Doctoral Dissertation

Essays on Taxation and Entrepreneurship

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Economics

Örebro Studies in Economics 49 | ÖREBRO 2026

Örebro Studies in Economics 49

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Title: Essays on Taxation and Entrepreneurship

Publisher: Örebro University, 2026
www.oru.se/publikationer

Print: Örebro University, Repro 12/2025

ISSN: 1654-8841
ISBN: 978-91-7529-726-2 (print)
ISBN: 978-91-7529-727-9 (pdf)

Abstract

This thesis examines the long-term tax incentives for Swedish entrepreneurs, using active owners of closely held corporations as a proxy for entrepreneurship. A general analytical framework is developed by extending the King and Fullerton (1984) model to calculate marginal effective tax rates on capital income (METRs) under detailed income-splitting and ownership rules. The thesis consists of four self-contained essays.

The first essay revisits the taxation of closely held corporations in a dual income tax system. It shows that METRs for active owners are highly sensitive to remuneration strategies, financing choices, firm characteristics, and opportunities for income shifting. Even investments with identical pre-tax returns may face tax wedges that differ by several tens of percentage points, implying substantial distortions.

The second essay documents the evolution of capital income taxation for active owners following the 1991 tax reform. It demonstrates that the tax system remains non-neutral, unstable, and difficult to predict, with large differences in effective taxation across sources of finance, profit levels, and owner incomes. This instability creates uncertainty regarding the future taxation of new investments, especially those financed through new share issues.

The third essay adopts a long-run perspective, constructing annual METRs for entrepreneurial investments from 1862 to 2018. It identifies five distinct tax regimes that help to explain the rise of many successful entrepreneurial firms around 1900, the absence of new large entrepreneurial firms after World War II, and a more recent entrepreneurial renaissance.

The final essay turns to industrial foundations, tracing their tax treatment over the same period. It has been argued that the Swedish tax system has favored firm control through tax-exempt industrial foundations, which should have inhibited entrepreneurship and economic growth. The analysis finds that the combination of tax exemption and mandatory donations to achieve tax exemption can imply required outflows of capital income corresponding to high effective tax burdens.

Taken together, the essays show that tax policy that attempts to combine high and progressive taxation on labor with strong entrepreneurial incentives comes with pronounced trade-offs in terms of neutrality, predictability, and the distribution of incentives across different types of firms.

Keywords: Taxation; Entrepreneurship; Institutional Quality; Marginal Effective Tax Rates; Tax Regimes; Tax Reforms; Dual Income Tax; Income Splitting Rules; Income Shifting; Foundations; Business Group

Acknowledgements

First and foremost, I would like to express my sincere gratitude to my main supervisor, Dan Johansson, and my co-supervisor, Mikael Stenkula, for their committed and persistent support with my thesis work. I also wish to extend my warm thanks to my co-supervisor, Daniela Andrén, who continued to provide advice and encouragement when my research shifted away from her area.

My deepest thanks also go to the Research Institute of Industrial Economics (IFN) and especially to Magnus Henrekson for allowing me to be part of its research environment.

Three people have been particularly helpful. Thank you, Jacob Lundberg, for reading, discussing, and commenting on my work. Thank you, Henrik Lundquist, for countless discussions about the tax rules for closely held corporations. Thank you, Hanif Bali, for IT support and generous coding advice.

I would also like to thank Sofia Torgå and Henrik Broborg for their excellent work with the research administration, and Anders Borg for encouraging me to apply to the PhD programme.

I could not have carried out this research alongside my regular work without the support and patience of my partner, Isak. For that, and for countless other reasons, I love you.

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Introduction

My thesis consists of four self-contained essays. The overall purpose is to examine the tax incentives for entrepreneurial investments in Sweden. The analysis covers the period from 1862 to 2024.

Studies on entrepreneurs' long-term tax incentives have long been hampered by the lack of theoretical consensus on how entrepreneurship should be defined, no distinct tax category in the tax code associated with entrepreneurial income, and no long and detailed time series of the effective taxation of entrepreneurs. I address all three of these issues in my thesis, making it possible to examine the long-term evolution of the taxation of Swedish entrepreneurs.

The first essay, *The taxation of closely held firms: the Achilles heel of the dual income tax system reconsidered*, co-authored with Mikael Stenkula, extends the King-Fullerton model for calculating the marginal effective tax rate on capital (METR) for active owners of closely held corporations in a dual income tax system with income splitting rules.[1] The model offers a more general method and analyzes how different assumptions affect the METR.

The second essay, *Capital income taxation of owners of closely held corporations in Sweden, 1991–2024*, presents an overview of the development of the rules for closely held corporations. In addition, it utilizes the theoretical results from the first essay to calculate time series of the METR for active owners of closely held corporations from 1991 to 2024.

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[1] The principal definition of a closely held corporation, according to the tax law, is that four or fewer owners control more than 50% of the ultimate voting rights. An owner is considered to be active if (s)he is (or during the past five years has been) active in the income generation of the corporation to a "considerable extent." Close family members are regarded as one owner in this context (see Bjuggren et al., 2011, for further details). Passive owners only provide capital.

The third essay, *The evolution of owner-entrepreneurs' taxation: five tax regimes over a 160-year period,* co-authored with Niklas Elert, Dan Johansson and Mikael Stenkula,[2] makes use of the results in the first and second essays to identify different tax regimes by calculating METR time series for active owners of closely held corporations, recognizing them as a relevant pool of potential entrepreneurs. The calculations cover the period 1862–2018.

The fourth essay, *The Taxation of Industrial Foundations in Sweden (1862–2018),* co-authored with Dan Johansson and Mikael Stenkula,[3] analyzes the rise of *industrial foundations* (*allmännyttiga stiftelser*) as owners of Swedish industry and calculates their METR. The role and conditions for industrial foundations are fundamental for understanding a significant part of the prerequisites for entrepreneurship in Sweden. The analysis also covers the years from 1862 to 2018.

Accordingly, I address the definitional issue in the literature regarding the entrepreneur by treating owners of closely held corporations as a relevant pool of potential entrepreneurs. This operational definition allows me to circumvent the absence of a distinct tax category for entrepreneurial income by using the tax code

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2 This essay is published as: Elert, N., Johansson, D., Stenkula, M., & Wykman, N. (2023). The evolution of owner-entrepreneurs' taxation: five tax regimes over a 160-year period, *Journal of Evolutionary Economics*, *33*(2), 517–540. A more comprehensive version is published as: Elert, N., Johansson, D., Stenkula, M., and Wykman, N, (2022). The evolution of owner-entrepreneurs' taxation: five tax regimes over a 160-year period. Örebro University School of Business Working Paper No. 2022: 4, Örebro: Örebro universitet and IFN Working Paper No. 1429, Stockholm: IFN.

3 This essay is published as: Johansson, D., Stenkula, M., & Wykman, N. (2020). The Taxation of Industrial Foundations in Sweden (1862–2018). *Nordic Tax Journal*, *1*(1), 1–14. The article was rewarded with the Nordic Tax Research Council's article prize 2021. A more comprehensive version is published as: Johansson, D., Stenkula, M., & Wykman, N. (2018). "The rise of private foundations as owners of Swedish industry: the role of tax incentives 1862–2018". Örebro University School of Business Working Paper No. 2018: 10, Örebro: Örebro University and IFN Working Paper No. 1245, Stockholm: IFN.

for active owners of closely held corporations. By incorporating the rules for closely held corporations into an extended King-Fullerton model of the marginal effective tax rate, I and my co-authors construct long time series based on Swedish tax data and thereby advance the historical knowledge of effective taxation of entrepreneurs. In doing so, the thesis contributes to our understanding of the effects of taxation on entrepreneurship and economic development from the onset of Swedish industrialization to the present.

My thesis is part of a comprehensive project to characterize the Swedish tax system from 1862, when Sweden introduced a new tax system, up until today. The studies undertaken in the project until 2013 are summarized in Stenkula (2014) and in Henrekson and Stenkula (2015) and cover six key aspects of the tax system: the taxation of capital income of households, consumption, gifts and inheritance, labor income, real estate, and wealth.

* * *

The entrepreneurs' crucial role for the working of the economy has at least been recognized in economic literature since Cantillon (1755). Today, the importance of entrepreneurs is widely acknowledged, and there is a growing body of literature on entrepreneurship, despite a lack of a theoretical or empirical consensus on their definition (see Hébert and Link, 2007, for a survey of the history of economic thought on entrepreneurs). Schumpeter (1934) defined entrepreneurship as the commercialization of novel combinations of heterogeneous factors of production, i.e., innovations, which sparks a process of creative destruction that drives economic growth—a view that has gained wide acceptance (Aghion et al., 2015). Knight (1921) emphasized ownership, since it is the active owner who ultimately controls the factors of production, carries out an executive role in their usage and takes the profit or loss as residual claimant. In the absence of a consensus definition of entrepreneurship, it is reasonable to assume that at least a subset of active owners of closely held corporations has entrepreneurial intentions.

Institutions ("the rules of the game") are fundamental in shaping the conditions for entrepreneurship in the economy (e.g., Baumol, 1990); the tax system is one of the most important ones since it affects the structure of payoffs and therefore forms the monetary incentives for economic actors. Still, neither in the past nor today has there been a distinct category in the tax code for entrepreneurial income. Taxation is either levied independently of source (global tax system) or based on a division between labor and capital (dual tax system). Several scholars point out that the distinction between capital and labor income is not well suited for the analysis of entrepreneurship. The economic reward for entrepreneurship is simply something else; it is the return on a unique combination of ownership competence, judgement, uncertainty bearing, and the pursuit of innovation (Pelikan, 1993; Henrekson and Johansson, 2009; Henrekson and Sanandaji, 2011; Foss et al., 2021). The return from entrepreneurship is sometimes thought of as an inframarginal return, associated with rents to ideas, managerial skill, or market power (Hubbard, 1997).

Although active owners of closely held corporations can be a good proxy for entrepreneurs and are expected to be crucial for creating employment and economic growth, their long-term Swedish tax incentives have rarely been studied. Hence, my thesis examines the tax conditions for active owners of closely held corporations as an indication of the long-run investment incentives provided by the tax system for entrepreneurs. Even though this owner category, following the introduction of the dual income tax system in the early 1990s, is closely associated with the corresponding tax regulations, active owners in this sense have always existed, i.e., people who put both their capital and labor into a business project and evolve it through entrepreneurial efforts by exercising owner control.

Throughout the thesis, the focus is on active owners of closely held corporations whose incomes place them in the top tax bracket, as they plausibly constitute a pool for successful entrepreneurs. Such entrepreneurship is argued to be critical for spurring firm and economic growth by commercializing radical innovations that lead to structural transformation of the economy (Schumpeter, 1934; Acs, 2008). In doing this, they can earn high incomes and accumulate substantial wealth. Research has also shown that entrepreneurs are more tax sensitive than wage earners (Bastani and Selin, 2014) and that high-income earners generally exhibit high income elasticity with respect to taxes (Gruber and Saez, 2002).

An alternative way to carry out entrepreneurial activity through direct ownership of corporations is to exercise control through industrial foundations. Industrial foundations have been an important means for a few influential family business groups to exercise far-reaching control over Swedish industry, possibly because they have been tax-exempt. Especially after World War II, entrepreneurs risked losing ownership—and hence control—over their firms. By bequeathing a corporation or a group of corporations to an industrial foundation and appointing family members to its board, the owner family loses the direct ownership but keeps control. The taxation of industrial foundations has, however, only been calculated for occasional years starting in the 1960s. My thesis provides time series of the taxation of industrial foundations and the overall incentives for exercising control through foundations rather than direct ownership.

* * *

The thesis uses the King and Fullerton (1984) framework to measure the METR on investment projects. The King and Fullerton METR is a compressed equilibrium measure that combines tax rates, tax rules, inflation, allowances, deductions, tax credits, and grants into an estimate of the real marginal effective tax rate. The METR is widely used in academic research as well as in applied economic analysis.

How to calculate effective tax rates properly is debated in academic research as well as in practice. The approach of just summing up statutory tax rates suffers from shortcomings, not least its disregard of the tax base and the valuation of different tax credits. Several methods have been developed to deal with these and other aspects of effective taxation. To summarize the discussion, effective tax rates could be based either on parameters in the tax code, a so-called parameter-based method, or on firm-level data such as balance sheets and income statements, a so-called data-based method. It is, further, possible to distinguish between techniques that estimate the marginal effective tax rates (METR) and average effective tax rates (AETR). Table 1 summarizes the four methods and gives examples of contributions in each line of research.

Table 1. Different methods for estimating effective tax rates

	Marginal	Average
Parameter based	King and Fullerton (1984)	Devereux and Griffith (1998)
Data based	Gordon et al. (2003)	Heshmati et al. (2010)

Note: "Parameter based" refers to methods where parameters from the tax code are the main input, while "Data based" refers to methods where information from corporations' balance sheets and income statements is the main input.
Source: Own table.

There are several reasons why my thesis uses the King and Fullerton framework. It is an internationally well-established method and has previously been used to analyze the Swedish tax system, both in academic research and in policy analyses. The method is appropriate for analyzing tax incentives at the owner level since it summarizes the effect of both corporate income and personal income taxation in one metric. Such an analysis, over a long period of time for a large number of firms and their owners, is most difficult to carry out with micro data-based methods, since such detailed data generally are not available. Moreover, data-based methods may suffer from an endogeneity problem because the parameters in the tax code affect the selection of firms and because firms adjust their income statements and balance sheets taking the parameters into account. For instance, if a stable tax system hampers the entry and growth of "entrepreneurial" firms for decades, it may be easier to detect by using a parameter-based method than a data-based method. Another drawback with data-based methods is that the results may partly be driven by macroeconomic fluctuations rather than changes in the tax code. Finally, an investment project is generally evaluated for its discounted future revenue, which speaks in favor of a parameter-based method when evaluating the relevant effective tax rate for an entrepreneur. A data-based method is, by definition, backward-looking (Sørensen, 2004).

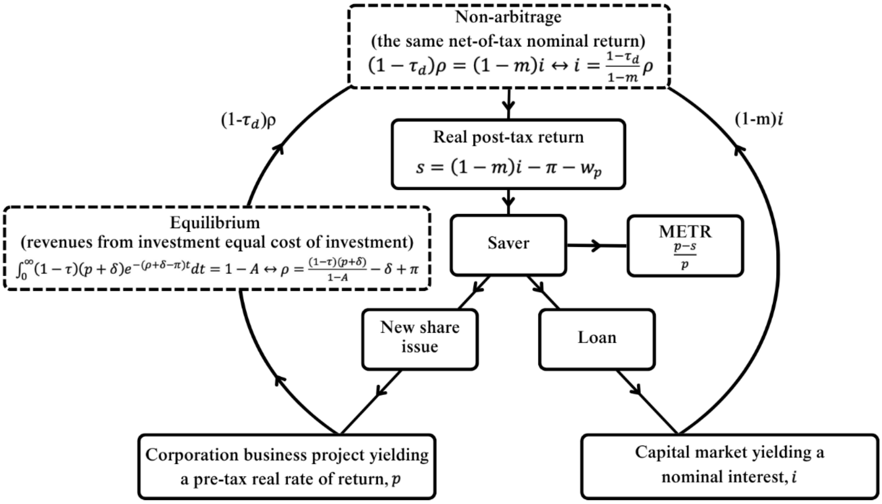
The choice between a marginal and an average approach depends on which question one aims to answer. AETR might give greater insight into the choice of location for economic activity, while METR determines the optimal scale of activity (Sørensen, 2004). As I exclusively focus on investments in Sweden, this speaks in favor of the METR measure.

The original King and Fullerton model examines the effective marginal tax rates on investments from different sources of finance (new share issues, retained earnings, and debt), from different groups of savers (households, tax-exempt institutions, and insurance companies), in different assets (machinery, buildings, and inventories) and in different industries (manufacturing, commerce and "other"). The framework is based on the cost of capital analysis in Hall and Jorgenson (1967) and presupposes a saver with two investment opportunities, either to invest in a corporation's investment project or to lend the funds on the capital market. Firms carry out investments until the marginal profit is zero and savers supply funds if it is at least as profitable as lending on the capital market. The METR is calculated for an investment where the economy has adjusted to fulfill these conditions (i.e., METR shows the effective tax rate for an investment with zero profit and where the return on the investment after taxes equals the interest rate on the capital market after taxes).

Following Bovenberg et al. (1990), the METR captures the effect of two tax wedges that can be calculated by defining three rates of return: the required pre-tax real rate of return on investment, p, the required yield on investment, ρ, and the post-tax real rate of return to savings, s. The required yield on investment, ρ, is an intermediate, the return the firm must pay the saver after corporate taxes, which is also the corporation's discount factor. The required pre-tax real rate of return on investment, p, is then the return the firm must earn to be able to pay both corporate taxes and the required yield on investment, ρ. The corporate tax wedge is $p - \rho$ and depends on the corporate tax rate, inflation, and allowances, A. The other tax wedge, $\rho - s$, depends on the relationship between the required yield on investment, ρ, and the post-tax real rate of return to savings, s, which in turn is determined by inflation and personal taxes. The total tax wedge is therefore $w = p - s$ and the METR is defined as $\frac{p-s}{p}$. In equilibrium, the pre-tax real rate of return, p, must equal the cost of capital.

The METR can be calculated either given a fixed pre-tax real rate of return, p, or a given fixed real interest rate, r. King and Fullerton (1984) primarily base their calculations on a fixed pre-tax real rate of return, p, which is also the case for previous studies on Sweden. To conform to this, I use a fixed-p approach as well. With this approach, the aim of the calculations is to find the nominal interest rate, i, that, given the tax rules and rate of inflation fulfills the equilibrium (discounted nominal revenues from investment in a project equal the cost of the investment) and non-arbitrage (investment in a project gives the saver the same net-of-tax nominal return as lending) conditions. A schematic presentation of the King and Fullerton framework for an investment financed with new share issues is presented in Figure 1. The same line of reasoning can be used to derive the METR for an investment financed with retained earnings or debt, which is formally explained in Essay I and Essay II.

Figure 1. A schematic presentation of the King and Fullerton framework



Note: p refers to the pre-tax real rate of return on a business project*; i* to the nominal interest rate on the capital market; ρ to the firm's discount factor (i.e., the nominal rate of return on the investment after corporate income taxes or the required yield on investments); τ, τ_d, and m to the tax on corporate profit, dividends, and interest, respectively; δ to the rate of depreciation, π to the rate of inflation, *A* to allowances, w_p to the saver's wealth tax, *s* to the post-tax real return and METR to the marginal effective tax rate on capital income. Two boxes are dashed to highlight the underlying economic assumptions of the framework, equilibrium and non-arbitrage. Equilibrium implies that the present value of the discounted nominal revenue stream from the investment after corporate tax is at least as large as the nominal investment itself. Non-arbitrage implies that the net-of-tax nominal return from investing in the corporation's business project should be the same as lending on the capital market.
Source: Own figure.

As stated above, the saver can either invest in a corporation's investment project or lend the funds on the capital market. The project yields a pre-tax real rate of return on investments, *p.* A necessary condition for the project to be carried out is that the present value of the discounted revenue stream from the investment is at least as large as the cost of the investment itself, which is assumed to be unity minus allowances, *A*, in Figure 1. The relationship between the pre-tax real rate of return, *p,* and the discount factor, *ρ,* that satisfies the condition that the discounted revenue stream from the investment is at least as large as the cost of the investment itself, is derived in the Equilibrium box. It is clear that ρ, by definition, is the *nominal* compensation the corporation can pay to the investor, i.e., the nominal rate of return on the investment after corporate income taxes or the required yield on investments. This is distributed to the saver in the form of dividends and taxed at rate τ_d.

Alternatively, the saver can lend the unit of capital on the capital market to the nominal interest rate, i, receiving the nominal after-tax return on the loan $(1-m)i$. Now the saver invests in the most favorable alternative until the saver receives the same net-of-tax return, which is used in the Non-arbitrage box in Figure 1 to derive the relationship between the nominal rate of return after corporate income taxes, ρ, and the nominal interest rate, i.

In equilibrium, the saver's required pre-tax real rate of return on investments, p, and the cost of capital must be equal. Together with the non-arbitrage relationship between the nominal interest rate, i, and the firm's discount rate, ρ, it is possible to describe the cost of capital, c, for financing with new share issues, as a function of the real interest

rate, r, so that: $c(r) = p = \frac{1-A}{1-\tau}\left(\frac{(1-m)i}{1-\tau_d} + \delta - \pi\right) - \delta$, where A is any grants, deductions, tax credits and allowances, τ is the corporate tax rate, δ is the rate of capital depreciation, and π is the rate of inflation.

Tax rules can differ depending on the source of finance, for instance, interest is a deductible cost for corporations while dividends are not. The way the return to the saver is distributed, i.e. as dividends, wages, capital gains, or interest, may also affect taxation. I take the taxation of all three sources of finance and the personal income taxation of the return to the saver into account in my analysis.

Despite shortcomings, the METR has attractive properties, not least that it is a highly combined statistic, making it possible to evaluate, if not the whole, then at least a large share of the tax system. The weakness of restricting the analysis to investments that on the margin generate no net profit for the firm, in an environment of perfect information and competition, also comes with the strength of knowing what is evaluated. Keeping both the pros and cons of the framework in mind, it is possible to use the results for a further quantitative and qualitative evaluation of the tax conditions for entrepreneurs. In particular, the METR allows comparisons over time and between countries. However, one must bear in mind that the METR is a measure of the incentive structure for investments and only a proxy for actual tax outcomes.

Incorporating the tax rules for closely held corporations, as stipulated after the tax reform in the early 1990s, into the King and Fullerton framework to get a model that can be generally applied over time to analyze the taxation of active owners of closely held corporations has turned out to be highly complicated. The difficulties arise from the rules themselves, and especially from the regulated division between the return to labor effort and capital investment. How to allocate the total surplus between wages, dividends, capital gains, and interest payments depends on several variables such as statutory imputed returns, the total level of surplus, and the size of the wage sum. Further, within the rules there are degrees of freedom, and the tax optimal strategy depends on even more variables, such as the relationship between different tax rates, the overall income of the investor, and the firm's initial financial position. The incorporation of the rules into a model is further aggravated by the instability of the rules—they have been changed several times since the introduction. This is a problem for model building and time-series creation, but more importantly it causes unpredictability for entrepreneurs; it is simply difficult for active owners with growth ambitions to estimate the tax rate when an investment is made—it is only possible to do afterwards. The unpredictability of the tax system is a drawback that requires a risk premium on investments and therefore hampers investment.

* * *

An important aspect when analyzing volatile outcomes, such as different pre-tax or post-tax returns to entrepreneurial investments, is the distinction between risk and uncertainty. Schumpeter did not distinguish between innovations characterized by risk, i.e., when the expected value of an innovation *can* be calculated *ex ante*, or uncertainty, i.e., when the expected value of an innovation *cannot* be calculated *ex ante*. Knight (1921), on the other hand, had the difference between the two concepts as a basis for explaining entrepreneurial profits. He concluded that neither entrepreneurship nor supernormal profits can be explained by risk-taking. If the expected outcome of an investment is known when the investment is made, competition and forward-looking expectations should lead to the disappearance of profit opportunities as economic actors adjust their prices and behavior to the known information. This also makes the entrepreneurial function meaningless (Henrekson et al., 2024). Knight therefore regarded the entrepreneur as a (firm) owner who actively searched for business opportunities by carrying out innovations characterized by uncertainty in anticipation of profits. This follows from the fact that, first, the owner ultimately decides whether the corporation should carry out an innovation, second, the owner also bears uncertainty as a residual claimant and therefore makes the profit or takes the loss.

