A Work Project, presented as part of the requirements for the Award of a Master's degree in International Development and Public Policy from the Nova School of Business and Economics.

BUREAUCRACY VS. EFFICIENCY: HOW DOES BUREAUCRACY IMPACT THE ACCESS TO EUROPEAN FUNDS - THE IMPACT OF EUROPEAN FUNDS ON R&D INVESTMENT BY FIRMS IN PORTUGAL

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Abstract - General

In the existing literature, Bureaucracy is often characterized as a hindrance to economic activity and business dynamism. Hence, this Policy Analysis Project seeks to illustrate the impact of Bureaucracy on Portuguese SMEs in the context of European funds, an essential instrument for the country's economy. An evaluation of the funds' effect is also presented to motivate the assignment, with favorable results. Lastly, the group proposes a series of policy recommendations to mitigate Portuguese companies' bureaucratic constraints based on our findings and research. The ultimate goal is to lower the current burden on SMEs.

Abstract

Due to the dynamic environment in which small and medium-sized businesses (SMEs) operate, they face unique problems. Through various tools and programs, public policies are attempting to boost the competitiveness and creativity of SMEs in this direction. This paper evaluates whether SMEs that received EU funds recorded an improvement in their intangible and tangible fixed assets investments and if those investments impact the perception of bureaucracy in the application process for EU funds. The findings demonstrate the efficiency of EU funds in encouraging investment in tangible assets while having some impact on the perception of bureaucracy.

Keywords: Public Administration; Bureaucracy; SME's; R&D; Innovation; Propensity score matching, Differences-in-Differences.

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1. Introduction and Conceptual Framework

1.1 Background Motivation

In the context of the recently inaugurated MSc in International Development & Public Policy, a new evaluation model was introduced for the Master's final project. The Policy Analysis Project (PAP) was designed to allow students to solve specific policy problems as a group, offering a complementary, hands-on experience to the theoretical knowledge lectured throughout the degree.

Five students were assigned to a specific project after an allocation process and, in collaboration with two academic tutors, developed a comprehensive research report regarding the overarching field of bureaucracy. The assigned topic was proposed by the Gabinete de Estratégia e Estudos (GEE), part of the Ministry of the Economy and Sea, in the light of a protocol between this entity and NOVA School of Business and Economics.

Understanding how multiple forms of bureaucracy may influence the interaction between public administration and these firms is critical to determining whether the State's contribution is significant within this framework. Examples of this linkage may assume various forms, such as access to financing and EU funds, firm creation, licensing requirements, or property registration.

1.2 Selection Process and Core Definitions

As stated above, firm performance is often influenced by the dynamics of a firm's relationship with the State, one of the normative - legitimate - stakeholders, according to Harrison and Wicks (2013). For these authors, normative stakeholders are those the firm owes an obligation to, including customers, communities, labor, and suppliers of capital, equipment, and materials. Following this definition, the article "Stakeholder Theory, Value, and Firm Performance" characterizes firm performance as the total value created by a firm through its

activities, which is the sum of the utility generated for each business's stakeholders.

On the other hand, the vast framework of the State's institutions implies a complex system of checks and balances, motivated by multiple stakeholders' interests. Indeed, several factors shape interactions within public entities. Due to tightly enforced legislation in this domain, public servants must comply with strict rules. In parallel, to protect citizens from arbitrary power by a government, there is an intricate accountability chain that involves numerous actors in different political and hierarchical positions. Lastly, limited financial and professional incentives might result in lower motivation to implement necessary changes to these arrangements. The ensuing outcome is a narrow scope of action regarding the pursuit of improved welfare and government services, characterized by rigid power structures and procedures, which in turn may lead to a highly bureaucratized system.

The term bureaucracy was first popularized by German sociologist Max Weber in his 1905 book "The Protestant Ethic and the Spirit of Capitalism". According to this author, bureaucracy combines standardized procedures, accountability, and labor division. This leads to well-defined hierarchies and professional, almost dispassionate interactions between employees. Weber believed that bureaucratic processes were a fundamental part of efficiently managing layered organizations that comprise many individuals. Moreover, some key characteristics of this phenomenon involve a considerable relevance for written rules and rigid structure, as well as a high degree of technical qualification and task specialization.

Taking a step back, should one consider the multiple forms in which bureaucracy manifests itself not only within the State's inner workings and even in its relationship with the private sector, a need for a more precise approach arose. GEE's foremost objective was to assess how administrative costs affect Portuguese Small and Medium Enterprises (SMEs) and the State's role in that regard. Several potential issues related to this subject may arise, such as inefficient administrative capacity or inadequate regulation. One should first assess these

aspects' impact on the national economy.

Nonetheless, in collaboration with the academic tutors, the group decided that the vast nature of this subject and its aforementioned branches posed an extensive challenge that had to be limited further. After some internal conversations, the group decided to concentrate its efforts on a topic concerning the dynamics at play between bureaucratic costs, European Funds, and their allocation to SMEs.

Given the structural importance of these Funds for the Portuguese economy and its development from a cohesion standpoint during the past decades, it was determined that they would provide sufficient material and data for an interesting research project. Furthermore, a second relevant aspect pertains to the transparency and abundance of information regarding this matter. Likewise, the European Commission's Multiannual Financial Framework (MFF) for 2021-2027, i.e., the European Union's (EU) budget for the current period, allocates a large percentage of the funding to Cohesion Policy, namely, 30,8%. A comprehensive component of financial support is a priority for the EU to empower and provide a better future outlook for business owners across the Union. In 2020, SMEs created 2 out of 3 jobs in the EU, and 50% of its GDP was attributed to these enterprises.

1.3 Relevance of the Research Project

From a practical viewpoint, the policy recommendations proposed for this project allow the Ministry to reflect upon new and pragmatic solutions to reform the application procedure, increase the takeup of these Funds and consequently strengthen economic growth. Before this endeavor, *Instituto Nacional de Estatística* (INE) released extensive reports regarding Context Costs based on Portuguese firms' data. These involve expenses from various regional contrasts, such as administrative, strategic, and cultural options. INE's approach covers a broad domain of bureaucratic expenditures, e.g., financial, judicial, and human resources costs.

Alternatively, this Policy Analysis Project aims to offer an in-depth assessment of the

firms' perception over the complete process - application, execution, and evaluation - concerning European Funds. As far as the group is aware, the present report is the first to encompass this particular topic. Since GEE's plan was to directly involve firms in the policy formulation process through a tailor-made Survey, the eventual desired outcome is to develop a more thriving environment for Portuguese SMEs, expecting a valuable opportunity to positively impact the country's economy. Past studies, such as Soukiazis and Antunes (2006) and Rodríguez-Pose and Garcilazo (2013), have identified a clear positive trend across the EU concerning regional development after the allocation of Structural Funds.

From a theoretical standpoint, this research project allowed the group to draw upon some conclusions and suggestions regarding several areas related to the process of European Funds' attribution. The primary intent is to gather knowledge on the impact of bureaucratic practices on SMEs' application process and quantify its tangible and intangible costs, such as time spent collecting necessary documentation. Moreover, the Survey present in this report and its analysis contribute to a better understanding of the Firms' insights concerning essential topics, namely, their expectations and financing alternatives. On the one hand, whether their initial objectives were achieved after the Funds' utilization, and on the other, how firms choose among different financial instruments.

Simultaneously, the group sought to obtain information regarding the most suitable communication methods in the context of general awareness about European Funds. Financial and demographic indicators were also a target of the group's approach, e.g., R&D expenditures over the past year, number of employees and their average age, or the firm's location.

Concerning the feasibility of the research project, the group, in collaboration with the academic tutors, deemed both the theoretical and practical components of this assignment appealing to the general public and viable. First, according to the World Bank's Doing Business (2019), a series of reports that evaluates a country's business-creation indicators such as context

costs and the regulatory burden, Portugal's position declined between 2016 (24th) and 2020 (39th). This evolution, combined with the country's economic performance during the aforementioned period, makes for a compelling work project subject.

In addition, the pre-existing and extensive databases found during the preliminary analysis, i.e., INE's Context Costs, Bureau Van Dijk's Sabi/Orbis, and FFMS's Pordata, did confirm our expectations concerning the project's viability. At the same time, the variety of selected data sources alongside their transparency are essential factors to consider. The group adopted a hands-on approach, focusing its efforts on the elaboration and eventual diffusion of the Survey and constructing a comprehensive and accurate database to become the basis for our Regression Analysis and Policy Evaluation to formulate policy recommendations better. To conclude, the group aimed to shed light on the impact of bureaucracy, more specifically on how it may hinder SMEs' future perspectives.

1.4 Hypothesis & Theory

Thus far, this introduction has presented an applied conceptual framework and a theoretical justification for this project. The group has strived to present these impartially, conveying multiple viewpoints associated with different schools of thought on the wider topic of bureaucracy. Henceforth, however, selected literature adopts a clearer stance on this matter, per the following Hypothesis.

In Bureaucracy and Development, Besley et al. (2021) connect the features of bureaucratic systems to the circumstances in which bureaucrats typically operate. More precisely, the relationship of these actors with citizens, politics, and firms. To begin, the authors attempt to highlight the role of the principal-agent Theory within this context. Departing from the concept of Moral Hazard, this dilemma arises when *agents* - those who act on behalf of the *principal* - possess the motivation and opportunity to act according to their interests. Applied to the central topic of this project, non-transitory bureaucrats - public servants, agents - are

appointed by elected politicians - principals - to enact policies in line with their particular agendas. There are often misaligned interests between the two parts, resulting in a clustered and persistent bureaucracy.

Continuing, the authors find a strong positive relationship between a variable of economic growth, measured by GDP per capita, and bureaucratic effectiveness. Simultaneously, high-income states have developed more successful bureaucratic systems, although establishing a causal relationship does appear to be a challenging prospect. Finally, a strong connection between economic growth and the quality of the bureaucracy is also found, with the explanatory variable of meritocratic recruitment providing the most significant result.

