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Policy Study No. 34

MEASURING ECONOMIC EFFECTS OF STATE AID GRANTED TO PRIVATE ENTERPRISES IN NORTH MACEDONIA

The case of the governmental Plan for Economic Growth

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1. INTRODUCTION

North Macedonia ranks 126 in the category "Domestic competition" out of 141 countries listed in the Global Competitiveness Index[1] 2019 of the World Economic Forum, hence being among the worst in ensuring market efficiency. Likewise, within this category index, it ranks 112 in "Distortive effect of taxes and subsidies on competition". Both rankings are the worst also when compared to the other facets of competitiveness of North Macedonia. They strongly suggest that while healthy market competition, both domestic and foreign, is important in driving market efficiency, the country fails to ensure that the most efficient firms are those that thrive. This conclusion is reflected in the latest EU Progress Report 2020[2] on North Macedonia, which stipulates: "The country is moderately prepared in the area of competition policy. No progress has been made in this field during the reporting period." (p.67).

The reasons for the dismal performance of the country on the 'Competition' measurement may be manifold: on the one hand, the governments have been frequently very sluggish in implementing efficient reforms, which then frequently retarded the development of the economy and the private sector in particular; on the other, market forces may have been determined by legacies inherited from the ex-socialist times and the subsequent (considered inefficient) privatization of the state capital, both of which produced market structure that has not been especially conducive to encouraging competition and efficient goods market. Other objective factors, like the market size, likely played constraining role as well.

[1] See the entire rankings here: link

[2] https://ec.europa.eu/neighbourhood-enlargement/sites/near/files/north_macedonia_report_2020.pdf

Nevertheless, there is one factor which has been in a full control of the government, but may have been used with its distortive market power, while attaining other objectives, frequently being sophistically political. The state aid – understood as an advantage conferred on a selective basis to private undertakings by public authorities that has the potential to distort competition and, in the broadest sense of the word, being: direct subsidies, granting state non-monetary resources, tax and social contribution exemptions, providing loans at discounted interest rates, etc. – may have worked to distort markets, discourage competition, increase the dependence on state money, and hence overall reduce the economic efficiency. Namely, while the benefits of state aid control are clear, it can reduce economic welfare by weakening the incentives for firms to improve their efficiency and by enabling the less efficient to survive or even expand at the expense of the more efficient (Buelens et al. 2007). Moreover, state aid may deter competition from entering the market, hence reducing consumers' welfare (Martin and Strasse, 2005).

There are two paramount facts to preliminary support these claims. First, 'subsidies to private sector' stemming from the general state budget of North Macedonia did not exist in 2006; while in 2018 they amounted to 9.8% of all government expenses.[3] Likewise, 'agricultural subsidies' did not exist in 2006, while in 2018 they amounted to 3.1% of all government expenses.[4] Other state aid programs emerged or intensified during the last 14-15 years, including tax exemptions and granting state land to foreign direct investment, subsidizing interest on loans through the Macedonian development bank, subsidizing an air carrier for passenger transport and so on.

The program to subsidize foreign incoming companies, known as "Invest in Macedonia" remained most known, as it provided generous state aid to such companies in the form of direct grants and a palette of exemptions, at the same time being "not in line with the state aid acquis" (EU Progress Report, 2019, p.65). Government transparency with respect to subsidizing foreign private companies has been particularly criticized, since it was accompanied by profligate costs for

[3]Source: Government Finance Statistics, International Monetary Fund

[4]Source: Agency for financial support of agriculture and rural development: link

advertising campaigns and roadshows. The new government of 2017 approached to reveal the amounts of the state aid to foreign companies and the associated costs, and an amount of 225 million euro was published for a period of about a decade.

While the effects of such state aid to private companies on domestic market efficiency (despite being slightly shielded through the concept of technological-industrial development zones) have been never investigated or considered in a compelling way, the program actually expanded in 2017, with the objective to embody domestic companies through subsidizing their expansion of production, investment, exports, employment, soft measures to increase competition and so on.

The Plan for Economic Growth 2018-2021 of the Government was adopted in 2017 to achieve this objective. It consisted three pillars: supporting investment and jobs (pillar 1), new market expansion (pillar 2) and innovation support (pillar 3). The first two pillars have been operationalized through the Financial Support of Investment Law (FSIL), adopted in 2018 (and amended in 2019), while the third pillar via the Midterm program of the Fund for Innovational and Technological Development (FITD), with an assessed (programmed) value of about 100 million euro, i.e. about 1% of GDP.

Nevertheless, while over time state aid to private entities kept increasing, key shortcomings remained. These continue to refer to the rules of state aid and the remaining room for discretion, which undermine its efficiency and transparency. While FSIL made a step forward in this area, it is still very hard to find neat information on who received the aid. The key concern stipulated in the EU Progress Report 2020 in this regard, refers to the fact that large share of firm-level state aid still supports firms' working capital, rather than enhancing their capabilities to compete through productivity improvements, or to increase domestic value added. The transparency of FITD in this regard is a level up, both in terms of the rules for the disbursement of the state aid, as well with regard to the tying of the disbursed funds with company's productive capacity more than with its working capital.

Nevertheless, the effects of state aid on efficiency and competition in North Macedonia have never been assessed nor properly understood by the key stakeholders let alone by the general public. While the public discourse has been frequently flooded with information on state aid, the prime interest has been the amounts spent and if there have been doubts for any misuse. Neither the government, nor the recipients, nor non-recipient competitors, nor the media, nor the civil society ever questioned the size of the distortive power onto market competition and of the (in)efficiency such large spending may have exerted. In other words, knowledge, evidence and awareness remain scarce in understanding if private recipients of the state aid operating in normal conditions of a market economy could have made the investment in question and achieved the same results.

The objective of this study is to produce robust quantitative evidence on the effects of state aid on private enterprises' efficiency and market competition, with an application on the governmental program for subsidizing companies in North Macedonia under the Plan for Economic Growth 2018-2021. To pursue this objective, we rely on a rigorous impact evaluation method, and more specifically on the difference-in-differences technique, to isolate the effect of the state aid on a range of efficiency and competition indicators. Namely, we observe the enterprises who obtained state aid versus a comparison group of similar enterprises who commenced an investment or committed to invest but who did not get a state aid. We source the latter from the pool of rejected applicants for the analyzed state aid programs. We analyze the two programs – for simplicity called FSIL State Aid and FITD State Aid – executed during or at the end of 2018, so that we are able to compare 2017 or 2018 (pre-support) and 2019 (post-support).

Results are as follows. The FSIL state aid proved largely ineffective. It did not exert almost any difference in sales, investment, wages or profits among recipients, compared to what has been observed among comparator non-recipients. However, it contributed to generating more jobs, whereby the cost for a job generated has been nearly 28 thousand EUR. On the other hand, the FITD state aid proved considerably effective. Due to the subsidy, recipients were able to increase their sales revenue, labor productivity and investment in technology of non-tangible form. However, no more jobs or higher wages were created in recipients. Overall,

the positive developments induced by the FITD state aid brought about a large increase in profits, far exceeding the profit growth in matching non-recipients, despite recipients were found under cash showers, which may suggest that excess profits were not entirely driven by the increasing revenue, investment and productivity, but also by the extra generated cash in the company due to the state aid.

The study is first of the kind in North Macedonia. As such, it brings a couple of novelties at various levels. At the academic level, it enriches the literature with evaluation of state aid programs in a developing country. At the practical level, the study is the first in the country to rigorously evaluate any state aid program. At the policy level, the study has the potential to change the discourse of considering state aid programs by policymakers in the future. At the level of public consideration, the study likewise has the potential to change the discourse of the public debate from subjective and concentrated on amounts to data-driven and evidence-based, hence focused on state aid efficiency and competition implications.

The study is structured as follows. Section 2 offers a comprehensive literature review. Section 3 describes the Plan for Economic Growth 2018-2021, in order to display the features of the two state aid programs subject to evaluation: FSIL State Aid and FITD State Aid. Section 4 portrays a detail overview of the applied impact evaluation technique. Section 5 presents the results and offers a discussion. Section 6 concludes and offers a policy inference.

2. LITERATURE OVERVIEW

The empirical literature on the effectiveness of state aid for business is rarely comprehensive; studies mostly evaluate certain schemes and/or types of aid (regional, horizontal, etc.). According to Ginevičius et al. (2008), state aid may be granted for achieving more than one objective and it is difficult to integrate all the possible effects into one indicator. Broadly, the effects of state aid can be aggregated into: direct effects on beneficiaries, indirect effects towards the objective and effects on competition and trade[5] (DG Competition, 2013). In the literature review, we will focus on the first - the direct effects, as state aid aims to achieve an objective(s) by first changing the behavior of beneficiaries, which then may or may not change the behavior of competitors and produce positive or negative indirect effects and effects on competition and trade (DG Competition, 2009). Furthermore, indirect effects are related with effects on competition and trade, for instance a spillover of increase of investments in competitors is considered a positive indirect effect of an investment subsidy, and a decrease could be considered both a negative indirect effect and a distortion of competition (DG Competition, 2013). We only briefly touch the empirical literature for distortion of competition, since it is relatively new and scarce (Buts and Jegers, 2013) and significantly heterogeneous.

This review aims to analyze the direct effects of state aid schemes in the form of subsidies, evaluated through an ex-post analysis. There are separate areas in the literature focusing on tax relief, loans, interest rate subsidies and other

[5]Illustration of the effects and result indicators (non-exhaustive) can be found at p.32 (by type of aid) and p. 35 (by grouping of effects) at the following link

forms of state aid, which we do not refer to in detail. We also note that there is a possibility that not all schemes included represent a state aid as interpreted by the EU acquis[6].

The literature review is organized as follows. First, we present the incentive effect, as a starting point of almost every analysis that evaluates the impact of state aid. Then, we analyze the direct effects of state aid in the manufacturing sector; we only briefly touch on the service sector, because to our knowledge, there is not much research done in this area. Next, we turn to the characteristics of the beneficiaries and the awarded aid as factors for effectiveness, and we also touch on the measurement of cost-effectiveness and the possible distortions of competition. Lastly, we conclude.

2.1. THE INCENTIVE EFFECT

The incentive effect is the channel through which state aid aims to achieve a certain objective(s), which is addressing a certain market failure or another objective of common interest (DG Competition, 2009). State aid has to induce the beneficiary to change its behavior i.e. undertake an activity (investment, R&D project etc.) that it would not have done without the aid or would do in a less desirable manner (DG Competition, 2009). Furthermore, the behavior has to lead to the achievement of the objective of the aid (DG Competition, 2009) and not merely induce beneficiaries to undertake riskier projects that are less beneficial to society (Nicolaides, 2009).

The incentive effect also shows the necessity of state aid. For example, if a beneficiary of an investment subsidy realizes an investment, but would do this even in the absence of the aid, state aid is unnecessary. In this situation, although the effect exists, it cannot be prescribed to the state aid (Nicolaides, 2009). Moreover, "it can readily be assumed that the aid is distortive in the sense that it provides the beneficiaries in question with windfall gains." (DG Competition, 2013, p. 9).

[6]Article 107 from the Treaty on the Functioning of the European Union (TFEU).

Nicolaides (2008) established that there is an incentive effect in the following cases: 1) when the beneficiary undertakes an additional investment or project; 2) when the undertaken project is of high risk; 3) when the undertaken project takes a long time to be completed; 4) when the undertaken project is not profitable. There is clearly a lack of motivation for the beneficiary to undertake the project/ investment in question because it expects that the potential losses are higher than the potential gains. When this is the case and the benefits for society are higher than the costs, the authority can use state aid to incentivize the beneficiary.

The simplest way of checking the presence of an incentive effect ex-ante is by using the standard level of assessment - if the beneficiary applies for aid after starting the investment, there is no incentive effect (Nicolaides, 2009). In another study, Nicolaides (2008) argues that even in this situation, there can still be an incentive effect, e.g. in the case of rescue and restructuring aid when the investment is urgent and the beneficiary cannot wait. He also argues that in some instances, the company may not need state support in the initial phase of the investment, but may need it in the following phases due to incurred costs that the company had not predicted. Therefore, timing should be taken into consideration when trying to justify the granting of aid (Nicolaides, 2009).

A rigorous ex-ante assessment of the presence of incentive effect is by showing the project is unprofitable or too risky, which is mostly applied for large companies and large amounts of aid. This level of assessment also includes the balancing test (Nicolaides, 2009) which not only assesses the incentive effect, but also the appropriateness of the instrument, the proportionality of the aid i.e. if the same impact can be achieved with less aid, as well as balancing the positive and negative effects - distortion of competition and effect on trade (DG Competition, 2009). The incentive effect can also be estimated by simply asking the beneficiaries what would they do without the aid, but DG Competition (2013) recommends this only as an additional tool because beneficiaries could be subjective or provide false answers.

The absence of the incentive effect, according to DG Competition (2013), can be considered as a failure to achieve the objective of aid, unless there are significant and positive indirect effects. However, the latter is unlikely and has to be backed up by an economic theory and strong arguments. Measuring the indirect effects

usually requires different tools than those used for the direct effects which should be tailor-made to the expected indirect effects, and it is not always possible to distinguish between the direct and indirect effects. Either way, more robust evaluation can be made for the direct i.e. the incentive effect and this effect should be evaluated first, as it can serve a guide for the possible indirect effects and effects on competition and trade (DG Competition, 2013). Furthermore, if no positive effects are found, there is no need to assess the distortion of competition and trade – the aid as such should be considered incompatible (DG Competition, 2009).