A straightforward way to analyze the impact of risk and uncertainty on the effective taxation is to vary the pre-tax real rate of return, p, as a higher risk and bearing uncertainty requires a higher p. If $\frac{\partial METR}{\partial p} > 0$ there could be a tax disincentive to take on risk and uncertainty, and if this derivative is large, so is the disincentive. In parallel, scaling up a business project under the same rate of return may also be an entrepreneurial activity, but which generates a larger sum of total income to the owner. Therefore, examining the METR at different levels of income is also important to estimate the (dis)incentives for entrepreneurship. My thesis draws on these two methods. In particular, it analyzes how the more complicated tax regulations after the introduction of the dual income tax system affect the impact on the METR of changes in the rate of return and the total income level.

There are more technically advanced methods to introduce risk in the METR analysis, such as a risk-adjusted measure. To assess the impact of risk or uncertainty on effective taxation, it can also be advantageous to use models that do not rely on equilibrium conditions. However, this is beyond the scope of my thesis and a task for future research.

* * *

As mentioned, my thesis consists of four independent essays.

Essay I: *The taxation of closely held corporations: The achilles heel of the dual income tax system reconsidered*
(co-authored with Mikael Stenkula)

Abstract: This article revisits the taxation of closely held corporations under a dual income tax system. Extending the classic King and Fullerton (1984) model, it analyzes the marginal effective tax rate (METR) for active owners, incorporating income splitting rules that separate labor and capital income. Prior analyses often assumed that share repurchases mirror asset depreciation or ignored depreciation entirely. This study relaxes those assumptions by considering alternative strategies where an amount equal to depreciation is saved in financial assets, distributed to the owner, or reinvested. The results reveal that the METR is highly sensitive to financing decisions, firm characteristics, and owner behavior. Notably, even investments with identical pre-tax real rates of return may face METRs that differ by more than 30 percentage points, depending on the remuneration strategy and available tax-planning opportunities. Furthermore, the METR can differ by as much as 50 percentage points across investments with varying profitability, highlighting substantial distortions and disincentives for high-return projects. Contrary to conventional expectations, investments financed with new share issues can yield lower effective tax rates than those financed with retained earnings for active owners. The study also demonstrates the potentially large impact of income shifting and the difficulty of preventing it, even when complex rules are in place. The analysis is applied to Sweden, but the findings are broadly relevant for countries using or considering dual income tax systems contributing to the debate on reconciling tax neutrality with anti-avoidance objectives.

Essay II: ***Capital income taxation of owners of closely held corporations in Sweden, 1991–2024***

Abstract: This paper examines the taxation of active owners of closely held corporations in Sweden following the introduction of the dual income tax system in 1991. The regulatory framework is complex and has been subject to numerous revisions. This study contributes, first, by summarizing the main features of the evolution of the legal framework, and second, by constructing time series of marginal effective tax rates on capital income for marginal investments financed through new share issues, retained earnings, or debt. The calculations are based on an extended version of the King and Fullerton (1984) model. There are four main findings. First, taxation is non-neutral throughout the period under analysis, exhibiting differences in effective taxation across sources of finance, profit levels, and owners' incomes. Second, taxation is unstable, as frequent changes in tax rates and rules create uncertainty regarding the taxation of investments. Third, financing through new share issues is especially exposed to volatility and unpredictability. Fourth, for lower rates of return, new share issues can be more tax-efficient than retained earnings.

Essay III: ***The evolution of owner-entrepreneurs' taxation: five tax regimes over a 160-year period***
(co-authored with Niklas Elert, Dan Johansson and Mikael Stenkula)

Abstract: The institutional literature suggests that long-term tax incentives are crucial for entrepreneurs, but studies on this topic are hampered by problems related to how to define and measure entrepreneurial income. We resolve these problems by drawing on a theoretical definition of the entrepreneur as an owner, which enables us to identify entrepreneurship empirically by means of investments made by active owners of closely held corporations. Using detailed Swedish tax data, we analyze the tax incentives for such owner-entrepreneur investments from 1862 to 2018, thereby highlighting the evolution of a general institutional phenomenon through a long-run, in-depth, country-specific analysis. We calculate the annual marginal effective tax rate (METR) on capital income for investments,

distinguishing between average- and top-income entrepreneurs, and between three sources of finance. We identify five tax regimes that indicate substantial differences in institutional quality over time according to the magnitude of the METR and METR differences between average- and top-income entrepreneurs and across sources of finance. Growth-conducive tax incentives shed light on why so many successful entrepreneurial firms were founded in Sweden around 1900, whereas increased taxation helps explain the absence of new large entrepreneurial firms in Sweden after World War II. Improved incentives can be associated with Sweden's recent entrepreneurial renaissance.

Essay IV: ***The taxation of industrial foundations in Sweden (1862–2018)***
(co-authored with Dan Johansson and Mikael Stenkula)

Abstract: It has been argued that the Swedish tax system has favored firm control through industrial foundations, which should have inhibited entrepreneurship and economic growth. However, research has been hampered because of a lack of systematic historical tax data. The purpose of this study is to describe the evolution of tax rules for industrial foundations in Sweden between 1862 and 2018 and to calculate the marginal effective tax rate (METR) on capital income. The results show that the METR for an equity-financed investment is typically below 20% and occasionally peaks at approximately 40%. When the requirement that industrial foundations have to donate the bulk of capital income (less capital gains) for charitable purposes is treated as a tax, the METR is seldom below 50% when financing investments with new share issues and often exceeds 100%.

Taken together, the essays in this thesis contribute to knowledge of a key institution—the tax system—in the Swedish economy and improve the understanding of the tax incentives for entrepreneurs, for instance to realize growth ambitions and to keep ownership and control over their firms. In doing so, it sheds new light on the economic development in Sweden from the onset of industrialization to the present. Until now, there has been no long time-series data over the METR for entrepreneurs or industrial foundations. The time series and the identified tax regimes are informative in themselves and useful for further empirical research on institutional changes, entrepreneurship, and economic growth in the Swedish economy from the start of industrialization onwards.

Active owners have been taxed differently through time. The empirical analysis in my thesis is therefore based on publicly available tax law and tax schedules that have been collected for the entire period. Sweden has largely undergone the same economic development as other OECD countries and has developed from being an agricultural economy to become a modern welfare state financed with increased taxation. However, from being a low-tax country, Sweden went further than other countries in its ambitions and reached the world's highest tax-to-GDP ratio during the 1970s and the 1980s. Taxes have decreased since the 1990s but remain among the highest in the world. It is plausible to assume that entrepreneurs in other (OECD) countries would respond to changes in tax incentives in similar way to Swedish entrepreneurs. I therefore deem the results of my study to be generalizable beyond the Swedish case. Sweden could therefore be regarded as a full-scale experiment from which foreign observers could learn when designing economic policy.

Finally, highly combined measures, such as the METR, must always rely on simplifications and assumptions. The research question determines the preferable choice of method. The complete description of the rules for closely held corporations and the extended model for measuring the METR advanced and used in my thesis give academic research as well as policymaking flexible tools for evaluating changes in the tax code.

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Essay 1

The Taxation of Closely Held Corporations: The Achilles Heel of the Dual Income Tax System Reconsidered

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Abstract

This article revisits the taxation of closely held corporations under a dual income tax system. Extending the classic King and Fullerton (1984) model, it analyzes the marginal effective tax rate (METR) for active owners, incorporating income splitting rules that separate labor and capital income. Prior analyses often assumed that share repurchases mirror asset depreciation or ignored depreciation entirely. This study relaxes those assumptions by considering alternative strategies where an amount equal to depreciation is saved in financial assets, distributed to the owner, or reinvested. The results reveal that the METR is highly sensitive to financing decisions, firm characteristics, and owner behavior. Notably, even investments with identical pre-tax real rates of return may face METRs that differ by more than 30 percentage points, depending on the remuneration strategy and available tax-planning opportunities. Furthermore, the METR can differ by as much as 50 percentage points across investments with varying profitability, highlighting substantial distortions and disincentives for high-return projects. Contrary to conventional expectations, investments financed with new share issues can yield lower effective tax rates than those financed with retained earnings for active owners. The study also demonstrates the potentially large impact of income shifting and the difficulty of preventing it, even when complex rules are in place. The analysis is applied to Sweden, but the findings are broadly relevant for countries using or considering dual income tax systems contributing to the debate on reconciling tax neutrality with anti-avoidance objectives.

Keywords: cost of capital, marginal effective tax rates, dual income tax, income splitting rules, income shifting

JEL Codes: H24, H25, H26, G35

1. Introduction

The general principles governing how a well-functioning tax system should be designed are the topic of an intense policy debate and have garnered considerable attention in the tax literature (see, e.g., Mankiw et al., 2009). A core policy choice is whether to levy income tax on a global comprehensive basis or under a dual system.

Following the seminal work by Atkinson and Stiglitz (1976)—which showed that the optimal tax on capital income may be zero—many countries have moved toward a dual income tax regime in which capital income is taxed at a proportional, comparatively low rate, while labor income is subject to a higher and progressive schedule. Dual income tax schemes have also gained increasing attention (e.g., Mirrlees et al., 2011) and have attracted supporters in countries with comprehensive or hybrid regimes, including the UK, Germany, and Switzerland (Keuschnigg and Dietz, 2004; Spengel and Wiegard, 2004; Crawford and Freedman, 2010). Only eight out of the OECD's 38 members still levy a fully comprehensive income tax; seventeen have adopted a dual income tax and the remainder operate hybrid systems (Hourani et al., 2023).

The discussion about the dual income tax system and its alleged benefits and costs remains contentious (see, e.g., Cnossen, 2000; Genser and Reutter, 2007; Cnossen and Sørensen, 2022). Whether a comprehensive or dual income tax system is the most efficient is ultimately an empirical matter, as both systems generate economic distortions. The canonical efficiency argument in favor of a dual schedule hinges on the relatively high elasticity and cross-border mobility of the capital tax base.

As outlined in Hourani et al. (2023), recent literature has, however, highlighted potential drawbacks such as weaker incentives for human-capital formation (Jacobs and Bovenberg, 2010), over-automation (Acemoglu et al., 2020), and tax-induced income shifting between capital and labor income (Romanov, 2006; Pirttilä and Selin, 2011; Alstadsæter and Jacob, 2016; Harju and Matikka, 2016; Tazhitdinova, 2020). Under-investment in human capital and over-investment in automation carry direct welfare costs, while tax-motivated organizational forms can divert resources from productive to unproductive entrepreneurship.

Entrepreneurs—especially active owners of closely held firms—pose a particular challenge for the dual income tax system, because there is no objective way to separate capital returns from labor earnings for these taxpayers. Sørensen (1994) famously labeled this as the "Achilles heel" of the dual income tax system. Sweden—one of the first countries to adopt a dual income tax system—has struggled with this very issue despite continuous refinement.[1] The Swedish experience, therefore, offers valuable lessons for countries considering a dual income tax, for jurisdictions seeking to reform existing systems, and for the theoretical literature on optimal taxation.

The purpose of this article is to extend the analysis of the marginal effective tax rate (METR) on capital income to active owners of closely held corporations in a dual income tax system with income splitting rules, based on the King and Fullerton (1984) model.[2] Earlier extensions of the King and Fullerton model analyzing the Swedish dual income tax system have assumed, explicitly or implicitly and consistent with the original model, either a financial strategy of repurchasing shares at the same pace as assets depreciate (Öberg, 2003) or, alternatively, an approach that ignores asset depreciation (Lindhe et al., 2002, 2003, 2004, and Sørensen, 2008).[3]

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1 A dual income tax system was introduced in Sweden in 1991, Norway 1992, Finland 1993 and in Iceland in 1997. Such a system has received a wide attention in economic research, particularly among Nordic economists with detailed knowledge of domestic tax laws and institutional settings (see, e.g., Sørensen, 1994; Nielsen and Sørensen, 1997; Kanniainen et al., 2007; Pirttilä and Selin, 2011; Södersten, 2020). See, e.g., Selin (2024) and Wykman (2026) for the development of the regulations.

2 This model is a standard tool when analyzing capital income taxation over time and across countries (see OECD, 1991; EU, 2001).

3 The Norwegian and Finnish dual income tax systems have also been analyzed extensively in the literature; see, e.g., Sørensen (2005b), Lindhe and Södersten (2012), Kari (1999) and Södersten (2020). Lindhe et al. (2004) provide a comparison among the Nordic systems.

We generalize previous studies by taking depreciation into account and relaxing the assumption that shares have to be repurchased. If the owner abstains from repurchasing shares, a corresponding amount is released that the owner can use in various ways, with implications for the METR. We calculate the METR for closely held corporations based on Sweden's rules in 2023 under alternative strategies, where this amount is saved in financial assets, distributed to the owner as wages or dividend payments, or used for reinvestment.

A key obstacle of the earlier literature is that most extensions of the King and Fullerton model treat income shifting implicitly or as an exogenous variation. This study extends the analysis by showing how income shifting depends on firm-specific characteristics and financial strategy. Although technically demanding, this extension makes it possible to quantify the magnitude of the incentives created by a dual income tax system—for both investment and income shifting—and thus deepens the theoretical understanding of the practical functionality of a dual income tax system. The article focuses on equity-financed investments, as the income splitting rules do not affect debt-financed investments through financial markets.[4]

In line with earlier research, we show that the effective tax rate is not easily calculated and is highly dependent on firm characteristics and underlying assumptions, but our analysis offers a more complete picture of how the tax rules may affect the METR for closely held corporations. Our results underscore the complexity of the tax system and provide new insights into its alleged unpredictability. We show that the METR can vary by more than 30 percentage points, for an investment with the same return, depending on the assumptions made about the owner's behavior and firm characteristics, such as preferences for share repurchases and the initial financial position. The tax rate for investments with different profitability can differ by even more—highly profitable investments can have a METR

[4] If the owner of a closely held corporation lends fund to his or her own corporation, Swedish regulations put restrictions on the interest rate.

exceeding 50 percentage points higher than investments with low rate or returns.

One of the original purposes of the King and Fullerton model was to facilitate comparisons of tax systems over time and across countries. To accomplish this, the model must be adapted to reflect changes in national tax legislation. The extended model presented here can, hence, serve as a basis for international comparisons of the taxation of closely held corporations, while also offering analytical insights into the most challenging features of dual income-tax systems.

The remainder of the paper is organized as follows. Section 2 provides a brief overview of the dual income tax system and the taxation of owners of closely held corporations in Sweden. Section 3 introduces the King and Fullerton model and shows how it can be adjusted to account for different assumptions. Section 4 presents the results from our analysis based on the rules for closely held corporations in 2023. Section 5 concludes the paper. In Appendix A, it is shown how the METR is calculated, whereas all parameters used for the calculations are presented in Appendix B. Online Appendices 1, 2, and 3 formally derive and discuss some of the relationships in the presented models in more detail.

2. The Swedish Dual Income Tax System and Income Splitting Rules

2.1 The Analysis of the Dual Income Tax System

Concerning income taxation, researchers generally distinguish between two main principles. The first is a global (or comprehensive) income tax system, where all forms of incomes are added together regardless of their source and taxed according to the same tax schedule. The second is a dual income tax system, where the tax on labor income and capital income differs, with a typically more lenient taxation of the latter. Whereas a global tax system may be credited for its alleged simplicity, resting on a horizontal equity basis, a dual income tax system makes it possible to maintain a progressive and relatively high tax on labor income, while lowering the tax on capital income, as called for by an increasing international mobility of capital in small open economies.[5]

The theoretical advantages of a dual income tax system, with its ability to tax different types of income differently, must be weighed against the problems encountered in practice. Under a dual income tax system, a taxpayer's total tax liability depends not only on his or her total income but also on how that income is divided between labor and capital. In theory, it is implicitly assumed (or required) that tax authorities can easily distinguish between and assess the levels of capital and labor income alike. Even if this is true for most taxpayers, such as regular employees with savings in bank accounts or listed shares, it is far from the case for everyone. The difficulty is particularly pronounced for active owners of closely held corporations, as it is up to the owners' discretion to determine how much wage income to report, which may have only a vague—or no—direct correlation with the actual labor effort put into the firm. As capital income is supposedly taxed at a lower rate, this creates opportunities for income shifting and tax avoidance, where what is in effect labor income is taxed as capital income.

The problem is aggravated by the fact that income from active owners of closely held corporations is a complex mixture of both a risk-adjusted return on capital and compensation not only for labor but also for entrepreneurial effort and ability (Kanniainen et al., 2007). The latter is not recognized as a distinct income category by tax authorities.[6]

To mitigate the income shifting problem, the introduction of a dual income tax system may be accompanied by special income splitting rules for closely held corporations. These rules regulate the division of

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5 See, e.g., Sørensen (1994) for a more thorough discussion of the purported benefits, including both efficiency and equality arguments, of a dual income tax system.

6 Remuneration of an active owner above a "normal" rate of return on capital must not necessarily be seen as disguised wages (*förtäckt lön*) that should be taxed as such, or as a highly taxable rent, but as a compensation for entrepreneurship. It is beyond the scope of this article to discuss these conceptual issues further.

income between capital and labor, as there is no objective way to determine whether a surplus in closely held corporations stems from the owner's capital investment or work effort (and, from a tax perspective, there is no additional third alternative). All Nordic countries with a dual income tax system have also introduced some form of income splitting rules. Even if the reason for and basic idea behind this type of regulation is the same, the design and structure of the laws differ across countries. The rules have also changed repeatedly over time and have been the source of considerable dispute in the Nordic policy debate (see, e.g., Sørensen 1998, 2005a; Bø et al., 2012; Knuutinen, 2018; Södersten, 2020).

The original King and Fullerton model did not incorporate the income splitting rules currently applied in dual income tax systems, nor did it include the possibility for active owners to choose the optimal remuneration strategy given the restrictions detailed in tax law. Earlier extensions assumed that active owners repurchased shares at the same pace as the assets depreciate or ignored asset depreciation. The latter assumption might be used if one is solely interested in the neutrality between investment and owner types, contending that depreciation affect all investments and owners in the same way.

2.2 Dual Income Taxation in Sweden

Following a major tax reform in 1990–1991, Sweden abandoned its nearly century-old comprehensive income tax system and introduced a dual income tax system with a progressive tax schedule for labor income and a flat tax rate on capital income, with the latter rate set below the highest marginal tax rate applied to labor income. This change was accompanied by special income splitting rules for active owners of closely held corporations to prevent or reduce potential tax avoidance.[7] Passive owners' income is always classified as capital

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[7] The principal definition of a closely held corporation under the tax law is that no more than four owners control more than 50% of the ultimate voting rights. An owner is considered to be active if he or she is, or has been during the past five years, active in the income generation of the corporation to a considerable extent. Close family members are treated as one owner in this context (see Bjuggren et al., 2011, for further details).

income and is not subject to income shifting regulations. This section summarizes the income splitting rules and their evolution over time. A comprehensive treatment is provided by Wykman (2026).

The basic idea behind the income splitting rule is to divide the remuneration of an active owner in a closely held corporation into a capital-income-taxed and labor-income-taxed part, or more formally, to limit the amount that can be taxed as capital income. Even if the details of the rules and tax rate levels have changed over time, the general idea is the same and about determining a rate of return allowance (RRA) within which remuneration in the form of dividends or capital gains can be taxed as capital income.[8] Dividends within the RRA are often referred to as normal dividends, whereas dividends above the allowance are termed excess dividends.

Initially, the RRA was solely based on the capital invested and equal to the owner's acquisition cost of the shares (denoted the capital or equity base), multiplied by an imputed normal rate of return consisting of a risk-free interest rate plus a risk premium.[9] Unused RRA could be saved and used in the future. Income above the RRA was taxed as labor income. The idea behind this type of regulation is called a *normal-return model*. It would be possible to have the opposite rule and instead specify an amount that must be taxed as labor income (a *normal-wage model*). However, capital or equity in a corporation is typically observable and can serve as a basis for calculating the RRA, whereas the working hours and effort of an active owner cannot be observed in the same way and are more

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8 Occasionally, it is termed the *dividend allowance*, but because it also might be used for capital gains, this term may be somewhat misleading.

9 The Swedish government borrowing rate (*statslåneräntan*) is used as the risk-free interest rate. The risk premium was initially 5% but has gradually increased to 9%. Other forms of owner capital injections may also be included the equity base.

difficult for the tax authorities to assess.[10] In Sweden, there was also concern that a normal wage model would allow active owners to avoid the progressive labor income tax altogether, resulting in overly lenient taxation. By using only the acquisition cost of shares, investments financed with retained earnings will not increase the equity base and, as a result, will not increase the amount that can be taxed as capital income. An alternative approach would be to use the corporation's gross or net asset value as the equity base.[11]

Since 1994, not only capital input but also labor input affects the size of the RRA—the higher the corporation's wage bill, the higher the RRA. A formal minimum wage requirement was also introduced for owners who wished to expand their RRA using these wage rules.[12] The importance of the wage bill for the size of the RRA has increased substantially over time, making labor-intensive firms more tax favored. From 2006, the owner's own wage has also been included in the wage bill, further complicating the choice of remuneration strategy and the calculation of effective tax rates.

Several reasons have been suggested by the legislator for the introduction and expansion of these wage-favoring rules (see, e.g., SOU 2002:52). The wage bill may provide a crude but reasonable estimate of the corporation's risk—the higher the wage bill, the higher the risk premium, and the greater the amount that can or should be taxed as capital income. Additionally, exploiting these rules by increasing the wage bill to avoid taxes is not advantageous, as the increased labor cost would be higher than the potential tax reduction;

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[10] Nevertheless, Iceland applies a normal wage model, and the Icelandic Ministry of Finance decides and publishes minimum imputed wages for different sectors and sizes of corporations on an annual basis (Matheson et al., 2012; Agnarsdóttir and Jensdóttir, 2014). The IMF has recommended that Iceland adopt a normal return model instead (Escolano et al., 2010).

[11] This alternative has been applied in other countries, and a variant of the idea was considered in Sweden but ultimately rejected (see, e.g., SOU 2002:52; Edin et al., 2005). Using only historical acquisition costs can be regarded as a modified form of the net asset value approach.

[12] With a minimum wage requirement and a very generous RRA, the system can be seen as moving toward a more normal-wage-type of system.

hence, the rules are difficult to abuse. A generous wage rule also meant that the income splitting rule in practice was not binding for closely held corporations with many employees, where the opportunities for income shifting were limited. Instead of having a sharp exception rule (e.g., for firms with more than ten employees), which could create uncertainty for companies fluctuating around that threshold, these rules offered a more flexible regulatory framework. Finally, these rules could encourage closely held corporations to expand and employ more workers.

Since 2006, there has also been an alternative rule available (mainly for self-employed individuals with few or no employees) where the RRA is set at a fixed amount, independent of equity invested and wage bill paid (*förenklingsregeln*). This fixed amount has increased over time.

Additional rules have been added and abolished over time. There is a ceiling that limits the amount of capital income that can be taxed as labor income. This rule applied to capital gains from the start in 1991 but was extended to dividends only in 2012. Between 1997 and 2005, a share of the income within the RRA was tax-exempt. Additionally, before 2006 and between 2007 and 2009, half of the capital gains exceeding the RRA were taxed as labor income and half as capital income.

3. The King and Fullerton Model and the Income Splitting Rules

The aim of the original, well-known King and Fullerton model is to calculate the marginal effective tax rate (METR) on investments, defined as

$$METR = \frac{p-s}{p}, \tag{1}$$

where p is the pre-tax real rate of return on a marginal investment and s is the post-tax real rate of return to the saver. The METR can be calculated either for a fixed pre-tax real rate of return, p, or for a fixed real interest rate, r. As King and Fullerton (1984) primarily use a fixed-p model, we follow that standard.

Our study analyzes the METR for closely held corporations, focusing on equity-financed investments (i.e., investments financed with new share issues and retained earnings).[13] The original King and Fullerton model does not model how one can divide the total income into labor and capital. For widely held corporations this is not a problem, as all income (except repurchases) is normally distributed and taxed as dividends. However, our analysis is more complex due to the rules for closely held corporations. Given that the RRA is not large enough to include the whole surplus generated by an investment, an owner who wants to minimize taxes will split the surplus between wages and dividends so that the after-tax sum is as large as possible.[14] The allocation between dividends and wages will, however, depend on the source of finance and other crucial assumptions described below.[15]

In section 3.1, the METR for new share issues is discussed, while the less complicated case of retained earnings as a source of finance is analyzed in section 3.2. In Appendix A, the ideas behind the original King and Fullerton model, as well as the earlier extensions, are described in greater detail. Here, the reader can also see how the METR is derived based on the corporation's remuneration to the owner, as explained below.

