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The Financial Effects of Direct Business Subsidies on Finnish Firms  
Evidence from Panel Data (2010–2016)

Bachelor's thesis  
Accounting and Finance

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Suomessa myönnetään vuosittain useita miljardeja euroja yritystukia, mutta niiden vaikutuksista yritysten taloudelliseen käyttäytymiseen on vain vähän systemaattista näyttöä. Julkinen keskustelu on korostanut sekä tukien kohdentumiseen liittyviä ongelmia että epävarmuutta siitä, tuottavatko tuet todellista lisäarvoa. Tutkielman tavoitteena on tutkia, miten suorat yritystuet vaikuttavat yritysten velkaantuneisuuteen sekä lyhyen aikavälin kannattavuuteen ja kasvuun vuosina 2010–2016.

Teoreettinen viitekehys yhdistää hyvinvointitaloustieteen ja markkinahäiriöiden teorian pääomarakenneteorioihin. Innovaatioihin ja luottorajoitteisiin liittyvät markkinapuutteet muodostavat perusteet julkiselle tuelle, kun taas trade-off- ja pecking order -teoriat ennustavat vastakkaisia vaikutuksia siihen, vähentävätkö vai lisäävätkö tuet yritysten velan käyttöä. Empiirinen analyysi perustuu kolmeen aineistoon: Ylen yritystukidataan, Orbis-tilinpäätöstietoihin sekä pienyrityksistä koottuun scraper-aineistoon. Mallit estimoidaan yritys- ja vuosikohtaisilla kiinteillä vaikutuksilla.

Tulokset osoittavat, että suurempi tukien intensiteetti edellisellä vuonna on yhteydessä korkeampaan velka-asteeseen. Tämä viittaa siihen, että tuet vahvistavat yritysten rahoitusasemaa tai helpottavat pääsyä velkamarkkinoille. Sen sijaan kannattavuuteen (ROA) ja liikevaihdon kasvuun ei havaita lyhyen aikavälin vaikutuksia. Johtopäätöksenä tuet näyttävät vaikuttavan rahoituspäätöksiin, mutta niiden vaikutukset suorituskykyyn eivät ilmene välittömästi tai voivat vaatia pidemmän tarkastelujakson. Tutkielma tarjoaa empiiristä näyttöä suomalaisen yritystukijärjestelmän toimivuudesta yritystasolla.

**Avainsanat: Suorat Yritystuet, Pääomarakenne, Yrityksen Suorituskyky**

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Finland allocates billions of euros in direct business subsidies annually, yet evidence on their firm-level financial impacts remains limited. Much of the public debate questions whether these subsidies correct genuine market failures or merely redistribute resources without improving economic outcomes. This thesis examines how direct business subsidies affect firms' leverage and short-run performance using a firm-year panel dataset for 2010–2016.

The theoretical framework combines welfare economics and market failure theory with capital structure models. Market failures related to knowledge spillovers, indivisibilities and credit rationing provide an economic rationale for subsidies, while the trade-off and pecking-order theories yield contrasting predictions about how subsidies influence firms' use of debt. The empirical analysis is based on three datasets: Yle's direct subsidy data, Orbis balance-sheet data, and a separate scraped dataset containing performance information for smaller firms. The models are estimated using firm and year fixed effects with clustered standard errors.

The results show that higher lagged subsidy intensity is associated with significantly higher leverage, suggesting that subsidies ease financing constraints or strengthen balance sheets in a way that enables firms to increase debt financing. However, no short-run effects are found on profitability (ROA) or revenue growth. These findings indicate that while subsidies influence financing decisions, their immediate performance impacts remain modest or may require a longer horizon to materialize. The study contributes to the evaluation of Finnish business subsidies by providing firm-level evidence on how public support interacts with corporate financing behavior.

**Key words: Direct Business Subsidies, Capital Structure, Firm Performance**

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## 1 Introduction

In Finland, the public sector plays a central role in the business financing ecosystem. The government maintains an extensive system of business subsidies as a tool of economic policy, reflecting a tradition of active state involvement in fostering enterprise development. Public agencies target especially small and growing companies with various funding programs – for example, innovation grants (formerly provided by the agency Tekes), startup accelerators and incubators (e.g. the Vigo program), public growth funds, tax incentives for growth, and even support for startup events like Slush (Ministry of Employment and the Economy (2015)).

Each year, billions of euros in state funds are channeled into business subsidies. For instance, a Ministry of Economic Affairs report in 2017 estimated the total volume of business subsidies at about €4 billion, including roughly €1.1 billion in direct grants and €2.9 billion in tax-based subsidies. Such subsidies are financed by taxpayers and thus represent a significant fiscal commitment. In essence they transfer public resources to selected firms, which raises questions of fairness and efficiency: supporting one group of companies through subsidies requires taxing others, potentially creating welfare losses and market distortions (Rauhanen, T. et al. (2015). *Yritystukien arviointi ja vaikuttavuus*, VATT Report 8/2015). Policymakers must therefore ensure that these public investments yield benefits that justify their cost to society.

Business subsidies can be classified as direct or indirect. Direct subsidies involve an explicit outlay of public funds to a firm – for example, a government grant, a low-interest loan or a capital injection – and appear as expenditures in the state budget. Indirect subsidies, by contrast, operate through the tax system or other foregone revenues, such as tax credits, exemptions or rebates that reduce a firm's costs without a direct cash transfer. (In Finland's budgetary discussions, indirect support is often referred to as "tax expenditures" or *verotuet*.) This thesis focuses on direct business subsidies. By narrowing the scope to direct financial support, the study examines clear-cut transfers from the state to businesses, as opposed to indirect aid delivered via tax concessions. The analysis is further delimited to subsidies granted to business enterprises (excluding, for example, support to universities or other public research institutions) over the period 2010–2016. These choices define the thesis's scope and ensure that the subject is manageable: the aim is to evaluate firm-level outcomes of direct subsidies to companies, rather than broader state aid or policy measures beyond the business sector.

The rationale for government intervention in the form of subsidies lies in addressing specific market failures and generating net social benefits. In principle, under well-functioning competitive markets, firms should thrive or fail on their own merit, and no subsidies would be needed. Unwarranted subsidies can indeed distort competition and disrupt the efficient functioning of markets. Economic theory therefore holds that state aid should be used only in exceptional cases where it serves a clear public purpose that the market on its own would not achieve (Laukkanen, M. & Maliranta, M. (2019). *Yritystuet ja kilpailukyky*, VNK Publication 2019:33).

Before a subsidy is introduced, policymakers are expected to consider alternative, less distortive means (such as regulatory changes or public procurement) to achieve the same goal. Only if a compelling case exists – typically, the presence of an identifiable market failure – should a subsidy be employed as a remedy (Ministry of Economic Affairs and Employment (2017). *Virkamiesselvitys yritystuista*). In other words, business subsidies must be justified as a last-resort tool to fix problems the private market cannot solve. Each support measure should have a well-defined objective grounded in the common good, and its necessity should be assessed relative to other.

Two main economic justifications underline the use of direct subsidies. First is the existence of financing gaps: private capital markets may fail to provide adequate funding to certain types of potentially viable firms. Notably, young, innovative companies with high growth potential often struggle to obtain finance because investors have difficulty evaluating their novel projects or the risk is perceived as too high (Rauhanen, T. et al. (2015). Yritystukien arviointi, VATT Report). In such cases of capital market failure, public subsidies can play a role by directing funding to promising businesses that lack access to private finance. Second is the presence of positive externalities: some activities of businesses produce benefits that spill over to other firms or to society at large, meaning that the social value of those activities exceeds the private returns to the company (known as “Spillover effect”). Research and development (R&D) is a classic example – a firm’s innovations can create new knowledge and technology that other firms might learn from or build upon. Because companies cannot fully appropriate these broader benefits, they tend to underinvest in R&D from society’s perspective. Subsidies targeted at R&D can thus be warranted to encourage additional innovation that would otherwise not occur. More generally, by correcting such market failures – alleviating credit constraints or encouraging socially beneficial investments – well-designed subsidies have the potential to generate net positive effects for the economy. The guiding idea is that a subsidy should induce additional activity that yields public value (such as new technologies, jobs or regional development) beyond what the market alone would deliver, thereby producing a net social gain.