2.2. DIRECT EFFECTS OF STATE AID ON BENEFICIARIES IN THE MANUFACTURING SECTOR

State aid can affect multiple aspects of business, such as: investment, production, employment, innovation, productivity etc. While these are all interrelated, investment can be used as a starting point of analysis since it is a direct target when granting regional, R&D and other types of state aid.

It is common practice that public support covers a percentage of the investment costs, while the rest is covered by private funds. Mouqué (2012) reviewed several studies and concluded that some companies reduced their private investment by substituting part of it with the received subsidy, leading to a decrease in total investment. Conversely, other companies were motivated to add additional private funds on what they had previously planned - also known as the leverage effect - which led to an increase in total investment. The author found the highest leverage in a study analyzing an innovation scheme during the financial crisis in the period 2008-2010 (Czarnitzki et al. 2007).

Cassidy and Strobl (2004) and Criscuolo et al. (2019) find that investment subsidies for the manufacturing sector are effective in creating employment. Criscuolo et al. (2019), who evaluate a place-based policy, go further and prove that this increase in employment is related to an actual decrease in local unemployment, rather than 'stealing employees' from other firms or nearby areas. In contrast, Einiö and Overman (2020) find that a place-based policy in the UK caused a transfer of employees from one deprived area to another, although the program was targeting local non-tradable companies. This means that even if state aid

increases employment in beneficiary companies, policymakers and relevant authorities should be careful that this is not merely a result of a decrease of employment in other firms or areas, also known as the displacement effect.

Mixed effects are found when it comes to innovation. González et al. (2005), Czarnitzki et al. (2007) and Görg and Strobl (2007) all find positive effects in terms of increasing R&D or preventing the cease of such activities, however in the study by Görg and Strobl (2007) this only applies to domestic companies that receive small grants, while there is no effect on foreign companies. González et al. (2005) add that most subsidies go to companies that would have undertaken an R&D project anyway, and a lack of the incentive effect is also found by De Blasio et al. (2015). The similar conclusion is also made by Wallsten (2000), who confirms the hypothesis that firms with higher R&D activity receive more subsidies rather than the other way around.

Even if production and employment increase, productivity may not, as is the case in Bondonio and Martini (2012) and Criscuolo et al. (2019). Bondoni and Martini (2012) evaluate two programs - a national investment grant scheme in Italy known as 'Law 488' and a set of support programs for SMEs in Piemonte. They find a lack of effect on productivity in 'Law 488', while the SME-Piemonte support programs show a modest increase for loans and interest rate subsidies, but not grants. Either way, neither Bondonio and Martini (2012) nor Criscuolo et al. (2019) find a decrease in productivity. Bergström (1998) finds that productivity growth (measured in terms of value-added rather than output) increases in the first year, but then takes a negative turn. While the author is explicit that the decrease may not be a direct result of the subsidies, the possible reasons could be that after receiving aid, managers lose interest in making their companies more efficient, or that the government grants aid to less productive companies to begin with, e.g. when they try to enhance their political power.

An increase in productivity is found by the Centre for Economic and Business Research (2010) and by Van Cayseele et al. (2014). The first study relates this to a support program combining grants and networking in the field of R&D, whereas the second shows an increase in productivity in financially constrained companies.

2.3. CHARACTERISTICS OF BENEFICIARIES AS A FACTOR FOR EFFECTIVENESS

There is a consensus that state aid is more effective when granted to smaller firms. This has been proven by the Centre for Economic and Business Research (2010), Bondonio and Martini (2012), Van Cayseele et al. (2014), Criscuolo et al. (2019) and many others. According to Criscuolo et al. (2019), large firms can more easily 'game the system', meaning that when they receive a grant, they can increase employment artificially by simply moving employees from one plant to another. Another reason is that large firms are less financially constrained, i.e. they have higher accumulation of private funds and easier access to capital markets. However, financial constraint does not have to be related to size - companies can be financially constrained for other reasons, e.g. laggard firms, young firms and firms in difficulties during a financial or economic crisis (Czarnitzki et al. 2007; Van Cayseele et al. 2014; Criscuolo et al. 2019). Such financially-constrained firms that are less competitive or at risk of being bankrupt, are also more motivated to succeed and use state aid to actually invest and innovate (Van Cayseele et al. 2014).

Although state aid is evidently more effective for smaller firms, Mouqué (2012) mentions that granting to large firms could be justified because of potential wider benefits, but does not find strong evidence for this. Furthermore, if there is no incentive effect for large firms, "how can one argue that change has been produced elsewhere?" (Mouqué, 2012, p. 11). Nonetheless, even if state aid does not have an impact on larger firms, Criscuolo et al. (2019) warn that limiting state aid to small firms could only discourage them from growing due to the retraction of the right to such subsidies.

In addition to size, there is also some evidence that effectiveness can vary depending on the activity for which it is granted. By using multiple criteria methods, Ginevičius et al. (2008) find that state aid is most effective when granted for production, R&D and education projects, whereas the effect of state aid on businesses in the service sector is much smaller. However, when it comes to the service sector, further investigation is needed in order to make a robust conclusion.

2.4. CHOICE OF POLICY INSTRUMENT AS A FACTOR FOR EFFECTIVENESS

When granting state aid, authorities have to decide about the size, intensity, form and other characteristics of the aid. All of these can influence the beneficiary to a different extent. They can also be assessed from the perspective of cost-effectiveness, which we will only briefly touch on because of its complexity (Spector, 2009) and difficulty in robust measurement (Pokorski, ed., 2011).

For instance, if the size of the aid is too small, it may not have a significant impact, and if it is too big i.e. more than necessary, it poses a degree of deadweight, i.e. a simple transfer of funds from the taxpayer to the beneficiary (Mouqué, 2012). This is the case when subsidies are not fully utilized for an investment, as previously discussed. According to the review by Mouqué (2012), more often than not, state aid is too big and large amounts of aid do not show higher impact than smaller amounts. The same was found by Czarnitzki et al. (2007), who prove that smaller and larger grants have almost the same innovation effects on firms. However, Görg and Strobl (2007) show that larger grants are actually less effective than smaller grants. We can conclude that a higher amount of aid does not equal a higher effect.

Based on the results of a firm that received subsidies multiple times, Czarnitzki et al. (2007) show frequency of aid as more important than size, which is why they advise authorities to repeat granting smaller subsidies instead of increasing the size of aid in order to achieve better results. Authorities can also increase the impact by increasing the intensity of aid (Ginevičius et al. 2008), but they should be careful that this does not significantly increase the distortion of competition.

The form of aid also plays a role. The review by Mouqué (2012) suggests that non-financial aid (networking, advice etc.) can be very effective, especially when combined with financial aid. The author also suggests that loans can be more effective than grants, which is also confirmed by Biagi et al. (2015). However, further research has to be made in order to compare the effectiveness of multiple aid instruments. In addition, authorities should also take into consideration the cost of various instruments and the different impact on distortion of competition they may exhibit, which applies for the other characteristics as well.

2.5. COST-EFFECTIVENESS OF STATE AID

The costs of state aid include, but are not necessarily limited to, costs incurred by the public administration and costs incurred by beneficiaries (Krupnik, 2008, cited in Pokorski, ed., 2011). Krupnik (2008) relates the first to collecting funds through taxes, costs for running the program and opportunity costs, while the latter is related to costs for applying, costs for documentation and reporting, and opportunity costs. Spector (2009) adds the deadweight cost of taxation, as well as the indirect cost of rent-seeking replacing the efficient allocation of resources by companies – this refers to companies in general, not just the beneficiaries and competitors. In his words, "every time an aid is granted, this confirms agents' belief that they live in an economy in which aid may be granted in the future" (Spector, 2009, p.5).

The cost per job indicator can be used to measure the cost-effectiveness of a scheme. Bondonio and Martini (2012) measure the cost per job using the nominal value of the aid itself as a numerator and the actual increase in employment as the denominator and find different results according to the form and the amount of aid. For the SME-Piemonte program they find the highest cost per job for capital subsidies amounting to 63.957 euros, whereas the cost for interest rate subsidies was almost half – 29.594 euros, and for soft loans 21.190 euros. For the 'Law 488' program, the cost per job was the highest for the largest subsidies – 488.676 euros per job for subsidies above 500.000 euros. This is drastically higher than the smaller subsidies, which on average amounted to 116.586 euros per job. The cost per job according to the size of the company was almost the same for all sizes, with the exception of large companies for which they found no increase in employment.

Bondonio and Martini (2012) show that the cost per job can vary depending on the form and the amount of state aid. Capital subsidies were proven to be the costliest, and the cost increases significantly with the increase of the amount. If costs other than the nominal value of the aid are taken into account, the cost per job will be even higher. Nonetheless, according to Bondonio and Martini (2012), using the nominal value of the subsidy has more appeal for policymakers due to its simplicity.

2.6. DISTORTION OF COMPETITION

According to Nitsche and Heidhues (2006), distortion of competition can be defined in a narrow and a broad sense. In the former, it implies the effect on rivals' profits, while in the latter, it also includes the effect on social welfare. While rivals can be negatively affected both in the short and long term, the negative effect on welfare is more likely to occur in the long term, since consumers can benefit from short-term decrease in prices and increase in output from the beneficiary, even though competitors suffer. Nevertheless, "the effect-on-rivals can be a proxy for the negative impact on consumers in a dynamic sense. The greater the negative impact on rivals, the more likely that consumers will be negatively affected in the longer run." (Friederiszick et al. 2006, p. 35).

There are several types of distortion of competition, also known as theories of harm. Friederiszick et al. (2006) consider four main theories:

1) Increasing or sustaining the market power of companies – this could create barriers to entry and/or force existing competitors to exit the market, especially if the beneficiary has already a dominant market position;

2) Decreasing the long-term (dynamic) incentives to invest – if the beneficiary receives aid for investment or innovations, competitors may expect their profits to decrease in the future and therefore lower their own investments. The same goes for beneficiaries, in the case of a soft budget constraint[7];

3) Keeping inefficient companies or sectors alive – especially relevant when it comes to markets with overcapacity and outdated technology;

4) Affecting the location and trade – competition can be distorted between regions and between countries (effect on trade), both in the product market and in the input markets, potentially creating a subsidy race and inefficient allocation of resources.

[7] A soft budget constraint is basically too much lenience on the side of the government in terms of conditions and budget for granting. If beneficiaries expect to receive aid over and over again, they can become less motivated to increase their efficiency (Friederiszick et al. 2006).

Which distortion is expected to arise depends primarily on the expected behavior of the beneficiary, which can then cause change of behavior in competitors and affect welfare (DG Competition, 2009). Possible distortions are generally related to the type of expenses covered by the aid. Aid that covers fixed costs, such as investment aid and R&D&I aid, helps beneficiaries expand their productive or innovative capacity, which can result in increase of their market share, reduce competitors' dynamic incentives to invest, prevent market entry, etc. Aid that covers variable costs, known as operating aid, may result in a decrease of prices and increase in output, thereby resulting in higher profits and increased market share for the beneficiary at the expense of its competitors, as well as potentially disincentivize them from increasing their production capacity (DG Competition, 2009). While both investment and operating aid are expected to increase sales and profits for the beneficiary, the first is typically long-term and the latter is more immediate (Friederiszick et al. 2006).

Collie (2000) examines the effect of subsidies on social welfare in a symmetric Cournot oligopoly model where firms are located in different countries, and finds that subsidies have a negative effect on welfare. Building on that study and including a Bertrand oligopoly model, the author finds for both models that the effect on social welfare is negative when the products are close substitutes, but not when they are differentiated (Collie, 2002). Garcia and Neven (2005) evaluate the effect on rivals' profits from subsidies targeting marginal cost, entry and quality, for both domestic and foreign companies. They assess whether the market characteristics impact the degree of price distortions and derive the following conclusions: market concentration strongly affects distortion for both domestic and foreign companies, market segmentation increases distortion only for domestic companies, while the intensity of domestic rivalry has a different effect for the two groups of companies and for the different types of aid considered. In a quasi-perfect competition, Jegers and Buts (2011) also find differing effects depending on the market characteristics – market size and cost structure – as well as the amount of subsidy, whereas for a Bertrand-Nash duopoly they find that subsidies actually enhance competition. The recent study by Oxera (2017), where four cases of individual aids are analyzed, shows that aid characteristics are an important factor for the degree of distortion, namely, the latter increases

with the size of aid relative to the market size, the breadth of aid (scheme vs. individual) and its frequency, although conclusions are not definitive due to lack of data. The theoretical literature adds that distortion of competition can even be affected by the process of granting – generally, the more selective and the less transparent the process of granting, the more distortive the aid, since "there is a potential that aid measures may be designed to support specific firms, e.g. national champions" (Friederiszick et al. 2006, p. 46).

2.7. A SUMMARY TABLE

The review of the literature is summarized in Table A1 in the Annex, providing a comprehensive overview of the underlying studies, their methodologies, data and findings.

The review on direct effects of state aid in manufacturing shows that aid may or may not be effective. They can increase, decrease or cause no change in the targeted activity, such as investment, employment, productivity etc. This primarily depends on whether or not the beneficiary changes the behavior when granted state aid or simply takes the money and does what it would have done anyway, which is a deadweight loss and puts the beneficiary in a more favorable position in relation to its competitors. A general conclusion is that state aid has an incentive effect when it reduces the costs of an otherwise undesirable investment/project for the beneficiary.