3.1 New Share Issues

Earlier models have explicitly or implicitly assumed that an amount equal to economic depreciation (asset depreciation) is used to repurchase the issued shares over time (analogous to the debt case, where the firm borrows funds for an investment and then gradually repays the loan). This assumption is, however, not necessary. Lindhe and Södersten (2016) point out that two approaches exist within the tax literature. One approach assumes that the investor will recover the

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13 As mentioned in the introduction, debt-financed investments through the financial market are not affected by the income splitting rules.

14 If wage payments are tax preferable to dividend payments, the entire surplus will be distributed as wages.

15 Cf. the analysis of the Norwegian system in Fjaerli and Lund (2001) and Finnish system in Hietala and Kari (2006) and Kari and Karikallio (2007).

original equity injection through share repurchases, whereas the other approach does not. In the latter case, the funds not used for repurchases may instead be saved and used to invest in financial assets or distributed to the owner as wages and dividends. This difference is important, since it allows us to analyze how the corporation's financial position at the time of investment may impact the effective taxation of that investment due to the tax rules. Analyzing and contrasting these two approaches *for closely held corporations* in a dual income tax system has not previously been done.

There might also be other possible alternatives. If a corporation does not repurchase the issued shares, an amount equal to depreciation could be used for reinvestment over time to maintain the value of the initial investment. This case is, however, not completely in line with the original idea of the King and Fullerton model, which analyzes the taxation of a marginal investment in isolation.

Thus, in this article, we analyze the following four cases:

A. Repurchases of shares

B. Saving and investment in financial assets

C. Payout only as wages and dividends

D. Reinvestment

Below, we give a description of each case.

A. Repurchases of shares[16]

Updating earlier work cited above, and using the tax rules from 2006 together with the standard assumption in the King and Fullerton model that the entire surplus is distributed, the division between dividends (D), wages (W), and repurchases of shares (RP) at time t, following a unit investment takes the form

$$D(t) = \beta e^{-(\delta-\pi)t} + \varphi W(t), \qquad (2)$$

[16] Repurchases of shares at their original value are tax-free.

$$W(t) = \frac{(1-\tau)MRRe^{-(\delta-\pi)t} - \beta e^{-(\delta-\pi)t} - RP(t) + \tau a e^{-at}}{\varphi + (1-\tau)(1+\sigma)}, \text{ and} \tag{3}$$

$$RP(t) = (\delta - \pi)e^{-(\delta-\pi)t}, \tag{4}$$

where β is the imputed normal rate of return on the equity base, δ is the depreciation rate of the asset invested in, π is the rate of inflation, φ is the coefficient representing the share of the wage bill added to the RRA, and MRR denotes the marginal rate of return on the investment. The last term in the numerator in equation (3), $\tau a e^{-at}$, refers to tax reduction due to depreciation allowances associated with real asset investments (machinery), where a is the tax depreciation rate. Repurchases of shares are made at the same pace as assets depreciate over time (adjusted for inflation).[17]

With share repurchases, the so-called non-arbitrage condition that a potential investor faces is

$$i(1-m)V(t) = (1-\tau_w)W(t) + (1-\tau_d)D(t) + (1-\tau_c)RP\,(t) + (1-\tau_c)\frac{d}{dt}V(t), \tag{5}$$

where $V(t)$ is the corporation's value at time t. The terms τ_w, τ_d and τ_c refer to the associated tax rates for wages, dividends and capital gains.[18] The right-hand side of the equation shows how a surplus generated by a potential investment can be received (after tax) by the investor. The left-hand side represents the return if the same amount, $V(t)$, were instead invested in the financial market, generating interest rate i taxed at the capital income tax rate m.

Solving the differential equation for time zero gives the maximum present value $V(0)$ of the corporation/investment project

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17 Hence, this reflects the change in replacement value (*återanskaffningsvärde*). The original King and Fullerton model analyzed investment in different assets (machinery, buildings, and inventories), we focus on an initial investment in machinery.

18 As the capital gains tax is deferred until the gains are realized, an effective accrued tax rate, which is lower than the statutory tax rate, should be used to account for this effect (see Appendix B for further details).

$$V(0) = \int_0^\infty \left(\frac{1-\tau_w}{1-\tau_c} W(t) + \frac{1-\tau_d}{1-\tau_c} D(t) + RP(t)\right) e^{-\frac{i(1-m)t}{1-\tau_c}} dt. \quad (6)$$

In equilibrium, the present value must equal the cost of the project and hence for a unit investment

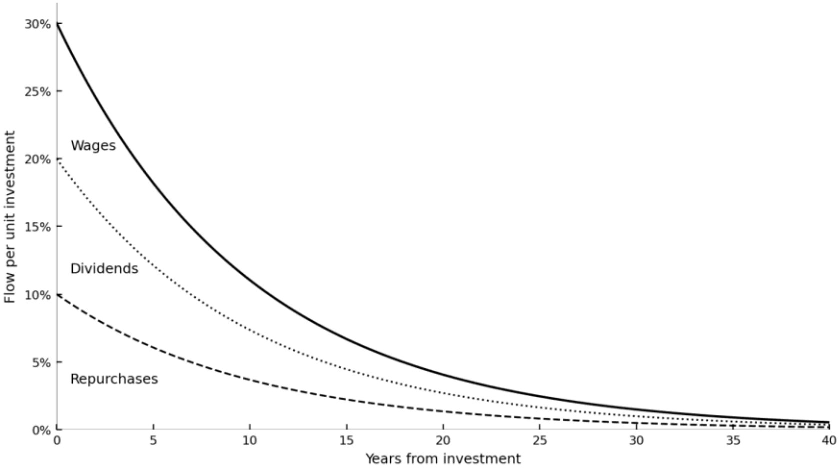
$$V(0) = 1. \quad (7)$$

The assumption about repurchases implies that the equity base—on which the RRA is calculated—diminishes at the same rate as the marginal rate of return of the investment project, hence both MRR and β are discounted by the depreciation rate, δ (less the inflation rate π). With reasonable parameter values, both the wage and dividend payments, as expressed by equations (2) and (3), as well as repurchases expressed by equation (4), will converge to zero as time approaches infinity.[19]

Excluding taxes, the division of income can be described graphically (see Figure 1). The present pre-tax value (of the first 40 years) of the return on the investment is the area under the solid line (showing the MRR). The present value of repurchases of shares is the area under the dashed line (showing the depreciation). The area between the dashed and dotted lines represents the RRA, which is used to pay dividends, and the area between the dotted and bold lines represents the residual used to pay wages.

[19] For some parameter values, the wage calculated using equation (3) can become negative and after repurchases, there may not be sufficient surplus to utilize the entire RRA. However, the METR in these cases corresponds to a situation in which no wages are paid out and unused RRA are used to transform income (not associated with the investment) from labor to capital, consistent with the analysis of income shifting in cases B and C below. See online Appendix 1 for a more formal treatment and interpretation of this situation.

Figure 1
The Division of Income after an Investment (MRR=30%) Financed with New Share Issues, with Repurchases of Shares at the Rate of Depreciation



Note: The bold line refers to the marginal rate of return (MRR) on an investment. The dashed line refers to economic depreciation (assumed to be 10%), which equals repurchases of shares. The area between the dashed and dotted lines refers to the Rate of Return Allowance (RRA), which is used to pay dividends. The area between the dotted and bold lines refers to the residual of the MRR used to pay wages. It is assumed that MRR is initially above the RRA. The figure is an illustration drawn for MRR=30% chosen to allow a clear and illustrative comparison across all cases.

Share repurchases taking place at the same rate as real assets depreciate within the corporation may seem unlikely and an inadequate way to depict firm behavior.[20] Even if this is not the way firms typically behave, this is a convenient modeling assumption, as the change in the value of the asset (machine) mirrors changes in the

[20] One could also assume that share repurchases occur at a faster or slower pace than asset depreciation. With a faster pace, the METR will unambiguously be higher. If one assumes a slower pace, the analysis is more complicated and resembles the cases with no repurchases as discussed under section B and C. The results will depend on the assumed p-value and on whether tax savings can be utilized.

value of the equity. This approach has therefore been used by other authors studying closely held corporations to ensure theoretical tractability and to avoid excess mathematical complexity.

B. Saving and investment in financial assets

In models with no share repurchases, an equivalent sum can, at each point in time be allocated to financial savings, $FS(t)$, gradually building up a financial asset, $FA(t)$. We assume that this asset yields the nominal rate of return i, which, just like the marginal rate of return on the investment, is subject to corporate income tax. The wage and dividend remuneration functions now take the form

$$D(t) = \beta + \varphi W(t), \tag{8}$$

$$W(t) = \frac{(1-\tau)MRRe^{-(\delta-\pi)t} - \beta - FS(t) + (1-\tau)iFA(t) + \tau a e^{-at}}{\varphi + (1-\tau)(1+\sigma)}, \text{ where} \tag{9}$$

$$FS(t) = (\delta - \pi)e^{-(\delta-\pi)t}, \text{ and} \tag{10}$$

$$FA(t) = \int_0^t (\delta - \pi)e^{-(\delta-\pi)x} dx. \tag{11}$$

If the surplus equivalent to depreciation is saved in a financial asset in this way, the corporation will have an amount equal to the original marginal investment at its disposal when the machine is worn out.[21] These savings can then be used to purchase a new machine and make a new "marginal investment" (this would be seen as a new separate investment not included in the analysis of the original investment). The funds could also be used to repurchase the original shares.[22]

The non-arbitrage condition and the value of the corporation/investment project now change to

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[21] That is, $\int_0^\infty (\delta - \pi)e^{-(\delta-\pi)x} dx = 1$.

[22] With this assumption, we return to case A involving repurchases of shares, but with different timing. The net present value of repurchases or a reinvestment in the distant future is zero for any positive discount rate and can be ignored in the analysis.

$$i(1-m)V(t) = (1-\tau_w)W(t) + (1-\tau_d)D(t) + (1-\tau_c)\frac{d}{dt}V(t), \tag{12}$$

and

$$V(0) = \int_0^\infty \left(\frac{1-\tau_w}{1-\tau_c}W(t) + \frac{1-\tau_d}{1-\tau_c}D(t)\right)e^{-\frac{i(1-m)t}{1-\tau_c}}dt. \tag{13}$$

In this case, β will not be discounted, as no shares are repurchased. In line with case A, the value of, and surplus generated by, the initial investment will depreciate over time. This implies that our model must be modified because the RRA might eventually exceed the generated surplus, allowing the owner to remunerate him- or herself without paying any wages. An owner that wants to minimize tax payments will remunerate him- or herself with wages only up to time, t_d, where

$$(1-\tau)MRRe^{-(\delta-\pi)t_d} - FS(t_d) + (1-\tau)iFA(t_d) + \tau a e^{-at_d} = \beta. \tag{14}$$

With this definition of t_d, the present value function in equation (13) must be reformulated as

$$V(0) = \int_0^{t_d} \left(\frac{1-\tau_w}{1-\tau_c}W(t) + \frac{1-\tau_d}{1-\tau_c}D(t)\right)e^{-\frac{i(1-m)t}{1-\tau_c}}dt + \int_{t_d}^\infty \frac{1-\tau_d}{1-\tau_c}D^*(t)e^{-\frac{i(1-m)t}{1-\tau_c}}dt, \tag{15}$$

where

$$D^*(t) = (1-\tau)MRRe^{-(\delta-\pi)t} - FS(t) + (1-\tau)iFA(t) + \tau a e^{-at}.[23] \tag{16}$$

A marginal investment will, further, give rise to tax savings as the unused RRA can be used to transform other income from labor to capital from time t_d and onward. If the owner has other high-taxed

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[23] Equation (15) is conditional on a unique cut-off point, t_d solving equation (14). In principle, a second cut-off point could arise if the left-hand side of equation (14) becomes non-monotonic in t (for example, if the $iFA(t)$ term eventually outweighs discounting). For all reasonable parameter values, this does not occur. Hence, t_d is unique, and the parameter-dependent integrals with endogenous limits have a closed-form solution. The central requirement is that the left-hand side of equation (14) is strictly decreasing in t; otherwise, the owner will resume paying him- or herself a wage and no tax savings will accrue. In addition, for some values of p no wage will be paid ($t_d = 0$).

labor income, some of it could, hence, be shifted to lower taxed dividend income. The tax savings (TS) are equal to

$$TS = \left(\frac{(1-\tau)(1+\sigma)}{(1-\tau)(1+\sigma)+\varphi}\right)\left(\left(\frac{\sigma+\tau_w}{1+\sigma}\right) - (\tau + \tau_d - \tau\tau_d)\right) \int_{t_d}^{\infty} \frac{\beta - D^*(t)}{1-\tau} e^{-\frac{i(1-m)t}{1-\tau_c}} dt. \quad (17)$$

The value in equation (17) has similarities with how Sørensen (2008) incorporates the effect of an increase in the equity base.[24] The idea also parallels Södersten's (2020) notion of tax savings following new share issues in the Norwegian system, due to an increased equity base. Hence, the increase in the equity base following investments financed with new share issues has two theoretical effects: an increase in dividend payments, and the opportunity to shift additional income from wages to dividends.[25]

The present value function of the investment will now be

$$V(0) - \frac{TS}{1-\tau_c} = \int_0^{t_d} \left(\frac{1-\tau_w}{1-\tau_c} W(t) + \frac{1-\tau_d}{1-\tau_c} D(t)\right) e^{-\frac{i(1-m)t}{1-\tau_c}} dt +$$

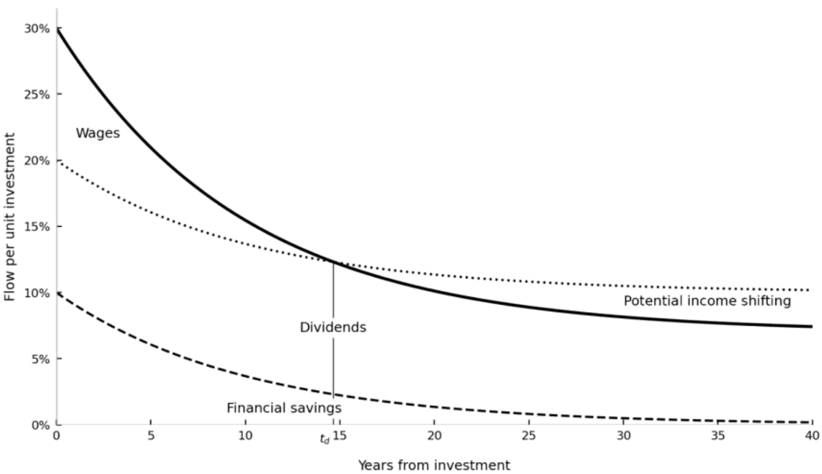
$$\int_{t_d}^{\infty} \frac{1-\tau_d}{1-\tau_c} D^*(t) e^{-\frac{i(1-m)t}{1-\tau_c}} dt. \quad (18)$$

The equilibrium condition (equation 7) must still hold.

24 See online Appendix 2 for a formal derivation of equation (17).

25 The issue of income shifting in closely held corporations has generated considerable debate, both in public discourse and academia, largely due to the growing generosity and complexity of income splitting rules. This paper is not about income shifting per se, but our model identifies an alternative channel through which income shifting can occur, although we acknowledge that this is not the main mechanism through which owners of closely held corporations typically engage in income shifting.

Figure 2
The Division of Income after an Investment (MRR=30%) Financed with New Share Issues, with Savings in Financial Assets at the Rate of Depreciation



Note: The bold line refers to the marginal rate of return (MRR) on an investment and the interest received on the financial asset (FA). The dashed line refers to economic depreciation (assumed to be 10%), which equals saving in financial assets. The area between the dashed and dotted lines refers to the rate of return allowance (RRA), which is used to pay dividends up to point t_d. After t_d part of the RRA can be used for income shifting. The area between the dotted and bold lines refers to the residual of the MRR and interest received that is used to pay wages until t_d. It is assumed that MRR is initially above RRA. The figure is an illustration drawn for MRR=30% chosen to allow a clear and illustrative comparison across all cases.

Excluding taxes, the division of income and the extent of tax savings over time can also be described graphically, as shown in Figure 2. The area under the solid line represents the pre-tax value of the return on the investment and the interest received on the financial asset (FA). The area under the dashed line (equal to depreciation) is now used for savings in financial assets. The area between the dashed and dotted lines represents the RRA, which is used to pay dividends. As there are no share repurchases, the RRA remains constant in nominal terms. The whole RRA is used to pay dividends until time t_d. After this point in time, the investment no longer generates sufficient surplus and part of the RRA can be used for income shifting, i.e., to increase the share taxed as capital income in other projects. The area between the dotted and bold lines represents the residual used to pay wages up to point t_d.

C. Payout only as wages and dividends

Instead of repurchasing shares, the owner could remunerate him- or herself with an equivalent amount in the form of wages and dividends. As the distributed surplus from the marginal investment would formally be too high, this requires internally generated surplus (or saved surplus) from other activities to comply with commercial law. In this case the wage and dividend remuneration functions take the form

$$D(t) = \beta + \varphi W(t), \text{ and} \tag{19}$$

$$W(t) = \frac{(1-\tau)MRRe^{-(\delta-\pi)t} - \beta + \tau a e^{-at}}{\varphi + (1-\tau)(1+\sigma)}, \tag{20}$$

and the associated present value function will be the same as in equation (13).

In line with the case involving savings in financial assets, the RRA might eventually exceed the generated surplus, allowing the owner to remunerate him- or herself without paying any wages. An owner who wants to minimize tax payments will now only remunerate him- or herself with wages up to time, t_d, where

$$(1-\tau)MRRe^{-(\delta-\pi)t_d} + \tau a e^{-at_d} = \beta. \tag{21}$$

With this definition of t_d, the present value function will be the same as in equation (15) except that

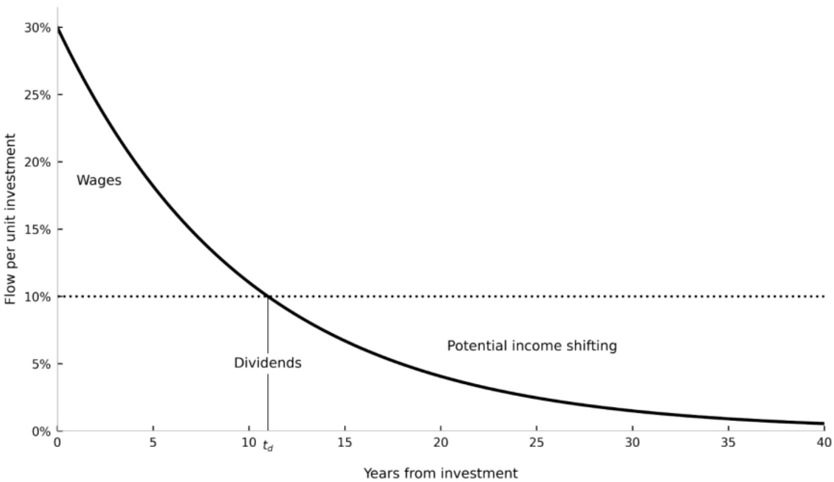
$$D^*(t) = (1-\tau)MRRe^{-(\delta-\pi)t} + \tau a e^{-at}, \tag{22}$$

and *W(t)* equals the expression in equation (20).

The tax savings in equation (17) still apply and the present value function of the investment mirrors equation (18) (but *W*, *D** and t_d will differ).

The equilibrium condition (equation 7) must still hold in this case. Excluding taxes, the division of income and the extent of tax savings over time can in this case be described graphically as shown in Figure 3. The present pre-tax value of the return on the investment is still the area under the solid line. The area under the dotted line represents the RRA, which is used to pay dividends until time t_d. After this point, the investment no longer generates sufficient surplus, and part of the RRA can be used for income shifting using the surplus from other projects. The area between the dotted and bold lines represents the residual used to pay wages up to point t_d.

Figure 3
The Division of Income after an Investment (MRR=30%) Financed with New Share Issues, with Payout Only as Wages and Dividends



Note: The entire surplus is used to remunerate investors. To comply with commercial law, this case requires that there is internally generated surplus (or saved surplus) from other activities that can be used. The bold line refers to the marginal rate of return (MRR) on an investment. The dotted line refers to the rate of return allowance (RRA). After t_d part of the RRA can be used for income shifting. The area between the dotted and bold lines refers to the residual of the MRR that is used to pay wages until t_d. It is assumed that MRR is initially above RRA. The figure is an illustration drawn for MRR=30% chosen to allow a clear and illustrative comparison across all cases.

D. Reinvestment[26]

Instead of assuming that the corporation repurchases shares, saves in financial assets, or provides additional payouts, one can assume that the firm reinvests part of the surplus to maintain the nominal value of the initial investment and prevent a declining surplus over time. In order to do this, the firm must reinvest an amount equal to $(\delta - \pi)$, which closely corresponds to the amount repaid (in case A), saved (in case B), or paid out (in case C).[27] In this case, the wage and dividend remuneration functions take the form

$$D(t) = \beta + \varphi W(t), \tag{23}$$

$$W(t) = \frac{(1-\tau)MRR - \beta - RI(t) + \tau a e^{-at} + \int_0^t \tau a(\delta-\pi)e^{-ax}dx}{\varphi + (1-\tau)(1+\sigma)}, \tag{24}$$

$$RI(t) = (\delta - \pi), \tag{25}$$

where RI refers to reinvestments made at the same pace as the total assets depreciate over time. The last term in the wage equation refers to the tax reduction due to depreciation allowances associated with all reinvestments.[28]

The assumption about reinvestments implies that the return will not diminish over time, as the reinvestments ensure that the value (as well as the surplus) of the investment does not shrink in nominal terms. As in cases B and C, β will not be discounted as no shares are repurchased, and β will not increase either, since investments made from internally generated surplus within the corporation will not

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26 This case is an extension of an idea and model received by Jan Södersten in private correspondence.

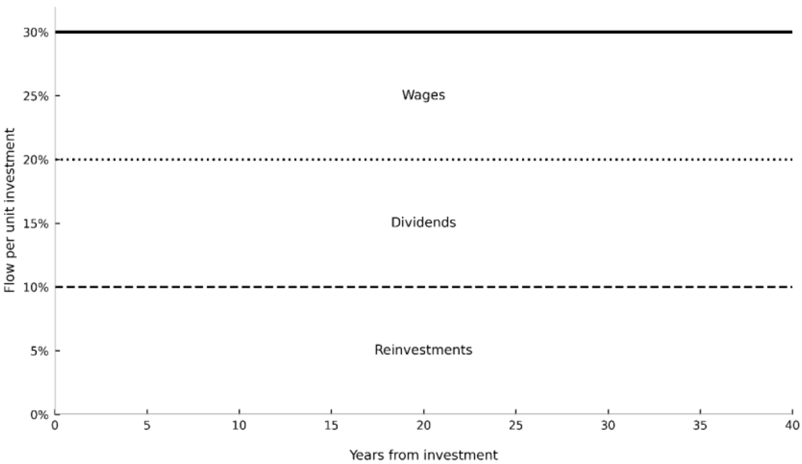
27 In case A, B, and C the amount repaid, saved, or paid out is $(\delta - \pi)e^{-(\delta-\pi)t}$, i.e., it is declining over time. The amount in the reinvestment case corresponds to the initial amount repaid or saved at time *t=0*. Repurchases of shares and financial savings sum to unity over the infinite time horizon $(\int_0^\infty (\delta - \pi)e^{-(\delta-\pi)t}dt = 1)$, while the sum of the reinvestments approaches infinity $(\int_0^\infty (\delta - \pi)dt)$.

28 See online Appendix 3 for a derivation of the numerator of the wage equation.

increase the equity base. The non-arbitrage condition and the present value function include only dividends and wages, but these remuneration functions now differ from cases A, B, and C as depicted above.