In his 1994 book, Bureaucracy and Public Economics, Niskanen argues that public servants are self-serving parties who seek to maximize their power and salary within their departments, following his Budget-maximizing model. By pushing for increased budgets, rational bureaucrats contribute to an enlarged public sector, which may reduce social efficiency. To avoid a flagrant excessive production of goods and services, the resulting deadweight loss from pursuing this strategy must not surpass the elector's consumer surplus. Lastly, increasing the number of supplied goods and services is the foremost objective of a bureaucrat. This falls in line with the Public Choice Theory, which states that decision-making in the Public Sector is a product of self-interested individuals.

Considering this branch of literature on bureaucracy, the group formulated a hypothesis based on some predictable impacts of this phenomenon. Departing from the main topic, which underlies the current assignment, each group member will resort to a Dependent Variable of their choosing and try to estimate the impact of certain independent variables or firm characteristics on it. Its overall significance will depend on these values, which the group sought to obtain through both the Survey and an extensive database of Portuguese firms. These two datasets include several Independent Variables such as the respondent's age, Operating

Revenue/Turnover of the firm, whether the company invests in R&D, and the year in which the firm was created.

In terms of the Funds' Impact Evaluation, each individual contribution was built upon a different set of variables selected by the group member. For instance, an individual part concentrates on the effect of firm-oriented characteristics, such as the number of employees, on the latest result of sales available. Another example aims to evaluate the impact of EU Funds on Portuguese firms, controlling for results-oriented variables. Alongside these linear regressions, two types of public policy evaluation methods were also utilized. Based on the acquired knowledge from the Masters' Degree, an attempt was made to explore Propensity Score Matching and Difference-In-Differences.

After selecting the working variables, one of the group's goals was to reject the Null Hypothesis in each analysis. To do so, the coefficients of each independent variable needed to be different from zero. Should this proposition hold, the Alternative Hypothesis is confirmed, and the Null is rejected. While experimenting with these methods, the group encountered some non-statistically significant results. Such outcomes are expected, given the number of missing observations in both datasets.

1.5 Structure of the Report

Following the set of rules established in the context of the Policy Analysis Project, this final report comprises both individual and collective contributions. After some intra-group discussion and a few exchanges with the academic tutors, the group decided on the ensuing configuration. To begin with, the first part of this assignment was drafted by all five group members. It encompasses the present introductory segment, a literature review concerning the main topic of bureaucracy, a chapter on European Funds and their purpose, and a section dedicated to the methodological basis of the research conducted during the project.

Next are the individual parts of each group member. Their respective configuration was developed following a simple model, composed of a short introduction, a concise literature review on each individual subject matter, an analysis of the results obtained through Descriptive Statistics and Regressions, as well as their main conclusions and obstacles faced. Lastly, the final collective section of this project focuses on the critical outcomes obtained throughout its different parts, with a clear emphasis on providing policy recommendations based both on the group's research and on case studies of various countries. Additionally, there is a final chapter including the utilized references and other useful annexes.

2 Literature Review

2.1 Definition of Small and Medium-sized Enterprises

Small and medium-sized businesses (SMEs), which are a diverse set of companies and the main generator of economic expansion in Europe, are crucial to the Portuguese economy. In Portugal, SMEs represent 99.9% of all companies, of which 96% are micro, 3.3% small, and 0.5% medium (PORDATA 2020).

> *"SMEs are the backbone of our economies...the industrial fabric of many regions and cities – they are the key to social cohesion and an engine of regional job creation and well-being"* (Angel Gurría 2019).

There are significant discrepancies between how small and medium enterprises are defined in economic literature. There isn't a single, broadly recognized definition of small and medium businesses. Since different people and organizations define SMEs differently, a firm that is regarded as small and medium-sized in one country may be seen differently in another. Therefore, it is essential to begin with a clear and objective definition of SMEs, which was first attempted by (Bolton 1971). According to the definition, a small firm is an independent company run by its owner or co-owners with a low market share.

The *Bolton Report* also recognized the three main characteristics that need to be considered when defining SMEs. First of all, a smaller company has a comparatively low market share. Secondly, a small firm is that its owners or part-owners manage it in a personalized way and not through a formalized management structure. Thirdly, it is autonomous because it is not a component of a bigger business, and the owner-managers should not be subject to outside influence when making major choices (Bolton 1971).

Based on the idea that the existence of different definitions at the Community level and the national level could create inconsistencies, the European Commission defines SMEs as enterprises that employ fewer than 250 persons and which have an annual turnover not

exceeding €50 million, and an annual balance sheet total not exceeding €43 million, as shown in Table 1 (European Commission 2003). According to the idea of a single market without internal borders, how businesses are treated should be governed by a set of standard guidelines.

Table 1. Definition of SME

Company Category	**Staff headcount**	**Turnover**	**Balance sheet total**
Medium-sized	<250	≤ € 50 m	≤ € 43 m
Small	<50	≤ € 10 m	≤ € 10 m
Micro	<10	≤ € 2 m	≤ € 2 m

In this regard, a common definition would help to improve the consistency and effectiveness of SME policy across the EU. Moreover, it is all the more necessary given the extensive interactions between national and EU measures designed to help SMEs in areas such as regional development and research funding. Most OECD governments promote entrepreneurship and develop SMEs with various policies and programs. Similar to the EU, this aims to address SME challenges like internationalization, management, funding, technology, and innovation (Lukács 2005).

2.2 Small and Medium-sized Enterprises' Characteristics

According to (Storey 2016), the universe of SMEs is dynamic, considering that there has been an increase in start-ups in the last 30 years. This trend becomes even more evident when there are more or less profound changes, such as the increase in unemployment and government policies regarding incentives, coupled with an emerging desire to increase support

for entrepreneurial culture. While many SMEs are born each year, the truth is that their survival is more difficult, as the first three years of a company's life are the most critical, with as many as 50% of SMEs filing for bankruptcy (Burns 2001).

Félix (2017) analyzed this evidence, concluding that many new firms are much smaller than existing ones. Some close within the first year of existence, others before seven years, with only 48% surviving. The author also mentions that these new companies are essential for developing the economy and creating employment. This is especially true in Portugal since most companies are SMEs (Félix 2017).

SMEs are much more affected by fiscal, legislative, and administrative burdens than large companies. Growing competition and market flaws including restricted access to capital, innovation, networks, and supply chains are barriers to their development. Given the relevance of SMEs in the economies of each country and their fundamental existence for the economic development of each country, the increase in studies on SMEs is of particular importance.

However, despite the undisputed significance of SMEs in the current context, they have not been the subject of many studies, and there is a significant lack of empirical evidence on their specificities, with studies being more directed at large firms. The lack of academic research on SMEs stems mainly from the unavailability of data due to this type of company's insufficient disclosure of information (Berger and Udell 1998). However, although the problem of obtaining information is the aspect that most hinders empirical research in the field of SMEs, this scarcity of studies may derive from other factors, resulting from the characteristics of SMEs themselves. SMEs are characterized, among other things, by the fact that ownership and management, as a rule, are concentrated in the same person (Ang 1991) and by significant difficulties in accessing the capital market, with bank loans being their primary source of financing (Barton and Matthews 1989). Nevertheless, SMEs are firms with greater difficulty

accessing credit (Beck and Demirguc-Kunt 2006) and with higher costs associated with these operations (Ang 1991).

On the other hand, it is found that, as a rule, SMEs have inadequate, or even insufficient, financial information, and the asymmetries in financial information are proportionally greater. Thus, as financial institutions need the information to assess loan risk, financing difficulties in SMEs may, in part, be a consequence of inadequate or insufficient information and asymmetries (Binks, Ennew, and Reed 1992).

SMEs play a crucial role in the recovery of the national economy, so they must have greater access to support to carry out their investments. Thus, the funding applications must be more flexible, less bureaucratic, and more adequate to the reality of national companies. A large percentage of companies did not obtain any support from European funds. It is expected, however, that this reality will change.

2.3 Historical Context of Bureaucracy

One may only begin to question the current level of bureaucracy if one understands what this term means and how it came to be. George Friedrich Hegel was the first scholar to write about this topic. At this time, bureaucracy was still not a fully characterized phenomenon as we know it today. Still, it had already been a mediator between civil society and the state. There were no established bureaucratic processes, but there was a sense that the state needed a formal, impersonal organization that focused solely on organizing its operations so that it could contribute to the greater good of the country. For Hegel, bureaucracy was the phenomenon where an organized group of people (or social class) imposed the obligation of duty on others and then reported upon the state's interests. His approach to bureaucracy was focused on the state and the public administration. Regardless, it was an important contribution as it was one of the first hints of bureaucratic thought.

For Karl Marx**,** bureaucracy was not something positive. He thought that bureaucracy, as characterized by Hegel, was created by the upper classes as a weapon to dominate the lower ones. In his words, "the only interest that bureaucracy pursues is the interest of bureaucracy itself" - the nobility. For bureaucracy to exist, hidden agendas had to be kept working, and these interests were not in any way aligned with most people's needs. By having people with important roles in society and hidden agendas ruling public management practices, the objective of the bureaucrat would change. It would depart from fighting for the country's greater good to squabbling for higher posts inside public administration. In turn, this would create a vicious cycle that would feed the functioning of this vast and complex network that was the governmental "machine". In conclusion, for Marx, bureaucracy is conceived both as a parasite and a chain of transmission essential to the survival of the upper social classes.

Finally, we focus our attention on Max Weber. He was, as described earlier, one of the biggest propulsors of the term Bureaucracy as we know it today and one of its biggest admirers. He thought bureaucracy was becoming so present in society because of its advantage compared to other forms of organization. By laying out standard procedures, human conflict and ambiguity were left aside, enabling processes to flow rapidly and without significant problems. Outcomes became rational and predictable, which made them valuable to other sectors besides the public.