Finnish policy guidelines stress that business subsidies must be selective and performance oriented. Aid should be targeted to firms and projects that are economically viable and aligned with policy priorities (for example, promoting innovation, growth or exports), rather than used to simply keep troubled companies afloat. It is generally accepted that subsidies are not meant to rescue failing or inefficient firms. Supporting enterprises that cannot survive on their own would only waste public funds and hinder the necessary renewal of the economy by preventing unproductive businesses from exiting the market (European Commission (2014). Yhteiset menetelmät valtiontukien arviointiin).

Instead, subsidies are typically tied to a specific purpose or project – for instance, a particular investment, development project or hiring program – for which the recipient must use the funds. Strict ex ante criteria are applied to ensure the firm and project are suitable (e.g. the project shows promise and likely wouldn’t proceed without support), and there are usually conditions attached to the aid. Recipients are often required to contribute some of their own resources, signaling their commitment, and the aid is granted for a limited duration or amount. Moreover, public authorities closely monitor the use of subsidies and evaluate their outcomes. During and after the supported project, the firm’s performance and the implementation of the subsidized activity are tracked to determine whether the objectives are met (Rauhanen, T. et al. (2015). Yritystukien arviointi, VATT Report). This oversight helps ensure accountability for achieving the intended results and allows the government to adjust or terminate programs that do not deliver.

In recent years, Finland’s business subsidy system has become the subject of intensifying public debate. On one hand, new societal challenges such as climate change and the transition to a low-carbon economy have spurred calls to redirect subsidies toward emerging priorities (for example, supporting clean technologies and renewable energy investments). The Government has signaled intentions to reshape subsidies accordingly. On the other hand, there has been growing criticism that the subsidy regime is inefficient and unfair (Ministry of Economic Affairs and Employment (2020). Yritystukien tutkimusjaoston raportti 2020). Past subsidies, once introduced, have often remained in place permanently, while new subsidies are added on top – resulting in a complex web of aid programs that is difficult to manage or rationalize. Observers argue that some long-running subsidies may no longer serve their original purpose, or may be favoring established industries at

the expense of new competition. The term “business subsidy jungle” has even been used in public discourse to describe the multitude of overlapping supports. In an era of fiscal constraints, such concerns have sharpened. Policymakers are under pressure to ensure that scarce public funds are not wasted on subsidies with poor returns. Indeed, recent governments have attempted to review and reallocate subsidies, trimming those deemed “ineffective” or outdated in order to fund new initiatives (Ministry of Economic Affairs and Employment (2020). Yritystukien tutkimusjaoston raportti 2020). For example, efforts have been made to cut certain cost-based subsidies (like energy tax rebates for industry) and channel the savings into innovation and education – but these cuts have proven politically challenging. Industries benefiting from subsidies tend to lobby strongly to keep them, especially during economic downturns when even “inefficient” subsidies provide short-term relief. As a result, comprehensive subsidy reform has been slow, and the public debate continues over how to balance the fairness and effectiveness of business subsidies in Finland’s current economic climate.

While the amounts and allocation of business subsidies are relatively well documented by authorities (with regular reports detailing how much support goes to different sectors and purposes, far less is known about subsidies’ actual impacts on firms’ performance. As noted in a 2017 government evaluation, there is a dearth of rigorous evidence on the true effectiveness of Finland’s business subsidies – in other words, to what extent they achieve their intended economic outcomes (Ministry of Economic Affairs and Employment (2017). Virkamiesselvitys yritystuista). Much of the existing research has focused on aggregate trends or case studies of specific programs, rather than comprehensive firm-level analysis.

This leaves a notable research gap: policymakers and scholars still have limited insight into how receiving subsidies influences a company’s financial trajectory (for example, its growth, profitability, or productivity). Does a direct subsidy replace other financing methods for firms, or do they establish a safe foundation to build on? Do subsidies sometimes support businesses that would have succeeded (or failed) regardless? This thesis examines how direct business subsidies influence firms’ capital structure decisions and financial performance. While previous research has extensively explored the effects of public support on innovation, employment, and productivity, much less attention has been given to how subsidies interact with corporate financing behavior. Understanding this relationship is crucial, as public funding can alter firms’ access to capital markets and their reliance on external debt, thereby shaping long-term financial stability and investment capacity.

The analysis builds on capital structure theories, particularly the pecking order and trade-off frameworks. According to the pecking order theory, firms prefer internal funds over debt or equity; hence, public subsidies may substitute for external borrowing by providing an additional internal financing source. In contrast, subsidies can also trigger new investments by improving creditworthiness or reducing financing costs, which in turn may increase leverage. These alternative mechanisms, substitution versus trigger effects, form the core of this study’s empirical investigation.

## 1.1 Research Questions

Based on the theoretical framework discussed above, this thesis investigates how direct business subsidies influence firms’ financial behavior and outcomes. The analysis focuses on two main dimensions: firms’ capital structure and their financial performance.

Accordingly, the thesis addresses the following research questions:

- How do direct business subsidies affect firms' leverage and capital structure? Do they substitute external financing by acting as internal funds, or do they enable additional borrowing and investment through improved solvency?
- Are the observed effects consistent with predictions from capital structure theories? In particular, do the results support the *pecking order* view—where subsidies reduce debt dependence—or the *trade-off* view—where subsidies lower financial risk and encourage higher leverage?
- Do subsidies improve firms' subsequent performance? Are subsidized firms more profitable or do they grow faster than comparable non-subsidized firms?

By addressing these questions, the thesis aims to clarify the financial mechanisms through which public support affects firm behavior, contributing to both corporate finance literature and policy evaluation of business subsidies.

## 1.2 Structure of the thesis

Chapter 2 presents the theoretical framework, summarizing economic and financial theories explaining why and how public subsidies may influence firm-level outcomes. Chapter 3 introduces the data and empirical methodology, including the construction of firm-level variables and econometric models used to estimate subsidy effects. Chapter 4 reports the empirical findings and interprets them in light of the theoretical expectations derived from the pecking order and trade-off frameworks. Chapter 5 discusses the implications of the results for financial theory and public policy, outlines the main limitations of the analysis, and suggests directions for future research. Together, these chapters provide an integrated examination of how government business subsidies interact with firms' financing choices and performance, offering evidence relevant to the ongoing policy debate on the effectiveness of state aid to enterprises.

## 2 Theory

### 2.1 Welfare Economics and Market Failures

The preceding section highlighted that business subsidies represent one of the state's most powerful yet controversial economic policy tools. While their stated purpose is to correct market inefficiencies and stimulate socially desirable activities, the theoretical foundations for such intervention require careful justification. Economic theory provides several complementary perspectives on why and how public subsidies may enhance welfare and firm performance.

#### 2.1.1 Welfare-economic perspective (Arrow 1962)

Welfare economics establishes a benchmark in which perfectly competitive markets allocate resources efficiently. Arrow (1962) showed that this benchmark is undermined in the innovation context because three assumptions underlying the competitive model are violated: the absence of indivisibilities, perfect appropriability and certainty (Arrow 1962). Invention involves high fixed costs and often yields non-rival, partially excludable knowledge. These characteristics imply that the "transformation sets" are non-convex and that information cannot easily be turned into private property; this combination breaks the welfare theorem (Arrow 1962).