Excluding taxes and inflation, the division of income can be described graphically as shown in Figure 4. The present pre-tax value of the return on the investment is the area under the solid line representing the MRR. The area under the dashed line (equal to total depreciation) is now used for reinvestments. The area between the dashed and dotted lines represents the RRA, which is used to pay dividends, and the area between the dotted and bold lines represents the residual used to pay wages.

Figure 4
The Division of Income after an Investment (MRR=30%) Financed with New Share Issues, with Reinvestment at the Rate of Depreciation



Note: The bold line refers to the marginal rate of return (MRR) on an investment. The dashed line refers to economic depreciation (assumed to be 10%), which is used for reinvestments. The area between the dashed and dotted lines refers to the rate of return allowance (RRA), which is used to pay dividends. The area between the dotted and bold lines refers to the residual of the MRR used to pay wages. It is assumed that MRR is initially above RRA. The figure is an illustration drawn for MRR=30% chosen to allow a clear and illustrative comparison across all cases.

This case may be the most realistic scenario. At the end of the day, it is highly plausible that a firm will not allow its investments to depreciate over time to the point where no surplus is generated. Instead, a firm will replace worn-out machines to ensure that the firm continues to generate surplus over time. Even in this case, the change in the value of the asset (machine) will follow the change in the value of the equity—neither the value of the asset nor that of the equity will decrease over time (in nominal terms).

However, this analysis is not consistent with the original King and Fullerton model and its underlying idea of analyzing the effective taxation of an isolated marginal investment, where the capital stock depreciates each year and is *not* replaced. This analysis now combines the effects of the original marginal investment with those of the associated reinvestment made to account for the plausible assumption that a certain fraction of the capital stock wears out each year and is replaced.

Sum up

Table 1 summarizes the four cases, ignoring taxes and inflation. The return of investment will normally (as in cases A–C) diminish over time due to depreciation of the assets but will remain constant in case D as a result of reinvestment. The RRA diminishes over time in case A as shares are repurchased, reducing the equity base. As no shares are repurchased in cases B–D, the RRA remains constant. In cases A and C, the owner will remunerate him- or herself with the entire return (MRR), but in different ways. In Case D, the payout equals the return on the investment minus depreciation (MRR – δ), as this case assumes that an amount equal to the depreciation is reinvested. In case B, the remuneration is complemented with the return on savings less depreciation ($MRR+iFA - \delta$), as this case assumes that an amount equal to the depreciation is used for savings in financial assets.

If the amount paid out exceeds the RRA, part of the remuneration must be paid out as wages. Conversely, if the amount paid out is below the RRA, part of the allowance can be used to reduce taxes on other income not related to the investment, serving as a form of income shifting. This occurs (after some time) in cases B and C where

MRR diminishes while the RRA remains constant. Income shifting will also be possible in cases A and D, if the RRA, already from the beginning, exceeds the amount paid out from the return on the investment.

Table 1
Summary of the Four Cases

	Case A	Case B	Case C	Case D
Strategy	Repurchase	Save	Payout	Reinvest
MRR (return of investment)	Diminish	Diminish	Diminish	Constant
RRA (Dividend taxed return)	Diminish	Constant	Constant	Constant
Remuneration	MRR	MRR+iFA – δ	MRR	MRR – δ

Note: The strategies repurchase, save, payout, and reinvest refer to the corporation's use of the part of the surplus that equals the amount of depreciation. The remuneration is paid out as dividends and potentially also as wages. The table is a simplification, ignoring taxes and inflation.

Both case A (with repurchases) as well as cases B and C (without repurchases) can be seen as purely theoretical cases analyzing an envisioned marginal investment. In reality, shares are not repurchased exactly at the rate of depreciation, nor do firms allow their investments to fully depreciate. Even if these cases may seem unrealistic, they serve here to illustrate the taxation of investments illuminating the complexity of the tax system in general and the dual income tax system in particular. Case D (with reinvestments) may be a more realistic scenario, but the taxation of a marginal investment is blurred as the analysis becomes intertwined with reinvestments. All cases thus help illustrate different aspects of the tax system and demonstrate how sensitive it is to changes in underlying assumptions and parameters.

Lindhe et al. (2002, 2003, 2004) and Sørensen (2008) circumvent the problems arising from the difference between the equity base and real assets by abstracting from depreciations.[29] The main purpose of their analyses is to examine the neutrality of investments across different types and legal forms, and they ignore depreciation, as it arguably affects all investments and owners in the same way. However, this approach overlooks important aspects of the METR, such as the possibility of income shifting.

3.2 Retained Earnings

The model for new share issues can easily be changed to the case of retained earnings by updating the non-arbitrage and equilibrium conditions as well as the remuneration functions. When retained earnings are used as a source of finance for investments, there is no increase in the equity base, and the analysis of tax savings in section 3.1, where new share issues were analyzed, is not applicable.[30]

From the owner's perspective, retained earnings imply giving up present income for a future return. Given the pecking order of remuneration alternatives, it is preferable to reduce the owner's wage to finance an investment. After 2006, when the owner's wage was included in the RRA, a reduction (increase) in the owner's wage

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29 Sørensen (2008) is an updated and more general version of the Lindhe et al. (2003) model. The model used in Lindhe et al. (2002) is somewhat different, because the cost of capital function is derived from a utility maximization problem in which the corporation's owner supplies and hires labor and chooses an optimal capital stock. Lindhe et al. (2004) draw on and extend Lindhe et al. (2002, 2003).

30 Based on the Norwegian tax system, Södersten (2020) argues, correctly, that this kind of tax savings may also affect investments financed with retained earnings, because the share price will increase. This is true for the Norwegian system analyzed by Södersten, but does not hold for the Swedish system, since the tax savings from a larger equity base are only valuable to owners of closely held corporations and do not necessarily impact the market price of shares when sold (see Södersten, 2020, for further discussion).

payment also induces lower (higher) dividend payments. The non-arbitrage condition for retained earnings is, in principle, the same as for new share issues, with the difference being that no new stocks are issued to theoretically repurchase.

Since the withdrawal of wage and dividend payments to finance a unit investment does not affect the equity base of the corporation, the wage and dividend functions will simplify to

$$W(t) = \frac{(1-\tau)MRRe^{-(\delta-\pi)t} + \tau a e^{-at}}{\varphi+(1-\tau)(1+\sigma)}, \text{ and} \tag{26}$$

$$D(t) = \varphi W(t). \tag{27}$$

In equilibrium, the value of the investment project (net of taxes) should equal the cost of the investment project. For retained earnings, the (opportunity) cost of the project is the after-tax value of the amount forgone (payments withdrawn) to finance the investment, which, in this situation is a combination of wages and dividend payments. As a result, the equilibrium condition for retained earnings will be

$$(1-\tau_c)V(0) = \frac{(1-\tau_w)}{\varphi+(1-\tau)(1+\sigma)} + \frac{\varphi(1-\tau_d)}{\varphi+(1-\tau)(1+\sigma)}.\text{[31]} \tag{28}$$

In equation (28), φ determines the mix between wages and dividends withdrawn. The first term on the right-hand side is the total after-tax value of the share withdrawn as wage payments, and the second term is the total after-tax value of the share withdrawn as dividend income.[32]

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[31] Cf. Öberg's equilibrium condition for retained earnings (based on the rules before 2006, when the owner's wage was not part of the RRA), $(1-\tau_c)V(0) = \frac{1-\tau_w}{(1-\tau)(1+\sigma)}$, where only wages were forgone to finance the investment.

[32] The first term on the right hand side in equation (28) can be seen as a weight of $\frac{(1-\tau)(1+\sigma)}{\varphi+(1-\tau)(1+\sigma)}$ times the after-tax value of the amount forgone if wages are used to finance the marginal investment $\frac{(1-\tau_w)}{(1-\tau)(1+\sigma)}$.

4. Results

To compare the METR across the different cases, we use the tax rules and tax rates for 2023 as an illustration, but with an assumed inflation rate at the 2% long-run target.[33] Our results indicate that the METR can vary substantially for an investment with the *same* but relatively low, pre-tax real rate of return depending on the specific assumptions made about the investment, as detailed above. The METR can, e.g., differ by more than 30 percentage points for an investment with a pre-tax real rate of return of 7%. We also show that the METR can differ markedly across investments with varying pre-tax real rates of return, with the gap potentially exceeding 50 percentage points between highly profitable and less profitable investments.

Closed-form solutions for the cost of capital expression (p as a function of the parameters used) are lengthy and uninformative, especially in cases B (saving and investment in financial assets) and C (payout only as wages and dividends). A summary of the different tax parameters used is presented in Appendix B.[34] First, we compare the METR for investments financed with new share issues, as this source of finance modifies the earlier models analyzing the taxation of Swedish closely held corporations the most. Table 2 reports the results, assuming a p-value of 10%, while Figure 5 illustrates how these results change as the p-value varies. The different cases cannot and should not be compared directly without considering the different assumptions and purposes underlying each specific case.

The original King and Fullerton model does not include any mechanism to divide the total income into labor and capital; hence,

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33 The inflation rate is chosen to avoid having the high inflation rate in 2023 blur the results. The imputed normal rate of return is chosen so that the government borrowing rate exceeds the inflation rate by one percentage point.

34 The results exclude some special tax allowances and deferral rules also applicable in 2023, primarily the periodization fund (*periodiseringsfonden*), with negligible impact on the problems considered here. See Wykman (2026) for a description of the special tax rules in place and how these rules can be incorporated into the King and Fullerton model.

all income is taxed either as labor or capital income. The lower METR (34.2%) in Table 2 refers to the case when all income is taxed as capital income within the RRA, and the higher METR (68.8%) refers to the case when all income is taxed at the highest labor income tax rate. This model is too crude to capture the main idea of a dual income tax system and the associated income splitting rules for closely held corporations; hence, these results serve only as a benchmark.

Table 2
Marginal Effective Tax Rate (METR) Financed with New Share Issues, 2023, p=10%

	METR (%)
King and Fullerton (1984)	
Personal income taxed as dividends	34.2
Personal income taxed as labor	68.8
Cases	
A) Repurchases of shares	30.7
B) Saving and investment in financial assets	
B1) With tax savings	32.9
B2) Without tax savings	40.2
C) Payout only as wages and dividends	
C1) With tax savings	26.5
C2) Without tax savings	37.1
D) Reinvestments	30.7

Note: Calculation based on parameter values given in Table 4 in Appendix B. All models are calculated using a fixed pre-tax real rate of return, *p* approach, but could also be derived using a fixed real interest rate *r* approach.
King and Fullerton (1984) refers to the original model, included here as a benchmark.
Case A is an extension of the original model, including the income splitting rules for closely held corporations and updated with the rules from 2006, see section 3.
Cases B–D are extensions of the original model including the income splitting rules for closely held corporations, where the assumption that shares have to be repurchased at the same pace as assets depreciate is relaxed, see section 3.
"With tax savings" refers to the possibility of using unused RRA to shift income from highly taxed labor to capital income.

In case A (with repurchases of shares), the equity base and RRA diminish over time, and the remuneration will be a combination of dividends, wages, and repurchases of shares. In our example, the METR is 30.7% which is even lower than the METR in the King and Fullerton model when all income is taxed as dividends (capital income).[35]

In the cases involving saving and investment in financial assets (case B) and payout only as wages and dividends (case C), the METR will depend on whether the owner can use tax savings or not. The cases with tax savings (B1 and C1) capture the maximum tax-savings effect, including the owner's possibility of shifting additional income from higher-taxed labor income to lower taxed dividend income. The METR without tax savings (B2 and C2) represents the situation in which the active owner cannot use the tax savings that follow from new share issues (as the owner, e.g., does not have other potentially highly taxed income that can be used). As can be seen, the value of being able to shift higher-taxed income to lower taxed income following new share issues can be substantial. If only part of the tax savings can be used, the METR will be somewhere between the values with (26.5%; 32.9%) and without (37.1%; 40.2%) tax savings.

From a tax perspective, it is more favorable for the owner to remunerate him or herself with more dividends and wages (case C) than to save in financial assets (case B), independently of the possibility to use tax savings. As stressed in the text, this requires that there is internally generated (or saved) surplus from other activities to comply with commercial law. When the effect of tax savings is included, the METR will be even lower if the surplus is distributed as dividends than if it is used for share repurchases (case A).

Using the surplus to reinvest (case D) results in the same METR (30.7 %) as in the repurchase model (case A). However, this case is not

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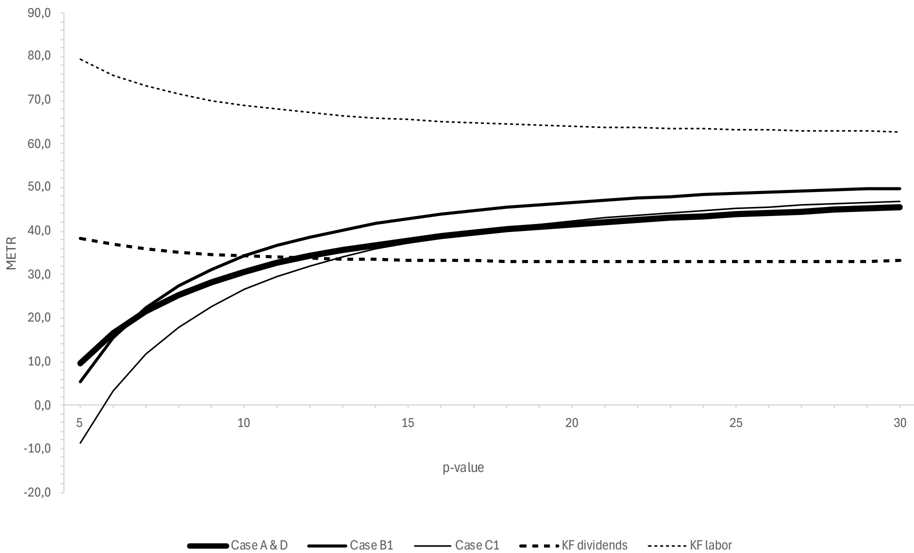
[35] In our example, with a p-value of 10% and a MRR of 20%, the return on the investment will not be high enough to allow any wage payments. As mentioned in footnote 19, this situation can be interpreted as the owner using part of the RRA to transform income from labor to capital income (i.e., tax savings), in line with the possible income shifting behavior in cases B and C (see discussion in online Appendix 1 for a more formal treatment).

fully comparable to the other cases as it does not examine a marginal investment in isolation but includes the effects of reinvestments made. This might be a more appropriate alternative and likely reflects corporations' behavior better than the other cases as a corporation that intends to continue doing business over time has to reinvest to maintain the value of its assets. In this case, the value of the initial investment will not be repaid to the original owner, which can, for instance, be the case in a family firm where the owner plans to transfer the corporation to future generations.

Including the effect of tax savings, our analysis yields a lower METR for new share issues than predicted in previous analyses, due to the new integration of the difference between the equity base and real assets. In itself, our analysis deepens the understanding of the concept of income shifting (cf. the discussion in Christiansen and Tuomala, 2008; Alstadsæter and Jacob, 2016). However, perhaps more importantly, the work in this article demonstrates that the King and Fullerton model, with its extensions, is also a robust tool for evaluating the most complex aspects of a dual tax system and its intricate income splitting rules.

Figure 5
Marginal Effective Tax Rate (METR) Financed with New Share Issues, Different p-values, 2023



Note: Case A & D refers to Repurchases of shares and Reinvestments
B1 refers to Saving and investment in financial assets with tax savings
C1 refers to Payout only as wages and dividends
KF dividends refers to the original King and Fullerton (1984) model, where all remuneration is distributed and taxed as dividends within the RRA
KF labor refers to the original King and Fullerton (1984) model, where all remuneration is distributed and taxed as labor income with the highest tax rate

The results in Table 2 are derived using predetermined parameter values, notably the value of *p* (the pre-tax real rate of return on the investment, assumed to be 10%, as detailed in Appendix B). Figure 5 shows how the results change as the p-value varies.[36] As depicted, the METR increases across all cases A, B1, C1, and D1 with higher *p*, and the tax rates converge toward approximately 50%. Moreover, the

[36] Cases B2 and C2 are excluded to avoid cluttering. The METR for these cases would be higher than B1 and C1, as indicated by Table 2, but would converge to the same METR values as B1 and C1 as *p* increases. Note that cases A and D coincide.

financing strategy yielding the lowest METR changes. For sufficiently high p-values, case A (repurchases of shares) will be the most tax-efficient option surpassing case C (payout only as wages and dividends).[37] Case B (investment in financial assets) is never the optimal strategy, regardless of the p-value. The two King and Fullerton benchmark calculations are also included in the figure. As shown, their METR decreases with rising p-values, illustrating that the original King and Fullerton model does not adequately capture the complexity of the tax rules for closely held corporations.[38] Nevertheless, for sufficiently high p-values, the METR estimates across our cases fall within the range defined by the two benchmarks.

If income shifting is feasible, the differences among the cases are relatively minor—the METR varies by only approximately five percentage points between the most and least favorable scenarios. By contrast, if the owner cannot engage in income shifting, the disparities may be more pronounced, particularly for investments with low rate or returns.

The METR can also be evaluated and compared for investments financed with retained earnings. As the equity base for tax purposes will not increase for investments financed with retained earnings, there is no tax savings effect, and the differences compared with earlier models using pre-2006 rules are minor. As already established in the tax literature, the taxation of personal remuneration is irrelevant in this case due to the so-called equity trap (see, e.g., King and Fullerton, 1984; Öberg, 2003, for further discussion). Instead, the capital gains tax affects the outcome, regardless of remuneration. Comparing investments financed with new share issues and retained earnings, it is notable that the METR for new share issues may be lower for active owners of closely held corporations, contrary to the case for other owners (see Table 3 for the case when the p-value is 10%). The increasing RRA and potential tax savings following new

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37 Given our parameter values, case A (repurchases of shares) is preferable if the pre-tax real rate of return, p, is about 17% or higher.

38 For very high p-values, the METR slightly increases even in the King and Fullerton model, as allowances are relatively less valuable when returns are high.

share issues in closely held corporations make this source of finance preferable, in contrast to what is typically concluded in earlier analyses. This conclusion, however, is also sensitive to assumed profitability. For investment with high rates of return, the result will reverse. Figure 6 depicts how the METR evolves as p varies. As can be seen from the figure, the METR for new share issues will increase as profitability increases (as already seen in Figure 5). By contrast, the METR for retained earnings remains relatively stable and may become more favorable than new share issues at sufficiently high p-values.[39] For very low p-values, the METR for new share issues can even turn negative. Injecting funds into low-yielding investment projects will enable owners the possibility to utilize a large share of the RRA for income shifting purposes.[40]

Table 3
The Marginal Effective Tax Rate (METR), Different Sources of Finance, 2023, p=10%

	METR (%)		
Source of finance	Closely held corporations	Widely held corporations (unlisted) Closely held corporations (passive)	Widely held corporations (listed)
New share issues	26.5	40.7	46.2
Retained earnings	40.8	26.2	28.9

Note: Calculations based on parameter values given in Table 4 in Appendix B. In the case of closely held corporations, the lowest values from the models in Table 2 are shown, which assumes that all potential tax savings can be fully utilized. Closely held corporations (passive) refers to passive owners of closely held corporations.

39 Given our parameter values, retained earnings are preferable if the pre-tax real rate of return, p, is about 17% or higher.

40 Investing in assets with no or low profitability on the other hand has a high opportunity cost, which is not included in the analysis. If the owner cannot engage in income shifting, the METR will be positive.

For comparison, Table 3 also reports the METR for listed, widely held corporations, as well as for unlisted, widely held corporations and passive owners of closely held corporations.[41] As the table shows, retained earnings are the preferred source of finance for these categories, in line with earlier findings. As illustrated in Figure 6, this remains true even for investments with relatively low returns—in contrast to active owners of closely held corporations. For owners of widely held corporations and passive owners of closely held corporations, the METR for new share issues is higher, as they cannot use the lower tax rate within the RRA or the tax savings that may result from expanding the equity base. In contrast, the METR for retained earnings is lower, as only the effective accrued capital gains tax matters in this case. For an active owner of a closely held corporation, the RRA does not increase following an investment financed with retained earnings, and if the owner has no saved RRA, capital gains will be taxed as labor.[42] The METR for retained earnings in this case almost coincides with that for owners of unlisted, widely held corporations using new share issues.

Regardless of the source of finance, the METR is fairly stable (though not constant, since factors such as the rate of inflation, depreciation allowances, and rate of capital depreciation affect the METR differently depending on profitability) for widely held corporations

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41 Since 2006, dividends and capital gains have been taxed at a flat rate of 30% for owners of listed widely held corporations and 25% for both owners of unlisted widely held corporations and passive owners of closely held corporations. The income splitting rules of the dual income tax system do not apply to these categories of owners.

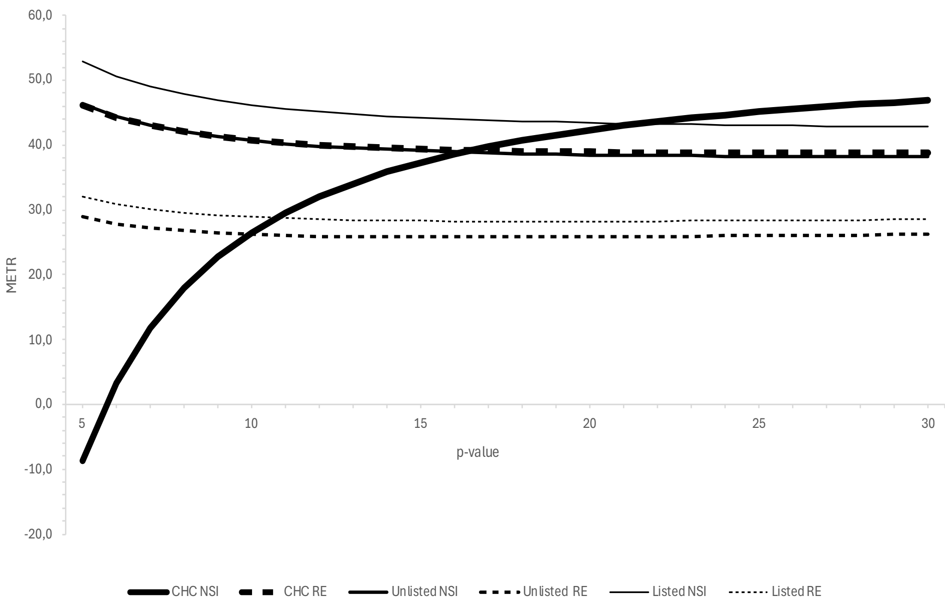
42 As described in section 2.2, the owner could save unused RRA and use it in later years. If the owner has saved RRA from previous years, or if the capital gain is small enough to be taxed within the present RRA, the METR for retained earnings will be lower for active owners of closely held corporations (and equal to 24.0% if $p=10\%$).
Instead of using equity to finance investments, one can use debt, which is not discussed or analyzed in this article. The METR for debt will be 24.3% if $p=10\%$ and is equal for all categories because the income splitting rules do not apply to debt-financed investments made through the market.

and passive owners of closely held corporations, regardless of profitability levels. For high p-values, when the lion's share of the dividends is labor taxed for active owners of closely held corporations, the METR for new share issues may even exceed that of other ownership categories. Hence, active owners of closely held corporations using new share issues as a source of finance face the most volatile and unpredictable tax outcomes, potentially incurring either the highest or lowest METR depending on investment profitability, penalizing high-return projects.

As described in section 2.2, there are ceilings restricting the amount of dividends and capital gains that are taxed as labor income for closely held corporations. If this ceiling is reached, the METR will be the same as for listed widely held corporations in Figure 6.

As stated at the beginning of this section, our findings demonstrate that the METR is highly dependent on the assumptions made about remuneration, corporate characteristics and source of finance. Even investments with identical pre-tax real returns may be taxed very differently. The rules for closely held corporations amplify these differences. Investments with a high pre-tax real return will be most heavily taxed when the owner is active in a closely held firm using new share issue as a source of finance.