The effectiveness varies depending on the characteristics of the beneficiaries. Aid to small and financially constrained firms was shown to be more effective, although it should not be disregarded that aid to large firms may have indirect effects and that limiting aid to small firms might disincentivize them from growing.

The characteristics of aid itself also affect the degree of impact. Higher amounts of aid are not necessarily more effective than lower amounts - frequency and intensity of aid were proven to be a stronger factor for effectiveness, however they can also be costlier and increase the threat of distortion of competition. The choice between various forms of aid should also be considered, as non-financial aid and loans can be more effective than a subsidy.

The cost of aid entails the amount of aid itself but also other costs incurred by the authorities and the beneficiary. One example measuring the cost per job taking into account only the amount of aid, shows that capital subsidies are more expensive than other types of instruments and that the cost-effectiveness gets worse with the increase of the amount of subsidy.

Conclusions are vague when it comes to the distortion of competition. Indeed, the type of distortion depends on the eligible costs, while its degree on the characteristics of the market, the beneficiary and the aid, all of which interact. The impact of the market structure and dynamics is what makes this analysis significantly different from the analysis of the positive effects. Moreover, in order to properly capture the distortion of competition, as well as the impact on welfare, long-term effects should be analyzed.

Overall, policymakers should adjust state aid case by case and should pay attention to the timing, types and motives of beneficiaries, as well as the choice of policy instrument and the potential impact on competition.

3. STATE AID PROGRAMS UNDER EVALUATION

3.1. STATE AID STEMMING FROM THE FINANCIAL SUPPORT TO INVESTMENT LAW – FSIL STATE AID

The Financial Support of Investments Law[8] (FSIL) of North Macedonia was adopted in May 2018 with the goal to promote investments, exports and the creation of well-paid jobs in the private sector[9]. It consists of 2 sets of measures packed in the 1st and the 2nd pillar of the government's Plan for Economic Growth 2018-2021 (PEG)[10]:

I. Measures supporting investments:

1. Support for new jobs;
2. Support for establishing and promoting the cooperation with suppliers from North Macedonia;
3. Support for establishing organizational forms for technological development and research;
4. Support for investment projects of significant economic interest;
5. Support for increasing capital investments and revenues; and
6. Support for purchasing assets of undertakings in difficulties.

II. Measures supporting export:

7. Support for increasing the competitiveness on the market; and
8. Support for entering new markets and for sales growth.[11]

[8]"Official Gazette of the Republic of North Macedonia" no. 83/2018, 98/2019 and 124/2019 – consolidated text

[9]Article 3, Article 4, item 11 and Article 9, paragraph 4, line 1; Ministry of Finance, 2019b, p. 69; Government of the Republic of North Macedonia, 2017, minute 12:04.

[10]Ministry of Economy, 2019.

[11]The pillars are presented on p. 4 from the Presentation of the Plan for Economic Growth: link

Companies can apply for multiple measures at once and combine measures from the two sets[12], which is why we continue to analyze the Law as a single state aid program which we denote "FSIL State aid".

FSIL applies to both foreign and domestic companies, as well as companies of all sizes. The selectivity is mostly visible in that support is available only to successful companies which have realized an initial productive investment (FSIL, Article 9, paragraph 1). Furthermore, companies with certain characteristics are excluded, such as: public companies, companies that use agriculture subsidies, companies that do licensed activity, etc.

There are several actors involved in the process of granting. The final decision is made by the Government, while authorities in charge of the procedure for granting are the Directorate for Technological Industrial Development Zones (DTIDZ) – for companies inside the TID zones, and the Agency for Foreign Investments and Export Promotion (AFIEP) – for companies outside the TID zones.

The process takes the following steps:

1. Companies submit applications to DTIDZ or AFIEP – they can apply anytime until the given deadline and there are no public calls.;

2. Applications are reviewed by an Evaluation Committee – after DTIDZ and AFIEP make an administrative check, they communicate applications to the Committee, whose members include representatives from government institutions. This Committee reviews which applications are eligible for signing of a contract according to the criteria in the Law and create a report, which they send back to DTIDZ and AFIEP;

3. DTIDZ and AFIEP create draft contracts and send them to the Government;

4. The Government takes the final step for signing of contracts and authorizes its representatives to sign them by 15th of October;

[12]With certain exceptions; the combinations allowed require that each measure covers different eligible costs, except for the combination of measure 5 and 7 which allows for covering the same eligible costs (Rulebook on the form and the content of the request for granting financial support and the necessary documentation, 2019, p. 7).

5. After the signing, companies submit request for payment to DTIDZ and AFIEP, together with accompanying documentation which serves a proof that conditions for payment have been fulfilled – this gets checked and sent to the Government;

6. Payment is made by the end of the same year.

If the sum of the requested support by companies exceeds the available budget, payment is made to all by proportionally reducing the amount, which means that the budget is not a reason for companies to get rejected at any stage of the process.

3.2. STATE AID THROUGH THE FUND FOR INNOVATION AND TECHNOLOGICAL DEVELOPMENT – FITD STATE AID

The Fund for Innovations and Technological Development (FITD) promotes innovations, technological and human capital development in micro, small and medium-sized enterprises (MSMEs), with the aim of increasing productivity, creation of highly-skilled jobs and competitiveness of the targeted enterprises[13]. It institutes the 3rd pillar from PEG. The legal basis for the implementation of the 3rd pillar is the Mid-term program for work of FITD for financial support of MSMEs for 2018-2020, which was adopted in February 2018. The Mid-term program also encompasses other measures implemented by the FITD (p. 2), but we focus only on those comprising the PEG's 3rd pillar. They include the following[14]:

1. Co-financed grants for fast-growing SMEs, so called "Gazelles"[15];
2. Co-financed grants for micro enterprises[16];
3. Co-financed grants for improvement of innovativeness;

[13]Mid-term program for work of the Fund for Innovations and Technological Development for financial support of micro, small and medium-sized enterprises for 2018-2020, 2018, pp. 9-13; Ministry of Finance, 2019b, p. 70

[14]Annual program for work of the Fund for Innovations and Technological Development for 2020, 2019, pp. 5-10

[15]For activities related to technological development and environmental protection.

[16]For activities related to business organization and management.

4. Co-financed grants for professional development and practice of newly-employed young people;

5. Creating an environment and a legal basis for the development of venture capital.

The criteria and procedure for granting regarding measures 1-4 are regulated with specific Rulebooks[17]. The 5th measure stands out because it does not directly refer to an instrument, but to steps that need to be taken so that the corresponding instrument can be designed and deployed. Its final goal is to provide enterprises with a venture capital via a Fund for equity and mezzanine investments (FEMI), officially established with a dedicated account in December 2017. FITD measures 1-4 are subject to our analysis and are jointly denoted "FITD State aid".[18]

Measures from the 3rd pillar only apply to MSMEs – with the exception of the 3rd measure which allows for large companies to apply as well. Funding is only available to successful companies while companies from certain sectors are excluded.

[17]In November 2019, a new instrument was introduced that integrated the 1st and the 2nd measure, named "Co-financed grants for technological development", which resulted in a new Rulebook that revokes the original two (Annual program for work of the Fund for Innovations and Technological Development for 2020, 2019, p. 5; Rulebook for the instrument for support – Co-financed grants for technological development, 2019, Article 1 and Article 37). These two Rulebooks are no longer available (Fund for Innovations and Technological Development, n.d.a; Fund for Innovations and Technological Development, 2018); some information such as criteria and eligible costs is available on pp. 9-10 from the Mid-term program and in the Public call announced on 28.04.2018 (link), but for the information that is not available, we refer to the new Rulebook. The criteria are almost the same, with a noticeable difference that the new instrument also allows for applications from private healthcare institutions (Rulebook for the instrument for support – Co-financed grants for technological development, 2019, Article 7, paragraph 1).

[18]The 5th measure is excluded from further analysis, for a couple of reasons. At the time of establishing of FEMI, the legal basis for its functioning was not yet created. According to the Annual program for work of the FITD for 2020, by the end of 2019 a document regulating the procedures and investment policies of the FEMI was created (p. 1 and p. 10), but we could not find this document at FITD's website, or any other document or legal act regarding FEMI. In addition, the data available shows that no payouts have been made from FEMI in 2018.

The process of application and granting is generally the same for all measures. First, FITD announces public calls containing information such as conditions and budget for granting. After enterprises submit their project proposals and other documents, selection goes through several phases:

1. Administrative check of the documentation, accompanied with checking for potential conflict of interests;
2. Grading and a preliminary selection by professionals;
3. Final selection by a Committee for approval of investments comprised of 5 international experts.

In the second and the third phase, the project proposals are graded on a scale from 0 to a 100 according to multiple criteria and projects that score 51 or above move on to the next phase. The third phase consists of two sub-phases. First, each member of the Committee grades the project proposals and then an indicative ranking list is created based on the averages of the grades by both the professionals and the members of the Committee. Second and final, the Committee holds a meeting where the members vote which projects are to be funded, taking into consideration the limitation imposed by the available budget[19].

3.3. THE EVALUATED PROGRAMS THROUGH THE PRISM OF THE STATE AID RULES

In the latest Progress report on North Macedonia, the European Commission states: "the scheme financed under the Financial Support of Investments Law is not in line with the EU State aid acquis and needs to be amended" (European Commission, 2020a, p. 70). In this section, we present the shortcomings we could identify. Given that neither the Law nor the related Rulebooks are explicit on the applicable decrees and provisions from the Law on State Aid Control ("Official Gazette of the Republic of Macedonia" no. 145/2010), we recognize them, as well as the relevant EU acts, by identifying the type of aid each of the measures represent.

[19]Regarding the new instrument "Co-financed grants for technological development", enterprises that have passed the first two phases, but have not received financial support, can apply again though a so-called shortened procedure i.e. skip the first two phases and move on directly to the final selection phase (Rulebook for the instrument for support – Co-financed grants for technological development, 2019, Article 12).

The most reliable source to provide information on the type of aid are the decisions adopted by the Commission for Protection of Competition (CPC) for approving of the granting of state aid[20]. Unfortunately, the decision which approves the granting of aid via the FSIL is not available on the CPC's website. Our analysis (Dimitrova, 2020) shows that most of the measures could be considered a regional aid, with some exceptions such as measure 3 which clearly represents R&D&I aid (falling in the broader category of horizontal aid, n.b.) and measure 8 which represents de minimis aid (pp. 27-28). However, there is an underlying issue regarding the incentive effect and what the aid is actually intended to be used for.

FSIL beneficiaries receive an aid for investment expenses incurred in the previous year. The ex-Vice President of the Government of the Republic of North Macedonia, responsible for economic affairs, coordination with the economic sectors and investments, made the following statement:

> "Within the framework of the Financial Support of Investments Law, companies with a main activity in manufacturing can receive 10% of the investments they realized during the past year." (Joveska, 2018)

By definition, there would be no incentive effect since companies already started the investment. Following the literature review, the aid could act as an incentive if, for example, a company starts an unprofitable investment in a given year with the expectation that the aid it would receive in the next year would increase the return of the investment. However, even if we assume that the company is certain it will receive a state aid – given that the criteria and the eligible expenses are transparent and that the available budget for funding is not an obstacle – it cannot be certain about how much aid it would actually receive because it cannot predict the number of applicants that will sign a contract and therefore whether the total amount of aid they all request would exceed the available budget. Nevertheless, this hypothesis could not be applied to companies that realized an investment in 2017 and received aid in 2018, because FSIL was adopted in May 2018, whereas PEG was adopted and publicly announced in late December 2017. This means that the effects from the investments realized in 2017 cannot be taken as effects from the aid granted in 2018. The question is then – what are the effects of the aid, or in other words, what do companies use the return on investments for?

[20]See, for instance, the decision available at the following link

According to unofficial information by the Ministry of Finance (2019b), companies can receive aid "based on investing the capital back in the business, in property or in human capital, in order to achieve development and better results" (p. 69). However, FSIL does not contain provisions that oblige companies to do so or to show proof thereof. The only proof companies have to submit to receive aid is that they have incurred the eligible investment costs in the previous year[21]. Furthermore, the only future obligation from FSIL to companies is that they have to keep the investment (probably referring to the production capacity) or the number of employees for a certain period of time after the investment project has been completed or after the last payment has been made. This leaves room for companies to use the aid by their own discretion, either for productive goals such as new investments, employment, know-how etc., or unproductive goals such as keeping the aid as accumulated gain, giving out higher dividends to equity holders, covering variable costs (wages and working capital) which could distort competition[22], etc. If, for example, companies face unexpected costs during the realization of the already initiated investment that would affect their decision on whether or not they should carry through, the aid could serve as an incentive for beneficiaries to continue the investment project at the same level versus rejected applicants that would decrease or delay theirs due to the absence of aid, assuming they were not rejected due to not having realized an investment. Either way, even if the aid does incentivize companies in a positive direction, FSIL does not require or oblige companies to satisfy this afterwards, which represents a significant legal shortcoming and lowers authorities' control.

[21] Rulebook on the form and the content of the request for payment of the financial support, the necessary documentation, the types of eligible investment costs and the manner of conducting the payment of the financial support, 2019, Article 13, paragraph 2 and Article 14, paragraph 3

[22] Unlike covering variable costs, giving out higher dividends to equity holders is not considered distortive to competition, but nevertheless harmful since it represents a deadweight loss (Buelens et al. 2007).