A "transformation set" simply refers to the combinations of inputs and outputs that a firm can achieve given its technology.

Convexity means that production levels can be freely combined — if two production methods are feasible, then any mixture of them is also feasible.

According to Arrow, this assumption does not hold in the case of innovation, because research and development involve large fixed costs and discontinuities. Creating new knowledge typically requires substantial upfront investments, but once knowledge is produced, its marginal cost of use is close to zero. This imbalance makes the production technology non-convex – the relationship between inputs and outputs is no longer linear or continuous but rather exhibits a "jump" caused by the fixed costs. At the same time, knowledge is a non-rival and difficult-to-exclude good: its use by one agent does not prevent others from using it, yet preventing its diffusion is nearly impossible creating a so called "Spillover effect".

Because firms cannot easily turn information into private property or set a market price for its use, the market mechanism can no longer guarantee an efficient equilibrium.

Uncertainty further depresses innovative activity. In a complete markets world, entrepreneurs would insure or diversify risks, but real financial markets are incomplete. Arrow argued that under uncertainty there will be an "underinvestment in risky activities" such as inventive R&D (Arrow 1962). Private investors require high returns to compensate for the risk of failure and the inability to sell knowledge as a normal commodity (Arrow 1962), leading to credit constraints for R&D projects. These arguments imply that targeted public support can raise welfare by reducing the gap between privately optimal and socially optimal investment. Subsidies or public grants are justified not as permanent assistance but as instruments to correct misallocation caused by indivisibilities, inappropriability and uncertainty.

From a firm level perspective, such intervention has two immediate implications. First, public funding can encourage firms to undertake projects whose expected social return exceeds their private return. Second, by increasing firms' internal funds through grants, subsidies can affect capital structure. Firms that receive non-repayable subsidies reduce their reliance on debt, potentially improving solvency and lowering the cost of external capital. Importantly for the present thesis, these mechanisms help explain why direct subsidies may alter firms' financing behaviour:

when firms underinvest due to uncertainty, indivisibilities or limited appropriability, public support effectively relaxes the financing constraints that shape capital structure decisions. In this way, Arrow's framework provides a direct theoretical link to the empirical question of whether subsidies subsequently influence leverage, which is one of the core outcomes examined in this study.

### 2.1.2 Financial market imperfections and Additionality (Stiglitz & Weiss 1981; Takalo et al. 2013)

While positive externalities justify subsidies from the demand side of innovation, financing frictions provide a complementary justification from the supply side. Stiglitz and Weiss (1981) developed a model in which imperfect information leads to credit rationing. Banks care not only about the interest rate charged but also about the riskiness of borrowers. Raising interest rates may sort borrowers adversely (those willing to pay higher rates tend to be riskier) or encourage borrowers to take riskier actions (Stiglitz & Weiss 1981). Because of this adverse selection and incentive effect, a bank's expected return may decrease when it raises the interest rate; thus, instead of clearing the market through higher rates, banks may deny loans to applicants who are observationally similar to those who receive credit. Stiglitz and Weiss call credit rationing a situation where some borrowers are refused credit even if they would pay a higher interest rate; or entire groups cannot obtain loans at any rate (Stiglitz & Weiss 1981). In such a world, innovative SMEs often face financing gaps because they lack collateral or track records, even when their projects are economically sound.

Later research has integrated financing frictions directly into models of R&D subsidies. Takalo, Tanayama and Toivanen (2013) develop a structural model describing the strategic interaction between firms, public funding agencies, and private financiers. Their framework assumes that R&D projects involve high fixed costs and that external finance is costly, reflecting the difficulty small and young firms face in obtaining loans or using internal funds to finance risky innovation.

Within this setting, they derive the optimal subsidy rule and show that the impact of financing frictions depends on two distinct margins:

- the extensive margin, which concerns *whether* a firm undertakes an R&D project at all, and
- the intensive margin, which concerns *how much* the firm invests once the project is underway.

When the cost of external finance rises, firms react less to small increases in subsidy induced support, so the optimal subsidy rate should be lower at the intensive margin.

Conversely, higher financing costs make it harder for firms to start projects in the first place, so the optimal subsidy rate should be higher at the extensive margin to help firms overcome fixed entry costs.

This mechanism links directly to capital structure considerations: at the extensive margin, subsidies reduce the need for debt financing by providing seed funding that substitutes for borrowing, while at the intensive margin, they can alter the balance between equity and debt by changing the effective cost of external finance.

The interaction between financing frictions and knowledge spillovers has further implications for subsidy design. Takalo et al. show that private investments in innovation remain below the socially optimal level because firms cannot fully appropriate the benefits of their research.

Projects with large spillovers often receive the highest subsidies, yet they are less likely to display additionality, that is, firms might have undertaken them even without public support. This means that high-spillover projects can be welfare-improving without showing measurable firm-level effects, implying that subsidies should be evaluated in terms of their broader economic impact, not

just observed additionality.

Effective policy must therefore balance two objectives: reducing financing gaps for constrained firms while avoiding excessive aid to projects that would proceed regardless.

The concept of additionality thus provides a bridge between financial frictions and observable firm outcomes. Takalo et al. (2013) emphasise that a subsidy's success cannot be judged solely by whether it increases private investment, since projects with high spillovers can improve welfare even when firms' own spending changes little. What matters is whether support corrects financing failures and guides resources toward socially valuable activities rather than simply replacing private funds.

Empirical evidence from Finland supports this view. Piekkola (2005) finds that public R&D funding by Tekes complements, rather than crowds out, private R&D—particularly among small and medium-sized enterprises close to the productivity frontier. Subsidised firms show higher productivity growth, although employment effects remain limited, suggesting that the benefits emerge mainly through efficiency gains rather than direct job creation. These findings underline that the impact of public support may materialise through improved knowledge capital, innovation intensity, and financing capacity instead of immediate expansion in inputs.

Together, these insights highlight that financing constraints and additionality are two sides of the same coin: the former explains *why* public support is needed, and the latter assesses *how* effectively it translates into real firm-level outcomes. In policy terms, additionality is crucial for accountability. Subsidies that simply replace private funds or support projects with large private returns generate little additional social value. Therefore, subsidy programmes often impose matching requirements, monitor project implementation and adjust support levels according to project spillovers and financing constraints.

This section has laid out a theoretical basis for examining the micro-economic effects of direct business subsidies. The welfare-economic argument emphasizes market failures stemming from indivisibilities, appropriability problems and uncertainty. The existence of knowledge spillovers and the positive effect of targeted support on productivity provide a demand-side rationale for intervention. Financing frictions and credit rationing explain why viable firms may still face funding gaps, while models of additionality caution against assuming that all subsidized activity is extra. Together, these theories suggest that effective subsidies should target high-spillover projects, alleviate financing constraints and ensure that public funds generate incremental investment.

These insights naturally lead to the next theoretical discussion: how subsidies interact with firms' financial decisions and capital structure. Understanding trade-off and pecking-order theories of financing will help us analyze whether receiving a grant reduces leverage, alters the cost of capital or influences investment timing. The following section therefore turns to corporate finance theories to further unpack the channels through which public support affects firm behavior.

## 2.2 Capital Structure Theories and the Effects of Business Subsidies

Building on the discussion of market failures and the rationale for government intervention, this section examines how direct business subsidies might influence firm financial decisions through the lens of two foundational capital structure theories. Each theory offers a perspective on financing choices and firm value, and we consider how the introduction of public subsidies could alter their assumptions or outcomes. The theories covered are: (1) the trade-off theory of debt and taxes, (2) the pecking order theory of financing hierarchy. By exploring each in turn, we establish a theoretical framework for understanding the potential impact of subsidies on firm-level financial outcomes.