Trying to leave its mark on the rationalization of the modern world, Weber draws what he considers to be the ideal type of bureaucracy. In this model, the objective would be to move the bureaucratic power from the Nobel class, entrusted by the sovereign, to an administrative group that could be detached, as much as possible, from individual agendas by providing conditions for such. For that, the bureaucrat would be paid and assured of a good standard of living while the work prospects would be stable, and promotions would be based on rational indicators. At its core, the model proposed by Weber had six characteristics:

1. The competencies of such administration had to be laid out in written rules to limit their scope and power;
2. There had to be a clearly defined hierarchy of authority and functions;
3. All the activities had to be reported to enable traceability;
4. The people in the job would have to have intense training beforehand;
5. The person in that position must have only one career to prevent conflict of interests;
6. By fulfilling their duties, the person in charge would get continuous and very specific training on the functioning of the bureaucratic process.

Weber's most significant contribution was to detach the concept from a social class affair to something that concerns the well-functioning of any organization based on rationalizing the process. From his perspective, bureaucracy was a way to shape an organization and its procedures, which could be adapted to multiple purposes in search of maximum efficiency.

2.4 Advantages and Disadvantages of Bureaucracy

Clearly defined procedures and responsibilities allow the upper levels of management to control the work of its employees and keep up with their tasks. Division of labor allows workers to specialize in a specific task, making them more productive. Standard procedures also make it easier because workers already have a guide on what to do and how to do it. Eliminating human ambiguity enables processes to develop more smoothly. Well-established roles and procedures are essential to tracing the root of a problem.

For the workers, the tasks at hand become more apparent. They do not have to think about how to approach the task at hand every time, and the outcome of their work becomes predictable - the same type of information, format, and size that is required from them - which makes life easier for the upper levels. Since tasks are standardized, it's also easier to predict

how much time a particular task will take to be accomplished. This model, however, doesn't get away free of criticism. Flaws become more evident as societies evolve and demand more flexible and agile procedures requiring administrative reforms.

The desire for control over all procedures by the leaders translates into a series of strict behaviors that cause the enactment of defense mechanisms by the lower management levels that appreciate a certain amount of freedom when making decisions. A clear hierarchical structure and power chain usually mean that middle and lower-level workers are left to do standardized operating procedures. Like Marx, Motta criticizes the fact that bureaucracy alienates workers from the world created by its work. (Faria 2011)

Stiff hierarchical structures can make it harder for information to flow along the organization since they must follow a level stream. Customer service becomes very restricted to the protocol and makes it harder to comply with situations that go beyond what is standardized already (Merton 1940).

The uniformization of activities makes employees resistant to change as they become accustomed to specific stability and repetition. Over-centralization of powers also makes it hard to do any kind of reform in public administration. Heavy rules and cumbersome procedures make organizations stiff and unable to change themselves at a reasonable pace. The result is that the public sector struggles to keep up with the demands of civil society and its dynamic private sector. (World Bank 2018)

2.5 How can Bureaucracy affect SMEs?

The bureaucratic performance of the public administration has a direct impact on the way companies perform. Enterprises interact with public institutions regularly, and it is in the state's interest that its institutions allow their counterparts to work as freely as possible to promote competitiveness. "The set of Institutions, Policies and other factors that contribute to a country's productiveness" - Competitiveness as defined in the Global Competitiveness

Report. According to a study developed by INE, we can see that the interaction between the private and public sectors happens at several levels and at different stages of an institution's life. In their report, they define the following: Business Start-up; Licensing; Network Industries, the ones a business depends on (Electricity, Gas, etc.); Financing; Judicial System; Fiscal System; Administrative Burden; Internationalization Barriers; and Human Resources.

As previously stated, this report will focus mainly on the Financing side of bureaucracy. How does the state hinder the access to financing and consequently its potential impact on improving a company's performance, for the specific case of the European funds?

Delays in the payments made by the state can harm the liquidity and growth of its economy. A study developed by the ECB shows how delays in payment periods can have detrimental effects on the performance of enterprises. They point out reduced profits, increased probability of bankruptcy, and slow economic growth to be the main effects of such delays. (ECB 2015)

An amount of financing has a certain potential to improve a company's performance and promote growth. Suppose the process of accessing these types of funding is characterized by poor organizational execution. In that case, the unnecessarily high costs that come with it will decrease its potential to fulfill its purpose. Complicated procedures, complex language, and poor communication between departments - inside the awarding body - can make it much harder for a company to access the funds it needs. (Brzakova and Pridalova 2016)

Some of the processes can be costly, and the approval percentage weighs in as a deciding factor on whether to apply. The need to report on several documents before approval brings significant opportunity costs to companies. These are resources that are not directly employed in the company to apply. This is especially detrimental for SMEs that have reduced resources and face the lowest approval rate varying from 27% for the Micro level and 34% for the Small. (+Liberdade 2022)

3 European Funds

3.1 Political Objectives and Instruments

The political reason for the existence of European Funds converges with one of the fundamental political roots of the European Union, the three pillars. Firstly established in the Treaty of Maastricht on the 1st of November 1993, these three pillars were the Common Foreign and Security Policy, which aimed to preserve peace and organize the foreign policy, and the Justice and Home Affairs Pillars on police cooperation and cross-border cooperation, which were both ruled on intergovernmental style, meaning that governments cooperated among them to achieve the objectives. The last pillar often represented first is the European Community that assured the economic union, cohesion, development policies, etc., and thus, where the European Funds were inserted. It had a supranational decision-making style (Bomberg, Peterson and Corbett 2012).

The three pillars were then abandoned after the signing of the Treaty of Lisbon in 2009. However, the objectives remained similar, although the competencies of the Union were reorganized while preserving the necessity of acting on economic, social, and territorial cohesion (EUR-Lex 2022). This authority aims to reduce economic and social differences within the European Union. To do so, the European Union employs monetary funds under the legal basis of Article 174-178 on the Function of the EU for its cohesion policy to assist and address the problems of the regions. These could be regions with land or demographic hindrances - such as regions with low population density or problematic connectivity. Additionally, EU cohesion funds are managed in cooperation between the European Commission and the respective authorities at national and regional levels. At the European level, the instruments applied are mainly the European Regional Development Fund, the European Social Fund, the European Cohesion Fund, and the Just Transition Fund (EUR-Lex 2022). Nevertheless, the European Maritime and Fisheries Fund, the European Agriculture

Fund for Rural Development, and the European Investment bank also support European cohesion with their investments.

3.2 PORTUGAL2020

A critical mechanism to ensure Portugal's economic, social, and environmental development through a partnership with the European Commission is "Portugal 2020", a partnership agreement that aims to stimulate economic growth and employment creation in Portugal (PORTUGAL2020 2014). Totaling 25 billion euros until 2020, its guiding lines were aligned with the strategy of EUROPA 2020, where the program had to follow rules that ensured intelligent, sustainable, and inclusive growth. To do so, Portugal received 25 billion euros until 2020. It organized its plan of action through four Thematic Objectives (PORTUGAL2020 2014):

- Competitiveness and internationalization, where the main objectives are fostering exportation, suitable employment, and investment in research, development, and innovation, capacitate SMEs to compete in the global markets, reducing the costs and the time spent transporting goods and modernizing public administration.
- The second objective is increasing social inclusion and employment that aims at improving employment access to the younger population but also to the most vulnerable demographic groups, promoting the development of competences for the integration and reintegration into the job market, and expanding access to social and health services and promoting active inclusion, fostering equal opportunities among all.
- The third objective concerns human capital and aims at decreasing the school dropout rate, expanding vocational education programs, and connecting them properly with the job market, and increasing the investment and quality in higher education and advanced training in order to guarantee better school success and more employment.

- Finally, the fourth and last objective concerns sustainability and the efficient use of resources. Its main goals are fostering economic development towards a low carbon emission economy, increasing the investment in renewable sources of energy, improving energy efficiency and smart grids, boosting the ability to adapt to climate change, protecting the shore from erosion, reducing wildfires, preventing flooding and reduce and recycle residue while promoting efficient water management.

  The image below indicates how the resources are divided between the objectives.

3.3 COMPETE2020

Under the toll of PORTUGAL2020's objective of increasing the competitiveness and internationalization of Portuguese companies, "*Compete 2020"* was created to manage the funds directed at this program segment. To do so and based on the regulating guidelines of the European structural and investment funds (ESIF), whose main area of action concerns research and innovation, digital technologies, supporting the low-carbon economy, sustainable management of natural resources, and small businesses (European Commission 2019). COMPETE2020 is organized in six different axes that create the pavement to reach the goals of increasing research, quality employment, sustainable transport, etc. Additionally, the type of companies eligible for the program must have organized accounting, and they can have different levels of size and organization. Nevertheless, companies' expenses regarding the application process are not eligible for a refund. Therefore, the companies must support those costs without the provision should they be accepted.

3.4 REACT-EU

As the acronym indicates, the REACT initiative is a reaction mechanism to the crisis created by the COVID-19 pandemic. The program is named Recovery Assistance for Cohesion and the Territories of Europe. Adopted on the 23rd of December 2020, the program will total €50.6 billion, which will be added to the European Regional Development Fund (ERDF), the European Social Fund (ESF), and the Fund for European Aid to the Most Deprived (FEAD), the funds were developed in 2021 through the Next Generation EU instrument and required a revision of the current financial framework (Eurocid 2022).

The allocation of funds will account for the impact the crisis had on the EU member-states through several economic indicators, such as the GDP drop, the rise of unemployment among young people, and the relative wealth of the countries (European Commission 2022). REACT complements existing programs and employs additional funding for those schemes, such as the Investment for Growth and Job Goal (IGJ).

However, the ERDF's additional funds will support SMEs by providing working capital and investment by increasing the investment in products and services. Digital and green economy concerns are also considered in the added funds, and regions more affected by the crisis and their correspondent sectors, namely the regions that rely more on tourism, are also further considered (European Commission 2022). The ESF sourced additional funds to support job maintenance in several types of employment and demographic groups, such as more vulnerable people and youth. Furthermore, the financing of this program is exclusive to the EU, meaning that no national co-financing is required, and member-states are encouraged to provide advance payments to beneficiaries via the high level of pre-financing available.