Another FSIL shortcoming is the lack of public transparency – neither of the institutions involved in the process of granting publishes data on the beneficiaries and the individual amounts of aid granted on its website[23]. According to the European Commission:

> "Given that State aid within the meaning of Article 107(1) of the Treaty is, in principle, prohibited, it is important for all parties to be able to check whether an aid is granted in compliance with the applicable rules. Transparency of State aid is, therefore, essential for the correct application of Treaty rules and leads to better compliance, greater accountability, peer review and ultimately more effective public spending." (Commission Regulation (EU) No 651/2014, 2014, recital(27))

The lack of public transparency and the requirement for the presence of the incentive effect is most probably due to the shortcomings in the Macedonian state aid legislation itself. More specifically, the decrees relevant to FSIL do not contain provisions on this – the Decree on regional aid[24] lacks provisions on both the incentive effect and public transparency, whereas the Decree on horizontal aid[25] only has provisions on the incentive effect (Article 14). The Decree on de minimis aid[26] is an exception because it does not contain such provisions, but neither does the corresponding EU Regulation, given that de minimis aid is not subject to standard state aid control due to the low amount of aid (Commission Regulation (EU) No 1407/2013, 2013, recital(1)(3)). Anyhow, the EU legislation and

[23]The data is available on the web portal "Open Finance" (https://open.finance.gov.mk/mk/home) created by the Ministry of Finance, which provides information about payments made from the state budget, by using the search criteria "Government of North Macedonia" as the name of the grantor and "D9" as the program (Ministry of Finance, 2019a, p. 18). However, this is merely by chance since the D9 government program includes all expenses for the Law and excludes everything else, which does not have to be the case for sources of funding for other aid schemes. In addition, this web portal does not include other information such as the aid instrument, the objective of the aid, the type of the beneficiary etc. which are required by the European Commission (Commission Regulation (EU) No 651/2014, 2014, Article 9, paragraph 1(c) and Annex III), but this is simply because the web portal was not built specifically for this purpose (Ministry of Finance, n.d.).

[24] "Official Gazette of the Republic of Macedonia" no. 109/2013, p. 2

[25]"Official Gazette of the Republic of Macedonia" no. 3/2014, p. 2

[26]"Official Gazette of the Republic of Macedonia" no. 141/2011, p. 2

guidelines corresponding to the other two decrees do contain such provisions, as presented in Table 1.

Table 1: Provisions on the incentive effect and public transparency in the EU State aid legislation and guidelines relevant to FSIL

#	Document/act	Incentive effect provisions	Transparency provisions[27]
1)	Guidelines on regional State aid for 2014-2020 (Official Journal C209, 23 July, pp. 1-45)	paragraph 26(d), paragraphs 60-63	paragraph 26(g), paragraph 141
2)	Communication from the Commission — Framework for State aid for research and development and innovation (Official Journal C198, 27 June, pp. 1-29)	paragraph 36(d), paragraphs 62-71	paragraph 36(g), paragraph 119
3)	Commission Regulation (EU) No 651/2014 (Official Journal L187, 26 June, pp. 1-78)	Article 6	Article 9

Source: EUR-Lex

Furthermore, the incentive effect and the transparency, as presented in the above provisions, are necessary conditions to be fulfilled (among others) in order for the state aid to be found compatible. Regarding the incentive effect, the basic condition to be fulfilled so that it is considered present is that companies should apply for aid before the investment/project starts[28].

[27]The provisions in 2) and 3) require the beneficiaries and the individual aid amounts granted to each to be made known only for amounts exceeding 500.000 euros (please note that even though the latter includes both regional and R&D&I aid, its aim as a Regulation is to identify which aid measures should be exempted from notification (recital(6)), rather than provide applicable rules to the types of aid in general). The provisions in 1) do not provide a threshold.

[28]1) paragraph 64 and 65; 2) paragraph 63; 3) art. 6(2). Other additional criteria apply as well.

The lack of these provisions in the Decrees point to the recommendation provided by the European Commission:

> "The State Aid Law and implementing legislation on certain forms of aid and for specific sectors, including the regulation for granting aid of minor importance (de minimis), need to be further aligned with the EU acquis." (European Commission, 2020a, p. 69)

However, it should be noted that the EU acts presented in the table are subject to revision and might be amended[29], which should be taken into consideration when amending the decrees.

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Contrary to the FSIL state aid, FITD state aid could be analyzed through the decree and type of aid referenced in each of the Rulebooks. FITD measure no. 3 constitutes horizontal aid, or more specifically aid for R&D projects, while measures no. 1, 2 and 4 represent de minimis aid, since the maximum allowed amount of aid per beneficiary does not exceed 200.000 euros for a period of 3 years. According to the European Commission, the de minimis aid is considered to be so low that it does not distort competition and trade (Commission Regulation (EU) No 1407/2013, 2013, recital(3); Commission notice on the de minimis rule for state aid, 1996, paragraph 1). However, in the Progress report on North Macedonia for 2014, the European Commission stated that "the de minimis threshold of €200.000 is too high and disproportional to the country's market and presents a risk for competition distortion" (European Commission, 2014, p. 32), which is why we do not exclude these measures from our analysis.

The measures from the PEG's 3rd pillar are aligned with the Macedonian state aid legislation, whereas regarding the alignment with the EU acquis, we only analyze the presence of the incentive effect and public transparency, as we did in the case of FSIL State aid. Regarding the incentive effect, this requirement is satisfied according to the standard level of ex-ante assessment, given that enterprises

[29] For the purpose of having sufficient time to complete the revision, the acts that were originally valid until 2020 have been prolonged: act 1) has been prolonged to be valid until the end of 2021 and act 3) has been prolonged to be valid until the end of 2023. Act 2) has no expiry date, but is also included in the revision. For more details, please refer to the following: Press release, Fitness check , Timeline (PDF)

apply with project proposals rather than with an already realized project. However, this does not necessarily confirm that enterprises would not have conducted the project had they not received support; in other words, there is a possibility that they would still carry out the project even in the absence of support, although the literature review suggests that this is unlikely when it comes to MSMEs.

The potential misuse of aid is also controlled for with the requirements imposed on beneficiaries during the procedure for granting. Namely, beneficiaries have to open a dedicated account, where they receive quarterly payments before they incur expenses for the quartile, but after proving that they spent the money as intended in the previous quartile – by submitting progress reports and allowing the FITD to make monitoring field visits. This significantly lowers the probability that the money is being misused – if it still does happen, FITD holds the right to suspend the funding or to end the contract and request a return of the granted support.

Regarding public transparency, FITD achieves this by posting information on its website about the beneficiaries and the aid they received for the corresponding public call[30]. The only minor shortcoming is that this information is not integrated into a single database, which would allow for easier search of granted support per beneficiary, which could be relevant since they are allowed to apply for multiple instruments by FITD. Having said that, FITD has announced in its Annual program for 2020 that it does intend to build an online database (p. 27).

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The analysis shows that FITD is in compliance with the state aid rules, whereas FSIL reveals significant shortcomings, namely the absence of the requirement for the incentive effect and the lack of public transparency. Furthermore, there is space for beneficiaries of FSIL to misuse the aid, because there are no requirements or obligations that condition them to use the aid for the intended purpose. This, on one hand brings into question the effectiveness of the public spending, and on the other hand, the potential harm on competitors that can arise from beneficiaries' behavior.

[30] Although this is not a requirement for amounts above 500.000 EUR (Communication from the Commission — Framework for State aid for research and development and innovation, paragraph 119).

4. IMPACT EVALUATION DESIGN

For the purpose of this study, we apply a quasi-experimental design of the impact evaluation. Quasi-experimental research designs, like experimental designs (also known as randomized control trials, RCT), test causal hypotheses: in our case, the causal hypothesis is whether allocation of FSIL/FITD State aid to enterprises produces plausible outcomes like higher revenues, employment, productivity etc. Hence, an outcome is observed for a treated group by a policy intervention against a comparison (control) group. The key differentiating feature of a quasi-experimental design is the absence of randomization (Gribbons and Herman, 1997). Namely, assignment could be either through self-selection (participants apply for a program themselves) or an administrator selects them (e.g., when a teacher selects best pupils for competitions outside the school) or both. Quasi-experimental designs identify a comparison group that is as similar as possible to the treatment group in terms of baseline characteristics. The comparison group captures what would have been the outcomes had the program/policy not been implemented (the so-called counterfactual). Hence, the program or policy can be said to have caused any difference in outcomes between the treatment and comparison groups. In this section, we explain the logic of the intervention, the outcome indicators, the definition of our comparison groups and the estimator.

4.1. LOGIC OF INTERVENTION AND OUTCOME INDICATORS

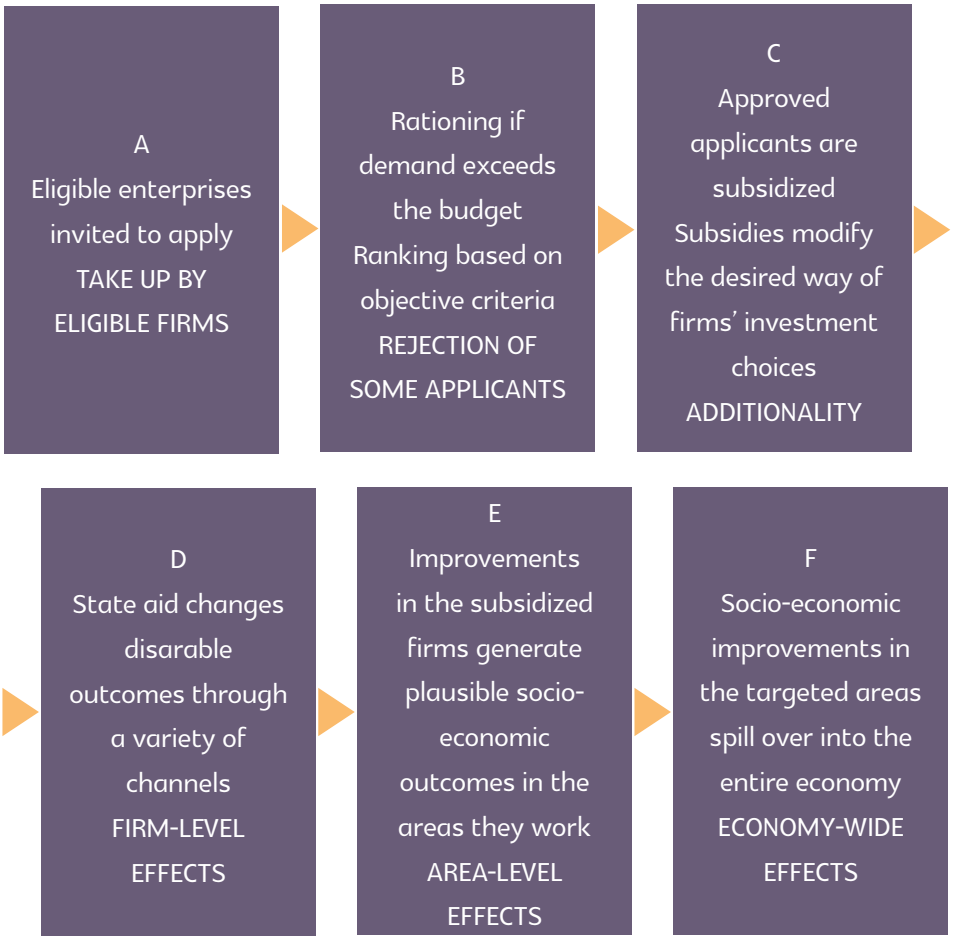
Since our objective is to evaluate private enterprise support (state aid) programs, we devise the following logic model (Figure 1). First, the program is announced and all enterprises who are eligible are invited to apply (block A). For our FSIL State aid, eligibility means that companies have entered into productive investment the year before, experienced sales growth and did not reduce their employees

number for more than 5% on annual basis. For the FITD State aid, eligibility means that companies commit to making an investment (according to their project proposal they submitted for funding) should they receive the state aid[31]. However, even if the programs are managed so that all funds are allocated to applicant enterprises, the actual impact of the program may still be nil. Namely, measuring outcomes solely based on block A on Figure 1 may mean that what we observe is not an outcome of the program (state aid) but rather results which the enterprise would have achieved even without the program. Unfortunately, most official monitoring and evaluation reports focus solely on outcomes A.

Second, the grantor may be applying some form of selection, the so-called rationing (block B on Figure 1). Rationing usually takes the form of evaluation based on objective criteria, so that those projects who are evaluated above certain threshold are awarded the state aid and vice versa. Usually, rationing is important for evaluation, since the pull of the rejected applications leads to a more credible inference about the impact of a state aid than generic non-applicants (Bondonio and Martini, 2012). The FSIL State aid does not apply rationing in this sense, as all eligible applicants are awarded a state aid. In case the demand exceeds the budget, then a linear reduction of the budget is applied to all applicants. However, applicants are rejected in case they fail to satisfy some of the additional criteria related to employees' growth, not having obtained any agricultural subsidy, not working in a licensed domain etc. The FITD State aid, on the other hand, applies evaluation by domestic professionals on a 0-100 scale in the first step (a threshold of 51 is applied). In the second step, foreign experts review the evaluations of the first step and vote with the power to alter the decision of the first step on objective grounds.

[31] After the program was deployed, it became an explicit requirement that companies should prove they were capable in making the investment even if funds were not awarded.

Figure 1: Intervention logic



Source: Charted by the authors based on Bondonio and Martini (2012).

