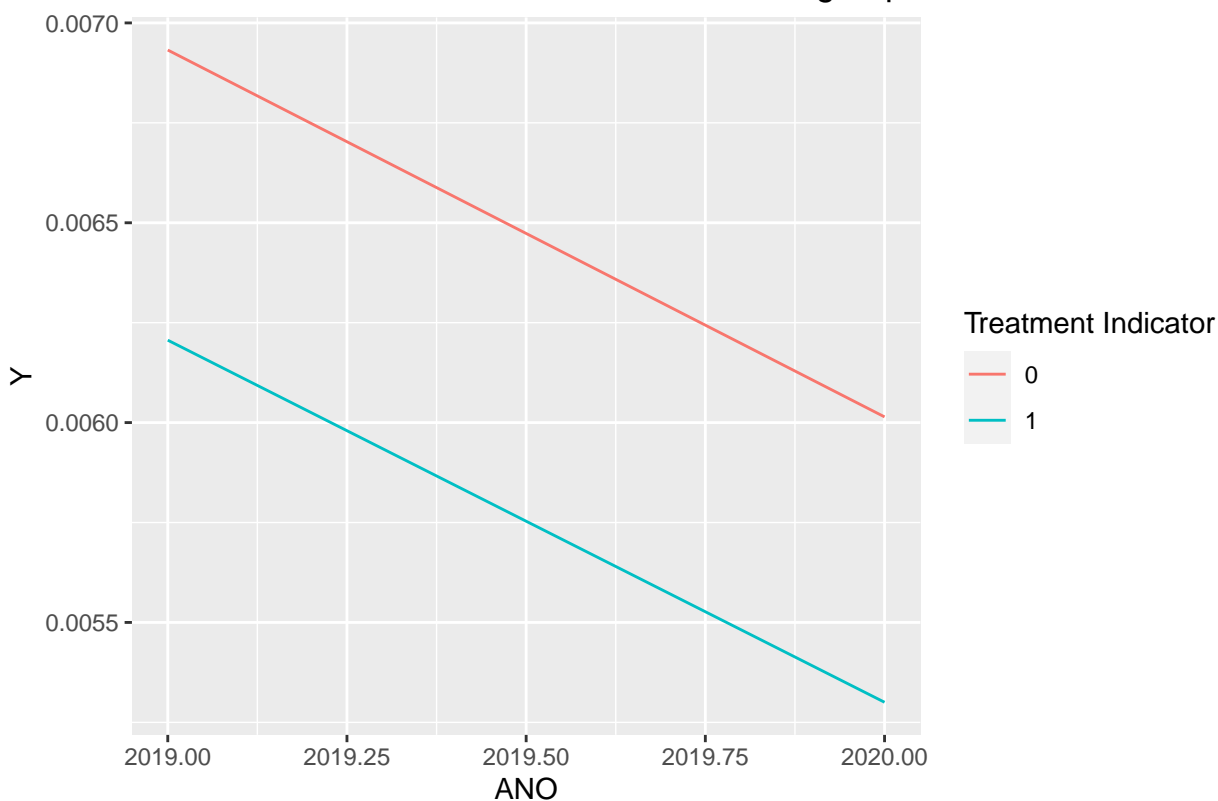
**Table 85: Covariate Balance after IPTW Adjustment**

	Diff.Adj	V.Ratio.Adj
Electricity use intensity	-0.129	0.502
Cost of goods sold/raw materials consumed	-0.091	1.13
Fuel use intensity	-0.018	0.783
Sales of products including biological assets	0.052	1.08
Water use intensity	0.018	2.175
Purchases in the extracommunity market	-0.092	0.948
Coverage of interest charges	0.178	1.028
External supplies and services for fuels	0.022	0.899
Total sales of goods, finished products, and biological assets	-0.222	2.891

**Table 85: Covariate Balance after IPTW Adjustment (continued)**

	Diff.Adj	V.Ratio.Adj
Own-entity works	0.018	1.171
Average personnel expenses	-0.232	1.419
Total sales in the community market of goods, products, and biological assets	0.219	0.491
Result before depreciation, financing expenses, and taxes	-0.164	0.665
Geographic diversification of exports	0.316	0.348
Return on equity	-0.042	2.021
Total sales in the domestic market of goods, products, and biological assets	-0.042	0.773
Service revenues in the domestic market	0.341	1.407
Interest and similar expenses incurred	-0.155	0.647
Return on assets 2	0.075	0.395
Subsidies	0.227	0.663
Service revenues	-0.032	4.043
External supplies and services in the community market	-0.039	0.971
Pre-treatment variation of outcome variable	0.007	1.277

**Pre-treatment trends for treated and control groups**



ATT Estimate: 0.033 Standard Error: 0.021 95% CI (-0.0082, 0.075)

**Table 86: Firm Count by Group**

Treatment	Count
0	22
1	61

### B.1.5.10 Generalized Propensity Score

**Table 87: Covariate Balance after GPS Adjustment**

	Type	Corr.Adj
Electricity use intensity	Contin.	-0.091
Cost of goods sold/raw materials consumed	Contin.	-0.021
Fuel use intensity	Contin.	-0.015
Sales of products including biological assets	Contin.	-0.003
Water use intensity	Contin.	-0.014
Purchases in the extracommunity market	Contin.	0.041
Coverage of interest charges	Contin.	7.4e-04
External supplies and services for fuels	Contin.	0.023
Total sales of goods, finished products, and biological assets	Contin.	0.002
Own-entity works	Contin.	0.03
Average personnel expenses	Contin.	0.013
Total sales in the community market of goods, products, and biological assets	Contin.	0.04
Result before depreciation, financing expenses, and taxes	Contin.	0.02
Geographic diversification of exports	Contin.	-0.03
Return on equity	Contin.	0.025
Total sales in the domestic market of goods, products, and biological assets	Contin.	0.014
Service revenues in the domestic market	Contin.	0.015
Interest and similar expenses incurred	Contin.	0.021
Return on assets 2	Contin.	0.003
Subsidies	Contin.	0.061
Service revenues	Contin.	-0.147
External supplies and services in the community market	Contin.	0.08

**Table 88: Regression Outputs (Continuous treatment)**

	Outcome Variable	
	(1)	(2)
w	−1.9e-10 (−8.49e-10, 4.7e-10)	−4.82e-10 (−1.47e-09, 5.08e-10)
I(w <sup>2</sup> )		4.41e-17 (−6.7e-17, 1.55e-16)
Observations	170	170
R <sup>2</sup>	0.679	0.68
Adjusted R <sup>2</sup>	0.626	0.625
Residual Std. Error	4.67e-06 (df = 145)	4.67e-06 (df = 144)
F Statistic	12.771*** (df = 24; 145)	12.251*** (df = 25; 144)

*Note:*

\*p&lt;0.1; \*\*p&lt;0.05; \*\*\*p&lt;0.01

Potential confounders' coefficients were omitted from the table.