3.5 Why EU Funds?

European Funds represent an excellent opportunity for the development of companies to ensure that their growth is sustainable and that they can compete with the rest of the world. However, since funds are limited, the level of competitiveness to receive the funds is high, and applications can be costly. Moreover, the costs allocated for loss applications are never recovered, which can further hinder the company.

Out of all applications for funds financed through the ERDF, less than 50% of those funds were approved (+Liberdade 2022). For instance, micro-companies had a 27% approval rate, while small companies had a 34% approval rate, medium companies 48%, and large companies had a 45% approval rate. The same study shared comments from stakeholders that criticized the complexity and poor quality of the required processes for the PORTUGAL 2020 funds application. They also claimed that a great deal of effort is needed from the companies to fulfill the bureaucratic requirements for the application and recommended that the applications become more accessible and transparent by decreasing bureaucracy. Therefore, we chose this topic to understand how costly it is for Portuguese companies to apply to European Funds and how these costs can be related to the application's approval and the company's performance.

4 Methodology

4.1 Motivation and Timeline

From day one, GEE's primary goal, along with NOVA SBE, was to implement a Survey that would provide a solid basis for the Policy Analysis Project. This questionnaire was intended to gather specific information from these firms, especially regarding how bureaucratic procedures in EU Funds affect their productivity, performance, and investment decisions. Such a tool grants both a rational and theoretical framework while establishing a direct communication channel with Portuguese SMEs that received European Funds. Subsequently, the course of the project called for designing and implementing a Control Group Survey, which would target firms that did not receive community funding. Thus, multiple comparisons could be established and studied across both groups, for example, in terms of firm structure and financial results.

After narrowing the project scope to be more specific, the group kept studying several possibilities concerning different methods to design and implement the research project. Initially, the preferred software was Google Forms, followed by KoBoToolbox. In a later stage, QualtricsXM was selected, given its survey design options and superior distribution tools. As for the latter, the main options on the table were contacting SMEs through e-mails directly provided by COMPETE2020, having this entity disseminate the questionnaires, and finally, manually matching and collecting NIFs and e-mails using the *nif.pt* website and an Excel document obtained through GEE.

The structure of the main questionnaire also underwent different stages. At first, the group's approach implied a vast number of questions to collect a large amount of information from the firms. Although it was divided into chapters, this initial version was deemed too complex and time-consuming. Therefore, considering the trade-off between collecting extensive data obtainable through other methods or quality feedback, the group decided to

simplify this Survey. One of these sources was Bureau van Dijk's Sabi/Orbis, which contains several relevant firm-related indicators. This database, along with continuous evaluation from the academic tutors, allowed the group to reduce the questionnaire's size significantly.

There are a number of comprehensive and noteworthy indicators that, among others, evaluate the impact of administrative costs on companies, namely, OECD's *Indicators of Product Market Regulation* or the World Bank's *Doing Business*. However, these metrics fail to address the evolving relationship between bureaucracy, EU Funds, and their diffusion to Portuguese SMEs. Furthermore, should we consider these businesses' smaller scale and economic leverage, one could infer that they would be underrepresented in these international indicators and, at the same time, subject to a disproportionate bureaucratic burden (Martini 2013). Such factors play a crucial role in the development and importance of designing practical and objective Surveys.

4.2 Main Data Sources

GEE provided the group with an Excel document containing vast information about the firms that received EU Funds between February 2015 and February 2022 from COMPETE2020. Some of the disclosed details were, e.g., the beneficiary's name and the public entity in charge of the funds' attribution in Portugal. Afterward, the program designation in the country was part of the filtering process since the group was solely interested in analyzing the program focused on SMEs, APOIAR. Finally, other interesting elements in the Excel file were several critical dates related to the application - submission, approval, project's beginning and end - and the investment amount, divided into self-financing and the EU-covered part.

Through NOVA SBE, the group has access to an extensive database concerning firms' structural and financial data, Bureau van Dijk's Sabi/Orbis. Over 900 thousand companies are cataloged in this source, which includes information such as the name of their directors and respective contacts, the size and sector of the firms, and their main accounting results, i.e., the

EBIT, EBITDA, sales, and total assets. Sabi/Orbis was also instrumental in constructing a second comprehensive dataset, created using the characteristics of the treated firms present in COMPETE's document. At a later stage of the project, this tool was an essential part of the individual contributions to the report, given the number of important variables it provides to both constructed datasets.

By now, it should be clear that the group relied on two different datasets. The first one was composed of firms that responded to either of the questionnaires - a smaller database (678 observations, 78 Treated, 600 Control). On the other hand, the second dataset was built upon the unique features of firms that received EU Funds between 2015 and 2022 - an extensive database (500.789 observations, 11917 Treated, 488.872 Control).

4.3 Control and Treatment Group Construction

The central research problem behind this project has been clear since the group first contacted GEE's proposal in January. Keeping in mind the purpose of gathering feedback from Portuguese SMEs regarding administrative costs, the questions posed in both Surveys had to involve diverse approaches. A mandatory question concerning the firm's fiscal number (NIF) was implemented to ensure precise identification of the responding firms. Later on, this information also made it possible to find the remaining characteristics of the firms on Sabi/Orbis, essential to pursuing further analysis without asking too many firm-related questions. Another example of a clear and unbiased binary question was whether the available EU Funds corresponded to the firms' needs. In this case, should the firm answer negatively, the questionnaire displayed a text field for the firm to justify its stance, which had an important role in drawing conclusions and recommendations for the project.

The questionnaires which would provide the basis for the first dataset included categorical- and numerical-type questions**.** In order to grasp the impact of the EU Funds on a given company, the group asked which practical outcomes arose in the post-funding period.

Potential options included increasing sales or firm size, a more significant percentage of exports, a higher level of workforce qualification, or innovation growth. Discrete-type questions were also introduced. One such example is a question in which the responding firm can classify possible policy changes that would tackle the broader issue of bureaucracy on an ordinal scale from 1 to 5.

Departing from COMPETE2020's Excel document, the group had access to the company names of 26904 firms that received European Funds. This was the Treatment Group's population. Using this information on the *nif.pt* website, 16309 fiscal numbers were manually found. After pre-formatting and uploading three documents Sabi/Orbis could read, 8686 e-mails were obtained, representing 53% of the matched fiscal numbers and 32% of the observed initial firms. Since retrieving fiscal numbers was a rather time-consuming process, the main Survey was distributed separately over three weeks.

Sometime later, the group was dissatisfied with the low rate of completed surveys since only seven firms had finalized the questionnaire. By the end of that week, it was clear that some adjustments were in order, particularly in terms of the text on the cover of the Survey and in the body of the e-mail. For instance, some text parts were removed altogether, and others were changed to appear more appealing to the firms, involving a more direct approach and highlighting the benefits of reduced bureaucracy.

From then on, the following cycles of e-mails were to incorporate these changes, which later yielded a more significant number of respondents. In the end, the group obtained 88 responses, a notable increase from the initial number of answers. It should also be mentioned that each *round* of e-mails was accompanied by a reminder message sent a few days later. Although the target firms were well defined - SMEs with similar characteristics (e.g., size) that had (Treatment Group) and had not (Control Group) received funding in the past eight years,

the sample size ended up being very different across both groups. Only 88 answers were registered on the Treatment survey, while 600 firms replied to the control one.

Considering that both groups have different characteristics, not all questions on the final versions of each Survey are the same. However, most questions on the Control Group questionnaire have been adapted from the Treatment one, which was developed earlier in the project. For instance, in the Treatment questionnaire, the group asks if the firm would advance with its project without European Funds. Meanwhile, the Control one concentrates on whether the company would have undertaken different strategic decisions should it have received funds.

Finally, to ensure the Control Group was correctly constructed, its questionnaire was not to be released until all answers from the Treatment Group were registered. This way, after carefully analyzing the Treatment Group's characteristics, the group could use the filtering options of Sabi/Orbis to contact firms with similar features exclusively. As soon as the Treatment Group survey was concluded, the group retrieved the NIFs of the responding firms and ran them through Sabi/Orbis. This way, many filters could be applied to gather more information and data about the respondents. Such knowledge is critical to examining and analyzing the specific characteristics of the Treatment Group firms. It is also essential to establish the overall framework that would be used to develop a reliable Control Group.

In particular, the criteria applied were Turnover, the Latest available number of employees, EBITDA, Total assets, Total liabilities, Sales, CAE Rev. 3 (Primary Code), and, lastly, whether Sabi/Orbis contained the e-mail address of the firm. For each numerical variable, the considered interval was limited by the minimum and maximum values of the Treatment Group's responding firms. It is also important to note that the aforementioned financial criteria were measured in thousands of euros. In contrast with the main questionnaire, this Survey was deployed over a week due to time-related constraints. To better understand the firms who had completed either of the Surveys, the final version of the first database was

composed of the obtained answers to each question and additional information regarding the firms' indicators, imported from Sabi/Orbis. This was done with the intent to run regressions with bureaucracy-related indicators serving as a Dependent Variable, particularly through a composite indicator based on Survey questions.

As for the second, larger database, it was constructed using the NIFs of Treated Firms and Sabi/Orbis. Once all the possible fiscal numbers were collected for this initial document, the group withdrew their key characteristics from Sabi/Orbis. This process ensured that essential information concerning the treated firms was obtained, securing a more extensive set than the one acquired through the Survey. Afterward, the group calculated the maximum and minimum values for each variable of interest: the number of employees, turnover, total assets, total equity and liabilities, and sales for each category's last available year. Next, the obtained values were run through Sabi/Orbis, to encompass firms that share similar features with the Treated ones. Due to the number of firms that met the aforementioned criteria (500.648), the respective Excel file was split into several smaller ones so that the firms and their individual information could be imported to Stata.

For this group of firms, the final database was constructed with firm-related information and other results of interest. The underlying objective of this process was to allow the group to experiment with a number of different variables in terms of running regressions. Some retrieved variables of interest are the date of establishment, the region, the EBITDA, or the intangible fixed assets.

4.4 Descriptive Statistics

To begin with, Descriptive Statistics are typically perceived as an interesting and straightforward way to introduce a recently created dataset and its features. Considering the specific context of this project, this perspective took on additional importance, given the group's low number of responses, particularly in the Treatment survey.