### 2.2.1 Trade-off Theory (Kraus & Litzenberger, 1973)

The trade-off theory of capital structure emerged as a response to the limitations of the M&M irrelevance proposition, by incorporating tax benefits and bankruptcy costs. Kraus and Litzenberger (1973) formalize this theory, which posits that firms balance the tax savings from debt against the rising expected costs of financial distress as leverage increases (Kraus & Litzenberger, 1973). On one side of the scale lies the fact that debt interest payments are tax-deductible, creating a tax shield that adds value – the firm’s value increases by the present value of saved taxes on interest (an effect Modigliani and Miller themselves acknowledged when relaxing the no-tax assumption). On the other side, higher leverage raises the probability of default and bankruptcy, and with bankruptcy come direct costs (legal fees, asset fire sales) and indirect costs (lost customers, agency problems), which erode firm value. Trade-off theory suggests that an optimal capital structure exists where the marginal benefit of debt’s tax shield equals the marginal cost of expected bankruptcy risk. At this optimum, the firm’s value is maximized, reflecting a deliberate trade-off between risk and return (Kraus & Litzenberger, 1973). Firms with very low leverage sacrifice tax benefits, while firms with extremely high leverage suffer disproportionate distress costs; the theory thus explains why most companies maintain moderate debt ratios rather than 100% debt financing.

Public business subsidies can shift this debt–equity trade-off in several ways. A direct subsidy (especially if sizable relative to firm assets) effectively strengthens the equity base of the firm by providing additional capital that does not require regular interest payments. This reduces the probability of default for any given amount of debt, because the firm has more cushion to absorb losses or meet obligations. In trade-off terms, subsidies lower the expected bankruptcy cost curve, allowing firms to carry more debt before distress risks become significant. Consequently, a subsidized firm might take on somewhat higher leverage (to utilize tax shields) than it would have without the subsidy, while still maintaining a safe buffer – the subsidy thus encourages investment and potentially higher debt capacity by reducing downside risk (Kraus & Litzenberger, 1973). Additionally, subsidies can improve firm profitability by funding new projects or reducing financing costs, which in turn increases taxable income that can be offset by debt interest. By improving the risk-return profile, subsidies may embolden managers to pursue growth opportunities (increasing their risk appetite) since the firm’s overall risk of ruin is partly mitigated by the external support. Government support shifts the balance, generally in favor of more aggressive investment with manageable risk, aligning with the trade-off theory’s insight that capital structure outcomes reflect a balance between benefit and cost of debt financing (Kraus & Litzenberger, 1973).

### 2.2.2 Pecking Order Theory (Myers & Majluf, 1984)

Pecking order theory, articulated by Myers and Majluf (1984), offers a different perspective: it emphasizes information asymmetry and managerial preferences in financing choices. According to this theory, managers follow a hierarchy (or “pecking order”) when raising capital (Myers & Majluf, 1984). Internal funds (retained earnings) are preferred as the first source of financing, since using cash on hand involves no external scrutiny or issuance costs. If external financing is required, firms next prefer debt because debt contracts are less sensitive to information asymmetries – lenders are primarily concerned with fixed repayments and have some protection (e.g. collateral), so debt issuance does not strongly signal that managers think the firm is undervalued. Equity issuance is treated as a last resort, because offering new shares can send a negative signal to the market: investors may infer that managers believe the stock is overvalued or that the firm has no cheaper funding options, often leading to a drop in the share price. In Myers and Majluf’s model, managers possess private information about firm value and prospects, and they may even forgo profitable projects if the only way to finance them is by issuing undervalued equity which dilutes existing

shareholders at a loss (Myers & Majluf, 1984). This explains why firms tend to rely on internal cash and debt, and only issue equity when they are either overvalued or absolutely financially constrained.

Direct subsidies can effectively act as a form of internal financing in the context of the pecking order. A subsidy provides cash that does not need to be repaid (akin to equity) but without diluting ownership or sending the adverse signals that a market equity issuance would. As such, when a firm receives a subsidy, it can fund projects using this no-strings-attached capital instead of tapping external debt or equity markets. This aligns with the pecking order prediction that firms exhaust internal funds before seeking external funds – the subsidy simply augments the pool of internal resources. In other words, managers treat the subsidy as first-tier financing, deploying it to finance investments while preserving existing cash and borrowing capacity. This can reduce the need for debt (lowering leverage) at least in the short term, and it postpones or altogether avoids new equity issues that might have been necessary absent the subsidy. Furthermore, because the subsidy alleviates information gaps the firm does not have to convince skeptical investors of its project's value. This mitigates the underinvestment problem described by Myers and Majluf (where firms pass up good projects due to financing frictions). In summary, the infusion of public funds complements the pecking order framework by providing an additional non-dilutive, non-signal-triggering source of financing. Subsidized firms can undertake investments with less concern about adverse market interpretation, thereby potentially improving their financial outcomes and capital structure in a way consistent with (or even better than) the pecking order's ideal scenario of plentiful internal financing.

Public business subsidies can be theoretically justified when markets fail to allocate resources efficiently or when financing frictions prevent firms from investing at a socially optimal level. Innovation activities often suffer from underinvestment due to uncertainty, high fixed costs, and limited appropriability of knowledge. Likewise, asymmetric information in credit markets restricts access to external finance, particularly for smaller firms with limited collateral. In such circumstances, public intervention can enhance welfare by reducing these inefficiencies, encouraging productive investment, and supporting firms that would otherwise remain financially constrained. The extent of this impact depends on additionality—whether subsidies genuinely increase firms' activity levels rather than substitute private funds.

From a financial perspective, subsidies can alter firms' capital structures through two contrasting mechanisms. In one view, subsidies strengthen the equity base and lower bankruptcy risk, which allows firms to safely take on more debt and expand investments. In the opposite view, subsidies resemble internal financing: they provide non-repayable funds that reduce the need for external borrowing, leading to lower leverage. These two perspectives represent alternative predictions about how public support influences firm behavior.

Together, the theoretical insights suggest that subsidies can affect firm performance through multiple channels—by relaxing financing constraints, stimulating investment, and altering the balance between debt and equity. The following empirical section examines how these mechanisms appear in Finnish firms between 2010 and 2016, focusing on the relationship between received subsidies, growth, profitability, and capital structure.

### 3 Empirical analysis

This chapter presents the empirical part of the thesis. The purpose of the analysis is to examine how direct business subsidies are associated with firms' financial structure and performance during the period 2010–2016. The chapter first outlines the theoretical and analytical framework that motivates the empirical investigation, followed by a description of the data, variables, and research methodology. The empirical analysis is divided into two parts. The first examines how subsidies affect firms' capital structure. The second part investigates whether subsidies are linked to improvements in firms' growth and profitability (ROA), as suggested by the welfare-economic and additionality perspectives. Finally, the chapter presents and interprets the regression results in light of theoretical expectations.

#### 3.1 Theoretical and analytical framework

Public business subsidies are rooted in the welfare economics perspective introduced by Arrow (1962), which recognises that markets may fail to allocate resources efficiently due to externalities, uncertainty, and imperfect information. In such cases, public intervention can enhance welfare by supporting activities that generate positive spillover effects.

Building on this view, Piekkola (2005) and Takalo et al. (2013) argue that subsidies can stimulate innovation and investment by correcting market failures. Through this additionality effect, public funding induces new private activity rather than merely replacing it, thereby contributing to higher productivity, employment, and firm growth.

While these welfare and innovation perspectives explain why public support is justified, the present study focuses on how such subsidies affect firms' financial and economic outcomes. The analysis proceeds along two complementary dimensions.