Figure 6
The Marginal Effective Tax Rate (METR), Different Sources of Finance and p-values, 2023



Note: CHC NSI refers to owners of closely held corporations financing investments through new share issues and following financial strategy C1 (payout only as wages and dividends).
CHC RE refers to owners of closely held corporations financing investments through retained earnings.
Unlisted NSI refers to owners of unlisted widely held corporations or passive owners of closely held corporations financing investments through new share issues.
Unlisted RE refers to owners of unlisted widely held corporations or passive owners of closely held corporations financing investments through retained earnings.
Listed NSI refers to owners of listed widely held corporations financing investments through new share issues.
Listed RE refers to owners of listed widely held corporations financing investments through retained earnings.

5. Concluding Remarks

The King and Fullerton model is a standard way of measuring and comparing the marginal effective tax rates (METR) on investments across countries and over time. The model is complex in itself, as it aims to measure marginal taxation in economic equilibrium taking into account different sources of finance, depreciation rates, inflation, and allowances, rather than simply summing up tax rates.

The dual income tax system introduced in most Nordic countries was accompanied by income splitting rules for active owners of closely held corporations to avoid or reduce income shifting behavior. Calculating the METR for closely held corporations under these rules requires extending the King and Fullerton model, as it was not originally designed to incorporate this type of complex rules. Earlier extensions of the King and Fullerton model analyzing the Swedish dual income tax system assume that the firm repurchases shares or ignores asset depreciation. We extend these analyses by including depreciation and by relaxing the assumption that shares have to be repaid. The amount used for repurchases is instead assumed to be saved in financial assets, distributed directly to the owner, or reinvested.

By comparing the METRs under different assumptions, we enhance the understanding of the King and Fullerton model and highlight limitations and differences between various extensions. Our analysis underscores that the METR is highly sensitive to how owner behavior is modeled and how remuneration is received, in combination with the financial position of the corporation. Even investments generating the same real pre-tax rate of return might, in the end, be taxed in completely different ways—the METR can diverge by over 30 percentage points for less profitable investments, but the difference diminishes quickly as profitability increases. Our results further indicate that investments financed with new share issues, in contrast to retained earnings, may be more favorable for active owners of closely held corporations, as this type of finance increases the amount that can be taxed as low-taxed capital income and increases the possibilities for income shifting. Our results also show that the METR for active owners of closely held corporations using new share issues to finance investments is highly sensitive to the rate of return—high return investments are more heavily taxed than other owner categories or when retained earnings are used, whereas low-return investments receive a more favorable tax treatment. An investment with a high rate of return can face a METR exceeding 50 percentage points higher than a low-return investment. The current Swedish tax rules for closely held corporations favors low-profit, income shifting behavior while discouraging high-return investments—especially when new share issues are used as a source of finance. Using retained earnings or the tax ceilings mitigates these distortions.

Even though the results in this article are based on the Swedish dual income tax system, the models can be used to analyze differences across other countries already using a dual income tax system or to assess the potential tax effect for countries considering introducing various versions of such system. Our analysis contributes to the ongoing discussion of tax system design and income splitting rules from both an academic and policy perspective.

Appendix A. Measuring the METR

The aim of King and Fullerton (1984) is to calculate the marginal effective tax rate (METR) on investment projects within the nonfinancial corporate sector using a framework that takes all personal capital income taxes, corporate taxes, wealth taxes, depreciation allowances, and inflation into account. The METR is a theoretical value based on an equilibrium model. Below, we briefly describe the framework and the intuition behind the model.

Taxes drive a wedge between the pre-tax real rate of return on an investment project and the net real return received by savers, and, as stated in the main text, the METR is formally defined as

$$METR = \frac{p-s}{p}, \tag{29}$$

where p is the pre-tax real rate of return on a marginal investment and s the post-tax real rate of return to the saver.

Both p and s can be further detailed. The idea behind the King and Fullerton model is that an investment must yield (at least) the same real rate of return *after taxes* as if the investor had lent his or her capital in the capital market and received the nominal interest rate, i, i.e.,

$$s = (1-m)i - \pi - w_p, \tag{30}$$

where m is the tax on interest income, π is the rate of inflation, and w_p is the wealth tax rate. The real interest rate, defined as $r = (i - \pi)$ will play an intermediate role between p and s.

The minimum real rate of return that an investment must yield *before taxes* to provide the saver with the same net-of-tax real return that he or she would receive from lending at the market interest rate is called the cost of capital and equals p. Denoting the marginal rate of return of the investment as MRR and the depreciation rate of the asset invested in as δ, p can be further defined as

$$p = MRR - \delta. \tag{31}$$

The original King and Fullerton model examines the effective marginal tax rates on investments from different sources of finance (new share issues, retained earnings, and debt); across different groups of savers (households, tax-exempt institutions, and insurance companies); in different assets (machinery, buildings, and inventories); and across different industries (manufacturing, commerce, and “other”). The METR can be calculated either with a fixed pre-tax real rate of return, p, or with a fixed real interest rate, r. Both approaches are used, but King and Fullerton primarily base their calculations on a fixed-p approach.[43]

This model can be extended and modified to allow for an analysis of closely held corporations subject to income splitting rules. Based on Sørensen’s (2004) and Öberg’s (2003) extensions, but using our own notation, the non-arbitrage condition that a potential investor faces can be expressed as

$$i(1-m)V(t) = \left(1-m_{cf}\right)CF(t) + (1-\tau_c)\frac{d}{dt}V(t), \tag{32}$$

where $V(t)$ is the corporation’s value at time t. As explained in the main text, the right-hand side of the equation shows how a surplus generated by a potential investment could be received (after tax) by the investor. The investor can be remunerated through cash flow CF and as an increase in corporate value $\frac{d}{dt}V(t)$. m_{cf} is the tax on the cash flow from the corporation to the investor, and τ_c is the effective capital gains tax. The left-hand side represents the return if $V(t)$ were instead invested in the financial market, generating interest rate i taxed at the capital income tax rate m.

Solving the differential equation (32) for time zero yields the maximum present value $V(0)$

$$V(0) = \int_0^{\infty} \frac{1-m_{cf}}{1-\tau_c} CF(t) e^{-\frac{i(1-m)t}{1-\tau_c}} dt. \tag{33}$$

[43] As noted by King and Fullerton (1984), the fixed-r case is also less flexible.

The general cash-flow term, $CF(t)$, could, e.g., represent wages, dividends, or share repurchases, each associated with a tax rate, or possibly no tax at all.

As described in the main text, the equilibrium condition for *new share issues* is

$$V(0) = 1, \tag{34}$$

as the value of the investment project, V, at time zero must equal the cost of the project, assumed to be unity.[44] For retained earnings, the corresponding equilibrium condition becomes

$$(1-\tau_c)V(0) = \frac{(1-\tau_w)+\varphi(1-\tau_d)}{\varphi+(1-\tau)(1+\sigma)}, \tag{35}$$

where, φ determines the mix between wages and dividends withdrawn.

The present-value function (equation 33) can be combined with the equilibrium condition (equation 34 or 35 depending on the source of finance), and a relationship for the interest rate, i, can be derived (either by calculus or by numerical approximation). For a given i, equation (30) can be used to solve for s, and then, given a fixed p, the METR can be determined (equation 29).

44 Formally, it should be the after-tax value of the investment project that equals the cost, $V(0) - \tau_c (V(0) - 1) = 1$, implying equation (34). The present value of the tax depreciation allowances, denoted A, is included in the equilibrium condition in the original model, implying an equilibrium condition of $V = 1 - A$. Here, the taxation depreciation allowances are directly integrated into the remuneration equation instead. This difference does not alter the results.

Appendix B. Parameters Used in the Calculations

The calculations in section 4 are based on the parameters listed in Table 4 below.

Table 4
Parameters Used

Measure	Percentage
Pre-tax real rate of return on a marginal investment, p	10.0
Depreciation, δ	10.0
Depreciation allowances, a	30.0
Corporate tax rate, τ	20.6
Dividend tax rate, τ_d	20.0
Labor tax rate, τ_w	52.24
Statutory capital gains tax rate	52.24/30.0/25.0/20.0
Effective tax rates on accrued capital gains, τ_c	26.12/15.0/12.5/10.0
Interest tax rate, m	30.0
Social security contributions, σ	31.42
Inflation rate, π	2.0
Imputed normal rate of return, β	12.0

Note: King and Fullerton (1984) assumes that the pre-tax real rate of return on a marginal investment, *p,* is *10%;* to conform to this, we assume that the rate of depreciation, *δ,* is *10%*, and the marginal rate of return, *MRR,* is 20%.
The taxes correspond to the tax rates of 2023. The inflation rate is set to the central bank's inflation target of *2%* and the imputed normal rate of return is chosen so that the government borrowing rate exceeds inflation by *1* percentage point.
The labor income tax rate refers to the top marginal rate.
The statutory capital gains tax rate is the rate outside the RRA (which is the same as the labor income tax, 52.24%)/the tax rate above the capital tax ceiling or the tax rate for listed firms (30%)/the tax rate for unlisted firms or passive owners (25%)/the tax rate within the RRA (20%).
Capital gains are taxed upon realization, and this benefit is accounted for by converting the statutory rate into an accrued effective tax rate. The accrued effective capital gains tax can be derived endogenously in the model. However, including this possibility will further complicate the calculations and will depend on assumptions about the average holding period. For simplicity, we assume that the effective tax rates on accrued capital gains are half the statutory rate. This assumption is also made by, e.g., King and Fullerton (1984, p. 146) and Södersten (2005, p. 422).

Online Appendix 1. The Repurchases Case and Negative Wages

If $\frac{(1-\tau)MRRe^{-(\delta-\pi)t}-\beta e^{-(\delta-\pi)t}-RP(t)+\tau ae^{-at}}{\varphi+(1-\tau)(1+\sigma)} < 0$, the wage will, in

accordance with equation (3) in the main text, be negative in the case with share repurchases. In this case, a correct specification would be to set the wage to *0* and allow all surplus (except repurchases) to be distributed as dividends, i.e., a correct specification of equations (2), (3) and (4) would be

$$D(t) = (1-\tau)MRRe^{-(\delta-\pi)t} - RP(t) + \tau ae^{-at}, \tag{36}$$

$$W(t) = 0, \text{ and} \tag{37}$$

$$RP(t) = (\delta-\pi)e^{-(\delta-\pi)t}. \tag{38}$$

If the possibility of tax savings, as discussed in section 3.1 and online Appendix 2, is included, it can be shown that the original model with negative wages corresponds to a situation where no wages are paid out, and unused RRA is used to transform income from labor to capital, as described in case B in the main text and expressed in equation (17). Hence, the model will nonetheless calculate a correct value of the METR but with the implicit assumption that the owner uses part of the RRA for income shifting purposes to reduce taxes paid.[45]

To show this, we start by excluding the wage bill's contribution to the RRA since it affects the wage-dividend relationship proportionally to the tax savings (which follows from the inclusion of φ in equation (2) and the first factor in equation (17)). Further, we note that no time index is necessary in the proof since the equality must hold at all points in time. The tax savings function, as derived in online Appendix 2 and expressed in equation (47), will then be

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[45] This interpretation has not been highlighted in earlier work. If the possibility of tax savings does not exist in this case, the actual METR will be somewhat higher than that predicted by the original model.

$$TS = \frac{\beta - D}{1-\tau}\left(\left(\frac{\sigma+\tau_w}{1+\sigma}\right) - (\tau + \tau_d - \tau\tau_d)\right). \quad (39)$$

Now, using the same notation as in the main text, we can show that

$$(1-\tau_w)W + (1-\tau_d)\beta + RP = (1-\tau_d)D + RP + TS, \quad (40)$$

where the left-hand side of equation (40) refers to the remuneration in the original case with negative wages (i.e., where *W<0*) and the right-hand side refers to the correct specification with dividend remuneration only and tax savings (TS), and where

$W = \frac{(1-\tau)MRR - \beta - RP + \tau a}{(1-\tau)(1+\sigma)}$, and $D = (1-\tau)MRR - RP + \tau a.$

As repurchases (RP) can be canceled out, equation (40) can be rewritten as

$$(1-\tau_w)W + (1-\tau_d)\beta = (1-\tau_d)D + TS. \quad (41)$$

Now, rewrite the right-hand side as

$$(1-\tau_d)(W(1-\tau)(1+\sigma) + \beta) + TS, \text{ or} \quad (42)$$

$$W(1-\tau)(1+\sigma)(1-\tau_d) + TS + (1-\tau_d)\beta, \quad (43)$$

using that

$$D = W(1-\tau)(1+\sigma) + \beta.$$

Rewrite TS (equation 43) as

$$TS = -W(1+\sigma)\left(\left(\frac{\sigma+\tau_w}{1+\sigma}\right) + ((1-\tau)(1-\tau_d) - 1)\right),$$

using that

$\frac{\beta - D}{1-\tau} = -W(1+\sigma)$ and that $(\tau + \tau_d - \tau\tau_d) = -((1-\tau)(1-\tau_d) - 1).$

The right-hand side of equation (41) can now be written as

$$W(1-\tau)(1+\sigma)(1-\tau_d) - W(1+\sigma)\left(\left(\frac{\sigma+\tau_w}{1+\sigma}\right) + ((1-\tau)(1-\tau_d) - 1)\right) +$$

$$(1-\tau_d)\beta, \quad (44)$$

which simplifies to

$$W\big((1-\tau)(1+\sigma)(1-\tau_d) - (\sigma+\tau_w) - (1-\tau)(1+\sigma)(1-\tau_d) + (1+\sigma)\big) + (1-\tau_d)\beta \tag{45}$$

and

$$(1-\tau_w)W + (1-\tau_d)\beta. \tag{46}$$

This is the left-hand side (less RP which appears on both sides) of equation (40).

Online Appendix 2. Deriving the Tax Savings Equation

In section 3.1, we claim that the value of the tax savings can be calculated as:

$$TS = \frac{(1-\tau)(1+\sigma)}{(1-\tau)(1+\sigma)+\varphi}\left(\left(\frac{\sigma+\tau_w}{1+\sigma}\right) - (\tau + \tau_d - \tau\tau_d)\right)\int_{t_d}^{\infty} \frac{\beta - D^*(t)}{1-\tau} e^{-\frac{i(1-m)t}{1-\tau_c}} dt. \quad (47)$$

To see why this holds, rewrite equation (47) as

$$TS = ES \times T_{diff} \int_{t_d}^{\infty} ISA(t) e^{-\frac{i(1-m)t}{1-\tau_c}} dt, \quad (48)$$

where $ES = \frac{(1-\tau)(1+\sigma)}{(1-\tau)(1+\sigma)+\varphi}$ is the effective share of a wage reduction that can be transformed into a dividend payment, $T_{diff} = \left(\frac{\sigma+\tau_w}{1+\sigma}\right) - (\tau + \tau_d - \tau\tau_d)$ is the total tax difference between paying wages and dividends, and $ISA(t) = \frac{\beta - D^*(t)}{1-\tau}$ is the income shifting amount at every point in time, which corresponds to the unused RRA scaled up by the factor $(1-\tau)$, since it is the amount before corporate tax that is of interest.

To derive the effective share ES, we note that two relationships must be fulfilled if we want to shift income from wages to dividends using an unused RRA equal to $\overline{RRA}$.

First,

$$\frac{\Delta D}{1-\tau} + (1+\sigma)\Delta W = 0, \quad (49)$$

i.e., the change in wages (including social security contributions) must equal the change in dividends before corporate taxes, and second,

$$\Delta D = \overline{RRA} + \varphi \Delta W, \quad (50)$$

i.e., the change in dividends equals the unused RRA plus a share of the change in wages (where ΔW can be negative, reducing the amount that can be shifted to dividends).

Solving for ΔW in equation (50) and replacing ΔW in equation (49) with this expression gives

$$\frac{\Delta D}{1-\tau} + (1+\sigma)\left(\frac{\Delta D - \overline{RRA}}{\varphi}\right) = 0.$$

Solving for $\frac{\Delta D}{\overline{RRA}}$, which is the effective share, gives

$$\frac{\Delta D}{1-\tau} + (1+\sigma)\frac{\Delta D}{\varphi} = (1+\sigma)\frac{\overline{RRA}}{\varphi} \leftrightarrow$$

$$\leftrightarrow \Delta D\left(\frac{1}{1-\tau} + \frac{(1+\sigma)}{\varphi}\right) = (1+\sigma)\frac{\overline{RRA}}{\varphi} \leftrightarrow$$

$$\leftrightarrow \Delta D\left(\frac{\varphi + (1+\sigma)(1-\tau)}{\varphi(1-\tau)}\right) = (1+\sigma)\frac{\overline{RRA}}{\varphi} \leftrightarrow$$

$$\leftrightarrow \frac{\Delta D}{\overline{RRA}}\left(\frac{\varphi + (1+\sigma)(1-\tau)}{\varphi(1-\tau)}\right) = \frac{(1+\sigma)}{\varphi} \leftrightarrow$$

$$\leftrightarrow \frac{\Delta D}{\overline{RRA}} = \frac{\left(\frac{(1+\sigma)}{\varphi}\right)}{\left(\frac{\varphi + (1+\sigma)(1-\tau)}{\varphi(1-\tau)}\right)} \leftrightarrow$$

$$\leftrightarrow \frac{\Delta D}{\overline{RRA}} = \frac{(1+\sigma)}{\varphi}\frac{\varphi(1-\tau)}{\big(\varphi + (1+\sigma)(1-\tau)\big)} \leftrightarrow$$

$$\leftrightarrow ES = \frac{\Delta D}{\overline{RRA}} = \frac{(1-\tau)(1+\sigma)}{\varphi + (1-\tau)(1+\sigma)}.$$

The other two factors in equation (48) are simply the difference between the total tax on wage income and the total tax on dividend income, and the difference between the $RRA = \beta$ (when no wage is distributed from the surplus of the investment) and the actual dividend payment $D^*(t)$, scaled up by $(1-\tau)$ to measure the unused RRA before corporate tax.

Online Appendix 3. The Wage Function with Reinvestments

In order to keep the nominal value of capital constant (unity), one must continuously invest an undiscounted amount equal to $(\delta - \pi)$. To see this, note that if the capital depreciates at a rate of $e^{-(\delta-\pi)t}$ it will depreciate by $-(\delta - \pi)e^{-(\delta-\pi)t}$ at every point in time

$\left(\frac{d}{dt}e^{-(\delta-\pi)t} = -(\delta - \pi)e^{-(\delta-\pi)t}\right)$. Because an investment of $(\delta - \pi)$

immediately starts to depreciate, it exactly offsets the change in capital value, $-(\delta - \pi)e^{-(\delta-\pi)t}$. From this, it is clear that $e^{-(\delta-\pi)t} + (\delta - \pi)\int_0^t e^{-(\delta-\pi)x}dx = 1$, which precisely corresponds to a constant value of capital in nominal terms.

The depreciation allowances from the initial unit investment remain unchanged $(\tau a e^{-at})$. The depreciation allowances from reinvestments increase to their maximum value $\tau(\delta - \pi)$ as more and more reinvestments accumulate, and the total depreciation allowances are given by $\int_0^t \tau a(\delta - \pi)e^{-ax}dx$.

Using the same setup as in case A, B and C in section 3.1, one can now write the numerator of the wage equation in the reinvestment case as

$$(1-\tau)MRR\left(e^{-(\delta-\pi)t} + (\delta - \pi)\int_0^t e^{-(\delta-\pi)x}dx\right) - (\delta - \pi) - \beta + \tau a e^{-at} + \int_0^t \tau a(\delta - \pi)e^{-ax}dx, \tag{51}$$

which is the same expression as in equation (24) taking into account that

$e^{-(\delta-\pi)t} + (\delta - \pi)\int_0^t e^{-(\delta-\pi)x}dx = 1$ and that $(\delta - \pi)$ is RI.

Recalling from equation (31) that p = MRR – δ, the wage equation can be rewritten as $W(t) = \frac{(1-\tau)p+\pi-\tau\delta-\beta+\tau a e^{-at}+\int_0^t \tau a(\delta-\pi)e^{-ax}dx}{\varphi+(1-\tau)(1+\sigma)}$,

which can be approximately simplified to $W(t) = \frac{(1-\tau)(p+\pi)-\beta+\tau a e^{-at}}{\varphi+(1-\tau)(1+\sigma)}$,

if the term $\int_0^t \tau a(\delta - \pi)e^{-ax}dx$ is approximated by $\tau(\delta - \pi)$. This simplification slightly underestimates the METR (by approximately 3 percentage points for reasonable parameter values) because it overestimates the depreciation allowances, but it helps the interpretation of equation (24).

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Essay 2
Capital taxation of active owners of closely held corporations in Sweden, 1991–2024*

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Abstract

This paper examines the taxation of active owners of closely held corporations in Sweden following the introduction of the dual income tax system in 1991. The regulatory framework is complex and has been subject to numerous revisions. This study contributes, first, by summarizing the main features of the evolution of the legal framework, and second, by constructing time series of marginal effective tax rates on capital income for marginal investments financed through new share issues, retained earnings, or debt. The calculations are based on an extended version of the King and Fullerton (1984) model. There are four main findings. First, taxation is non-neutral throughout the period under analysis, exhibiting differences in effective taxation across sources of finance, profit levels, and owners' incomes. Second, taxation is unstable, as frequent

* I am grateful for comments from Daniela Andrén, Dan Johansson, Erik Svensson, Henrik Lundquist, Jacob Lundberg, and Mikael Stenkula as well as participants at seminars at Örebro University and the 86th Annual SEA Conference in Washington.

changes in tax rates and rules create uncertainty regarding the taxation of investments. Third, financing through new share issues is especially exposed to volatility and unpredictability. Fourth, for lower rates of return, new share issues can be more tax-efficient than retained earnings.

Keywords: cost of capital, marginal effective tax rates, marginal tax wedges, tax reforms

JEL Codes: L26, H21, H31, N44

1. Introduction

The 1990–1991 tax reform represented a radical transformation of the Swedish tax regime, aimed at enhancing incentives and reducing significant economic distortions (e.g., Lodin, 2011). Notably, the reform changed the income taxation of capital and labor from being global and progressive to dual, with a flat tax rate on capital income and progressive taxation on labor income (Agell et al., 1996).

The taxation of closely held corporations is of significant economic importance, since many new and growing corporations with active owners[1] can be expected to be closely held. Activities within such corporations are often thought of as the very essence of entrepreneurship. Moreover, approximately nine-tenths of Swedish-owned limited liability corporations are closely held (Andersson et al., 2018), and in 2021 closely held corporations accounted for approximately 37% of total turnover, and 50% of employment among private limited companies (SOU 2024:36). Further, Swedish data indicate a negative relationship between taxes and entrepreneurship (Hansson, 2012).

The tax rules for owners of closely held corporations are intricate and have undergone frequent reforms. The tax outcomes of the rules are difficult to interpret, even retrospectively and for well-informed observers (Alstadsæter and Jacob, 2016). To understand the tax conditions for entrepreneurs, documenting the complexity of the rules and calculating effective tax rates are both crucial, as the administrative burden and the level of taxation dampen productive entrepreneurship (Braunerhjelm et al., 2021).

This study employs the King and Fullerton (1984) model to estimate the marginal effective tax rate (METR) on capital income. The model is widely recognized for its use in analyzing capital income taxation across various sources of financing, over time, between countries, and across organizational forms (see OECD, 1991; European Commission,

[1] In principle, an active owner invests both capital and labor, i.e., takes an active part in the governance and development of the corporation, whereas a passive owner provides only capital.