Regarding Categorical Variables (e.g., Q5 of the Treatment Survey), the main statistical instruments used to analyze this type of data are frequency tables, split into absolute and relative frequencies. Likewise, the mode can be presented as a result of the category with the highest absolute frequency. For a simple yet informative visualization, bar and pie charts are usually the chosen method. As for Numerical Variables (e.g., Q17 of the Treatment Survey), they are divided into Location Measures and Dispersion Measures.

Location Measures are, in turn, divided into Central and Non-central tendency ones. While the former includes the mean, the median, and the previously mentioned mode, the latter comprises quantiles, percentiles, and deciles. Once more, considering the reduced number of answers obtained, the quantile will be the sole measure of interest. By contrast, Dispersion Measures encompass the range, interquartile range, and standard deviation. Lastly, histograms are the preferred option to plot continuous numerical data. For the individual parts, each group member will select the Descriptive Statistics that convey the most noteworthy results.

4.5 Multilinear Regressions

The group could establish a Dependent Variable for the first, smaller database by creating a composite indicator based on the Survey's answers. By doing so, a bureaucracy-related variable was created to gather the firms' overall perceptions regarding the main topic of this project. It includes responses associated with tasks one usually perceives as bureaucratic, such as filling forms, collecting an extensive degree of information, and dealing with complex legislation. On the right-hand side of the equation, variables related to a firm's economic performance and firm-related characteristics were tested.

However, running regressions on small datasets implies several issues regarding the accuracy of the performed analysis. While these operations can not always assure statistically significant results, if the p-value does not meet the minimum threshold of 0.05 significance, finding two or more correlated variables does not imply causality. Regardless, the value of the

coefficient of determination states how much of the Dependent Variable is explained by the independent ones. Each group member will experiment with different variables in Stata in an attempt to obtain interesting results.

4.6 Policy Evaluation Methods

The second, more extensive database allows the group to test two of the previously studied Policy Evaluation Methods - Differences-In-Differences (DiD) and Propensity Score Matching (PSM). DiD offers the possibility to understand before-after patterns and Treatment-Control group differences. PSM adds an extra layer of certainty to the Average Treatment Effect on Treated (ATET) or Average Treatment Effect (ATE) result by matching similar observations across both groups. This can be achieved either through a Nearest-Neighbor matching process or a Radius one (Cunningham 2021).

Both methods have specific assumptions that need to be met to be properly implemented. DiD requires the Parallel Trends Assumption to be verified, i.e., changes in outcome for these groups would be predictably equal over time if treatment had not occurred. In turn, PSM is slightly more demanding - it needs two assumptions to hold. The first one, Conditional Independence, implies that uptake of a particular program - in this case, EU Funds - is based solely on observed characteristics. The last assumption refers to the quality of the Common Support region, which requires Treatment observations to have comparable Control ones.

Considering the nature of the large database, the group did not identify any problems with the Parallel Trends or Common Support assumptions. However, Conditional Independence may not hold since Treatment take-up - receiving EU Funds - may be determined by unobservable characteristics to the group or those involved in the application acceptance process. One practical example of such an unobservable feature could be the usage of a consultancy firm to help throughout the application process. Some firms have access to these

third-party resources, whereas others do not. This difference may have unnoticeably impacted the results stemming from the application process, an effect the group could not control.

5. The impact of European Funds on R&D Investments by Firms in Portugal

5.1 Introduction

Small and medium-sized businesses (SMEs) play an important role in the innovation ecosystem and significantly impact employment rates and economic growth. This role has become more and more important, increasing not only attention among innovation academics but also government understanding of the necessity of supporting the growth of the small company sector through specialized policies. This is particularly relevant in Portugal, where SMEs represent a big part of the economy.

Theoretically, innovation makes a substantial contribution to growth at the corporate and societal levels. Modern economies can better accommodate rising living standards and, as a result, increased levels of welfare. In addition, they are more effective, flexible, and resilient in the face of difficulty and change. They might also create more efficient production processes.

Even though information is a public good and research and development (R&D) typically produce higher social returns than private profits, without government support, private agents are likely to underinvest in R&D (Nelson 1959). In this environment, governments and supranational organizations have put in place policies to support individual innovation endeavors through grants and subsidies, either directly or indirectly.

Firms invest in R&D for various reasons, depending on the markets they serve, their size, the company's stage of development, the type of work done, the level of competition, or the development strategies they have in place. These investments also yield various returns, some of which are more tangible and felt right away, such as developing new goods and services. In contrast, others are more intangible, such as enhancing abilities and knowledge.

Compared to larger companies, SMEs are more frequently financially limited (Czarnitzki and Hottenrott 2009). However, SMEs significantly contribute to knowledge development and technical advancement since younger, smaller businesses often undertake more fundamental and daring innovation projects (Schneider and Veugelers 2010). In light of these factors, the European Union provides funding to SMEs to encourage or allow them to involve in R&D at the appropriate level and breadth.

In addition to the knowledge gained from R&D activities, businesses acquire and develop skills that enable them to pick up signals from the markets and ecosystems in which they operate. Companies that develop and expand their expertise across a range of fields are better able to anticipate trends and be prepared to change course when necessary.

In this context, the contribution of this paper is to evaluate the impact of the financial support program from the European Union on SMEs' performance, especially the impact on R&D investments. After that, I will examine how EU funds affects the perception of red tape in obtaining European funding.

The rest of this paper is structured as follows. Section 2 presents the literature on SME and R&D. The duty data is described in section 3. The methodology for the study is thoroughly detailed in Section 4. The empirical findings are discussed in Section 5, and, finally, in Conclusions, the study's main findings are summarized.

5.2 Literature Review

Small and medium-sized enterprises (SMEs) are well-recognized by policymakers as crucial stakeholders in the innovation ecosystem because of their considerable contributions to the production of innovation, jobs, and growth (European Commission 2020). Schumpeter (1934) emphasized the part that small businesses play in the innovation process: they provide innovative goods, methods, and concepts that disrupt the R&D operations carried out by large firms in highly specialized and knowledge-based labs (Schumpeter 1934).

The efficiency of R&D incentives has been the subject of numerous studies with contradictory results. This may be due to the design and variety of support instruments provided (subsidies, tax benefits, etc.) or to the various objectives and variables used to measure the impact of public policies (investment in R&D, creation of patents, productivity gains, etc.). Besides, it may also be due to the various methodologies used, the level of data aggregation, and the multiple periods studied, making it challenging to compare the different studies.

The literature acknowledges that SMEs' low resources and restricted access to financing impede their ability to innovate (Acs and David Bruce Audretsch 1991). R&D is expensive for SMEs businesses because they lack the money and substantial resources of their larger competitors. It is less costly for a SMEs to copy the inventive activity of another company than it is to innovate itself.

The correlation between a firm's size and its expenditure on R&D is highly influenced by the technological traits of the sector to which it belongs (Kamien and Schwartz 1982). On the other hand, Scherer (1965) asserted that innovation activity rises more than proportionately with size up to a certain point, beyond which the connection becomes essentially proportional (Scherer 1965).

Despite this, it should be borne in mind that small businesses mainly engage in informal R&D, which leads to a downward bias in estimating their propensity for innovation when only formal R&D expenditures are considered (Kleinknecht 1989). Nevertheless, they appear to be more efficient R&D agents, producing more patents and inventions per unit of R&D investment than larger companies (Van Dijk et al. 1997). Additionally, SMEs frequently outsource temporary R&D while utilizing resources from other divisions. Finally, a different management organization and a less bureaucratic ecosystem enable small businesses and new entrants to the industry to respond more quickly to innovative opportunities through activities that are in no way connected to officially recorded R&D expenditures.

On the one hand, due to a lack of awareness about how and where to obtain the required competence, SMEs typically underinvest in R&D. On the other hand, according to Czarnitzki (2006) technical suppliers frequently show a reduced understanding of their actual competence demands. According to this view, the existence of some formal R&D activities within SMEs may be essential, not only as a requirement for internal innovation but also as a critical resource for enhancing their absorptive capacity in terms of external knowledge and for maximizing the benefits of technological spillovers and collaboration from larger businesses and knowledge institutions, like universities (Simonen and McCann 2008).

5.3 Dataset Characteristics

This paper uses two datasets: data about firms' performance that received funds between 2015 and 2021, obtained from COMPETE 2020, and firms that did not receive funds (largest database). The second database is from a survey implemented on firms that received and did not receive the funds (smallest database). Using these two databases made it possible to cross information with various variables on the characteristics of firms. The first database comprised 500789 observations, and the second comprised 676 observations.

Between 2015 and 2021, 26904 firms received European Funds under the four systems of incentives: Liquidity Incentives System, Incentives System for the Qualification and Internationalization of SMEs, and the Incentives System for Business R&D. The survey carried out allowed the construction of a sample of 676 SMEs (consisting of the ones that responded to our survey although a significantly larger number of them were invited to participate), of which 78 received funds and 598 did not. These constitute the smallest database, which is the focus of the following analysis.

Answers to the questionnaire were given by 92.46% owners or co-owners. Of these companies, 301 are from the Lisbon and Vale do Tejo region, 212 from the North region, 102

from the Center region, 28 from the Algarve, 24 from Alentejo, 7 from Região Autónoma da Madeira and the last 2 from Região Autónoma dos Açores.

The 78 companies of the sample (the ones that received funds) belonged to the following sectors of activity: "professional training" (CAE 85591 Rev. 3), "manufacture of metal moulds" (CAE 25734 Rev. 3), "IT programming activities" (CAE 62010 Rev. 3) and "occasional transportation of passengers in light vehicles" (CAE 49320 Rev. 3).

The other 598 firms (the ones that did not receive funds) belong to the sectors of "other business and management consulting activities" (CAE 70220 Rev. 3), "occasional transportation of passengers in light vehicles" (CAE 49320 Rev. 3) and "engineering activities and related techniques" (CAE 71120 Rev. 3).