First, it examines whether subsidies influence firms' capital structure, drawing on two central financial theories: the trade-off theory of debt and taxes and the pecking-order theory of financing hierarchy. According to the trade-off theory, subsidies that reduce financial risk may encourage firms to increase leverage and take advantage of tax benefits, whereas the pecking-order theory predicts that subsidies function as internal funds that lower the need for external borrowing.

Second, the analysis explores whether subsidies are associated with changes in firms' growth and profitability (ROA). This aspect builds on the welfare economics and additionality perspectives, which view public funding as a means to overcome credit constraints, stimulate investment, and enhance productivity. If subsidies succeed in correcting such market failures, firms should exhibit stronger subsequent performance; if not, the effects may remain neutral or even negative due to inefficiency or crowding-out.

Together, these two mechanisms—financial adjustment through capital structure and performance improvement through productivity gains—form the theoretical foundation for the empirical analysis that follows.

#### 3.2 Data

The empirical analysis is based on three main datasets. The first dataset contains information on business subsidies collected from a public database maintained by *Yle*. This dataset aggregates direct subsidy records reported by several Finnish authorities, including the Ministry of Economic Affairs and Employment (TEM), Business Finland (formerly Tekes), the Ministry of Transport and Communications, the Finnish Transport Agency, the Energy Authority, and the Ministry of

Agriculture and Forestry. According to Finnish law, these data on direct subsidies are publicly available.

The raw subsidy data was of relatively poor quality and required extensive cleaning to make them suitable for research purposes. Duplicates, irrational entries (such as negative subsidy amounts), and misformatted or inconsistent variables were identified and removed. After cleaning, the dataset consisted of approximately 160,000 observations, including information on the subsidy amount, type of support, year, recipient, potential loan component, and region. To classify the nature of recipients, an additional variable was created using an artificial intelligence–based text classifier that identified whether the recipient was a private, public, or other entity. The analysis focuses exclusively on private-sector firms, which meant that around 2,000 non-private recipients were excluded from the sample.

The second dataset contains firms' financial information, retrieved from the Orbis Europe database provided through the TSE Finance Lab. The data were first exported from Orbis and combined in Excel, where the business identification numbers (Y-tunnus) served as the key variable linking financial information to the subsidy records. The raw Orbis data were partly incomplete—especially for smaller firms, which often lacked detailed balance sheet or debt-structure information—so the usable sample was largely restricted to medium-sized and large companies with consistent reporting. After removing observations with missing or inconsistent values, the final Orbis-based sample comprised approximately 40 firms and 460 firm-year observations, forming an unbalanced panel dataset suitable for fixed-effects estimation.

To complement Orbis and to improve coverage of smaller firms, a third data source was created using a Python-based web scraper. The scraper collected financial statements directly from *Kauppalehti.fi* by automatically generating firm-specific URLs based on the companies' business identification numbers (Y-tunnus) and extracting numerical information from the corresponding HTML tables. The extracted variables included turnover, operating profit and personnel headcount. These scraped records were then joined to the MOT/Yle subsidy dataset via Y-tunnus. This approach proved particularly useful for smaller companies that were poorly represented in Orbis, as it enabled the inclusion of micro and small enterprises that otherwise lacked standardized reporting in international databases.

Because the scraper generated a large number of firm-year level observations that required extensive matching with the subsidy data, the integration was first attempted in Excel but proved too computationally heavy for XLOOKUP-based joins. Consequently, the data were transferred to Snowflake, where all merging, cleaning, and aggregation operations were performed using SQL. In Snowflake, the datasets were joined by the unique business identification number, duplicate records were removed, and variables were standardized to a consistent format and unit. The resulting table provided a clean and unified firm-year panel combining subsidy, Orbis, and scraped financial information, which was later exported back to R for the regression analysis.

After the integration and cleaning steps, two final firm-level panel datasets were obtained for the empirical analysis. In both cases, the subsidy data cover the period 2010–2016, while the corresponding financial data extend up to 2020, allowing for observation of firms' post-subsidy performance. The first dataset, combining Orbis financials with the subsidy records, includes balance-sheet information required for analysing firms' capital structure. The second dataset, constructed from the scraper–MOT merge, contains turnover, profit, and personnel data and is therefore used exclusively for the growth and profitability model. Both datasets are unbalanced

panels, with varying numbers of yearly observations per firm, and together they form the empirical foundation for the regression analysis presented in the following sections.

### 3.3 Methodology and Research Design

The empirical approach is based on panel data regression analysis, which enables the examination of both cross-sectional and time-series variation among firms. This method is particularly suitable for the present study, as the dataset covers multiple years and includes firm-specific characteristics that may otherwise bias the results if ignored.

The models are estimated using firm fixed effects and year fixed effects to control for unobserved heterogeneity. Firm fixed effects ( $\mu_i$ ) capture time-invariant characteristics such as ownership structure, management quality, location, and business model, while year fixed effects ( $\tau_t$ ) account for macroeconomic shocks or policy changes that affect all firms in a given year. In practice, these effects are implemented through the *within transformation*, which demeans each variable by subtracting its firm-specific (and year-specific) mean. This transformation removes all variation that is constant within a firm or within a year, ensuring that the coefficients are estimated solely from within-firm changes over time rather than from cross-sectional differences between firms. By doing so, the model eliminates bias from unobserved, time-invariant firm characteristics that could otherwise be correlated with subsidy receipt or financial outcomes. Standard errors are clustered at the firm level to account for serial correlation and heteroskedasticity within firms over time.

To mitigate simultaneity concerns—where subsidies might be both a cause and a consequence of firm performance—the main explanatory variables (subsidy dummy and subsidy amount) are lagged by one year. This approach assumes that the financial effects of receiving a subsidy are more likely to materialize in the following period.

The baseline regression model takes the following general form:

$$Y_{it} = \alpha + \beta_1 \text{Subsidy}_{i,t-1} + \beta_2 X_{it} + \mu_i + \tau_t + \varepsilon_{it}$$

where  $Y_{it}$  represents the dependent variable for firm  $i$  in year  $t$  (e.g., leverage, profitability, or asset growth),  $\text{Subsidy}_{i,t-1}$  is the lagged subsidy variable,  $X_{it}$  denotes a vector of control variables (such as firm size, profitability, and liquidity),  $\mu_i$  are firm fixed effects,  $\tau_t$  are year fixed effects, and  $\varepsilon_{it}$  is the error term.

### 3.4 Leverage Model

The leverage model examines how public business subsidies are associated with firms' financing behaviour, interpreted through the lenses of the trade-off and pecking order theories. In the model, the debt ratio serves as the dependent variable, while the lagged subsidy intensity—measured as direct subsidies relative to total assets—represents the main explanatory variable. The subsidy variable is lagged by one year to reflect the notion that firms typically adjust their capital structure after receiving public support and implementing the associated projects. Moreover, lagging the subsidy variable helps to mitigate simultaneity concerns: subsidies may be granted partly based on current performance or financial conditions, and using the previous year's subsidy level reduces the risk that the estimated effect merely captures reverse causality. By focusing on  $t-1$  values, the model more plausibly reflects the timing through which subsidies influence leverage adjustments.

The model is estimated as a firm–year panel with fixed effects:

$$\text{DebtRatio}_{it} = \alpha + \beta_1 \ln(\text{SubsidyIntensity}_{i,t-1}) + \gamma_1 \ln(\text{Assets}_{it}) + \gamma_2 \text{Liquidity}_{it} + \mu_i + \lambda_t + \varepsilon_{it},$$

where  $\text{DebtRatio}_{it}$  represents the share of total assets financed by debt, and  $\ln(\text{SubsidyIntensity}_{i,t-1})$  denotes the logarithm of the previous year's ratio of direct subsidies to total assets.