Regardless of the existence and the form of rationing, finally a number of companies receives the state aid (block C in Figure 1). The question is if the state aid could modify the behavior of the aided enterprises, or simply the enterprises who had already invested (or have been at the verge of making the investment) ended up in intercepting the program and applied. This is particularly important for the FSIL State aid: the condition stipulates that the applicant has started and committed to the investment. Therefore, the risk that the state aid is granted to something that would have produced the same outcomes even without it increases, despite this is something to be tested through this impact evaluation. In the literature, this is called the 'no incentive' effect (see Section 2.1).

Namely, our null hypothesis is that the state aid produces plausible outcomes for the subsidized enterprise (block D on Figure 1), on a couple of fronts, which correlate to what the FSIL State aid and FITD State aid programs are designed for:

1. Increased revenues (sales revenues),
2. Increased investment in machinery and equipment (tangible assets),
3. Increased investment in technology (non-tangible assets),
4. Higher wages (payroll costs),
5. Higher employment (number of employees),
6. Increased gross profits,
7. Increased net profits,
8. Increased labor productivity (sales revenue over number of employees, which may signify that workers became more productive due to the investment, being a reflection of the increase of the overall efficiency – hence correlating with the total factor productivity; or that the company advance technologically so that more sales is generated with the same number of workers).

However, due to the risk stipulated under block C, we have a reason for concern– as the FSIL awards a state aid for an investment already commenced (see an extended discussion in section 3.3) – rather than providing further support to the investment, it may actually generate a deadweight loss for the society, which we expect to appear in generating extra cash in the company – also known as the windfall effect, hence we also use the following indicators as outcomes:

9. Working capital (current) ratio (current assets over current liabilities),
10. Cash ratio (cash over current liabilities),

on top of the profit-related indicators already captured within the first group.

Finally, as we revealed in Section 2, the state aid may affect competition in the branch or wider. Namely, state aid may create unfair advantage over the competitors, which in the long run impairs consumers' choices and the prices they pay for the goods. We need to note that this aspect may be problematic from both conceptual and technical point of view. Conceptually, North Macedonia is a small market and a part of the subsidized companies are exporters who could hardly

change competition forces at the global level. Still, the state aid may provide some wind in the back of these companies, but this would be barely detrimental for global consumers. For those selling on the domestic market, such argumentation against state aid may be more valid. Technically, given we work at the firm level, we would not be able to capture competition at the branch level. However, we conduct a loose alternative design. Namely, we pursue a survey to all treated and comparison companies, whereby we ask them to assess the competitive pressure in the two years of observation (discussed in Section 4.3), on a scale from 1 (very low) to 10 (very high) and through the technique we use here, we attribute any difference between the treated and comparison group to the state aid. In addition, we use the share of sales revenue in branch total sales to capture any changes in market share. Therefore, we have on disposal the following two indicators:

11. Market share (% of firm's sales revenues in total branch sales revenues, at three-digit NACE Rev.2),
12. Competition perception (1-10 scale, own-collected survey).

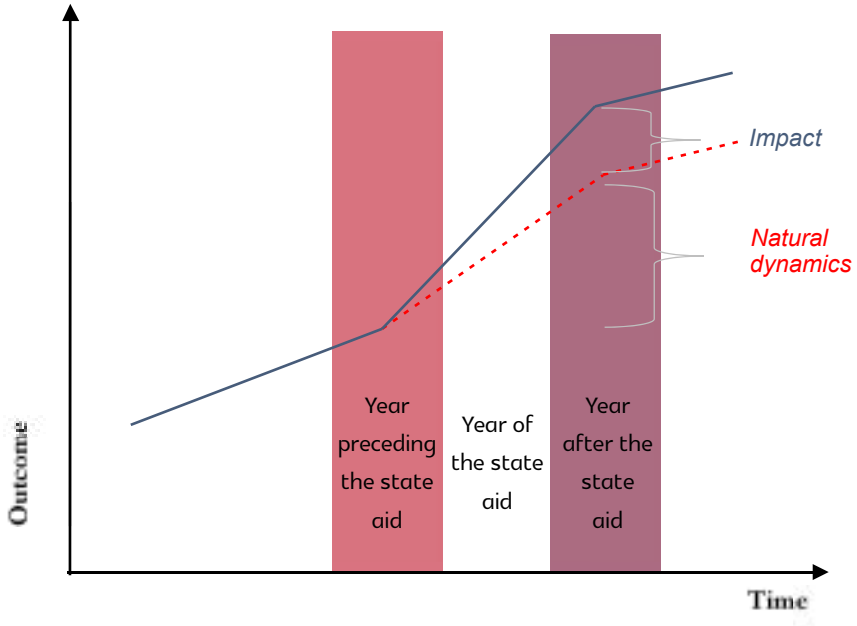
State aid may produce area- and economy-wide effects (so-called, indirect effects) as stipulated in blocks E and F of Figure 1, but they are beyond the scope of this study.

4.2. CAUSALITY, COUNTERFACTUAL AND ESTIMATION METHOD

Inferring about which state aid program worked and which did not is not a mere question of collecting the data in Section 4.1. and observing differences, but involves dealing with causality and counterfactuals. To identify the causal effect of the state aid program, we need to compare the observed changes in the supported companies with the changes that "most plausibly" would have occurred over the same period of time, for the same firm, had it not received the state aid. However, it is not possible to observe the same company over the same period of time in both 'receiving' and 'non-receiving' condition. This hypothetical situation is called the 'counterfactual' and is not observable. The counterfactual change must be inferred from reconstructing the treatment group as succinctly as possible from other enterprises who, despite not receiving any subsidy, are similar enough to represent what would have happened to subsidized firms have they not received the state aid.

The ideal situation is presented on Figure 2. The outcome indicator is presented on the y-axis and we observe it along time represented on the x-axis. Let us assume that we are observing only the companies who invested (or started an investment) in 2017 (the pre-state aid year), being all eligible on this criterion. Some of them did not apply or were rejected on other criteria. However, all of them seized the fruits of the investment, since the outcome notes acceleration in the year of the state aid (denoted "natural dynamics" on Figure 2). Hence, such acceleration is not because of the state aid, but because of the investment. Due to the state aid itself, the outcome accelerated more in the recipients than compared to non-recipients (denoted "impact" on Figure 2).

Figure 2: Intervention effect – treated and comparison group are identical

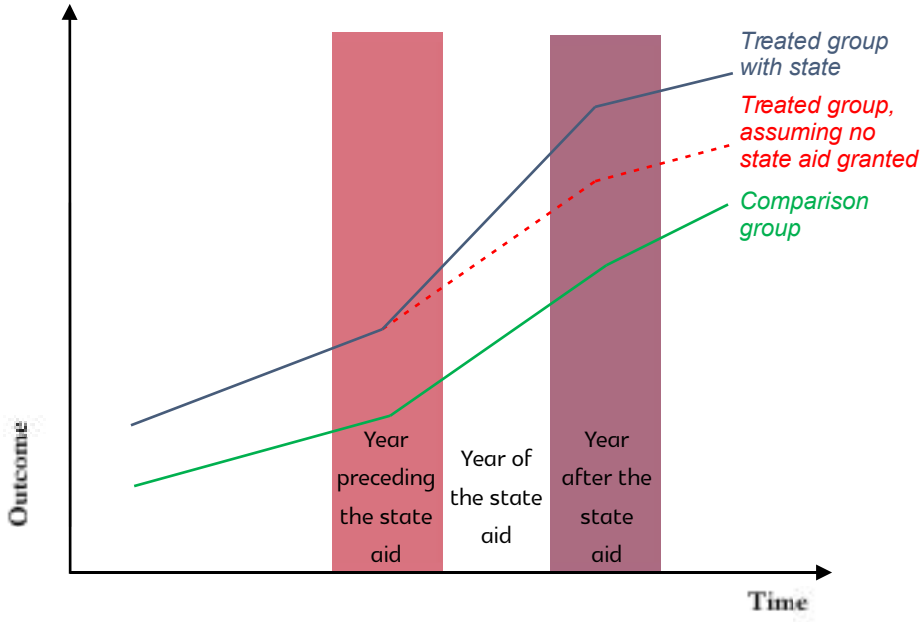


Source: Drafted by the authors.

Even if the comparison group is assumed to have followed a different path of its outcome indicator before the intervention (Figure 3), we need to assume that the effect of the investment – the key criterion for getting the state aid, has been identical, as demonstrated by the parallel red and green lines on Figure 3. This is the parallelism assumption: without the subsidy, supported firms would have followed a trajectory parallel to that of non-supported firms. However, beyond its prima facie plausibility, nothing guaranteed such parallelism is true. Still, it is

more plausible to assume that the counterfactual trend would have been parallel to that observed among the non-supported firms, than assuming that the all change is due to the intervention.

Figure 3: Intervention effect – comparison group is distinct



Source: Drafted by the authors.

In Section 4.1, we elaborated no rationing is applied when selecting applicants for the FSIL State aid, while two-phase evaluation is conducted for the FITD State aid. Yet, in the FSIL case, we are left with rejected applicants who did not satisfy some of the additional criteria. There is another small group of applicants who were first accepted but then the contract for state aid was not executed (i.e. no disbursement of funds followed). We are short of information about why the latter happened and if these companies did not satisfy some specific criteria or they had been offered another more favorable funding opportunity and hence withdrew. In case the second happened, our evaluation will wrongly attribute the effect of another funding opportunity, which we clearly want to circumvent. To avoid further speculation on this, we focus on the first group: companies who invested but failed on some of the additional criteria and were hence rejected. Note that one company is not used because it went bankrupt in the meantime.

In the FITD case, we have all applicants on disposal, ranked on a scale 0-100, whereby 51 is used as a threshold. However, in the second phase, it could happen that a company is rejected even if it scored above 51. Moreover, to avoid the potential problem that companies who scored very high and those who scored very low are very different on unobservables, we retain for analysis the companies who scored between 20 and 80, i.e. funded companies who scored between 51 and 80, and rejected companies who scored between 20 and 50. To the group of rejected applicants, we add those who scored 51-80 but who were ultimately rejected in the second round. Moreover, we cannot treat 29 companies which were established in 2017 or later and these are dropped. Note that six companies are not used either because they appeared twice (once awarded, once rejected, for different projects) or because they went bankrupt.

Table 2 presents the construction of the treatment and comparison groups, as well the associated information in a visually compelling manner.

Table 2: Treatment and comparison groups for the two analyzed state aid programs

	FSIL state aid	FITD state aid
Type of method	Conditional difference-in-differences: comparison group selected through propensity score matching (exact and near neighbor matching)	
Treatment group	72	76
	Supported companies (all)	Supported companies who scored 51-80 in the first evaluation stage (except 16 who were established in or past 2017)
Control group	60	66
	Rejected applicants who failed on some of the additional criteria (but excludes applicants who were awarded but where subsequent disbursement did not occur)	Rejected applicants who scored 20-50 in the first evaluation stage and those who scored 51-80 but were rejected in the second evaluation stage (except 14 who were established in or past 2017)
Intuitive description of the method	Supported firms are matched with non-supported firms in identical sector (three-digit NACE Rev.2), size class (categorical ordering: micro, small, medium, large), location (distance from the capital), age (years in operation). An estimate of the impact is obtained by difference in differences.	
Differences between treated and non-treated firms controlled for by this method	- sector-specific economic trends; - size effects (large and small firms may face different types of market failures); - geographic areas (proxy for possible socio–economic -institutional-transportation and labor cost-differences that may affect outcomes); - aging effects (accumulation of know-how, past retained earnings etc.) - unobserved characteristics that may lead to the decision to apply for the subsidy; - remaining unobserved differences between treated and non-treated firms, as long as they do affect the outcomes in a constant-over-time manner	

Source: Drafted by the authors.

Our comparison group(s) has the advantage of approaching the parallelism assumption in that before the intervention these firms likewise commenced or committed to an investment, which makes easier to disentangle the effect of the investment from the effect of the state aid. This makes program participants as systematically close to the rejected applicants as possible, hence reducing the selection bias. A sporadic disadvantage is that some of the rejected applicants may have considered dropping after applying for the FSIL State aid because another funding opportunity appeared (for example, the IPARD program), however such a problem would be attenuated, first because it is likely that such dropouts, if exist, are mainly observed among recipients who ultimately did not get the disbursement; and second, since programs targeting same or similar activities in the country are few if at all existing.

In any case, the objective in the definition of the comparison group is that is it as close as possible to the treatment group. Our construct of the comparison groups detailed above may still not satisfy the parallelism assumption, because both treated and comparison groups may still be different. One approach to finally equalize (or practically further approximate as much as possible) our treatment and comparison groups is through propensity score matching (PSM). With PSM, firms from the comparison group are matched with the firms from the treated group on pre-intervention characteristics. Such characteristics are observable and in our case we use: firm's age, location represented through the distance from the capital, firm's size and industry (three-digit NACE Rev.2 code). Since we are using a comparison sample of rejected applicants for the two programs, we assume that they are equal on some unobservables, most notably on their desire to invest. Since comparison applicants are fewer than the treated one, the option to use them more than once under PSM is applied. Hence, the one-to-one matching with replacement is conducted in two variants: nearest neighbor and within a caliper of 0.5 standard deviations of the estimated propensity scores.