The number of companies that access European funds without investing in R&D projects is higher than those that invest in R&D. The same happens when asked if they have human resources allocated to R&D activities—more than 80% said they did not have human resources assigned, which aligns with the literature.

Companies identified the main obstacles when investing in R&D as obtaining public funding, the high associated costs, and the competitive market. Regarding the reasons to invest, the first is keeping up the sales pace, the second is the technological opportunities, and the third is maintaining/increasing productivity. About the expectations of R&D investment in the next two years, by the SMEs that answered the questionnaire, 402 expect to invest in R&D, and the rest (241) have no investment expectations. For more detail see Appendix 1.

As for the largest database, 11917 firms received funds and 488872 did not (the latter group was used as the control group, and it was built based on the characteristics of the firms that received European funds).

Concerning the 1917 firms received funds, from 2014 to 2019, the average amount spent on intangible fixed assets, which is the variable of interest of this project, was between 29,000

and 31,900 thousand euros, reaching 34,661.28 in 2020 and 38,970.64 in 2021. As for the median, it is always constant, with a value of 0, meaning that most companies in our sample do not invest in intangible fixed assets.

Regarding the examined distributions, we note that the data are fairly distributed across all years, with the year 2021 having larger values for the standard deviation and variance. It can signify that the data distribution is not symmetrical or normal. As a result, the mean cannot be a reliable indicator of central tendency when the data does not follow a normal distribution.

Moving on to the analysis of the skewness coefficient, we notice that all the distributions present positive values far from 0, so they are positively asymmetric (or skewed to the right). Analyzing the kurtosis measure, we verify that the distributions are leptokurtic in all years because it presents a positive kurtosis value. That is, the intensity of the frequencies around the mean is higher than that of the normal distribution, which causes a smaller flattening than the normal distribution.

Analyzing the companies that did not receive funds, when compared with the values of the companies that received funds, we see that the average value is lower, but the median value remains at 0. About the distributions analyzed, we see that the data is relatively dispersed in all years, and in 2014 the standard deviation and variance are higher. Moving on to the analysis of the skewness coefficient, we notice that all the distributions present positive values far from 0, so they are positively asymmetric (or skewed to the right). Regarding the kurtosis measure, we verify that in all years, the distributions are leptokurtic since they present a positive kurtosis value, i.e., the intensity of the frequencies around the mean is higher than that of the normal distribution, which causes a smaller flattening than the normal distribution. For further detail see appendix 2.

5.4 Methodology for assessing the impact of European funds

Given that numerous factors could affect the outcomes, it is typically challenging to determine how a policy will affect firms. Under certain presumptions, the propensity score matching and differences in differences procedures, which can give objective results, are used to analyze the impact. Companies are matched one year before the treatment based on the given control variables. When an investment is made, the year of treatment coincides with the year funds are received.

Tangible fixed assets, operating revenue, sales, and employee count are the variables employed as controls. They generally assess the company's capability for investment, business performance, and human capital.

Analysis of the effect on R&D is done with the investment in intangible assets. It more accurately measures the kind of investment the European Union hopes to encourage through the funding. This variable considers internal R&D, external R&D contracts, and the acquisition of R&D outputs produced by other businesses.

5.5 Results Obtained

5.5.1 Propensity Score Matching

Companies are matched one year before to the treatment based on the given control variables. The conditional probability of receiving treatment is compared using the propensity score technique matching (the method's advantage is that all the data necessary to identify a control group is condensed into a single variable, the propensity score).

After randomly selecting a sample of 50% from the treatment group and 5% from the control, two propensity score matching arise, one to estimate the ATE and the other the ATET coefficients, year by year. The *teffects* command estimates average treatment effects (ATEs) – the impact we would have observed had the entire population been treated and the average

treatment effects among treated subjects (ATETs) – the causal effect among those who get the treatment from observational data by propensity score matching (PSM).

Looking at the ATEs' and the ATETs' results, the last ones display a higher coefficient – around 20 (see figure 15 – appendix 3). In spite of this, there are no significant values for the impact of EU funds on firms received between 2015 and 2021. When we look at the impact year by year, we observe that the effect is also not significant, but there are negative coefficients between 2016 and 2019 for the ATEs' results and negative between 2015 and 2020 for the ATETs' results.

Concerning Tangible fixed assets, the ATETs' results display a higher coefficient – around 134 – compared with ATEs' results (see figure 16 – appendix 3). Besides a significant p-value, it is clear that firms that received public support between 2015 and 2021 had, on average, their 2021 tangible investments positively impacted by EU funds. In other words, receiving public support moved 82 thousand euros on all firms, as seen in figure 1. In addition, looking at the results year by year, we obtain the same ones with significant values almost for all years.

```
Treatment-effects estimation                    Number of obs      =     12,496
Estimator      : propensity-score matching      Matches: requested =          4
Outcome model  : matching                                       min =          4
Treatment model: logit                                          max =         45
```

tfa2021_n	Coef.	AI Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
ATE						
got_funds (1 vs 0)	**82.35382**	**26.79223**	**3.07**	**0.002**	**29.84202**	**134.8656**

Figure 1. Propensity score matching tangible fixed assets – larger database

5.5.2 Differences in differences model

The differences in differences method, which calculates the differences between treated and untreated groups before and after treatment (Card and Krueger 1994), was also used to analyze the effect of European funding on intangible and tangible investment.

In order to compare the outcomes of enterprises treated that year with those who were not, the model was individually estimated for each year. The model was computed both with and without controls for each year.

The coefficient of interception between the two variables is insignificant and gives us negative coefficients between 2016 and 2019. As previously, propensity score matching results give the same effects of the EU funds identified above. This can be attributed to a lack of knowledge regarding R&D spending as well as the fact that these years have been marked by greater uncertainty, particularly the last two years during the Covid-19 crisis, when businesses have been less likely to invest. These findings are in line with Hud and Hussinger (2015), which found that businesses would be less likely to invest during a crisis.

The intangible fixed assets of firms with funds tended to increase in 2015 by more than 30 thousand euros to those without funds, see figure 17 – appendix 4. The results show that a policy's influence is greatest in the first year after it is put into place, and, in 2015, the incentive programs for innovation, business R&D, and qualification and internationalization saw the greatest number of supported projects.

Although, when looking at the analysis from 2015 to 2021, the coefficient is positive and significant, making us believe that the investment of intangible fixed assets will be more impactful in the long term, as shown in table 1.

Table 1. Differences-in-differences model - Intangible Fixed Assets 2015-2021

VARIABLES	(1) DiD IFA
Got Funds	17.49***
	(5.807)
TFA 2014	-0.00512***
	(0.00114)
Sales 2014	0.0321***
	(0.00107)
ORT 2014	-0.0369***
	(0.000893)
Number of employees	0.946***
	(0.0800)
Constant	3.510***
	(1.300)
Observations	183,685
R-squared	0.010

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Concerning the investment in tangible assets, against what we observe in intangible fixed assets, the coefficient of interception between the variables is significant for all years considered (2015-2020). The years 2015 and 2017 are the years in which we observed the most significant increase in tangible investment for the companies that received the funds—corresponding to more than 540 thousand euros for the companies that received the funds, see figures 18 and 19 – appendix 4. The model was also estimated without controls for each year, and the results follow the same pattern. Firms that received funds increase their investments in tangible fixed assets.

5.5.3 Impact on Bureaucracy Perception

A new variable was developed through the survey's questions to quantify perceptions of bureaucracy. The new variable consists of aggregating all categorical variables that allow the link with bureaucracy in a single variable. The following variables make up the newly variable,

bureaucracy perception: complex legislation; complex procedures; filling forms; collecting necessary information; obtaining opinions and studies; delays in communication; and delays in receiving the funds for the treated firms. These variables also take into consideration the responses of the control group. For the treatment group we asked about the difficulties that they went thru, while for the control group aimed at understanding the perceived red tape. With the creation of this new variable, the higher the value, the greater the perceived bureaucracy in the process of applying for EU funds.

For the variable *bureaucracy_perception*, the mean value is 17,5, while it is 17,2 for the control group. The maximum value is 30, while the minimum is 7, for the treatment group (Figures 20 and 21 – appendix 5).

A multilinear regression was tested use *bureaucracy_perception* as a dependent variable and *got_funds* as an independent. First, a regression was estimated only with two variables and after was added to control variables to test whether the funds really impact on bureaucracy perception, as shown in table 2. Even though no result is significant, they point in different directions.

Table 2. Multilinear regression bureaucracy perception

Variables	(1) Bureaucracy Perception
Got Funds	1.866
	(2.259)
IFA	-0.000346
	(0.000645)
TFA	-0.00305
	(0.00189)
Constant	18.07***
	(0.456)
Observations	322
R-squared	0.010

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

First, firms that receive funds tend to have less bureaucracy perception. Secondly, the perception tends to increase when adding two control variables, intangible and tangible fixed assets investments from the last year available. A possible justification would be that firms with more technological and general knowledge more easily recognize bureaucracy that can be minimized through other processes.

5.6 Conclusions

Without public funding, private spending on R&D falls short of what society desires. Because of this, governments and international organizations have implemented programs that directly and indirectly fund innovation initiatives. In recent years, EU funds have provided advantages for SMEs. This is clear given that these programs are crucial for SMEs to improve their capacity for innovation and competitiveness. This study uses propensity score matching and differences in differences methodology to examine the effects of EU grants for SMEs. It also carried out a multilinear regression to estimate the impact of EU funds on bureaucracy perception. The consistency of the results acquired using the two methods provides greater robustness to the analysis.

The results show the impact of EU funds in promoting investment in tangible fixed assets through the impact of European funds. It was also feasible to note that funds are less efficient at encouraging intangible fixed assets investments. This can be justified by the high associated costs and market competition, as mentioned by the companies in the survey, or by the fact that intangible assets are not seen as a factor that can develop the company and bring profit. There is also the possibility that the impact on investment in intangible assets only occurs over the long term, which was the result when the impact of the funds was estimated over the entire period of analysis.