2001; Sørensen, 2008). The model goes beyond simply summing up tax rates, as it measures the (dis)incentives to invest in equilibrium, taking into account prevailing tax rates, non-arbitrage conditions, and economic variables such as inflation. Integrating the tax rules for closely held corporations into this theoretical framework is, however, a demanding task, and calculating time series data is even more challenging. In addition to frequent changes in tax regulations, a complicating factor is how to divide any surplus between wages, dividends, capital gains, and share repurchases. A purely tax-minimizing strategy is rarely feasible, given that the purpose of these tax rules is to prevent income shifting from progressively taxed labor income to flat-taxed dividend income.[2]

Earlier work has extended the model to incorporate the implications of a dual tax system (e.g., Lindhe et al., 2003; Öberg, 2003; Sørensen, 2008). More recent contributions by Stenkula and Wykman (2026) have incorporated recent policy changes and different corporate financial strategies, creating a more flexible toolbox for calculating the METR. To the best of my knowledge, no study has conducted a full time series analysis of how the 1990–1991 tax reform, along with subsequent changes to the tax code, have affected the METR for investments in closely held corporations over the entire period.[3] Prior work has typically calculated the METR for selected years; for instance, McLure and Norrman (1995) calculated the METRs for 1991–1995, Öberg (2003) for 1991 and 1999, and Sørensen (2008) for 2007. In this study, I extend the analysis by both calculating complete time series of the METR, from 1991 until 2024, and by incorporating updates to the model into the calculations.

A prerequisite for the METR calculations is access to a detailed description of the structure of the regulations and their changes over time. Such an overview is also essential for analyzing the results, particularly since no generalized calculations, regardless of their precision, can account for all aspects of the regulatory framework. To

2 For a comparative discussion on how such splitting rules can be designed, see, for example Selin (2024).

3 Elert et al. (2023) utilized parts of the results from this study, initially published as a working paper to identify tax regimes from 1862 onward.

comprehend the incentives for investing in closely held corporations, it is therefore vital to document the regulations in their entirety, as certain aspects may create advantages or disadvantages for corporations or individuals with specific characteristics. Hence, the purpose of this study is twofold: first, I provide a comprehensive overview of the evolution of the core elements of the legal framework since its introduction in 1991,[4] and second, I calculate the METR for investments undertaken by an active owner of a closely held corporation during the period 1991 to 2024.[5]

Research and policy evaluations benefit from comprehensive time series of the METR for closely held corporations. These series not only shed light on investment incentives but also provide insights into the uniformity and neutrality of the tax system. Furthermore, even though there is no universal definition of entrepreneurship,[6] at least a subset of the owners of closely held corporations can be described as entrepreneurs[7] (Elert et al., 2023). While the regulatory framework allocates any surplus only between labor and capital income, its origin may stem from entrepreneurial efforts. Consequently, the METR also serves as a measure of incentives for entrepreneurship. For a sufficiently deep and broad understanding of how taxation, from these different perspectives, evolves over time, I calculate the METR annually for different income levels of active owners, varying corporate rates of return, and for different sources of finance. In the analysis of tax conditions for entrepreneurship, certain results carry greater significance than others. The METR for higher incomes reflects the tax incentives for more successful entrepreneurship, which research identifies as crucial for economic growth (Henrekson et al., 2010). Moreover, financing from new share

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4 In Selin (2021), many aspects of the development of the regulations are presented within a broader socio-economic context.

5 This study contributes to a long-term research project on the Swedish tax system; see, for example, Stenkula (2014).

6 For a discussion on entrepreneurship, see, for example, Hébert and Link (2007) and Bruce et al. (2020).

7 With one or several characteristics such as dealing with uncertainty, having growth ambitions, introducing new products and services to the market, and taking on risk.

issues plays a vital role in establishing new corporations that adopt innovative or advanced technologies (e.g., Gompers and Lerner, 2001; Bornhäll et al., 2016; Wallmeroth, 2018). Finally, the regulations governing new share issues are more complex and warrant further analysis.

As for the results, the METR ranges from below 20% to nearly 75% throughout the period across all levels of income, returns, and sources of financing. Debt financing is, on average, the most tax-efficient source of finance over time. Investments financed through new share issues have a lower METR than investments financed through retained earnings for lower rates of return. However, this relationship changes as the rate of return increases. The METR is most volatile over time for new share issues and least volatile for debt financing.

The findings reveal a trend toward lower METRs over time. However, this evolution has been non-monotonic; it has been influenced by significant fluctuations caused by factors beyond tax legislation for closely held corporations, such as the wealth tax and the inflation rate. An examination of the tax rules themselves also reveals that they have been highly unstable, with frequent, almost annual, changes until 2014, after which they have remained more stable. Finally, it is worth noting that effective income taxation at the personal level may vary significantly due to factors beyond income level, such as the corporation's total wage bill and financial position, for example, the presence of additional income streams or accumulated capital.

The remainder of the paper is structured as follows: Section 2 outlines the main features of how closely held corporations are defined and taxed. Section 3 reviews the development of the relevant statutory tax rates and the rate of inflation. Section 4 introduces the King and Fullerton model. Section 5 presents and discusses the results, and Section 6 provides concluding remarks. Appendix A provides a formal, closed-form description of the rules intuitively outlined in Section 2. Appendix B offers comprehensive tables detailing the tax rates and tax rules introduced in Sections 2 and 3. Appendix C provides the METR estimates and analyses under fixed inflation assumptions, and Appendix D explains the special tax rules: Annell deduction, tax equalization fund, periodization fund, and relief amount. Finally, Appendix E includes tables of the various METRs.

2. Tax treatment of closely held corporations in Sweden

Closely held corporations constitute a heterogeneous category of firms, ranging from small livelihood businesses to multinational enterprises. The primary criterion for defining a limited liability company as a closely held corporation is that a small group of individuals controls more than 50% of the ultimate voting rights.[8] The Swedish tax code distinguishes between an active owner, who invests both capital and labor and actively participating in the governance and development of the corporation, and a passive owner, who only provides capital. The shares of the former are classified as *qualified*, while those of the latter are deemed *unqualified*. An owner is considered active, or synonymously qualified, if (s)he or a close family member is currently, or has been within the past five years, actively involved in the corporation's income-generating activities to a "considerable extent". Otherwise, (s)he is referred to as passive, or synonymously, unqualified (Swedish Income Tax Act 1999:1229, Chapter 56, Section 2; Chapter 57, Sections 3–4).[9]

2.1 The 1990–1991 tax reform

The Swedish 1990–1991 tax reform was a comprehensive transformation of the tax system, based on the fundamental principles of neutrality and uniformity (Calmfors, 2012). A key component of the reform was the introduction of a dual income tax system, in which capital and labor income were taxed separately, with a progressive tax on labor income and a flat and lower tax rate on capital income. In most cases, this separation did not lead to practical difficulties in taxation. However, for active owners of closely held

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8 The maximum number of people has changed from 10 to 4 during the evaluated period.

9 See Bjuggren et al. (2011) for a detailed analysis.

corporations, it is not possible to objectively determine whether income derives from capital or labor.[10]

As part of the reform, several tax rates were lowered while tax bases were broadened.[11] Capital gains were fully taxed, irrespective of the holding period, at a flat rate of 30%, as were dividends and interest income. The corporate income tax was set at a flat rate of 30%, while social security contributions remained at 38%. The average local labor income tax was 31.15%, with an additional 20 percentage points levied on income exceeding threshold as state income tax. The lower tax on capital income was primarily justified by the fact that a portion of such income, in nominal terms, stems from inflation. If labor and capital income were equivalent, the latter would be taxed more heavily in real terms (Government Bill 1989/1990:110).[12]

As a result, particularly for individuals subject to state income tax, the total marginal tax rate on labor income, including social security contributions, exceeded the combined corporate and personal capital income tax rates. This led policymakers to fear a significant structural transformation, driven by high-income earners shifting progressively taxed labor income into lower-taxed capital income. As the architects behind the rules stated:

> The primary rationale for implementing a specific taxation system for qualified owners of closely held corporations is prevention. Without specific regulations, we would get a purely tax-driven structural transformation, allowing many wage earners to avoid

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[10] This *uncertainty of source* for closely held corporations has been called the Achilles' heel of the dual tax system (Sørensen, 1994).

[11] The marginal tax rate on labor income decreased from a range of 36% to 72% to a range of 31% to 51%, and the individual marginal tax rate on personal capital income decreased from a range of 36% to 72% to a flat 30% rate (Sørensen, 1998). The social security contribution was approximately unchanged, and the statutory corporate income tax was decreased from approximately 50% to 30% (Henrekson and Stenkula, 2015) in combination with reduced allowances and grants; see Lodin (2011, chapter 7) for a further discussion of the design of the new corporate taxation scheme.

[12] There are additional arguments for a lower tax rate on capital than labor, such as a more elastic tax base, see e.g., Bastani and Waldenström (2020) for a discussion.

> the progressive labor taxation by income shifting—an outcome that would result in substantial economic efficiency losses.[13]

To prevent income-shifting, the legislator introduced a rule-based distinction between labor and capital income for owners of closely held corporations. The division aimed to ensure that an active owner of a closely held corporation was taxed equivalently to a wage earner who holds shares in, for example, a publicly listed corporation, given the same level of labor and capital contribution (Government Bill 1990/91:54). These specific tax regulations are commonly referred to as the 3:12 rules.[14]

2.2 The evolution of the taxation of passive owners

The tax rules for passive owners are straightforward as no division between labor and capital taxation is necessary. A passive owner of a closely held corporation is taxed similarly to a shareholder in a widely held, unlisted corporation, i.e., all dividends and capital gains are taxed as capital income.

Originally set at 30% for both capital gains and dividends, the tax rate on capital gains was reduced to 25% in 1992–1993. In 1994, the tax on dividends was abolished, while the tax on capital gains was halved to 12.5%.[15] However, in 1995, the 30% tax rate on both capital gains and

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13 Edin et al. (2005, p. 5) original Swedish text: ”Det avgörande skälet för att ha en särskild beskattning av kvalificerade ägare till fåmansföretag är preventionen. Utan särskilda regler skulle vi få en renodlat skattedriven strukturomvandling där många löntagare skulle kunna undvika den progressiva beskattningen av tjänsteinkomster genom att ’sätta sig på bolag’ – något som skulle ge påtagliga samhällsekonomiska effektivitetsförluster”.

14 The widely used phrase “3:12 rules” refers to the original placement of these rules in the code of laws.

15 Sometimes there is uncertainty about which tax rates applied to capital gains and dividends in 1992 and 1993; for example, SKV 152 cites incorrect rates. The confusion probably arises because the announced across-the-board reduction of the capital income tax rate to 25% was postponed until 1995 by a crisis bill (Government Bill 1992/1993:50). Capital gains, however, were to be included at only five-sixths of their amount, resulting in an effective tax rate of 25 percent. By 1995, however, the planned general reduction was not implemented.

dividends was reintroduced (RSV 292, SKV 292). Aligning with the tax rate applied to unlisted, widely held corporations, the tax on capital gains and dividends was again reduced to 25% in 2006 (RSV 292, SKV 292).

2.3 The evolution of the taxation for active owners

Since the introduction of special tax rules for owners of closely held corporations, a *normal return model* has been applied. Under this model, the legislator defines a normal return on capital for active owners, which is taxed as capital income, while any excess return is taxed as labor income.[16] Alternative models, such as a *normal wage model*, have been proposed but repeatedly rejected.[17]

Despite being the preferred approach of the legislator, the normal return model presents challenges. As long as labor income tax rates exceed those on capital income, there are incentives for income shifting. However, the difficulties associated with a normal return model extend beyond preventing tax avoidance. For example, active owners who achieve high returns are taxed at a much higher rate than wage earners holding shares in publicly listed companies, which contradicts the principles behind the regulations. To mitigate excessively high taxation, the rules have, from the outset, been supplemented with thresholds and relief mechanisms. The scope of these exceptions has grown over time, often to achieve political objectives such as promoting employment or fostering small-scale entrepreneurship. In turn, this has created new incentives for income shifting, which have been counteracted with new regulations. Some measures have led to unintended consequences, which have been

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[16] Critics have argued that the normal return is too low for entrepreneurial activities, is difficult to determine, or is even unsuitable to serve as the basis of a legal framework for entrepreneurs (Bjuggren et al., 2007).

[17] Governmental investigations, including SOU 2002:52 and Edin et al. (2005), have rejected the optimality of the normal wage model. The primary reason for this conclusion, these studies argue, is that defining a normal wage is more complicated than determining a normal return on invested capital. Moreover, under a normal wage model, active owners would rarely be subject to progressive labor income taxation.

remedied through reversions or further regulations. The relatively complicated framework has been unstable over time. The rest of this section outlines the main characteristics of the regulatory evolution, while a detailed description of the parameters is provided in Tables A1 and B1 in Appendices A and B.

2.3.1 The rate of return allowance: the general rule (*huvudregeln*)

The rate of return allowance (RRA, *gränsbeloppet*) divides the total surplus distributed to the active owner into capital and labor income for taxation at the personal level. Surplus distributed within the allowance is taxed as capital income. This does not impose a limit on the total dividend a corporation may distribute, but rather on the portion that may be taxed as capital income at the personal level.

The total tax on dividends within the rate of return allowance consists of corporate income tax and personal capital income tax. The total tax on excess dividend income, that is, dividends exceeding the rate of return allowance, comprises corporate income tax and labor income tax but not social security contributions.[18] A corporation may always distribute its surplus as wage payments to the owner, which are subject to social security contributions and labor income tax.

Capital gains from share sales are taxed according to the same principles as dividends, though in certain years a special split rule (*klyvningsregeln*) was applied to capital gains exceeding the rate of return allowance. Before 2006 and between 2007 and 2009, such capital gains were taxed as a combination of labor and capital income: half was taxed as labor income, and the other half as capital income. The exception occurred in 1994, when 70% of capital gains were taxed as labor income.

The calculation method for the rate of return allowance has evolved over time. Initially, it was based on an imputed return on the equity base, defined as:

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18 Nor does such remuneration entitle recipients to tax deductions or social benefits, as regular wage payments do.

$$\mathit{Rate\ of\ return\ allowance} = \mathit{Imputed\ rate\ of\ return} \times \mathit{equity\ base}. \tag{1}$$

The equity base has been calculated throughout the period as the sum of the acquisition cost of shares and capital injections made by the owner. The imputed return was initially set at 5% plus the government borrowing rate (*statslåneräntan*, SLR).[19] However, it faced criticism for being too low and was subsequently increased to 7% plus the government borrowing rate in 2004, and further to 9% plus the government borrowing rate in 2006.[20]

In 1994, the rate of return allowance was expanded by adding a portion of the corporation's wage bill, referred to as the wage base (*lönesummetillägg*), to the equity base:

$$\mathit{Rate\ of\ return\ allowance} = \mathit{Imputed\ rate\ of\ return} \times (\mathit{equity\ base} + \mathit{wage\ base}). \tag{2}$$

The main reason for introducing a wage base, the legislator argued, was that the corporation's risk increases with the number of employees, all else equal. This implies that a larger share of the potential surplus could be regarded as a risk premium and should consequently be taxed as capital income. Additionally, incorporating the wage base into the rate of return allowance was considered a preferable way to reduce taxes from an income-shifting perspective. The legislator argued that no active owner would increase employment solely to lower the tax rate on her or his own income. Therefore, a greater share of income could be taxed as capital income without increasing the risk of abuse (Lodin, 2011). However, these changes also implied a relative tax advantage for owners of labor-intensive corporations compared to capital-intensive corporations.

At the time of the introduction, the wage base was small and defined as 10% of the corporation's wage bill above 10 price base amounts

[19] The government borrowing rate consists of the average market yield on government bonds with a remaining maturity of at least five years (Swedish National Debt Office, n.d.a). The actual rate from 30 November of the previous year is to be used, i.e., in year *t*, the government borrowing rate of 30 November of year *t-1* is to be used. See Table B4 in the Appendix.

[20] See SOU 2002:52, Alstadsæter and Jacob (2016), and Government Bill 2005/06:40.

(*prisbasbelopp*, PBB[21]). The owner's wage was excluded from the calculation of the wage bill, and the increase in the rate of return allowance due to the wage base could not exceed the owner's wage. Furthermore, the owner could only add the wage base if her or his own wage was at least 150% of the highest-paid employee's wage (RSV 292, SKV 292).

The wage base was expanded in 1997. First, the wage base was increased from 10% to 70%, and later to 100% of the total wage bill. Second, the restriction that the increase in the rate of return allowance relative to the wage base could not exceed the owner's own wage was abolished. Instead, a new, more generous restriction was imposed, limiting the wage base to at most 50 times the owner's wage. Furthermore, the restriction on the owner's wage was reduced to be the lower of 120% of the highest-paid employee's wage or 10 price base amounts. Nonetheless, the owner's wage and wage bills below 10 price base amounts were not included in the wage base (RSV 292, SKV 292).

In 2006, the common equity and wage base was abolished and replaced by a wage-based allowance (WBA; *lönebaserat utdelningsutrymme*), which was added separately to the rate of return allowance:[22]

$$\begin{aligned}&Rate\ of\ return\ allowance = Imputed\ rate\ of\ return \times equity\ base + \\ &wage\ based\ allowance. \end{aligned} \tag{3}$$

Initially, for total wage bills below 70 income base amounts (*inkomstbasbelopp*, IBB[23]), the wage-based allowance was calculated as 20% of the total wage bill, after deducting 10 income base amounts. For wage bills exceeding 70 income base amounts, an additional 30 percentage points were applied to the calculation of the allowance.

[21] This is a government standard related to the development of prices, used to calculate, e.g., social benefits and tax rules. In 2024, the Swedish price base amount was approximately USD 5,500.

[22] The reform in 2006 was far-reaching and included both changes in the regulations and the tax rates. The purpose of the changes was to encourage entrepreneurship and employment (Government Bill 2005/06:40).

[23] This, like the price base amount, is a government standard. In 2024, the Swedish income base amount was approximately USD 7,300.

The owner's own wage was included in the wage bill, but with a modified requirement, set to the lower of 15 income base amounts or 6 income base amounts plus 5% of the corporation's total wage bill. It is only from this point onward that the owner's wage payments began to affect the effective tax rate through the size of the rate of return allowance. Additionally, the limitation of the wage base to a maximum of 50 times the owner's wage was abolished (RSV 292, SKV 292). The increased weight of the wage bill in the rate of return allowance further benefited corporations with large payrolls. In 2007, the deduction of 10 income base amounts from the wage bill was abolished, and the 20% share of the wage bill included in the wage-based allowance was increased to 25%. In 2014, the wage bill's contribution to the allowance was set at a fixed rate of 50%, irrespective of the total wage payments (RSV 292, SKV 292).

Between 1997 and 2005, part of the rate of return allowance, a relief amount (*lättnadsbelopp*), was tax-exempt at the personal level. The relief amount was calculated in the same way as the rate of return allowance, but with a lower imputed rate of return, initially set at 65% of the SLR and increased to 70% from 1998 onward (RSV 292, SKV 292).

Following the reforms in 2006 and 2007, combined with reductions in the corporate tax rate and the statutory personal capital income tax, stronger incentives emerged to structure employment so that employees became partners, holding only very small equity stakes.[24] To curb overuse of these regulations, a new requirement was introduced in 2013, mandating that firm owners had to hold at least 4% of the total shares to qualify for the wage-based allowance. Additionally, the wage bill used to calculate the wage-based allowance was once again capped at 50 times the owner's wage. To maintain unchanged tax revenues, the wage requirement was reduced so that the owner's wage was the lower of either 9.6 income base amounts or 6 income base amounts plus 5% of the corporation's total wage bill.

[24] This was used, for example, by law and accounting firms.

Under all three methods of calculating the rate of return allowance in Equations (1)–(3) above, any unused portion of the allowance could be carried forward with a so-called carry-forward interest rate, such that:

$$Rate\ of\ return\ allowance = This\ year's\ rate\ of\ return\ allowance + (1 + carry\ forward\ interest\ rate) \times unused\ rate\ of\ return\ allowance. \quad (4)$$

The carry-forward interest rate was the same as the imputed rate of return on the equity base until 2006, when it was reduced to the government borrowing rate plus 3 percentage points (RSV 292, SKV 292).

Finally, if a corporation repurchases shares at their original cost, such remuneration to the owner is not subject to personal taxation. However, it reduces the equity base and consequently lowers the rate of return allowance.

2.3.2 The simplification rule

A simplification rule (*förenklingsregeln*) was introduced in 2006 as an alternative to the general rule described above. Under this rule, the rate of return allowance was fixed, regardless of the amount of capital invested or the corporation's wage bill. Initially, it allowed 1.5 income base amounts per corporation to be taxed as capital income. The owner was entitled to the rate of return allowance multiplied by his or her ownership share.

The allowance was subsequently increased to 2 income base amounts in 2007, 2.5 in 2009, and 2.75 in 2012. From 2012 onward, an active owner could apply the simplification rule to only one of his or her closely held corporations (RSV 292, SKV 292).

The simplification rule is not further analyzed in this paper. However, for small livelihood businesses, corporations with limited surplus, or owners with strong preferences for minimizing administrative work, the rule may be the most preferable option.

2.3.3 Tax ceilings on capital gains and dividends

Since the introduction of the rules for closely held corporations, a ceiling has been in place on the amount of capital gains that are taxed as labor income. No more than 100 price base amounts (income base amounts from 2006 onward) of capital gains could be subject to labor income tax during a six-year period (Lodin, 1994).[25] A governmental inquiry discussed the possibility of introducing a similar ceiling for dividends but did not support the proposal. The primary argument against it was that such a measure would increase the complexity of the rules. Instead, it was argued that expanding the wage-based allowance could increase incentives to own corporations and to pay dividends (Edin et al., 2005). However, to improve tax conditions, a tax ceiling for dividends was introduced in 2012. Under this provision, no more than 90 income base amounts of dividends can be taxed as labor income in any given year (Government Bill 2011/12:1).[26]

A few other special regulations have a significant impact on the METR over the period; they are thoroughly explained in Appendix D.

3. The evolution of inflation and statutory tax rates affecting the taxation of active owners in closely held corporations

The statutory marginal tax rates for owners of closely held corporations have varied considerably over time, as has the rate of inflation. Inflation has both a direct effect on effective taxation, as the tax system is nominal, and an indirect effect through its impact on the government borrowing rate. Tables B2a, B2b, B3, and B4 in Appendix B summarize this evolution, while this section presents an overview.

Dividends exceeding the rate of return allowance (but remaining below the ceiling described in Section 2.3.3 from 2012 onward) are subject to a progressive labor income tax. Capital gains that exceed the rate of return allowance (but not the ceiling) are taxed as labor income, either fully or partly, in combination with capital income,

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[25] That is, if an active owner sold shares at a gain, the tax authority had to sum up all capital gains during the previous five years to decide how the capital gains should be taxed.

[26] Another relevant discussion at the time was the taxation of venture capitalists, who are often located and taxed abroad. A cap on dividends clarified the tax rules and decreased the potential tax burden for this group. A cap also had the potential to broaden the tax base by attracting venture capitalists to pay tax in Sweden and to mitigate the use of cross-border tax-driven structures with interest payments.

under the split rule described in Section 2.3.1. Incomes exceeding the ceilings are taxed at the standard capital income tax rate, which has remained at 30% throughout the period, while the capital income tax rate within the rate of return allowance has varied over time.[27]

Wage payments or capital income classified as labor income are subject to local income tax, which varies across municipalities, but has remained relatively stable at slightly above 30% on average over the period. In addition, incomes above a certain threshold are subject to state income tax. Initially, this state tax was levied at an additional 20%, but in 1995 it increased to 25%. In 1999, an additional threshold was introduced in the state income tax system, below which incomes were again taxed at 20% rather than 25%. However, in 2020, this additional threshold was abolished, and the state income tax reverted to a flat 20% rate.

For simplicity, the calculations in Section 5 take into account only the average local tax rate and the highest state income tax rate.[28] This approach enables a comparison between two hypothetical marginal income earners: low-bracket income earners (LBE), who are subject only to local tax, and high-bracket income earners (HBE), who are also subject to the top state income tax. The analysis of high-bracket income earners serves to illustrate the marginal effective tax rate for entrepreneurs with growth ambitions, and low-bracket income earners primarily serve as a benchmark.