### 3.4.1 Control variables

- Firm size ( $\ln(\text{Assets})$ ) controls for differences in access to capital markets and economies of scale. Larger firms typically have more stable cash flows and easier access to debt.
- Liquidity (Current Assets/Total Assets) reflects the availability of internal cash buffers. Highly liquid firms rely less on external financing and typically maintain lower leverage to preserve financial flexibility.

The model includes both firm fixed effects ( $\mu_i$ ) and year fixed effects ( $\lambda_t$ ) to control for unobserved heterogeneity. Firm fixed effects remove all time-invariant characteristics, such as industry, ownership, or governance structure, ensuring that the estimated coefficients are based solely on within-firm variation over time. Year fixed effects capture macroeconomic conditions and policy shocks common to all firms. Standard errors are clustered at the firm level to account for heteroskedasticity and serial correlation within firms.

### 3.4.2 Interpretation

The coefficient of interest,  $\beta_1$ , measures how lagged subsidy intensity affects a firm's leverage.

- A negative and statistically significant  $\beta_1$  supports the *pecking order theory*, indicating that subsidies act as an internal financing source and reduce reliance on external debt.
- A positive  $\beta_1$  would be consistent with the *trade-off theory*, suggesting that subsidies lower financial risk and enable firms to safely increase leverage to benefit from tax shields.
- An insignificant  $\beta_1$  would imply that subsidies have limited influence on firms' capital structure, consistent with the view that larger and financially unconstrained firms do not adjust their debt levels in response to public support.

Overall, this model tests whether public business subsidies substitute for or complement external financing among Finnish firms, providing evidence on how public support interacts with firms' capital structure decisions.

## 3.5 Profitability Model

The second model examines whether public business subsidies are associated with subsequent changes in firms' growth and profitability (ROA) in a panel of mainly small and micro firms. The dependent variable is, in turn, (i) ROA and (ii) revenue growth. The key explanatory variable is the lagged subsidy intensity, defined as the ratio of direct subsidies to firm scale and measured at  $t - 1$ . Lagging reflects that performance effects materialise after supported projects are implemented and mitigates simultaneity between subsidy allocation and current outcomes. Because the scraper dataset does not include full balance sheets, this model focuses on performance not capital structure. ROA is chosen because it is one of the most widely used accounting-based measures of profitability

and captures how efficiently a firm converts its asset base into earnings. It provides a direct indication of whether subsidized projects translate into improved operating efficiency. Revenue growth is included as a complementary indicator of firm expansion and is particularly relevant in the context of public subsidies, where additional economic activity, rather than short-run profit, is often the primary policy objective. Together, these two measures offer a balanced view of whether subsidies generate observable performance improvements at the firm level.

Both outcomes are estimated separately as firm–year panels with fixed effects:

$$\begin{aligned} \text{ROA}_{it} &= \alpha + \beta_1 \ln(\text{SubsidyIntensity}_{i,t-1}) + \gamma_1 \ln(\text{Size}_{it}) + \gamma_2 \ln(\text{Headcount}_{it}) + \mu_i + \lambda_t + \varepsilon_{it}, \\ \text{Growth}_{it} &= \alpha + \beta_1 \ln(\text{SubsidyIntensity}_{i,t-1}) + \gamma_1 \ln(\text{Size}_{it}) + \gamma_2 \ln(\text{Headcount}_{it}) + \mu_i + \lambda_t + \varepsilon_{it}. \end{aligned}$$

where  $\text{ROA}_{it}$  and  $\text{Growth}_{it}$  are constructed from the scraper financials,  $\ln(\text{Size}_{it})$  is the logarithm of firm size (turnover), and  $\ln(\text{Headcount}_{it})$  is the logarithm of personnel.

### 3.5.1 Control variables

- Firm size ( $\ln \text{Size}$ ): absorbs scale effects and demand shocks correlated with both subsidy take-up and outcomes.
- Headcount ( $\ln \text{Headcount}$ ): proxies labour input and organisational expansion that co-moves with performance.

The model includes firm fixed effects ( $\mu_i$ ) and year fixed effects ( $\lambda_t$ ). Firm FE difference out all time-invariant characteristics (e.g. industry niche, governance, location), so identification comes from within-firm changes over time. Year FE absorb common macro shocks and policy shifts. Standard errors are clustered at the firm level to allow for heteroskedasticity and serial correlation within firms.

### 3.5.2 Interpretation

The coefficient of interest,  $\beta_1$ , captures how a change in lagged subsidy intensity is associated with within-firm changes in performance:

- $\beta_1 > 0$ : consistent with additionality (welfare/credit-constraint channel)—subsidies precede higher profitability or faster growth.
- $\beta_1 \approx 0$ : limited average impact (projects would have proceeded anyway, or benefits materialise outside near-term accounting).
- $\beta_1 < 0$ : potential inefficiency or crowding-out (resources reallocated away from productive uses or weaker incentives).

Overall the model assesses whether public subsidies generate measurable improvements in firm efficiency and profitability among companies, thereby testing the additionality principle central to welfare-based justifications for business support.

## 4 Results and Interpretation

### 4.1 Subsidies and Leverage (Model 1)

The fixed-effects regression results for leverage (debt ratio) are presented in Table 1. The key finding is that lagged subsidy intensity has a positive and statistically significant effect on firm leverage. The coefficient is approximately 1.17 ( $p < 0.01$ ), indicating that firms which received higher subsidies (relative to size) tend to subsequently carry higher debt ratios. In economic terms, this magnitude suggests a meaningful increase in leverage associated with subsidization, holding other factors constant. By contrast, liquidity (current assets relative to liabilities) shows a significant negative coefficient, implying that more liquid firms use less debt. The control for firm size (log assets) is positive (as expected for larger firms' debt capacity) but less pronounced. Overall, the Model 1 estimates imply that public subsidies are correlated with an increase in borrowing, whereas abundant internal funds curb debt levels (consistent with pecking-order behavior).

| <b>Fixed Effects (Firm &amp; Year), Firm-Clustered SE</b> |                      |
|---|----------------------|
| <i>Dependent variable:</i>                                |                      |
|   | DebtRatio            |
| LnSubsidyIntensity_lag                                    | 1.167***<br>(0.400)  |
| lnAssets  | 0.017<br>(0.026)     |
| Liquidity   | -0.237***<br>(0.080) |
| Observations  | 460                  |
| R <sup>2</sup>  | 0.053                |

*Note:* \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

*Table 1 : Leverage Model Regression results*

These results can be interpreted through the lens of capital structure theory. The positive subsidy–leverage link aligns with the trade-off theory (Kraus & Litzengerger 1973): a subsidy injection may reduce financial distress risk or effectively act as an equity cushion, encouraging firms to take on more debt to exploit the tax shield benefits of leverage. Subsidies might also serve as a signal of firm quality or a form of collateral, alleviating credit rationing constraints (Stiglitz & Weiss 1981) and enabling previously constrained firms to access external loans. In this way, public support appears to complement external financing rather than substitute for it. Notably, the finding runs counter to the pecking-order theory (Myers & Majluf 1984) prediction that subsidized funds, functioning as internal capital, should reduce the need for debt. Instead of using subsidies to avoid borrowing, Finnish firms in the sample increased their leverage, suggesting that the presence of subsidy funding may prompt additional debt-financed investment (for example, if grant programs require co-financing). The significant negative effect of liquidity on debt further supports pecking-order intuition: firms with ample internal cash flows prefer to finance operations internally and thus maintain lower debt levels, all else equal. This contrast between the subsidy effect and the liquidity effect highlights that while internal resources reduce leverage, external public support appears to encourage leverage – a dynamic consistent with subsidies easing financing frictions and shifting the firm's financing mix toward debt.