Finally, it was also examined whether an investment in intangible assets impacted the perception of bureaucracy. First, if firms receive funds, they tend to perceive bureaucracy less.

This notion might be accurate, considering that companies that received funds are more likely to have undergone the respective application process. In spite of this, after adding some controls such as intangible and tangible investments, that perception tends to increase. A possible justification would be that companies with more technological knowledge more easily recognize bureaucracy that can be minimized through other processes.

5.7 Policy Recommendations

The literature highlighted that SMEs that benefited from EU funds increased their private expenditure on R&D, expanded their technology and product development and boosted the number of innovations. Therefore, the policy project analysis focused on analyzing the impact of the funds on R&D investment by SMEs through a proxy, investment in intangible assets. The companies in the research received funds under four incentive systems: Liquidity Incentives System, Incentives System for the Qualification and Internationalization of SMEs, and the Incentives System for Business R&D. The results indicate, on the one hand, that SMEs do not increase their investments in intangible assets after receiving funds. On the other hand, investments in tangible assets increase significantly.

Considering the reasons that may lead SMEs to underestimate or not invest in R&D, such as lack of knowledge on how and where to obtain the necessary skills or the fact that R&D is influenced by the technological characteristics of the sector they belong to, some recommendations emerge. However, to be consistent, the recommendations consider the diversity of SMEs.

Firstly, business associations, particularly sectoral associations, should seek to develop strategic visions about the technological developments they foresee as essential for companies in their sectors, trying to formulate proposals for strategic mobilizing projects for the sector.

Universities also play a significant role since businesses with R&D already seek to engage with them.

Secondly, the government should be more proactive in encouraging partnerships between SMEs and research organizations. Indirect R&D support, such as consulting, mentoring, and networking, can complement direct support in increasing innovation and good support in applying for EU funds. The construction of a widespread database between SMEs and other companies, universities and research institutes support the diffusion of information about market needs and the scientific seeds of R&D activities and using networked intermediaries makes it easier for SMEs to connect with potential partners.

6 Concluding Remarks & Recommendations

6.1. Brief Introduction and Study Limitations

This Policy Analysis Project adds to the existing literature regarding SMEs and their relevance to a country's economy by studying the impact of funds on firms' performance, the impact of red tape on firms' performance, and the influence of their geographical location in receiving funding. However, as far as we know, this is the first project to encompass the dimension of bureaucracy, specifically in the context of Portuguese SMEs' access to European funds.

To reach a tangible measure of bureaucracy, we turned towards firms' perception on the matter, questioning respondents about their perspectives regarding various stages of the application process: before, during, and after. Afterward, the answers to these questions were merged into one single variable, later used in Regression Analyses. Although non-significant, the ensuing regression results suggest that Treated firms have a higher bureaucratic perception than Control firms and that companies that outsourced their application may have had a reduced notion of existing red tape. There may be a negative correlation between a possible effect of red-tape on a firm's Operating Revenue, although the results are non-significant.

Evaluating firms' performance directly, considering the variables of Operating Revenue/Turnover, Sales, and Tangible Fixed Assets, we conclude that European funds positively impact Portuguese SMEs' growth. For Intangible Fixed Assets, the results are less clear, which seems to suggest that the funds may not alter firms' investment in R&D. By analyzing the data from a geospatial point of view, we observe that most approved projects belong to companies located on the Portuguese coast, leading us to believe that there may be a loose connection between further distance from the major urban areas and a lower approval rate.

Staying in the realm of potential limitations to the present study, one possibility may be related to the group's selection of control variables. While valuable to help explain the impact of European funds through various methods, these variables may be biased through the effect of other funds or other types of financing on firms, such as bank credit or loans. In fact, this may condition the analysis of the companies' performance, given that there is no practical way to account for this external effect.

Another component that could be further explored which the group did not consider was the effect of co-financing the approved projects on firms. These projects often present a significant financial burden, one that not all firms can bear. Indeed, this fact may help explain the ex-ante differences found in business size. In the case of some financial outcomes, the effect of the funds may not materialize in a short period. For example, some investments may result in economies of scale later, reducing the average cost of each produced unit. At the same time, there is a learning curve associated with advanced technology. Our analyses focus mainly on short- and medium-term impacts, which may not reflect these phenomena.

A different possible limitation of the study is the limitation of the geographical aspect since the sample is limited. Therefore, in future expansions of this work the geo-economic analysis of the survey should include a larger sample that allows for all variables to be considered in the realm. Moreover, doing a quantitative analysis on the distance could also be interesting as it could potentially tell us the significance of the distance to the seaside and the impact in the realm of the funds' application.

6.2 Survey Policy Recommendations

The purpose of the surveys was to obtain information that was not available to us from previous analyses so that we could have a clearer understanding of how European Funds work and their impact on companies. The group mainly focused on closed-answer questions since it

would be more practical in statistical terms. Regardless, the information we obtain is limited to our reflections on the subject, given that respondents may only choose from the options provided. Therefore, we thought it would be critical to have an open answer question to let respondents share their personal experiences and suggestions. These are especially important for the concluding segment of this assignment: policy recommendations. The group has been analyzing the process as an outsider, comprising different perspectives contemplated in the individual parts. However, we lack the hands-on experience that would allow us to understand the real challenges firms face. Having an open answer question makes it possible to incorporate a more direct and holistic view on the matter. Thus, we have organized the answers around four main axes.

Many companies note that communication takes a long time, which is detrimental. Some firms stated that their candidacies were dropped because the contact with the respective entities took too long, and the application period was over before they could apply. Considering the widespread availability of digital means nowadays, companies feel that communication should be faster and more regular to ensure the process is running smoothly and warn applicants of eventual requests and additional clarifications needed in due time.

Some firms, especially smaller ones, state that information regarding EU funds and respective applications is not well disseminated. Moreover, this idea is reinforced by the fact that companies chose "choosing and finding the right Operational Program (OP) to apply for" as the most challenging step to comply. Many OPs have different deadlines, and such information can be difficult to track. Similarly, companies argue that the application period had already passed when they finally had access to knowledge about the program. Others noted that larger firms have an inherent advantage in accessing information since they have stronger connections to firm and sector associations. One policy recommendation arising from these suggestions would be centralizing the information regarding existing funds and their deadlines

in a straightforward manner. This new channel would enable more accessible access to funds and increase the sense of transparency and fairness in the process among Portuguese SMEs. Still on the information front, another suggestion concerns the possible simplification of the technical language used in forms and other required procedures.

A large share of companies remark that the application procedure is too complex. Two recommendations are proposed to make it more agile. First is a better connection between state agencies regarding document sharing. Respondents report that it can be time-consuming to get the documents needed. The state could avoid this by creating a direct link between the respective entities, which is also associated with the topic of communication. A cloud-like platform in which firms and state entities would be able to share and access documentation could be a possible solution. Such a tool would reduce the need for communication and respective delays.

In addition, some valuable suggestions were received regarding a potential diversification of assistance for applicants to EU funds. In particular, it was recommended that local or regional offices be established with the purpose of supporting companies in carrying out their application process. Eventually, such a measure would contribute to reducing some associated imbalances between the Portuguese coastal and inland regions. The third piece of advice is related to the development of online content, such as informational videos or a blog, which could shed some light on the process for firms without requiring a hefty investment from the state. Another option would be the concession of financial incentives to business associations. This measure would give them a prominent role in guiding SMEs towards a better understanding of the application procedures and the funds in general. Finally, a further suggestion involves the creation of application forms in all European languages in order to facilitate the process for foreign companies and citizens.

6.3 Policy Recommendations from Other Contexts

Different contexts and countries can be valuable tools for analyzing policy solutions. Therefore, to understand how well funds are used across Europe from a macro perspective, we will explore the utilization of European funds by EU member-states in diverse scenarios and focus on the relevant factors that may influence the quality of execution.

A country's absorption capacity can be defined as the degree to which a country is able to spend the financial resources that originate from the Structural Funds in a precise and efficient manner (Cace et al. 2009). Additionally, Cace et al. state that one may study this capacity from two perspectives. The first is linked to the capacity of absorption of the supply side, related to the established institutional system managing the funds, and the second is the capacity of take-up from the demand side, i.e., the firms.

Moreover, the concerns regarding the proper utilization of European funds can be directed through two levels of institutional issues (Zaman et al. 2009): European and National Structures. The European Commission is the leading institution that influences the quality of the funds' execution. However, at the national level, connected to the present assignment, the authors identified the economy's structure, the administrative capacity, the political system, and countries' economic policies as important institutional factors that influence the absorption capacity.

Regarding the political system, corruption can also be a determinant factor in the quality of management of European Structural Funds. Mihailescu (2012) studied the impact of corruption on European funds' administration, comparing Poland and Romania. The author finds that Poland had a high degree of absorption capacity, supported by collaborative actions between mass media and civil society. This led to the highest economic growth in the EU in 2010, while corruption was declining. On the other hand, Romania still struggled to harness funds effectively. Mihailescu claims that strengthening the institutional system and the rule of

law, improving transparency, efficiency, competitiveness, and multi-level governance were essential aspects of tackling the issues faced by Romania.

Additionally, in the Romanian case, the various factors influencing the inferior execution level are related to the lack of expertise and qualifications in accessing, managing, and evaluating European-funded projects, as well as the low managerial and financial capacity. (Bragaru, 2011) This author also reinforces the importance of local public institutions as the main responsible authorities in ensuring that funds are utilized to develop those regions effectively.

One way to safeguard the effectiveness of European Funds is to create effective monitoring and evaluation mechanisms that allow a proper assessment of projects. One study on the Hungarian and Slovakian experiences regarding funds absorption (Cartwright and Batory 2011), explores the impact of Monitoring Committees as tools to assist the member-states in evaluating the effect of the funds. Yet, the authors find that these committees were highly technocratic and lacked decision-making power. Nevertheless, these discussion bodies were also regarded as effective communication tools that may produce valuable information for decision-makers. The study finds that they gather essential information regarding projects' development and bolster the importance of cross-consultation among multiple stakeholders.