3.1 Dividend income

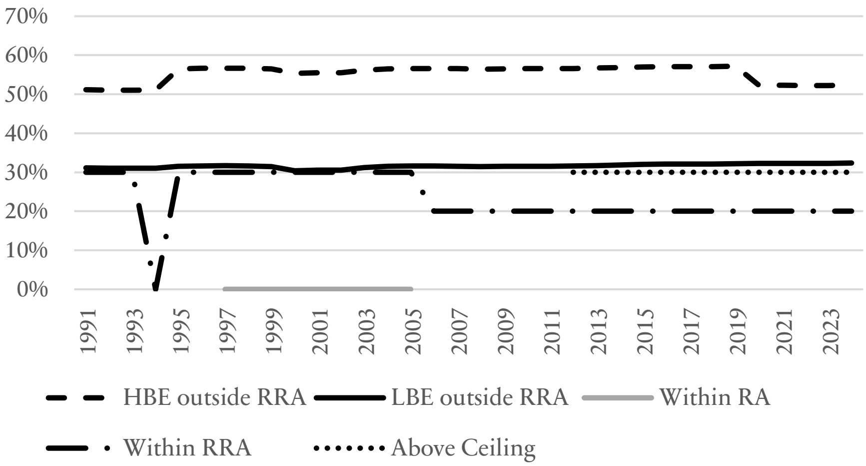
Figure 1 depicts the statutory personal marginal tax rates on dividends for active owners of closely held corporations, specifically

27 In 2013, an investment deduction (*investeraravdrag*) was introduced for new share issues. Under certain restrictive conditions, it allows a portion of the investment to be deducted from the capital-income tax base. However, it is excluded from the analysis without significantly affecting the overall conclusions.

28 I exclude the earned income tax credit and other personal-level tax reductions or credits from the analysis. This simplification does not lead to a significant loss of generality, as the analysis focuses on marginal effects. However, for low-bracket income earners, particularly those with low incomes, this approach may result in an overestimation of the effective tax rate.

the marginal tax rates applied within the rate of return allowance (capital income tax), within the relief amount (exempt from taxation), above the rate of return allowance (taxed as labor income), and above the ceiling of 90 income base amounts (capital income tax). The marginal tax rates vary considerably, ranging from zero and almost 60%, depending on the year and whether the dividends fall within or above the rate of return allowance or the relief amount.[29]

Figure 1. Marginal statutory tax rate on dividends for active owners of closely held corporations, 1991–2024



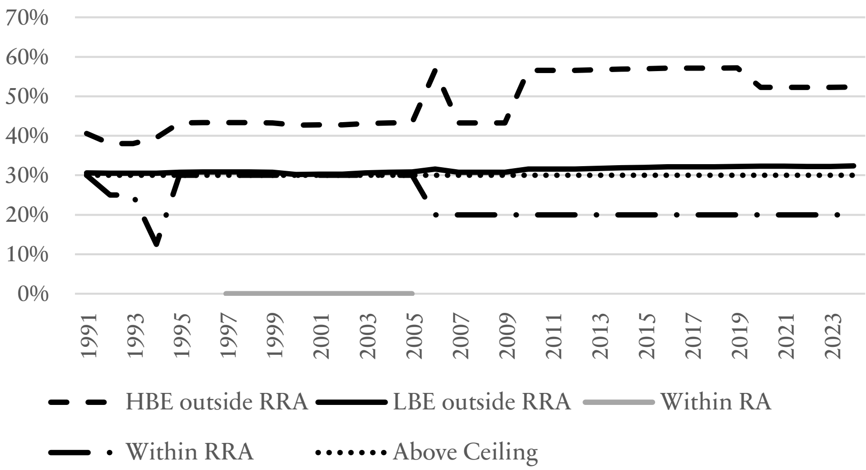
Note: HBE denotes a high-bracket income earner paying the top state income tax, and LBE denotes a low-bracket income earner with earnings below the threshold for state income tax liability. RRA (rate of return allowance) is the amount within which remuneration can be taxed as capital income. RA (relief amount) is a subset of the RRA and is exempt from tax. The HBE and LBE face the same tax rate within the RRA, above the ceiling and within the RA, but face different tax rates outside those boundaries. All income exceeding the ceiling (90 income base amounts) is taxed as capital income.
Source: Government Bill 1992/1993:50; Government Bill 2019/20:1; RSV 292, SKV 292 and Statistics Sweden (n.d.a).

[29] Since 2000, the Church of Sweden (*Svenska Kyrkan*) is no longer a formal part of the Swedish state, and the fee paid to the church is not regarded as a tax in the official statistics. I follow this classification and exclude the fee paid to the church from 2000 onward.

From Figure 1, it is clear that the taxation of active owners involves several tensions. The level of taxation on income exceeding the rate of return allowance varies by 20 to 25 percentage points between low-bracket and high-bracket income earners. For high-bracket income earners, the difference is even greater between incomes falling within or exceeding the rate of return allowance.

3.2 Capital gains

Figure 2. Marginal statutory tax rate on capital gains for owners of closely held corporations, 1991–2024



Note: HBE denotes a high-bracket income earner paying the top state income tax, and LBE denotes a low-bracket income earner with earnings below the threshold for state income tax liability. RRA (rate of return allowance) is the amount within which remuneration can be taxed as capital income. RA (relief amount) is a subset of the RRA and is exempt from tax. The HBE and LBE face the same tax rate within the RRA, above the ceiling and within the RA, but face different tax rates outside those boundaries. Before 2006 and between 2007 and 2009, the marginal tax rate outside the RRA was a combination of statutory labor and capital income tax rates. All income exceeding the ceiling (100 income base amounts) is taxed as capital income.
Source: Government Bill 1992/1993:50; Government Bill 2019/20:1; RSV 292, SKV 292 and Statistics Sweden (n.d.a).

Figure 2 depicts the statutory personal marginal tax rates on capital gains for active owners of closely held corporations. The differences in tax rates between Figures 1 and 2 stem from four factors. First, in 1992 and 1993, the capital gains tax was reduced to 25%. Second, in 1994, dividends were exempt from taxation, but the tax rate on capital gains was 12.5%. Third, the split rule did not apply to dividend income when it was in effect. Fourth, the ceiling for dividends was introduced much later (2012) than for capital gains (1991), and with a different threshold and construction.

3.3 Interest tax

The marginal tax rate on interest income has remained at 30% since 1991. There are regulations designed to prevent active owners from shifting labor income to interest income by lending to their corporations. In particular, loans must be made on “commercial grounds”. Such interest income is taxed as ordinary interest income, i.e., 30% at the personal level, while the interest payment is deductible at the corporate level. Excess interest payments are reclassified and taxed as “hidden” dividend payments[30] (Alstadsæter and Jacob, 2012).

3.4 Wealth tax

The personal wealth tax was levied at a flat rate of 1.5%, except in 1991, when it was progressive with a cap at 2.5%, until 2007, when it was abolished.[31] However, equity from unlisted firms, such as closely held corporations, was not included in the wealth tax base from 1991 onward (see Du Rietz and Henrekson, 2015, for further details). The model for calculating the marginal effective tax rate, introduced in

[30] “Commercial grounds” refer to the interest rate that the corporation would have to pay for a comparable loan from a third party, taking into account, for instance, the market interest rate, business risk, and collateral. There is no fixed regulation on how high interest rate the corporation is allowed to pay the owner; SLR+3 percentage points is always accepted by the tax authority, but decisions are made on a case-by-case basis.

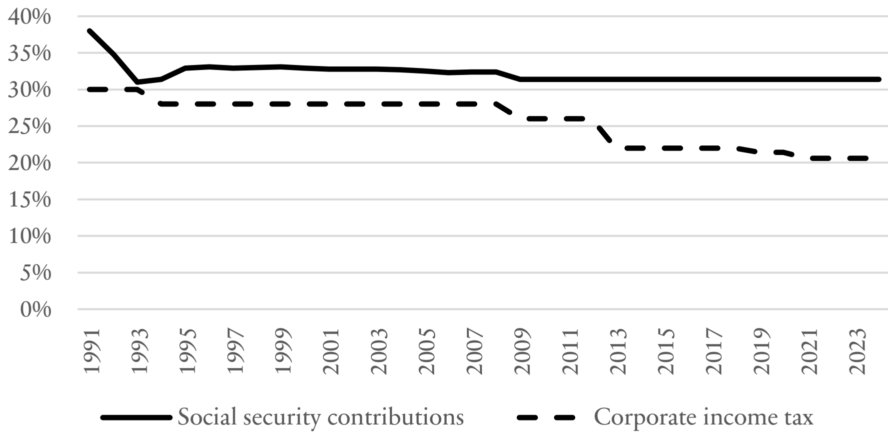
[31] It was abolished retroactively for the whole of 2007 at the end of the year. An investor at the beginning of 2007 could, therefore, have taken the tax into account, but I disregard this possibility and treat the tax as abolished from the start of 2007 onward.

Section 4, assumes general equilibrium and non-arbitrage conditions, thereby considering alternative uses of equity. Whether to include the wealth tax in the analysis depends on the underlying assumption about how the income generated by the investment is saved, and whether that income is subject to wealth taxation.

3.5 Corporate income tax and social security contributions

The statutory corporate tax rate was reduced to 30% in 1991 and gradually lowered to 20.6% by 2024. After significant reductions early in the period, social security contributions have remained fairly stable at just over 30%.

Figure 3. Statutory marginal corporate tax rate and statutory social security contributions, 1991–2024



Source: Government Bill 2017/18:245 and SKV 152.

The divergent developments of corporate income tax and social security contributions, as illustrated in Figure 3, have further increased the tax tension between dividend payments and wage payments.

The interpretation of social security contributions is less straightforward than that of other taxes. For high-bracket income earners, these contributions function as a pure tax at the margin, as they provide no additional insurance value. Although the benefit ceilings for pension funds, sick leave benefits, parental benefits, and other social security schemes vary, the income of high-bracket income earners consistently exceeds these ceilings.

For low-bracket income earners, the situation is more complex. In many social insurance schemes, the ceiling is 7.5 price base amounts (Flood et al., 2013). Between 2007 and 2024, this ceiling was below the threshold for state income tax, implying that social security contributions could constitute a pure tax for owners not subject to state income tax at the margin.

However, between 2003 and 2006, the ceiling and the state tax threshold approximately coincided, and prior to 2003, the state tax threshold was lower than the ceiling.[32] This could justify a reduction in social security contributions in the calculations below, at least for years preceding 2003.[33] For simplicity, however, I treat social security contributions as a pure tax at the margin, for both high- and low-bracket income earners.

3.6 Inflation

The tax reform was a significant policy change in Sweden during the early 1990s. Another major reform was the granting of independence to the central bank, making price stability the primary objective of

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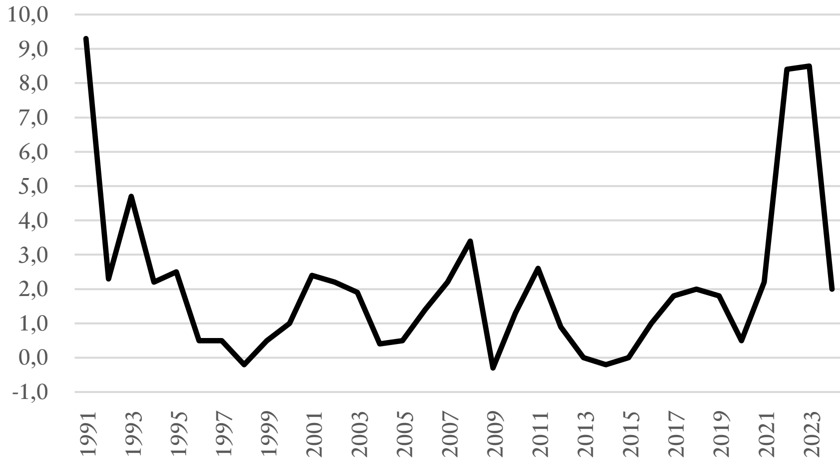
[32] The ceiling is, however, higher for some social benefits, but the difference does not have a significant impact on the results. Choosing another value, for example 10 price base amounts, delays the interaction with the threshold by approximately 10 years. For annual incomes between 0.5 and 7.5 price base amounts, Flood et al. (2013) calculate the tax component to be 40% of social security contributions.

[33] There are other aspects of social security contributions that are not accounted for, such as reductions for special groups of employees (such as young people, elderly people, and people living in remote areas), employee social security contributions, and the 5-percentage-point reduction for closely held corporations with small wage bills between 1997 and 2006. I disregard these since they will not significantly influence the results below or materially impact the conclusions.

monetary policy. As a result, inflation fell and averaged approximately 2% between 1991 and 2024. However, as illustrated in Figure 4, inflation fluctuated over this period, potentially having a significant impact on effective taxation.

Figure 4. The inflation rate (%), 1991–2024



Source: Statistics Sweden (n.d.b).

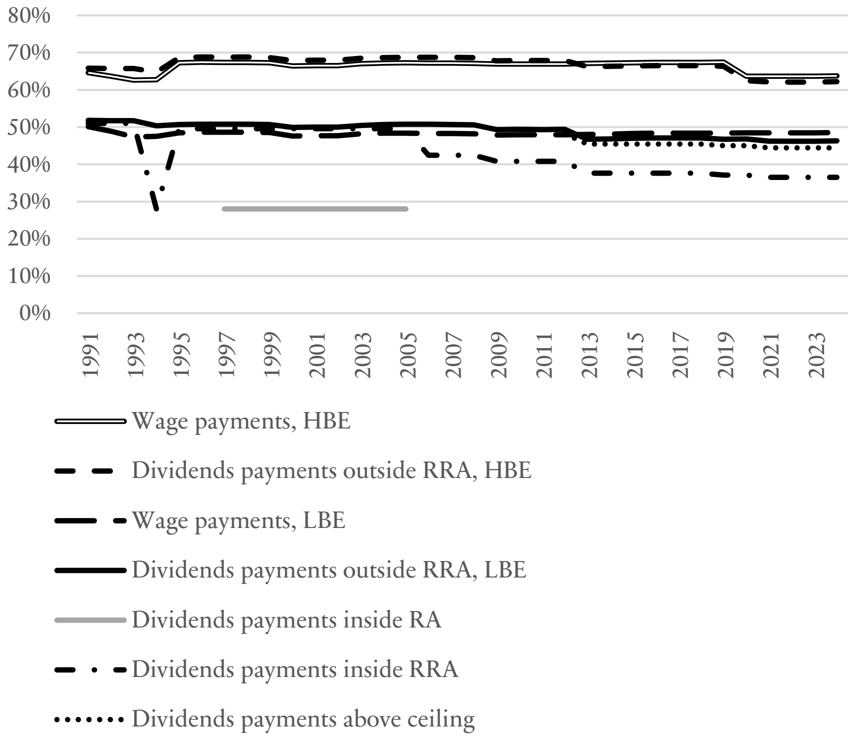
3.7 Pecking order

Analyzing the marginal effective tax rate requires identifying the most tax-efficient remuneration strategy. Öberg (2003) argued that the Swedish tax system was characterized by the following inequality:

$$(1-\tau)(1-\tau_d) > \frac{1-\tau_w}{(1+\sigma)} > (1-\tau)(1-\tau_w), \tag{5}$$

where τ is the corporate tax rate, τ_d is the dividend tax rate, τ_w is the labor income tax, and σ is the social security contribution rate. This inequality implies that the after-tax return to the owner from a marginal surplus in a closely held corporation is highest when it is distributed as dividends within the rate of return allowance. The second highest after-tax return is achieved when the marginal surplus is paid out as wages, while the lowest return occurs when dividend payments are made outside the rate of return allowance.

Figure 5. Total statutory marginal tax rates, 1991–2024



Note: Total statutory marginal tax rates refer to the combined effect of corporate income tax or social security contributions and personal income tax. HBE denotes a high-bracket income earner paying the top state income tax, and LBE denotes a low-bracket income earner with earnings below the threshold for state income tax liability. RRA (rate of return allowance) is the amount within which remuneration can be taxed as capital income. RA (relief amount) is a subset of the RRA and is exempt from tax. The HBE and LBE face the same tax rate within the RRA, above the ceiling and within the RA, but face different tax rates outside those boundaries. All income exceeding the ceiling (90 income base amounts) is taxed as capital income. From 2006 onward, the owner's wage payments expand the RRA, which converts the taxation to up to approximately two thirds labor tax and one third dividend tax, depending on the total wage sum. From 2014 onward this holds regardless of the wage sum. Hence, if the total statutory marginal labor tax is 60% and the dividend tax within the RRA is 30%, the total marginal tax is approximately 50%.
Source: Own calculations.

Figure 5 depicts the pecking order between wage and dividend payments for different income levels.[34] The figure demonstrates that the inequality stated above does not always hold, partly because this analysis incorporates varying income levels, which Öberg (2003) did not, and partly due to the introduction of the ceiling as well as subsequent changes in tax rates. There is no fixed pecking order over time, and it is important to note that:

1. Wages below the threshold for state income tax liability were preferable to dividends within the rate of return allowance between 1995 and 2005, contradicting the left-hand side of the inequality for those years.

2. From 2013 onward, dividends exceeding the rate of return allowance were preferable to wage payments, violating the right-hand side of the inequality. However, since the owner's wage could be included in the wage base from 2006 onward, this ordering does not hold in practice, as a share of the wage payments was effectively transformed into payments inside the rate of return allowance. Nevertheless, low-bracket income earners may have been restricted from utilizing the wage-based allowance and could therefore have preferred dividend payments exceeding the rate of return allowance.

3. Tax-relieved dividends were consistently preferable to wages between 1997 and 2005.

These findings are integrated into the METR calculations presented in Section 5.

4. The marginal effective tax rate on capital income (METR)

To illustrate how tax incentives for active owners to invest are affected by the regulations for closely held corporations, this study applies the

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[34] The pecking order is derived under the assumption that the owner's own wage does not restrict the size of the rate of return allowance and meets the minimum required level to add a wage base/wage-based allowance. If the owner's wage does restrict the size of the rate of return allowance, the pecking order and the allocation between wages and dividends will change.

King and Fullerton (1984) model. There are several methods for estimating tax incentives, but I choose to apply the King and Fullerton model since it is a standard technique in academic research as well as in practical use (see, for example, OECD, 1991; Södersten, 1993; European Commission, 2001; Sørensen, 2004). In particular, there are several studies on Swedish data using the King and Fullerton model, for example, Öberg (2003), Lindhe et al. (2003) and Sørensen (2008).

The objective of King and Fullerton (1984) was to calculate the marginal effective tax rate on investment projects in the nonfinancial corporate sector, taking inflation as well as all personal income taxes, corporate taxes, and wealth taxes into account. The original King–Fullerton framework is not, without extensive revision, applicable to a dual tax system with regulations for closely held corporations such as in Sweden. No country in the original King and Fullerton (1984) study had such rules. Since then, several extensions of the model have been developed, to modify it for dual taxation and to incorporate changes in the tax system. In particular, the allocation of surplus for taxation as either capital or labor income plays a critical role. This division, together with further adaptations to new regulations and alternative remuneration strategies, is described in Stenkula and Wykman (2026); the time series calculated in this study rely on those techniques. This section merely aims to provide an intuitive introduction to the model.

The METR is formally defined as the difference between the pre-tax and post-tax real rate of return relative to the pre-tax real rate of return on a marginal investment project.

Taxes drive a wedge between the pre-tax real rate of return on investments by corporations and the post-tax real return received by savers. The pre-tax real return is denoted p, and the post-tax real return s.[35] The METR can be calculated either for a given fixed pre-tax

[35] Since it is an equilibrium model, the pre-tax real rate of return p must equal the corporation's *cost of capital*.

real rate of return, p, or a given fixed real interest rate, r. The post-tax real return, s, is in both cases a function of r.

King and Fullerton (1984) primarily based their calculations on the pre-tax real rate of return, p. In other words, it is assumed that a marginal investment has a real marginal rate of return, *MRR,* and that capital depreciates at the rate δ, so that:

$$p = MRR - \delta. \tag{6}$$

King and Fullerton assume that p is 10%, and this study conforms to that standard by assuming an MRR of 20% and a depreciation rate (δ) to be 10% in the benchmark case. These results are compared with investments that yield a higher return, i.e., those associated with higher values of p.

For a given p, an r must be determined that satisfies an equilibrium condition; that is, the present value of the project, $V(0)$, should equal the size of the investment, which is normalized to one, so that:

$$V(0) = 1. \tag{7}$$

In this example, the unit investment is financed through new share issues. If the investment is instead financed through retained earnings, its present value must correspond to the owner's post-tax value, that is, the amount that would have been received if it had been distributed rather than reinvested. Furthermore, if debt is the source of finance, the present value of the project, after repayments and interest payments, must be zero.

The present value function, $V(0)$, can be obtained by solving the differential equation that defines the non-arbitrage condition:

$$i(1-m)V(t) = (1-\tau_w)W(t) + (1-\tau_d)D(t) + (1-\tau_c)\frac{d}{dt}V(t), \tag{8}$$

which, in continuous time, evaluated at $t = 0$, takes the form:

$$V(0) = \int_0^\infty \left(\frac{1-\tau_w}{1-\tau_c}W(t) + \frac{1-\tau_d}{1-\tau_c}D(t)\right)e^{-\frac{i(1-m)t}{1-\tau_c}}dt. \tag{9}$$

Equation (8) states that the post-tax value of all revenues (wages, W, and dividends, D) from the investment project, together with the growth in corporate value $\frac{d}{dt}V(t)$, must at any time t be as valuable as the return on holding the value of the investment project, $V(t)$, in government bonds.[36] Inflation is accounted for by indexing the revenues and using the nominal interest rate, i. The non-arbitrage condition in Equation (8) is provided for intuition, and can be refined further, for example, by including repurchases of shares, which in turn modify the present value function in Equation (9).

In the model, the investor has the option to pursue alternative investments, such as purchasing government bonds, earning the post-tax real rate of return:

$$s = (1 - m)i - \pi - w_p, \tag{10}$$

where m is the tax rate on interest income, π is the rate of inflation, and w_p is the wealth tax. The nominal interest rate, i, in Equation (10), takes the value that satisfies Equation (7), with the present value as defined in Equation (9). The METR is then defined as:

$$METR = \frac{p-s}{p}. \tag{11}$$

Major complications in the calculations arise from the question of how to allocate the total surplus between wages and dividends, or, using the notation above, how to divide the marginal rate of return on investment (*MRR*) into dividend payments (*D*) and wage payments (*W*). Another complication stems from the depreciation of real assets, which leads to ever-lower proceeds over time. In contrast, the impact of an investment financed through new share issues on the rate of return allowance is constant, as it depends on the (non-depreciating) equity base. To address these complexities, Equation (8) must be further refined. This process, together with the differences between calculating the METR for new share issues, retained earnings, and debt, is explained thoroughly in Stenkula and Wykman (2026), drawing on earlier work, such as Öberg (2003), Lindhe et al.

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[36] In Equation (8), m is the tax on interest income, τ_w is the labor income tax, τ_d is the capital income tax within the rate of return allowance, and τ_c is the effective tax on capital gains. For simplicity, this study assumes the effective capital gains tax to be half the statutory rate. The same assumption is made by King and Fullerton (1984, p. 146). Further, this illustration of the non-arbitrage condition is the same as that used in Öberg (2003), but without repurchases of shares. This formulation qualitatively corresponds to the alternative remuneration strategy discussed in Section 5.2.

(2003), and Sørensen (2008). The inclusion of certain special rules is explained in Appendix D.