## 4.2 Subsidies, Profitability and Growth (Model 2)

Table 2 reports the results of Model 2, which examines the association between lagged subsidy intensity and firm performance (measured by return on assets and revenue growth). In stark contrast to the leverage outcomes, the subsidy intensity coefficients in the ROA and growth regressions are statistically insignificant and near zero. In both the profitability and growth specifications, the subsidy term does not differ significantly from zero (p-values well above 0.10), indicating no clear evidence that receiving a subsidy boosts short-run financial performance. The point estimates are very small – for instance, the subsidy coefficient in the ROA model is close to zero – suggesting that, on average, public business subsidies did not translate into any immediate improvement in profitability or sales growth for the sampled firms. This null result holds despite the inclusion of firm and year fixed effects, implying that within-firm changes in subsidy receipts are not associated with detectable changes in the next year’s performance. In economic terms, any potential positive impacts of subsidies on ROA or growth were too modest or too delayed to be captured in the one-year post-subsidy window of this analysis.

**Small Firms: Fixed Effects (Firm & Year), Firm-Clustered SE**

|                                | <i>Dependent variable:</i>  |                         |
|--------------------------------|-----------------------------|-------------------------|
|                                | roa<br>ROA<br>(1)           | growth<br>Growth<br>(2) |
| <i>ln_subsidyintensity_lag</i> | -0.053<br>(0.044)           | -0.013<br>(0.012)       |
| <i>lnsize</i>                  | 1.344*<br>(0.717)           | 1.016***<br>(0.074)     |
| <i>ln_henk</i>                 | -0.429<br>(0.271)           | -0.356***<br>(0.074)    |
| Observations                   | 342                         | 342                     |
| R <sup>2</sup>                 | 0.427                       | 0.771                   |
| <i>Note:</i>                   | *p<0.1; **p<0.05; ***p<0.01 |                         |

*Table 2: Profitability model regression results*

The control variables in Model 2 behave as expected and provide additional insights. Firm size (log turnover) has a positive and significant association with both ROA and growth: when a firm grows larger (in revenue terms), it tends to enjoy higher profitability rates and faster growth, all else equal. This may reflect economies of scale or better access to markets among larger firms. In contrast, headcount (log number of employees) enters with a negative coefficient in the performance models – a result that is statistically significant. This suggests that, conditional on a firm’s fixed characteristics and revenue size, an increase in workforce is associated with lower ROA and slower revenue growth. One interpretation is that rapidly expanding labor forces can temporarily depress productivity or profit per employee (for example, due to hiring costs or lagging productivity improvements), or it may indicate diminishing returns when scaling up personnel without proportional revenue gains. Regardless, the significance of these controls underscores that firm fundamentals (scale and resource usage) strongly influence performance, whereas the subsidy itself shows no immediate payoff in accounting metrics.

### 4.3 Interpretation of Performance, null findings

The absence of measurable ROA or growth effects from subsidies is noteworthy, and several explanations can be considered. One possibility is a timing lag: the benefits of projects funded by subsidies might take more than one year to materialize. Many public support programs (especially for R&D, innovation or capacity building) aim to enhance a firm's capabilities and competitive position, but these improvements may only translate into higher profits or sales after a longer period. In the short run, subsidized firms could be in an investment or development phase that dampens profitability (e.g. incurring R&D expenses) even though their prospects improve in the long run. Another consideration is the nature of additionality. The additionality perspective (Takalo et al. 2013) posits that subsidies should induce extra activity and improve performance by overcoming market failures. However, if in practice the subsidized projects would have proceeded even without public funding (i.e. low additionality), then the subsidy will not significantly change the firm's outcomes in the near term. It is possible that some firms used the grants mainly to finance projects they had already planned, resulting in no incremental boost to ROA/growth relative to non-subsidized scenarios. Similarly, if the primary benefits of the subsidy are social or long-term – for example, generating knowledge spillovers or preserving jobs (in line with welfare economics arguments of Arrow (1962) about correcting underinvestment) – then private accounting returns may remain unchanged. Takalo et al. (2013) emphasize that the success of a subsidy should not be judged solely by immediate increases in the firm's own output or profits, since projects with large positive externalities can improve overall welfare even if the firm's short-run financials do not increase markedly. Additionally, there could be a selection effect: firms that receive subsidies might be those facing greater challenges (e.g. innovative but high-risk ventures, or temporarily distressed firms seeking aid). For such companies, a grant might prevent further decline or enable important activities, yet their average performance might still lag behind more established firms, yielding an insignificant average effect in the data. At the same time, two dataset-specific limitations are likely to contribute to the null findings. First, the empirical window is relatively short, as performance is observed only one year after the subsidy; this limits the ability to detect effects that materialize gradually. Second, the performance dataset consists largely of small and micro firms with volatile year-to-year outcomes and incomplete financial information, increasing statistical noise. These factors mean that even if subsidies had positive effects, they may be too small or too delayed to appear in short-run firm-level accounting metrics. Lastly, practical inefficiencies or constraints tied to subsidies (administrative burdens, conditionality of funds, or allocative inefficiency) could dilute their impact on profitability. In sum, the lack of short-run performance improvement does not necessarily mean subsidies had no effect; rather, it suggests that any benefits did not manifest as an immediate boost to standard performance indicators within the observed timeframe.

#### 4.3.1 Synthesis and Theoretical Implications

Synthesizing the evidence from both models, the results present a nuanced picture of how public business subsidies in Finland affect firms, and these findings can be linked back to the thesis's theoretical framework. Model 1 (leverage) indicates that subsidies influence *how firms finance themselves*, in a manner consistent with easing financial frictions. The positive leverage response supports the view that subsidies can relax credit constraints and encourage higher debt uptake – behavior aligned with the trade-off theory's expectation that reducing risk allows firms to capitalize on debt tax shields. This complements the credit-rationing theory (Stiglitz & Weiss 1981) rationale that injecting public funds improves firms' access to external finance. In essence, the evidence suggests that government support did not crowd out private financing; instead, subsidized firms leveraged the assistance to obtain additional debt capital. On the other hand, Model 2 (performance) finds no immediate enhancement in firm outcomes like profitability or growth, meaning that

subsidies did *not* rapidly translate into superior performance within the sample period. From a welfare economics perspective (Arrow 1962), one would expect that correcting market failures (such as under-investment due to externalities or credit gaps) should eventually reflect in better firm-level results. The short-run null findings imply that either such benefits require a longer horizon to become evident, or that the private gains from subsidies are modest and potentially outweighed by other factors. This does not necessarily invalidate the additionality principle – it may be that subsidies’ main contributions lie in enabling projects with high social returns (e.g. innovation with spillovers) that do not immediately boost profits.

In conclusion, the two models together suggest that while public subsidies have a significant impact on corporate financial structure – confirming some theoretical predictions (notably, consistent with trade-off theory and credit-constraint alleviation, and contrary to a pure pecking-order substitution effect) – their impact on short-term performance metrics is limited. This outcome highlights a key insight for the overall thesis: subsidies seem to change the financing behavior of firms (providing relief and encouraging leverage), yet evidence of improved efficiency or growth is absent in the near term, raising important questions about the channels through which subsidies yield benefits and whether those benefits manifest more in qualitative or longer-term dimensions than in immediate financial ratios. The findings thus integrate into the thesis framework by showing partial support for the hypothesized mechanisms – finance-related effects appear as theorized, whereas the anticipated performance gains (per the additionality and welfare arguments) remain elusive, suggesting a need to consider longer-term and broader outcome measures when evaluating the effectiveness of business subsidies.

## 5 Conclusion

This thesis set out to examine whether Finland's substantial business subsidies – over €8 billion in annual support – truly address market failures or risk misallocating public funds. The motivation stemmed from growing societal debates about the fairness and efficiency of these subsidies. Critics argue that the system often distorts competition and props up outdated industries; even many entrepreneurs perceive it as unfair in its current form. In light of these concerns, the study's findings offer nuanced insight into how subsidies influence firm behavior and outcomes.