After matching, we apply a method to estimate the difference of the differences between the treated and the comparison groups and between the two years, through the use of the psmatch2 command in Stata. The method is called difference-in-differences or DID, while the resultant estimate is called the average treatment effect of the treated or ATT. The method is common in quasi-

experimental designs, i.e. when randomization was not possible. The approach removes biases in post-treatment comparisons between the treatment and comparison group that could be the result from permanent differences between those groups, as well as biases from comparisons over time in the treatment group that could be the result of trends due to other causes of the outcome.

4.3. DATA

As the FSIL State aid was disbursed on December 26-28, 2018, we consider two years: 2018 and 2019. Using 2018 as the year pre-state aid is suitable because it is the year after the investment commenced in 2017 as well the year before the aid was awarded. By so doing, we avoid the problem of identifying the effects of the investment rather than of the aid, since all applicants (approved and rejected) would have had effectuation of their 2017 investment in 2018.

As the FITD State aid started being distributed in the second half of 2018 (in quarterly instalments), we likewise consider two years: 2017 and 2019. 2017 is used as the pre-state aid year, just to assure that any effects of the distributed grants in mid-2018 started effectuating by the end of the year. While, taking 2019 as the post-state aid year for both programs is a natural choice as presently this is the last available year to evaluate. From that viewpoint, one should consider that we are measuring the short-run effects of the state aid.

Data were sourced from various institutions. Final lists with the FSIL applicants (approved and rejected) were obtained from the Agency for Foreign Investment and Export Promotion, under the right to obtain information from government institutions for the public interest. Initially, these lists only contained the short names of the companies and the date of granting/applying for aid, which made it difficult to identify them when searching for demographic data. Through online research, we found a list of all the companies that signed a contract for FSIL in 2018, with the full names – derived from the minutes of the 82nd Government session held on 31.07.2018[32]. This, on one hand, enabled us to correctly identify the approved applicants, and on the other hand, provided us with the restricted group of rejected applicants that signed a contract but were not disbursed aid later.

[32] The minutes are available in PDF format at the following link

Initial list with the FITD applicants (approved and rejected) was obtained from the Fund for Innovation and Technological Development under a Non-Disclosure Agreement signed between the Fund and Finance Think. This list contained names of companies, city, belonging sector and the score in the selection procedure. The demographic data of companies for both programs was manually entered from the publicly available online database at BiznisMreza.mk, after which an additional check was made on the website of the Central Registry of North Macedonia for potentially incorrect and missing data. The full names and registration numbers were used to seek financial data from the Central Registry of North Macedonia, namely the Balance Sheet, the Income Statement and the Statement of Changes in Equity for each company. These were obtained and the needed items of the financial statements used to create the dataset for our sample.

To create the variable on the market share, we used the structural business statistics of the State Statistical Office, namely the total turnover at three-digit level of NACE Rev.2. Unfortunately, for some of the three-digit branches, total turnover was not available, so that we ended up with 97 observations out of the total of 132 for the FSIL case, and 122 out of 142 for the FITD case. We are satisfied with the share of available data and ignore any selectivity.

To measure the competition perception, we pursued a survey to all treated and comparison enterprises, whereby we asked them to assess the competitive pressure in the two years of observation, on a scale from 1 (very low) to 10 (very high). The following two questions were asked: "Please think about your main competitor. How would you assess the competitive pressure in your industry / branch in 2019 (in any case, before the onset of the pandemic)?" and "Now, please think back two years earlier, in 2017. How would you assess the competitive pressure in your industry / branch in that period?". The survey was conducted through e-mail and telephone. The respondents were not told how they were selected, to avoid that their answer is influenced by the fact that they have received or have been rejected to receive a state aid. 37 answers were obtained through the e-mail surveying, and additional 88 through telephone surveying, which is a fairly satisfactory 45.6% response rate. Yet, there is no guarantee that self-selection bias was not present and hence results should be interpreted with caution from that viewpoint.

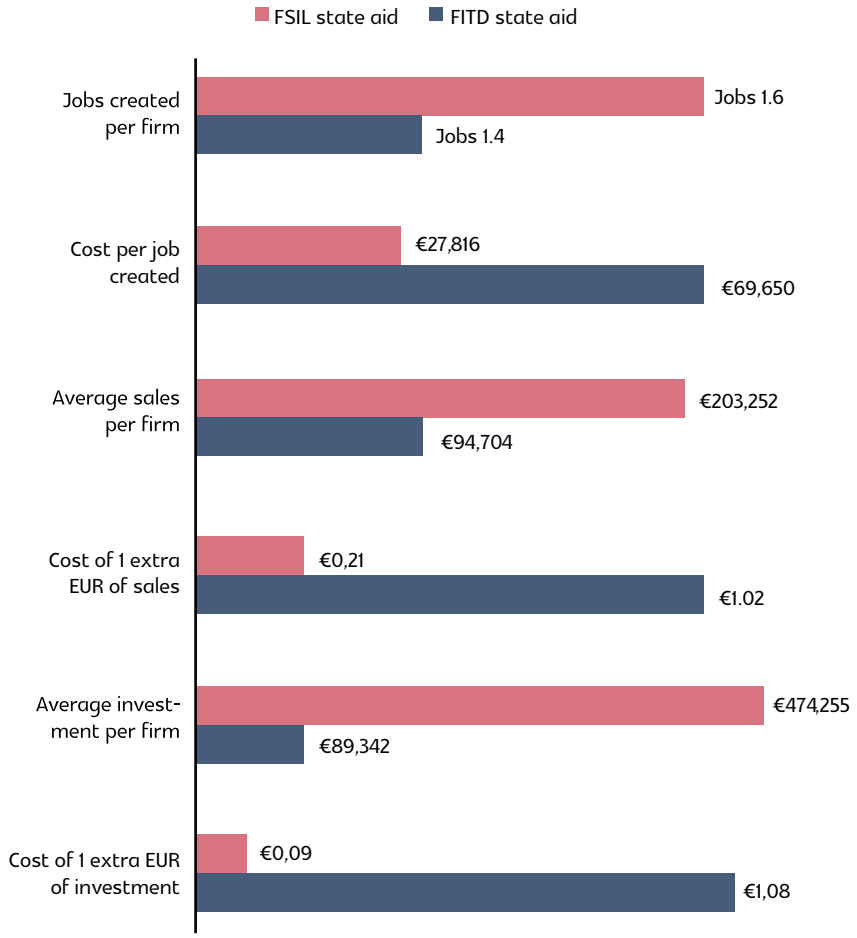
5. RESULTS AND DISCUSSION

In this section, we first present some pure cost-effectiveness metrics for the two types of state aid we evaluate. Then, we calculate the obtained effects for the two types of state aid on a range of efficiency and competition indicators. We first observe the extent to which our treatment and comparison groups are similar or different. Then, we produce a propensity score to assist the matching procedures. Finally, we pursue the matches.

5.1. COST-EFFECTIVENESS OF THE STATE AID PROGRAMS

In this section, we calculate average difference in employment, sales and investment before and after the receipt of the state aid, and calculate a simple cost effectiveness of the programs; this implies that we are not yet observing the impact because such a naïve overview disregards how the comparator non-recipient companies fared over the same period of time. The indicators are presented on Figure 4. Companies receiving the FSIL State aid created more jobs on average (1.6 per company) compared to FITD one (1.4), on top they cost almost three times less (28 versus 70 thousand EUR per workplace). Likewise, FSIL-supported companies exhibited larger absolute amounts of sales and investment, whereby the cost per additional euro of sales and investment has been 0.21 EUR and 0.09 EUR, respectively. On the other hand, such unitary costs were quite higher in FITD-supported firms: 1.02 EUR and 1.08 EUR, respectively. Therefore, at first sight, FSIL State aid may be associated with larger multiplier effects.

Figure 4: Average difference in key outcomes and related cost-effectiveness of state aid programs



Source: Authors' calculations.

From this overview, the FSIL State aid is a more cost-effective subsidy program. However, such observation may be immature and a rush to wrong conclusions if the cost effectiveness is observed without considering of what has been happening in the comparator non-receiving companies over the same period of time. We turn to revealing such causal effects.

5.2. CAUSAL EFFECTS OF FSIL STATE AID

Table 5 presents the results of the tests measuring the significance of the differences in observables between the treatment and comparison groups. We work with four variables: age of the firm and distance from the capital, both of which are continuous; size of the firm, which is ordinal variable; and sector of operation, which is a categorical variable. Towards the bottom of the table, the Hotelling test is performed to assess the equality of the vector of means of all variables. Two of the four individual tests as well as the Hotelling test reject the null hypothesis that the means between the treatment and control group are equal, providing sufficient grounds to treat the two samples as different on observables.

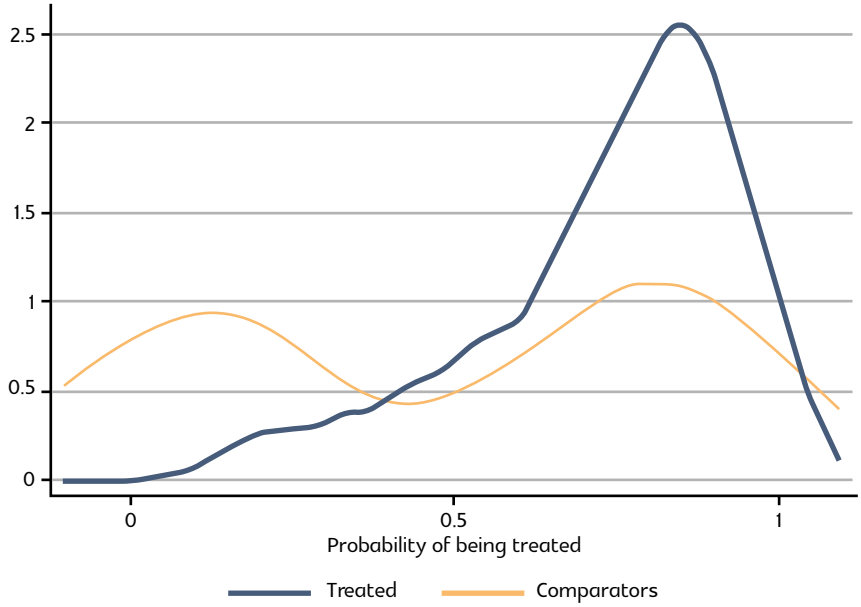
Table 3 : Test of the randomization across treatment and comparison groups

Ho: Means are equal for the treatment and control groups	
	Two-sample t test with unequal variances (p-value)
Age (years)	0.0318
Distance from Skopje (km)	0.6170
	Two-sample Wilcoxon rank-sum (Mann-Whitney) test (exact p-value)
Size (1 = small, 2 medium-sized, 3 – large)	0.4704
	Kruskal Wallis equality-of-populations rank test (p-value, with ties)
Sector (3-digit NACE Rev.2 classification	0.0019
	Hotelling T-squared test (p-value)
Vector of means of all variables	0.0002

Source: Authors' calculations.

With these variables, we run a probit model, whereby treated are used as the dependent variable. The coefficients are then used to predict a score which represents the probability that according to some demographic characteristics a company is selected to be awarded a FSIL State aid. Figure 7 presents the distribution of such score and depicts a clear difference between the treatment and the comparison group. Namely, the comparison group is distributed along entire propensity score in a two-hump shape, while the treated group has a clear peak at a high propensity score and skewness to the left.

Figure 5: Distribution of the propensity score – FSIL state aid

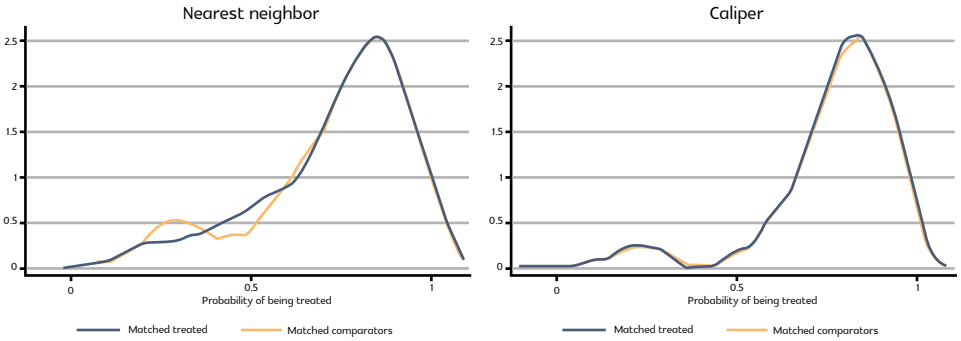


Source: Authors' calculations.

Such score is used for matching, based on two techniques: by selecting the nearest neighbor and by selecting a matching comparator within a caliper defined by a 0.5 standard deviation. Moreover, in the calculation of the ATT we impose a common support by dropping treatment observations whose propensity score is higher than the maximum or less than the minimum score of the comparisons.

When the matching algorithm is applied, both groups become highly comparable, as observed on Figure 8. Namely, the propensity scores almost overlap, and particularly when comparators are chosen based on the caliper procedure.

Figure 6: Assessing matching quality – FSIL state aid



Source: Authors' calculations.

Now, we embark on presenting the main results. They are presented in Table 6: only the effect of the state aid on the range of outcomes is presented for clarity. The first row presents the effect estimated on an unmatched sample for comparison purposes (otherwise invalid for the reasons explained in the previous paragraphs). The next rows focus on ATTs, based on the two estimators (nearest neighbor / caliper) and with the optional usage of the common support option, which altogether leads to four variants.