Lastly, several governance-related indicators can positively influence the absorption capacity of the member-states (Atchim and Borlea 2015). Between 2007 and 2013, These authors conducted a study concerning the determinant factors which affect the European funds' absorption. They find that adequate accountability, government effectiveness, regulatory quality, the rule of law, and reasonable control of corruption positively influence the state's ability to manage funds properly.

European Funds are a great instrument to generate development. European countries, entrepreneurs, and political institutions must be prepared to ensure those are being duly applied.

These recommendations relate to developing institutions capable of harnessing the funds' potential. Therefore, member-states should design policies that tackle corruption and address issues related to education and training. At the same time, reinforcing the role of public institutions and providing them with tools and know-how to manage and monitor the funds while maintaining good democratic levels that facilitate the communication between stakeholders.

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—Appendixes —

Appendix 1. Descriptive Statistics Smallest Database

Firm Received Funds?	Freq.	Percent	Cum.
0	598	88.46	88.46
1	78	11.54	100.00
Total	676	100.00	

Figure 1. Smallest database sample

Do you own or co-own the company?	Freq.	Percent	Cum.
1	613	92.46	92.46
2	50	7.54	100.00
Total	663	100.00	

Figure 2. Summary statistics of owner and co-owner of the firm

NUTs II	Freq.	Percent	Cum.
Alentejo	24	3.55	3.55
Algarve	28	4.14	7.69
Centro Portugal	102	15.09	22.78
Lisboa e Vale do Tejo	301	44.53	67.31
Norte Portugal	212	31.36	98.67
Região Autónoma da Madeira	7	1.04	99.70
Região Autónoma dos Açores	2	0.30	100.00
Total	676	100.00	

Figure 3. Region Smallest Database

Does your company invest in Research and Development (R&D) or intangible assets?	Freq.	Percent	Cum.
1	**20**	**25.97**	**25.97**
2	**54**	**70.13**	**96.10**
3	**3**	**3.90**	**100.00**
Total	**77**	**100.00**	

Figure 4. Firms that received EU funds and invest in R&D or intangible assets

Does your company have personnel assigned to Research and Development activities	Freq.	Percent	Cum.
1	**13**	**17.33**	**17.33**
2	**62**	**82.67**	**100.00**
Total	**75**	**100.00**	

Figure 5. Firms that received funds and have people assigned to R&D activities

Appendix 2. Descriptive Statistics Larger Database

Firm Received Funds?	Freq.	Percent	Cum.
0	488,872	97.62	97.62
1	11,917	2.38	100.00
Total	500,789	100.00	

Figure 6. Largest database sample

Intangible Fixed Assets th€ 2014

Percentiles		Smallest		
1%	0	0		
5%	0	0		
10%	0	0	Obs	8,459
25%	0	0	Sum of Wgt.	8,459
50%	0		Mean	29.25766
		Largest	Std. Dev.	382.0633
75%	.27891	8692		
90%	14.0007	9959.571	Variance	145972.4
95%	54.87	16263.7	Skewness	36.47953
99%	509.6904	21604.98	Kurtosis	1707.659

Figure 7. Summary statistics of Intangible Fixed Assets 2014

Intangible Fixed Assets th€ 2015

Percentiles		Smallest		
1%	0	0		
5%	0	0		
10%	0	0	Obs	8,973
25%	0	0	Sum of Wgt.	8,973
50%	0		Mean	30.53404
		Largest	Std. Dev.	388.5794
75%	.28001	9190.999		
90%	13.50564	9959.571	Variance	150994
95%	52.86843	16281.76	Skewness	34.40331
99%	571.131	21604.98	Kurtosis	1543.628

Figure 8. Summary statistics of Intangible Fixed Assets 2015

Intangible Fixed Assets th€ 2016

	Percentiles	Smallest		
1%	0	0		
5%	0	0		
10%	0	0	Obs	9,573
25%	0	0	Sum of Wgt.	9,573
50%	0		Mean	31.82615
		Largest	Std. Dev.	397.8459
75%	.2204	9730.624		
90%	13.5	9959.571	Variance	158281.4
95%	53.32909	16308.97	Skewness	32.33665
99%	555.1663	21618.25	Kurtosis	1371.615

Figure 9. Summary statistics of Intangible Fixed Assets 2016

Intangible Fixed Assets th€ 2017

	Percentiles	Smallest		
1%	0	0		
5%	0	0		
10%	0	0	Obs	10,129
25%	0	0	Sum of Wgt.	10,129
50%	0		Mean	30.02943
		Largest	Std. Dev.	309.8791
75%	.23572	8822.079		
90%	16.666	9556.023	Variance	96025.08
95%	62.47021	9700.919	Skewness	27.99693
99%	611.5472	16300.34	Kurtosis	1088.401

Figure 10. Summary statistics of Intangible Fixed Assets 2017

Intangible Fixed Assets th€ 2018

	Percentiles	Smallest		
1%	0	0		
5%	0	0		
10%	0	0	Obs	10,599
25%	0	0	Sum of Wgt.	10,599
50%	0		Mean	30.46721
		Largest	Std. Dev.	305.8016
75%	.21201	8575.503		
90%	18.4499	9473.877	Variance	93514.59
95%	67.58761	9641.509	Skewness	28.4155
99%	693.8389	16393.69	Kurtosis	1119.691

Figure 11. Summary statistics of Intangible Fixed Assets 2018

Intangible Fixed Assets th€ 2019

Percentiles		Smallest		
1%	0	0		
5%	0	0		
10%	0	0	Obs	11,035
25%	0	0	Sum of Wgt.	11,035
50%	0		Mean	31.67467
		Largest	Std. Dev.	329.7797
75%	.13336	9418.204		
90%	20	9552.394	Variance	108754.6
95%	72.17601	15000	Skewness	30.14612
99%	694.993	16780.8	Kurtosis	1208.175

Figure 12. Summary statistics of Intangible Fixed Assets 2019

Intangible Fixed Assets th€ 2020

Percentiles		Smallest		
1%	0	0		
5%	0	0		
10%	0	0	Obs	11,403
25%	0	0	Sum of Wgt.	11,403
50%	0		Mean	34.66128
		Largest	Std. Dev.	365.6437
75%	.12336	10014.21		
90%	21.46186	13985.38	Variance	133695.3
95%	78.22917	15000	Skewness	28.35654
99%	679.7175	17069.59	Kurtosis	1027.061

Figure 13. Summary statistics of Intangible Fixed Assets 2020

Intangible Fixed Assets th€ 2021

Percentiles		Smallest		
1%	0	0		
5%	0	0		
10%	0	0	Obs	11,296
25%	0	0	Sum of Wgt.	11,296
50%	0		Mean	38.97409
		Largest	Std. Dev.	402.8249
75%	.166655	11250		
90%	24.7351	13390.2	Variance	162267.9
95%	81	15703.21	Skewness	25.44188
99%	752.2292	17290.11	Kurtosis	814.7889

Figure 14. Summary statistics of Intangible Fixed Assets 2021

Appendix 3.

```
Treatment-effects estimation                   Number of obs      =     13,052
Estimator      : propensity-score matching     Matches: requested =          4
Outcome model  : matching                                  min =          4
Treatment model: logit                                     max =         32
------------------------------------------------------------------------------
             |               AI Robust
   ifa2021_n |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
ATET         |
   got_funds |
   (1 vs 0)  |   20.78169   11.17927     1.86   0.063    -1.129279    42.69266
------------------------------------------------------------------------------
```

Figure 15. Propensity Score Matching – Average treatment Effect on Treated

```
Treatment-effects estimation                   Number of obs      =     12,496
Estimator      : propensity-score matching     Matches: requested =          4
Outcome model  : matching                                  min =          4
Treatment model: logit                                     max =         45
------------------------------------------------------------------------------
             |               AI Robust
   tfa2021_n |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
ATET         |
   got_funds |
   (1 vs 0)  |    134.244   53.91991     2.49   0.013     28.56291    239.9251
------------------------------------------------------------------------------
```

Figure 16. Propensity Score Matching – Average Treatment Effect on Treated

Appendix 4.

VARIABLES	(1) DiD - IFA 2015
Funds 2015	33.84**
	(15.42)
Sales 2014	0.00266***
	(0.000412)
TFA 2014	0.00120***
	(0.000454)
ORT 2014	-0.00540***
	(0.000329)
Number of employees	0.121***
	(0.0351)
Constant	2.530***
	(0.515)
Observations	223,656
R-squared	0.002

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 17. Differences-in-Differences Intangible Fixed Assets 2015

VARIABLES	(1) DiD -TFA 2015
Funds2015	427.8***
	(30.00)
Sales 2014	0.00565***
	(0.000802)
IFA 2014	-0.00109
	(0.00161)
ORT 2014	-0.0119***
	(0.000638)
Number of employees	2.082***
	(0.0673)
Constant	5.820***
	(0.999)
Observations	223,668
R-squared	0.006

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 18. Differences in Differences Tangible Assets 2015

VARIABLES	(1) DiD – TFA 2017
Funds 2017	272.3***
	(27.99)
Sales 2016	0.0148***
	(0.000824)
IFA 2016	-0.0101***
	(0.00159)
ORT 2016	-0.0202***
	(0.000726)
Number of employees	3.377***
	(0.0637)
Constant	6.352***
	(0.877)
Observations	244,154
R-squared	0.013

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 19. Differences in Differences Tangible Assets 2017

Appendix 5.

Variable	Obs	Mean	Std. Dev.	Min	Max
bureaucrac~n	17	17.47059	8.008727	7	30

Figure 20. Summary statistics of Bureaucracy Perception for Treatment Group

Variable	Obs	Mean	Std. Dev.	Min	Max
bureaucrac~n	359	17.93036	7.792931	7	35

Figure 21. Summary statistics of Bureaucracy Perception for Control Group

VARIABLES	(1) Bureaucracy Perception
Got Funds	-0.460
	(1.937)
Constant	17.93***
	(0.412)
Observations	376
R-squared	0.000

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 22. Multilinear regression with Bureaucracy Perception