First research question: *Do public subsidies affect firms' capital structure (leverage)?* The analysis finds that they do. Lagged subsidy intensity had a positive, statistically significant effect on firm leverage, indicating that subsidized firms tend to take on more debt. This suggests that subsidies ease financing constraints – consistent with the idea that government support relaxes credit frictions and expands debt capacity. In practical terms, receiving a subsidy might improve a firm's balance sheet or creditworthiness, enabling it to borrow more than it otherwise could. Such a result aligns with classical capital structure theory: according to the trade-off theory, companies balance the tax benefits of debt against bankruptcy risks, and an infusion of public funds may effectively lower the perceived risks or provide collateral, encouraging higher leverage. In contrast, the result is not consistent with a strict pecking order view. Pecking order theory postulates that firms prefer internal financing (like grants) over debt; if that held here, subsidies would substitute for debt and reduce leverage, which is the opposite of what was observed. Thus, the first two research questions can be answered by noting that subsidies do affect capital structure, and the pattern of increased leverage fits better with trade-off theory (and the easing of credit constraints) than with pecking-order behavior.

Third research question: *Do subsidies improve firm performance (profitability or growth)?* Based on the empirical evidence, no significant short-run improvement in profitability (ROA) or revenue growth was detected for subsidized firms. In the panel models, lagged subsidy intensity did not yield a measurable increase in ROA or sales growth in the subsequent period. In other words, the data showed no immediate performance “additionality” from subsidies – the firms that received more subsidies did not, on average, outperform their peers in the short term. This finding tempers expectations about the efficacy of subsidies: while public support may strengthen firms' financial positions, it does not automatically translate into higher profits or growth (at least within the one- to two-year window considered). It is possible that any positive impacts on performance require a longer time to materialize (for instance, if subsidies are invested in projects with a multi-year payoff), or that they manifest in qualitative ways not captured by short-run financial metrics.

These results carry important implications for theory and policy. The positive leverage effect lends credence to the notion that subsidies can alleviate capital market failures by helping firms access debt financing. From a welfare economics perspective, this could be seen as a desirable correction if credit constraints were preventing worthwhile investments. However, the lack of short-run performance improvement raises questions about efficiency and additionality. If subsidized firms are not becoming more profitable or growing faster, the social return on these public expenditures may be limited in the short term. This outcome echoes concerns that some subsidies may simply reallocate financial resources without spurring new value creation – for example, by sustaining companies or projects that would have proceeded even without aid. In such cases, subsidies risk becoming transfers that preserve the status quo rather than catalysts for innovation or productivity. To justify their cost, subsidies should ideally generate benefits that would not occur otherwise (be it new investments, jobs, or technologies). The evidence here suggests that immediate financial gains are elusive, underscoring the importance of targeting and evaluation.

In sum, this thesis contributes to the broader economic policy discussion by providing empirical evidence on what public subsidies in Finland are (and are not) achieving. The findings show a clear influence on firms' financing behavior but cast doubt on any quick wins in terms of profitability or growth. This nuanced picture reinforces why ongoing scrutiny of subsidy programs is warranted. As Finland – like many countries – grapples with how to best spend public funds to foster sustainable growth, results such as these highlight the need to align subsidy initiatives with well-identified market failures and to monitor their outcomes diligently. Ultimately, making business subsidies more effective and equitable is an evolving policy challenge, and this study's evidence can help inform that endeavor in pursuit of improved economic welfare.

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## Appendices

### Appendix 1 : Python Scraper script

```

import requests
from bs4 import BeautifulSoup
import pandas as pd
import time

df = pd.read_excel("y_tunnarit.xlsx")
df.columns = df.columns.str.strip().str.lower()

selector = "#main_content_anchor > div > div > div > main > section:nth-child(5) >
div.sc-adfgt2-0.cxgEyy > div:nth-child(2)"

def clean_number(value):
    return (value
            .replace('\xa0', '')
            .replace('\u00A0', '')
            .replace('\u202f', '')
            .replace('Â', '')
            .replace(' ', '')
            .replace('-', '-')
            .replace('€', '')
            )

def parse_financial_data(element):
    result = {}
    lis = element.find_all('li', class_='sc-adfgt2-2 hMool')

    i = 0
    while i < len(lis):
        text = lis[i].get_text(strip=True)

        if '/' in text:
            vuosi_str = text.split('/')[1]
            vuosi = vuosi_str if vuosi_str.isdigit() else None

            if vuosi:
                liikevaihto = clean_number(lis[i+1].get_text(strip=True))
                liiketulos = clean_number(lis[i+2].get_text(strip=True)) if (i+2) <
len(lis) else None
                henkilosto = clean_number(lis[i+4].get_text(strip=True)) if (i+4) <
len(lis) else None

                print(f"Vuosi {vuosi} | LV: {liikevaihto} | Tulos: {liiketulos} |
Hlö: {henkilosto}")

                if any(c.isdigit() for c in liikevaihto):

```

```

        result[f"liikevaihto_{vuosi}"] = liikevaihto

        if liiketulos and any(c.isdigit() for c in liiketulos.replace('-',
'')):
            result[f"liiketulos_{vuosi}"] = liiketulos

            if henkilosto:
                if henkilosto.isdigit():
                    result[f"henkilosto_{vuosi}"] = henkilosto
                elif henkilosto == "-":
                    result[f"henkilosto_{vuosi}"] = None

                i += 5
            else:
                i += 1
        else:
            i += 1

    return result

def fetch_kauppalehti_data(y_tunnus, nimi):
    ytunnus_url = y_tunnus.replace("-", "")
    nimi_url = nimi.lower().replace(" ", "+").replace(",", "").replace(".", "")
    url = f"https://www.kauppalehti.fi/yritykset/yritys/{nimi_url}/{ytunnus_url}"
    print(f"Haku: {url}")

    headers = {"User-Agent": "Mozilla/5.0"}
    response = requests.get(url, headers=headers)
    if response.status_code != 200:
        print(f"Virhe {response.status_code}")
        return {}

    soup = BeautifulSoup(response.text, 'html.parser')
    element = soup.select_one(selector)

    if not element:
        print(f"Dataelementtiä ei löytynyt {url}")
        return {}

    parsed_data = parse_financial_data(element)
    return parsed_data

results = []
for idx, row in df.iterrows():
    y_tunnus = str(row['y_tunnus']).strip()
    nimi = str(row['nimi']).strip()

    if not y_tunnus or not nimi:
        continue

```

```
data = fetch_kauppalehti_data(y_tunnus, nimi)
result_row = {"y_tunnus": y_tunnus}
result_row.update(data)
results.append(result_row)

time.sleep(1)

output_df = pd.DataFrame(results)

# Lajitellaan sarakkeet aikajärjestyksessä
fixed_cols = ['y_tunnus']
liikevaihto_cols = sorted([col for col in output_df.columns if
col.startswith('liikevaihto_')])
liiketulos_cols = sorted([col for col in output_df.columns if
col.startswith('liiketulos_')])
henkilosto_cols = sorted([col for col in output_df.columns if
col.startswith('henkilosto_')])

final_df = output_df[fixed_cols + liikevaihto_cols + liiketulos_cols +
henkilosto_cols]

final_df.to_csv("kauppalehti_scraper_tulokset.csv", index=False, encoding='utf-8-
sig')

print("Valmis!")
```

#### Disclosing the use of AI:

Artificial intelligence tools, including ChatGPT, were utilized to improve the clarity, grammar, structure, and wording of the text. Some of the R code and python code used in the empirical analysis was developed with the assistance of AI tools.