It is the general impression that companies which obtained the FSIL State aid did not achieve different results that could be ascribed to the subsidy receipt. All estimated effects except one are statistically insignificant at common levels, providing grounds to claim that the FSIL State aid has been largely ineffective. The only consistently appealing result is that the FSIL State aid likely worked positively for employment in the recipient companies, partially supporting the notion that it aided operations and working capital. These companies achieved a better result in employment growth than compared to their matching counterparts, despite not in wages. Namely, their employment between 2018 and 2019 grew by on average 6%, while in their matching non-recipient counterparts declined by 3% to 7% (depending on the matching procedure used).

This may be insufficient yet a decent result for at least three reasons. First, higher employment has been among the objectives of the Financial Support of Investment Law, and this finding validates that such a result has been attained, although absence of differential in wages overthrows the objective that well-paid jobs were created due to the subsidy. Second, we expressed a concern in our contextual

discussion that since FSIL State aid is distributed only after an investment is made, it may result in a significant deadweight loss for the society and wash the recipient with cash in a situation when the funding for the investment is likely to have been secured either. Such cash showers may pump up profits, which would simply mean that the society pays for narrow private gains. Results do not lend support to this claim, because there is no apparent difference in the cash and profit growth with recipients more than of what has been observed in non-recipients. Even strangely, the difference in differences for the profit and the cash ratio are consistently negative (though statistically not different than zero). Finally, we do not find consistent evidence that the subsidy distorted markets or discourage competition, as the last two indicators are statistically insignificant.

In conclusion, FSIL state aid is largely found ineffective as there are no compelling signs that it exerted any positive effect on revenues, wages, investment and profits among the recipients. It is only the employment which increased due to the subsidy and the difference of differences which ranges between 9 and 13 percentage points is consistently statistically significant. However, considered in its entirety, the FSIL State aid did not result in improving economic efficiency, yet it has no distortive effect on market competition nor resulted in windfall gains. In the jargon of DG Competition (2009), the FSIL State aid did not make recipients change their behavior i.e. undertake an activity that they would not have done without the aid or would do in a less desirable manner, and is a clear 'no incentive effect' example.

Table 4: Effects of the FSIL state aid – average treatment effect of the treated

		Difference in differences (decimal points)											
		Revenue	Tangible assets	Non-tangible assets	Payroll cost	Employment	Labor productivity	Gross profit	Net profit	Current ratio	Cash ratio	Market share	Competition perception
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Unmatched		-0.59*	-0.13*	0.15	-0.46	0.03	-0.77	-0.79	-1.40*	-0.12	-12.85*	-0.54	-0.16
ATT	Nearest neighbor	0.09	-0.00	0.12	0.09	0.13***	-0.04	-0.50	-1.29	0.06	-4.95	0.03	0.07
	Caliper	0.05	0.01	-0.04	0.02	0.09**	-0.03	-0.95	-2.01	0.08	-6.72	0.01	-0.01
ATT (common support)	Nearest neighbor	0.09	-0.00	0.12	0.09	0.13***	-0.04	-0.50	-1.29	0.06	-4.95	0.05	0.07
	Caliper	0.05	0.01	-0.04	0.09	0.09**	-0.03	-0.95	-2.01	0.08	-6.72	0.04	-0.01

Source: Authors' calculations. *, ** and *** denote statistical significance at the 10%, 5% and 1%-age level, respectively.

5.3 CAUSAL EFFECTS OF FITD STATE AID

Table 5 presents the results of the tests measuring the significance of the differences in observables between the treatment and comparison groups in the case of FITD State aid. On top of the four demographic variables used in the FSIL case, we consider the points obtained for the project in the application phase. All tests reject the null hypothesis that the means between the treatment and comparison groups are equal, suggesting that the two samples are different on observables and cannot be compared directly.

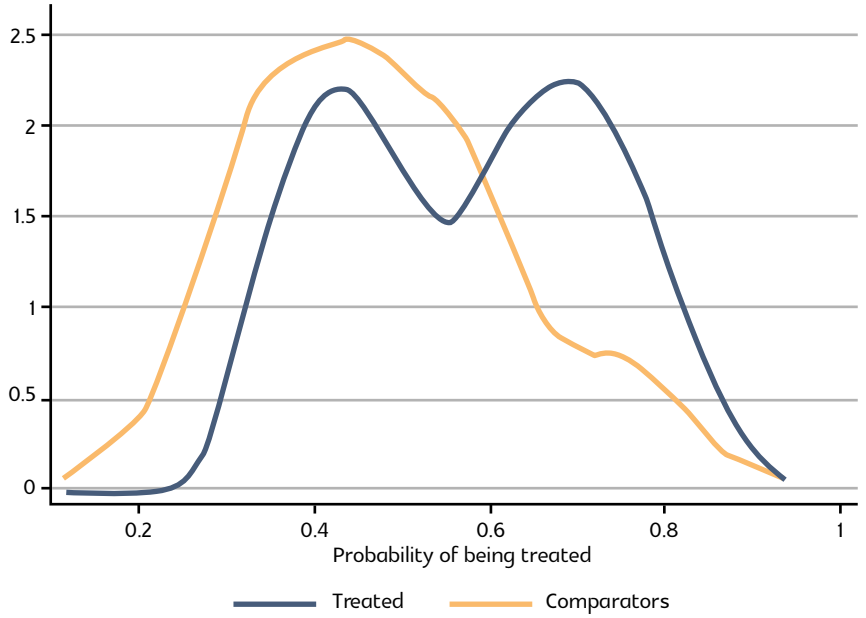
Table 5: Test of the randomization across treatment and comparison groups

Ho: Means are equal for the treatment and control groups	
	Two-sample t test with unequal variances (p-value)
Age (years)	0.0485
Distance from Skopje (km)	0.0628
Grading of application (20/80 points)	0.0001
	Two-sample Wilcoxon rank-sum (Mann-Whitney) test (exact p-value)
Size (1 = small, 2 medium-sized, 3 – large)	0.0113
	Kruskal Wallis equality-of-populations rank test (p-value, with ties)
Sector (3-digit NACE Rev.2 classification	0.0082
	Hotelling T-squared test (p-value)
Vector of means of all variables	0.0069

Source: Authors' calculations.

Figure 7 presents the distribution of the predicted score from the probit model, and depicts a clear difference between the treatment and the comparison groups. Namely, the comparison group is slightly tilted towards lower scores when compared to the treatment group, whereas the latter is apparently two-humped.

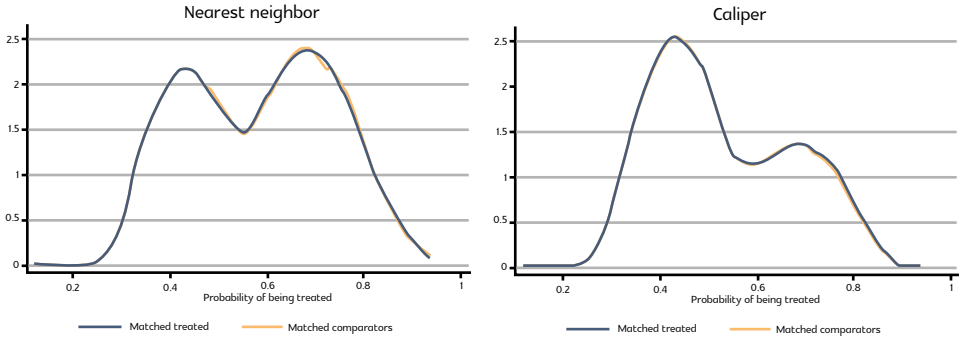
Figure 7: Distribution of the propensity score – FITD state aid



Source: Authors' calculations.

When the matching algorithms are applied, both groups become highly comparable, as observed on Figure 8.

Figure 8: Assessing matching quality – FITD state aid



Source: Authors' calculations.

We embark on presenting the main results in Table 6. As usual, significance is presented as well, and we may already note that most of the differences in differences are significant, though only at the 10%. Given the small sample and its large heterogeneity (even when observed treated versus comparators), we do not consider this a large ground for concern.

Companies which obtained the FITD State aid consistently achieved higher sales than their matched counterparts, which is only due to the state aid they received. On average, between 2017 and 2019, their sales revenues grew between three and four times (depending on the matching procedure used), while the ones of the matching comparators grew between 40% and 50% (hence, 4 to 6 times less). Likewise, recipients have had a consistently higher investment in non-tangible assets, which may be largely labelled as an investment in technology. Namely, their investment in non-tangible assets increased by about 50% between 2017 and 2019, while that of comparators declined by about 13%. Therefore, the FITD State aid gave a clear advantage of the recipients to commence, sustain or expand their investment in technology, which was the idea behind the grant of such type. The finding is further important provided that non-recipients declined their investment in non-tangible assets over the same period, which could either be an indication of shortage of funds to support such investment or a give-up of the investment project in its technological level or character in which it was presented in front of FITD and then rejected.

On the other hand, recipients of the FITD State aid do not pay out higher wages than their non-recipient comparators, nor invested in tangible assets (machinery and equipment) in a different manner than companies which ultimately did not receive the FITD State aid. The latter may be an indirect indication that, on average, rejected applicants continued their investment despite not receiving the grant. Moreover, there is no evidence of higher employment growth among recipients. However, there is limited evidence that the labor productivity of the recipients increased due the FITD State aid: productivity of treated increased between 50% and 80% between 2017 and 2019, while of the matched comparators between 29% and 35%.

FITD State aid increased growth of profits and cash among recipients. Particularly, the increase of the net profit is astonishing: between 2017 and 2019 it grew 17 to 19 times, while in non-recipient matching counterparts it only grew between 3% and 30% (depending on the matching procedure). In part, such a profit surge is driven by the increased sales revenue and labor productivity, hence affected by the lack of differential increase of the FITD subsidy in jobs and wages (increase of the capital share and no change in the labor share). In another part, however, over the same period, FITD State aid contributed to an astonishing increase of the cash

ratio: for recipients it increased over 10 times, while for matched non-recipients it increased about 2.5 times. Therefore, both groups have secured a source of cash, but the cashing of the latter has been apparently more cautious, probably because its source was of a more commercial (and hence more expensive) nature. However, when both: large surges of the growth of profits and of cash in FITD State aid recipients are observed in conjunction, it leaves a space to claim that the subsidy, while spurring sales, productivity and investment in technology, it also floods recipients with cash, part of which potentially supports higher profits. This conclusion should be particularly paid attention to, also from the viewpoint of the cost-effectiveness presented in Section 5.1: a euro of investment and of sales is paid for by more than a euro of FITD State aid. Nevertheless, with this analysis we cannot observe if (parts of) such cash have been obtained at the year-end and have been committed to pursuing further investment in the next year.

As a result of all these effects, FITD State aid recipients were able to increase their market share, whose growth outpaced the one of non-recipients by 1.5 to 2.5 times, hence making a significant difference. This suggests that the FITD State aid contributed to recipients' strengthening of market position. While this is considered a distortion of competition itself, it was not accompanied by exerting stronger and potentially distorting competition on the market when observed through the perceptions of the companies. According to our result, both recipients and matching non-recipients continued observing the competition pressure on the market in a similar fashion after the aid was obtained, despite majority of them reported they were selling either on the domestic market only (44%) or on both domestic and foreign markets (30%)[33]. Hence, when observed in conjunction, the state aid confluence for market share growth and no effect on perceived competition does not lend firm support to the claim that the subsidy exerted distortive power on the market. However, this finding should be carefully taken given we measure the competition perception rather than competition itself.

In conclusion, FITD state aid seems to have achieved a significant goal in increasing revenues, investment in technology and labor productivity among recipients. It did not spur new jobs or higher wages more than what is observed in the matched

[33]The distribution in the case of FSIL state aid was similar: 41% were selling on the domestic market only, 17% on foreign, 29% on both, and 12% responded they had no competition.

non-recipients. Such investment in fundamentals then leads to higher profits for FITD recipients. However, FITD State aid was likewise accompanied with cash showers, suggesting that it may be over-cashing recipients hence pumping up their profits. Still, such potential windfall effects should by cautiously observed, since some of the FITD State aid may have been paid out and reserved for later investment.

Table 6: Effects of the FITD state aid – average treatment effect of the treated

		Difference in differences (decimal points)											
		Revenue	Tangible assets	Non-tangible assets	Payroll cost	Employment	Labor productivity	Gross profit	Net profit	Current ratio	Cash ratio	Market share	Competition perception
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Unmatched		1.49	0.41	0.63*	0.18	0.11	-0.06	-10.68	-6.61	-1.83	4.04	1.16	0.15
ATT	Nearest neighbor	1.74*	0.35	0.66*	0.10	0.10	0.22	12.21*	16.1**	2.11	7.86*	1.55*	0.12
	Caliper	2.85*	0.51	0.64*	0.19	0.20	0.43*	19.94	18.86*	-0.02	9.26*	2.47*	0.64
ATT (common support)	Nearest neighbor	1.77*	0.35	0.67*	0.10	0.10	0.21	12.40*	16.4**	2.19	8.15**	1.58*	0.12
	Caliper	2.85*	0.51	0.64*	0.19	0.20	0.43*	19.94	18.86*	-0.02	9.26*	2.47*	0.64

Source: Authors' calculations. *, ** and *** denote statistical significance at the 10%, 5% and 1%-age level, respectively.

5.4. INDICATIVE COMPARISON OF THE TWO STATE AID TYPES

In this section we pursue a direct comparison of the FSIL and FITD State aid recipients. The value of such comparison is only indicative and should be used with a large caution, given that the nature of the two subsidies is different. Most notably, a FSIL State aid receive companies which committed an investment the year before they applied for the subsidy, while a FITD State aid receive companies that have an innovative investment project yet to be deployed. Therefore, when observed in a single point in time, the two may be significantly different on unobservables, most notably on their intent and motive to invest. On the other hand, we pursue the above matching procedures and equalize the groups on observables, which may yet be insufficient for compelling inference.

To preserve space, we directly embark on the results; they are presented in Table 7. Despite the needed caution in the interpretation and usage of these results, they are quite appealing. The FITD State aid has a clear advantage over the FSIL State aid in terms of revenues, productivity and profits – the areas where its effectiveness was revealed in Table 6. On top of them, the FITD State aid is superior to FSIL one in terms of wages as they have been rising in FITD recipients over 50%, while in FSIL ones about 15%; as well in terms of investment in fixed assets and machinery. The latter is clearly reflecting the differences between the two types of state aid: FSIL subsidy is awarded on investment prior made and we observed that it did not induce any further investment (the insignificant differences in differences on tangible assets in Table 4) over the observed period; while FITD subsidy is awarded for an investment to be made if project approved, and the positive coefficients we observe on tangible assets in Table 7 are clearly picking up this definitional difference. They must not be interpreted as one subsidy inducing larger investment effects than the other.

Table 7: FITD versus FSIL state aid – average treatment effect of the FITD over FSIL recipients

		Difference in differences (decimal points)											
		Revenue	Tangible assets	Non-tangible assets	Payroll cost	Employment	Labor productivity	Gross profit	Net profit	Current ratio	Cash ratio	Market share	Competition perception
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Unmatched		2.11*	1.20**	0.32	0.85***	0.34***	0.51***	12.2	16.2*	2.73	8.82***	1.69*	0.19
ATT	Nearest neighbor	2.30**	1.30***	0.39	0.92***	0.35*	0.70***	11.9	15.8*	2.81	8.50*	1.97**	-0.18
	Caliper	0.26*	0.76***	-0.66	0.39***	0.14	0.15*	2.57*	15.8	0.23	2.65	0.20	0.10
ATT (common support)	Nearest neighbor	0.32***	0.77***	-0.46	0.41***	0.15	0.21***	2.08*	2.11*	0.10	1.43	0.34***	0.29
	Caliper	0.25*	0.79***	-0.72	0.40**	0.15	0.14	2.57*	2.57*	0.24	2.36	0.18	0.06

Source: Authors' calculations. *, ** and *** denote statistical significance at the 10%, 5% and 1%-age level, respectively.

6. CONCLUSION AND POLICY INFERENCE

The objective of this study is to measure the effects of state aid distributed to private enterprises in North Macedonia on efficiency and competition. We examine the governmental program for subsidizing companies under the Plan for Economic Growth 2018-2021, which is composed of state aid resulting from the Financial Support of Investment Law (FSIL) of 2018 (first and second pillar of the Plan) and the one disbursed through the Fund for Innovation and Technological Development of North Macedonia (third pillar of the Plan). Hence, we analyze two programs – labelled FSIL State Aid and FITD State Aid – executed during or at the end of 2018, so that we are able to compare 2017 or 2018 (pre-support) and 2019 (post-support). We rely on a rigorous impact evaluation method. First, we create comparison groups out of the pool of rejected applicants for the two programs, because they best mimic the treatment group on unobservables: in both cases they had the same investment motive as they have also committed an investment (the FSIL case) or intended to make an investment (FITD case). Moreover, in the FITD case, we use the selection points to arrive at a more homogenous group of comparators. We pursue conditional matching on firms' age, industry at three-digit NACE Rev.2, location (distance from the capital) and firms' size, by using the procedure of nearest neighbor or a caliper (searching for matches within a range of standard deviations). After the matching we pursue a difference-in-differences calculation to isolate the effect of the state aid on a range of efficiency and competition indicators: growth in sales, investment, profit, employment, wages, productivity, cash, market share and competition perception.

The FSIL State aid – the first two pillars of the Plan for Economic Growth 2018-2021 – proved largely ineffective. Our findings suggest that the state aid did not exert almost any difference in sales, investment, wages or profits among recipients, compared to what has been observed among comparator non-

recipients. However, the FSIL State aid contributed to generating more jobs, as recipients steadily achieved a 9 to 13 percentage points higher employment growth than their matching counterparts over the same period. Yet, absence of wage differentials due to the subsidy overturns the objective of the program to generate well-paid jobs. The cost for a gross job generated has been nearly 28 thousand EUR. This suggests that the FSIL State aid has been largely consumed to generate new jobs, rather than to make extra cash or profits, which is yet a positive sign given the overall ineffectiveness of the subsidy. No cash shower nor distorting market competition is discovered due to FSIL State aid.

The FITD State aid – the third pillar of the Plan for Economic Growth 2018-2021 – proved considerably effective. Our findings suggest that due to the subsidy, recipients were able to increase their sales revenue and labor productivity. The cost of additional euro of sales generated, in gross terms, has been slightly over a euro. However, no more jobs or higher wages were created in recipients than in what has been observed among matching comparators non-recipients. Likewise, the FITD aid has been found responsible for the increase in investment in technology of non-tangible form, which was particularly important finding given: i) the definitional role of FITD aid to spur technological growth and innovation; and ii) the declining investment in non-tangible assets among non-recipients over the same period. Overall, these positive developments induced by the FITD State aid brought about a large increase in profits, far exceeding the profit growth in matching non-recipients. However, at the same time, FITD recipients were found under cash showers, which may suggest that excess profits were not exclusively driven by the increasing revenue, investment and productivity, but also by the extra generated cash in the company due to the grant. As a caution, though, we cannot exclude that cash accumulation from state aid disbursements has been a commitment for pursuing investment later, in the subsequent year, which we did not observe in our data.

Important policy implications stem out of the findings of the effects of the two types of state aid. The finding that the FSIL State aid is largely ineffective is a significant policy concern. It may signify that the subsidy either needs to be aborted or significantly transformed to produce results. The argument against the abandonment of the FSIL subsidy program is the identified positive effect

on employment generation. However, lack of sales, investment, wages and profit effects dwells for a significant overhaul of the Financial Support of Investment Law. The vein of reform may be steered by the positive effects that the FITD State aid generates: award a FSIL State aid for an investment project yet to be deployed, after having examined its feasibility, costs, rate of return and wider effects, despite this will require more effort and cost to be borne by the government. Therefore, one important way of revamping the FSIL State aid is to convert its ex-post into ex-ante disbursement, subject to project evaluation. Furthermore, this is necessary in the context of the EU acquis, as applying for aid before the start of the investment is a basic pre-condition for the incentive effect to be considered present (along with other additional ones), and the presence of the incentive effect is necessary for approving the granting of state aid.

Still, before any significant attempt is made into such direction, a reexamination of the FSIL State aid of 2019 and 2020 should be made. Namely, the 2018 disbursement of the FSIL subsidy was the first one, so that applying companies did not have the information when making the investment in 2017 that a law will be made the year after, which will award them a financial aid. However, for the subsequent rounds, companies making the investment in 2018 knew that they could apply for FSIL subsidy the year after (yet, subject to fulfilling the additional criteria). Given such 'forward guidance', it is (at least theoretically) likely that they were (partially) driven (or encouraged) by the existence of the FSIL State aid in their decision to invest, despite this argument is weakened by the fact that prospective applicants cannot be certain about the amount they would ultimately receive, because they cannot predict the number of awardees which determines the percentage of the budget finally allocated to each awardee. Still, in such circumstances, the FSIL State aid evaluated on 2019 and the subsequent disbursements may provide more plausible results and elucidate the argument for any policy decision pertinent to the subsidy.

Policy inferences for the FITD state aid are more captivating. First, given its effectiveness for sales, investment and productivity, the state aid should be continued to a large extent in its present form. The point of possible intervention may be the need to strengthen rules related to assessment of the proposed costs in the project application budget, particularly costs related to purchase of

equipment, software, trademarks and other intellectual property. Namely, any possibility of artificial inflation of such costs as a potential vehicle for obtaining higher cash through the FITD should be reduced to zero. Complementary or alternatively, the amounts / shares disbursed through the FITD State aid should be revised downwards ex-ante, to eliminate any windfall effects and to potentially increase the subsidy cost-effectiveness.

The readers and the policy users of these findings should be aware of the study's limitations. The key limitation is that the study identifies the short-run effects of the state aid, since we only observed the year after the state aid was disbursed. It is hence wise that the longer-run effects are examined after the passage of sufficient time. Literature is inconclusive on this point because if the state aid supported companies' fundamentals, then the propensity to positively affect the long run is higher. In contrast, a state aid used for quick improvements in the cash position or for generating employment, particularly when the latter is required as a condition to obtain additional or maintain the current disbursements of the state aid, may result in reversals of any short-run gains. However, identifying such behaviors will help policymakers to further tailor the design of the state aid programs to deliver better results.

Other issues which stem out of this analysis and which may require deeper further research include companies who were rejected in one year, but who obtained funding in a subsequent year, which may be particularly important in the FSIL case whereby the application is determined by the investment already made. Then, the issue of related entities, particularly if both applied for the same or different state aid type and then obtained varied outcomes of the application, may be examined from the viewpoint of the effect of the state aid obtained by one entity on the overall group of affiliated entities. Finally, the importance of the size of the subsidy should gain more prominence in further research, particularly given we suspected limited windfall effects in the FITD case.

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ANNEX 1: REFERENT LITERATURE IN DETAIL

Study	Data and sample	Scheme/ Type of aid	Comparison group	Methodology	Indicators used	Result	Other problems
Criscuolo et al. (2019)	1997 - 2004; UK (area-level, plant-level and firm-level)	RSA program - regional investment subsidies (regional aid)	None; impact estimated based on exogenous policy changes in eligibility of areas in 2000 (EU rules changing the regional aid map)	Instrumental variables	Employment (main indicator), as well as investment, output, productivity and entry/exit	Positive effects on jobs and reduction in unemployment; no effect on large firms; increase in investment and employment but not in productivity	
Bondonio and Martini (2012)	a) 2000-2004; b) 2005-2009; Italy (firm-level)	Enterprise support: a) 'Law 488' - Nation-wide investment grants; b) SMEs Piemonte - all grants, soft loans and interest rate subsidies	a) Rejected applicants; b) Non-applicants; similar in size, location, desire to apply and other, including unobserved characteristics	ATT - Conditional difference-in-difference, beneficiary survey	Average growth in: 1) employment, 2) sales and 3) investments (as well as job quality - labor productivity and payroll costs used as a proxy); Cost-effectiveness	Positive impact for all three indicators, but no impact for large firms (except sales); soft loans and interest rate subsidies are generally more effective than grants and cost less; smaller grants are far more cost-effective than the larger grants	
Centre for Economic and Business Research (2010)	1995 – 2008; Denmark (firm-level)	Subsidy scheme for innovation consortia (R&D)	Non-applicants, 2 controls per 1 participant (chosen in 2 rounds); similar in size, industry, region, age and the expected probability of participation	ATT - Difference-in-difference	Average growth in: a) value creation (measured as gross profit), and b) employment	Positive impact in annual gross profit for firms with a gross profit below 150 million DKK (~20 million euros); positive impact in employment for firms with under 150 employees	The work of unobservables should be specifically considered; employment effects not robust to alternative comparison groups; too few observations for identifying causality in large firms and the service sector

Bergström (1998)	1987 - 1993; Sweden (firm-level); manufacturing firms only	Place-based, selective, mostly capital subsidies (regional aid)	Non-applicants; randomly chosen - differences accounted for after the selection by using a logit model	Multiple linear regression	TFP - capital-augmenting production function, based on value added rather than output	TFP increases in the first year, but then decreases	The comparison group may differ from treatment in region, age and labor productivity; missing observations in some years; the analysis is limited to joint-stock companies with less than 75 employees
Van Cayseele et al. (2014)	2003 - 2011; European Union (firm-level and sector-level); manufacturing firms only	All schemes and ad-hoc aids (797 cases matched in total)	Non-applicants; similar in average employment, tangible fixed assets and value added (established after the selection)	Multiple linear regression	TFP - Cobb-Douglas production function; additional factors besides aid are cash constraint (measured by the Lerner index as a proxy) and distance to the frontier	Positive effects for laggard firms and financially constrained firms - especially in the post-crisis period	Unclear by what criteria and in what number of firms the comparison group was chosen
Cassidy and Strobl (2004)	1972 - 2000; Ireland (sector-level); manufacturing firms only	All grants to manufacturing	None	GMM systems estimator	Sectoral employment; additional factors: competition (Herfindahl index), presence of foreign firms, age and a lagged dependent variable	Positive impact on sectoral employment	Wage rate and output should be included as factors; unbalanced panel due to one sector not existing for the entire period
Ginevičius et al. (2008)	2004 - 2006; Lithuania (firm-level)	EU structural funds; 4 main areas of enterprise activities: development of production, R&D, education and services	None	Quantitative multi-criteria evaluation methods	A mix of two groups of indicators: one referring to the aid itself and one describing the effect of aid - ranked 1-10 by beneficiaries; weights were used according to EU aid experts' opinion	Aid intensity is the strongest factor; the smallest effect was in the area of services; aid for educational projects was more cost-effective than aid for production and R&D projects	Possible bias due to subjectivity or providing intentionally false answers by respondent-beneficiaries


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Belgrade


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