5. Results

This section outlines the time series of marginal effective tax rates, spanning from 1991 to 2024. The presented tax rates account for variations in sources of finance, rates of return, and total owner income. In the benchmark case, I assume that repurchases equal to the original investment are carried out at the same pace as assets depreciate and are exempt from personal taxation. The depreciation rate, δ, is assumed to be 10% in all calculations. To assess the impact of the repurchase strategy, I also perform calculations using an alternative financial strategy that excludes repurchases. Additionally, I conduct robustness tests to analyze the effects of inflation and government borrowing rates. This is particularly important for detecting the impact of year-specific changes in the tax regulations, as they may be less readily identifiable amid the variation in inflation and government borrowing rates, and is discussed in Appendix C. Altogether, the calculations yield numerous marginal effective tax rates annually, even after limiting the possible levels of return and total owner income to three each, that is three levels of MRR (20%, 30%, and 40%) and three income categories (high-bracket, low-bracket, and above the ceiling). The table and figures below depict a selection of these results, highlighting key aspects of the evolution of tax incentives for owners of closely held corporations since the 1990–1991 tax reform. The results are presented in Tables in Appendix E.

Table 1. Summary statistics: marginal effective tax rates, 1991–2024

METR %	New share issues *High-bracket*	*Low-bracket*	Retained earnings *All income earners*	Debt *All income earners*
MRR=20				
Mean	39.0	40.7	47.5	30.1
Max	67.9	66.3	73.2	39.4
Min	19.8	23.4	31.3	19.4
Std. Dev.	12.6	11.6	8.8	6.6
MRR=30				
Mean	48.7	41.4	42.5	27.0
Max	63.3	54.5	55.2	31.9
Min	38.0	32.9	33.5	21.6
Std. Dev.	7.3	6.1	4.3	3.1
MRR=40				
Mean	52.2	42.1	41.3	26.6
Max	62.4	51.3	49.9	30.1
Min	43.9	35.9	34.7	23.0
Std. Dev.	6.0	4.3	2.9	2.0

Note: High-bracket refers to income subject to the top state income tax and low-bracket to income below the threshold for state income tax liability. *MRR* is the marginal rate of return on an investment, with the depreciation rate fixed at 10%. The interest income tax is independent of income level, and for retained earnings it is assumed that all sales of shares at the margin generate gains outside the rate of return allowance, which are subject to the highest marginal tax rate on capital gains.
Source: Own calculations.

For new share issues as a source of finance, the METR differs between levels of income. For debt financing, there is no difference across income, as both corporate income tax and the tax on interest income are flat.[37] For retained earnings, the assumption is that the sale of the

[37] If the debt holder is also the owner, specific regulations regarding the interest rate may impose constraints on both remuneration and tax deductibility. In the analysis that follows, it is assumed that these restrictions are not binding. However, if they are, meaning that the equilibrium interest rate exceeds the market interest rate as determined by the tax authorities, the METR will increase and may surpass the METR for new share issues. This occurs because debt financing does not contribute to an increase in the rate of return allowance, and any interest payments exceeding the accepted market rate would be reclassified as hidden dividends, thereby becoming subject to the labor income tax rate. The results for an analysis where the regulations are binding can be sent upon request.

corporation, or shares, will result in a sufficiently large surplus to be subject to the highest marginal tax rate on capital gains.[38]

With actual inflation rates and across all levels of income, returns, and sources of financing the marginal effective tax rate ranges from approximately 20% at its lowest to around 73% at its highest. As also shown in Table 1, debt is on average the most tax-efficient form of financing. However, while the METR is, on average, lower over time for new share issues than for retained earnings at lower rates of return, it becomes higher at higher rates of return. The standard deviation is highest for new share issues, and lowest for debt, and it declines with the rate of return across all sources of finance. The largest variation in the METR between sources of finance within the same year is approximately 34 percentage points, while the smallest is approximately 12 percentage points. The results are discussed and analyzed in more detail in the sections below.[39]

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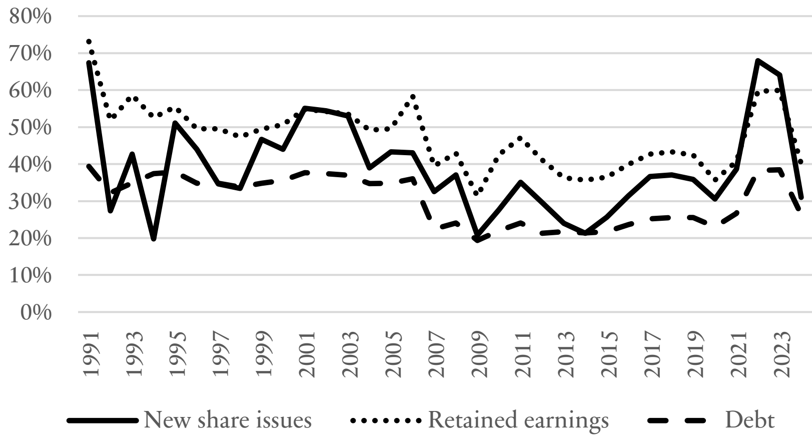
[38] This assumption is reasonable, since it is unlikely that a closely held corporation, or any part thereof, would be sold in such a way that only the low-bracket tax rate would apply to the owner. If the assumption does not hold, there would be differences in the METR between low-bracket income earners and high-bracket income earners also when retained earnings are used as source of finance. Consequently, the results in Table 1 and in the figures below would overestimate the METR for low-bracket income earners by approximately 5 percentage points in years when the split rule applies and by approximately 10 percentage points when it does not, across all levels of return.

[39] If the corporation generates sufficient surplus for the owner's income to exceed the ceilings at which labor income tax applies, as discussed in Section 2.3.3, the results presented in Table 1 will change for both new share issues and retained earnings. For retained earnings, the effect will be similar to, but somewhat larger than, the effect observed when introducing low-bracket income earners into the analysis, as the standard capital income tax, which is the relevant tax rate for surplus exceeding the ceiling, does not deviate significantly from the average local tax. In the case of new share issues, the ceiling becomes irrelevant for low rates of return, as the surplus does not exceed the rate of return allowance. However, for higher returns, the ceiling may reduce the METR by up to approximately 10 percentage points since its introduction in 2012.

5.1 METR for different sources of finance, rates of return and levels of income

The METR over time for a high-bracket income earner and an investment generating a marginal rate of return of 20% is illustrated in Figure 6. Recall from Equation (6) that a marginal rate of return of 20% corresponds to a pre-tax real rate of return (p) of 10%, given the assumed depreciation rate of 10%.

Figure 6. Marginal effective tax rate at a 20% marginal rate of return for a high-bracket income earner by year, 1991–2024



Note: High-bracket refers to income subject to the top state income tax. The METR for new share issues in 1991–1993 may be underestimated because it assumes the full utilization of the Annell deduction; see Appendix D for further details. The depreciation rate is set at 10%.
Source: Own calculations.

Figure 6 illustrates significant volatility in the METR over time and across different sources of finance. This reflects frequent changes in the tax system, differences in the tax treatment of returns to investments financed through new share issues, retained earnings, and debt, and interactions with inflation and the government borrowing rate. At returns as low as 10%, income shifting can also materially affect the taxation of new share issues.

Over the period analyzed, statutory tax rates relevant to the results in Figure 6 have both increased and decreased, with two notable exceptions. The interest income tax rate has remained constant at 30%, contributing to the relative stability of the METR for debt financing. Meanwhile, the corporate income tax rate exhibits a downward trend, marked by six reductions that cumulatively reduced the rate from 30% at the beginning of the period to 20.6% at the end. This steady decline in the corporate income tax rate has fostered a long-term tendency for the METR on equity financing to decrease, while simultaneously increasing the METR on debt financing, because the tax value of interest deductions falls as the corporate rate declines.

The fiscal consolidation after the crisis at the beginning of the 1990s included, among other measures, an increase in the top marginal tax rate on labor income. This adjustment raised the METR for new share issues. In 2006, the tax framework for closely held corporations underwent significant reforms, which reduced the effective taxation on investments financed through new share issues, with effects in subsequent years. Furthermore, the abolition of the wealth tax in 2007 led to a substantial reduction in the METR across all sources of finance.[40]

For a weighted investment with an equal share of each financing source depicted in Figure 6, the lowest METR occurred in 2009 at 23.8%, while the highest was recorded in 1991 at 60.0%. The low average in 2009 is attributed to deflation. *Ceteris paribus*, the rate of inflation is positively correlated with the METR for all sources of finance, while a higher government borrowing rate exclusively reduces the METR for new share issues, through its positive impact

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[40] As pointed out in Section 3.4, the inclusion or exclusion of the wealth tax in the calculations is assumption-based. In Figure 6, as in the other figures, the wealth tax is included. If it were excluded, the METR during the period 1991–2006 would be 15 percentage points lower across all sources of finance and levels of income, assuming a marginal return of 20%. Consequently, the levels of the METR should be interpreted in light of this assumption. If the marginal return is 30%, the overestimation is 7.5 percentage points; with a return of 40% it decreases to 5 percentage points; and so on. In many cases, however, the wealth tax may not be applicable at all.

on the rate of return allowances. The lower METR for new share issues in 1994 is partly attributed to the abolition of the dividend tax and the reduction in the corporate income tax, while the higher METR for retained earnings in 2006 resulted from changes to the taxation of capital gains. However, the rise in the METR for all sources of finance in 2022 was due to a sharp rise in inflation. At times, changes in the tax code interact with shifts in economic variables, amplifying their impact on the METR. A notable example of this interaction occurred in 1992, where the reduction in the METR for new share issues was driven by a sharp decline in inflation, which was reinforced by a reduction in social security contributions. A comparable situation occurred in 2009, with a significant drop in inflation combined with a reduction in the corporate income tax rate. While this combination also lowered the METR for retained earnings and debt, the effect was smaller because these sources of financing are unaffected by the higher rate of return allowance implied by the previous year's higher government borrowing rate, due to the higher inflation at that point in time.

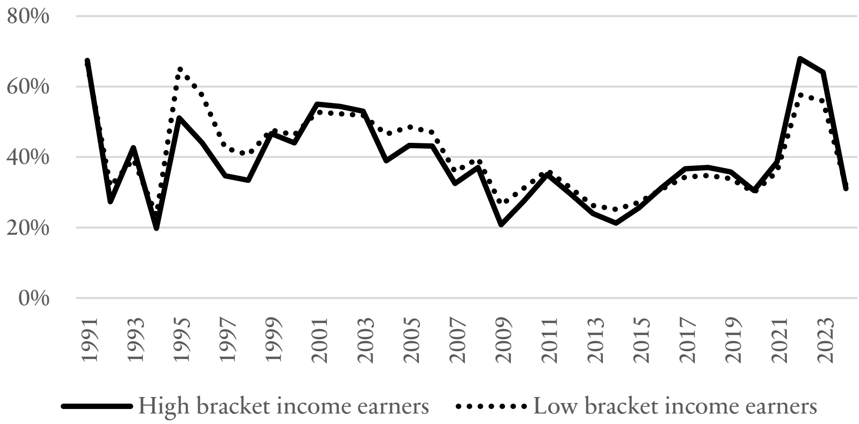
Changes in inflation and government borrowing rates can blur the effects of tax changes. To isolate the impact of the tax code and quantify the influence of economic variables in the model, Appendix C replicates the results under the assumption of fixed inflation and government borrowing rates.[41]

Figure 7 compares the METR for new share issues of a high-bracket income earner, as illustrated in Figure 6, with that of a low-bracket income earner. Despite a 20–25-percentage-points higher statutory labor income tax rate for high-bracket income earners, the METR is often

[41] A fixed inflation approach facilitates comparison of the tax rules over time and across countries and is frequently used. A further advantage is that it may be more reasonable for an investor to assume that long-run inflation will, on average, be closer to the inflation target than to the current year's rate. On the other hand, the investor is assumed to take present tax rates as given, and a fixed-inflation approach disregards the importance of the built-in link to the government borrowing rate. Previous studies on Swedish data have used actual inflation rates.

approximately on par with that of a low-bracket income earner. In most years, the METR is even lower for high-bracket income earners.[42]

Figure 7. Marginal effective tax rate at a 20% marginal rate of return, new share issues, high- and low-bracket income earner by year, 1991–2024



Note: High-bracket refers to income subject to the top state income tax and low-bracket to income below the threshold for state income tax liability. The METR for 1991–1993 may be underestimated because it assumes the full utilization of the Annell deduction; see Appendix D for further details. The depreciation rate is set at 10%.
Source: Own calculations.

The explanation for the seemingly counterintuitive result presented in Figure 7 is the possibility of income shifting. With a marginal rate of return of 20%, the surplus is often taxed within the rate of return allowance. When the entire rate of return allowance is not utilized, a high-bracket income earner benefits more from an investment. This occurs because the unused portion of the allowance, which increases due to the investment, can be used to shift additional income from higher-taxed labor income to lower-taxed dividend income. If there is no additional surplus, and thus income shifting cannot be utilized,

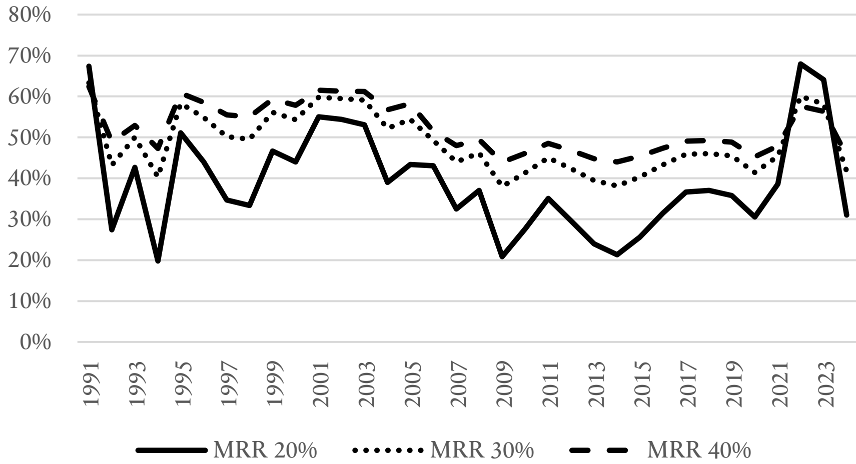
[42] If only high-bracket income earners had been subject to the wealth tax, the results in Figure 7 would change and the average pre-2006 METR for low-bracket income earners would have been 15 percentage points lower.

the results for new share issues, especially for high-bracket income earners in Figures 6 and 7, will be underestimated. For example, the METR in 2024 for new share issues would increase from approximately 31% to 35% for a high-bracket income earner. Further, without the possibility of income shifting, a low-bracket income earner will always have a lower or the same METR, as a high-bracket income earner.

The years with a lower METR for low-bracket income earners are associated with a relatively low government borrowing rate, which reduces the rate of return allowance. However, for higher rates of return, such as 30%, the METR is consistently higher for high-bracket income earners throughout the analyzed period. Figure 8 below illustrates the METR for high-bracket income earners for investments with varying marginal rates of returns financed through new share issues.[43]

[43] Low-bracket income earners with high investment returns are likely to emerge in the economy as a response to avoiding the effective marginal tax rates depicted in Figure 8. On average, low-bracket income earners pay approximately 7 percentage points less tax on an investment yielding a 30% return and 10 percentage points less on an investment yielding a 40% return compared to high-bracket income earners.

Figure 8. Marginal effective tax rate, new share issues at different levels of marginal rate of return, high-bracket income earner by year, 1991–2024



Note: MRR refers to the marginal rate of return on an investment, with the depreciation rate fixed at 10%. The METR for new share issues in 1991–1993 may be underestimated if the Annell deduction is not fully utilized; see Appendix D for further details.
Source: Own calculations.

As demonstrated in Table 1, the average METR for new share issues increases from 39.0% to 48.7%, reaching 52.2% as the marginal rate of return rises from 20% to 30%, and further to 40%. Simultaneously, volatility decreases substantially. The positive correlation between the METR and the marginal rate of return is due to a larger share of the surplus being taxed outside the rate of return allowance as the return increases. Furthermore, with higher returns, there will be no unused rate of return allowance to transform additional income from labor into dividend taxed income. However, for years with high inflation, the METR is higher for lower rates of return, because inflation constitutes a larger share of the total nominal return. This also partially explains the higher volatility associated with a lower rate of return. Additional contributing factors include changes in how the RRA is calculated and variation in the applicable tax rates within the allowance, as these affect investments with lower returns more.

In addition to the information in Figure 8, variations in the rate of return also affect the METR for retained earnings and debt as sources of finance. Since remunerations from these investments are unaffected by the rate of return allowance, the differences in the METR are less pronounced than for new share issues, although not negligible, as is demonstrated in Table 1. For both retained earnings and debt, fluctuations in inflation have a larger impact on the METR for investments with lower returns. In contrast to the METR for new share issues, which increases with higher returns, it decreases for retained earnings and debt.

For new share issues, the substantial reform of the tax rules in 2006, including an increase in the imputed rate of return, the inclusion of the owner's wage in the rate of return allowance, and reduced tax rates, left the METR approximately unchanged that year for a return of 20%, while it reduced the METR for higher returns. The unchanged METR for a 20% return is, however, an effect of inflation. See Appendix C for an analysis of the impact of inflation and the evolution of the METR under fixed inflation assumptions.

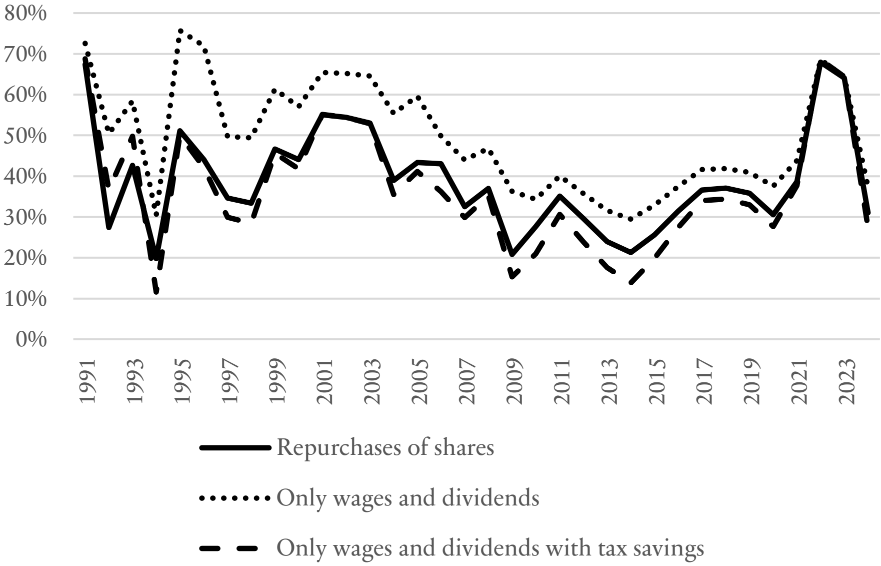
Several year-specific changes in the tax regulations are, however, visible in Figures 6 to 8. Among those affecting investments financed through new share issues are the introduction of the relief amount in 1997 and the increase in the imputed rate of return in 2004. For retained earnings, the most significant change during the period analyzed was the abolition of the split-rule taxation in 2006. Additionally, reductions in the corporate income tax rate, such as the substantial cut from 26.3% to 22% in 2013 reduced the METR for new share issues and retained earnings but increased the METR for investments financed through debt.

5.2 A different financial strategy

As thoroughly discussed in Stenkula and Wykman (2026), different financial strategies can lead to different tax outcomes. In addition to repurchases of shares, they analyze the tax outcomes of full remuneration through wages and dividends, financial savings within the firm, and reinvestment in new physical capital. The reasons behind these financial decisions may vary, such as tax minimization, portfolio management, or growth strategies. For the purposes of this study, the evaluation of such strategies is confined to a robustness test using one alternative approach to the benchmark scenario depicted in Figure 6. Rather than repurchasing shares, the owner remunerates himself or herself with an equivalent amount in the form of wages and dividends.[44] As a consequence, the equity base in Equation (1) does not diminish over time, leading to a permanent increase in the rate of return allowance following an investment financed through new share issues. A larger rate of return allowance increases the possibility of shifting additional surplus from labor to dividend taxation; on the other hand, the owner has to give up the tax-free repayment of the original investment. Whether the owner can take advantage of the tax savings from a larger rate of return allowance significantly impacts this trade-off, as illustrated in Figure 9. As noted, the potential for income-shifting may also arise in the benchmark scenario; however, in the absence of share repurchases, the effect is significantly larger, as the increase in the rate of return allowance resulting from the investment persists over time.

[44] This assumes the presence of internally generated surplus (or accumulated surplus) from other activities to ensure compliance with commercial law.

Figure 9. Marginal effective tax rate at a 20% marginal rate of return, new share issues, different remuneration, high-bracket income earners by year, 1991–2024



Note: Repurchases of shares refer to a situation in which the corporation repurchases shares at the same pace as assets depreciate. Only wages and dividends describes a situation in which the entire surplus is distributed as wages and dividends, with no share repurchases. Only wages and dividends with tax savings refers to a scenario where the owner can shift additional surplus from labor income to dividend income. The METR for new share issues for 1991–1993 may be underestimated because it assumes the full utilization of the Annell deduction; see Appendix D for further details. The depreciation rate is set at 10%.
Source: Own calculations.

As demonstrated in Figure 9, there is no dominant tax-minimizing strategy throughout the period. If the owner can realize the value of a large rate of return allowance as tax savings through income shifting, foregoing share repurchases often becomes the tax-preferred strategy. This result also applies to low-bracket income earners. However, in addition to the results shown in Figure 9, under scenarios with marginal rates of return of 30% or 40%, share repurchases consistently emerge as the tax minimizing strategy, even though the difference between different strategies narrows with higher returns.

As long as tax savings can be utilized, the tax differences between the remuneration strategies remain relatively small. The tax cost for not being able to utilize the tax savings decreases with higher rates of return, as an increasingly smaller share of the rate of return allowance can be used to shift income. Independent of strategy, and disregarding inflation, the METR will ultimately converge to the statutory tax rate as the return increases.

5.3 Summary of results

Over the analyzed period, and across different sources of financing and income levels, debt is normally tax-advantaged compared to equity financing. Within equity financing, new share issues are tax-favored compared to retained earnings when returns are relatively low. This differs from the tax incentives for widely held corporations and the general assumption regarding investments, namely that retained earnings are taxed more favorably than new share issues. However, for higher returns, the METR is notably lower for retained earnings among high-bracket income earners. When total income remains below the threshold for state income tax, the METR for new share issues and retained earnings largely coincide, even at higher levels of return. For lower returns, new share issues can occasionally be more tax-efficient than debt in certain years. However, the relatively lower METR for new share issues at lower rates of return is not solely attributable to the favorable tax treatment within the rate of return allowance itself. It also depends on the possibility of transforming additional income from labor taxation into dividend taxation. If income shifting is not feasible due to the absence of supplementary income, the METR for new share issues may frequently be underestimated. Conversely, if a corporation is in a financial position that allows for full utilization of income shifting, the tax advantage increases.

The METR varies significantly across years, with inflation playing a central role in year-to-year fluctuations. By comparing Figure 4 in Section 3.6, which illustrates the rate of inflation over time, with the METRs depicted in Figures 6 to 9, it becomes evident that inflation shapes the pattern of the METR. Although the METR measures the tax incentives to invest, its interaction with economic variables such as inflation and government borrowing rates can limit its effectiveness as a tool for identifying changes in the tax system. However, robustness tests assuming fixed inflation provide a quantitative measure of the impact of tax reforms on the METR.

Moreover, since the wealth tax depends on factors beyond the taxation of individual investments in closely held corporations, excluding it from the analysis helps clarify how the taxation of closely held corporations affects the METR. This approach facilitates an examination of the underlying changes in the METR caused by tax reforms over the period.

For debt financing, abstracting from the wealth tax, there is a continuous upward trend in the METR across all levels of return, driven by several reductions in the corporate income tax rate. The reduction in corporate income tax has lowered the METR for retained earnings as a source of finance. However, when comparing the beginning and end of the period, this effect is roughly offset by the abolition of split-rule taxation in 2006.

For new share issues, the comparison of the METR across the period is less straightforward. In 1994, the tax on dividend income was abolished, substantially lowering the METR.[45] From 1995 onward, a period of fiscal consolidation, with higher income taxes, pushed the METR above 60% for high-bracket income earners undertaking high-return investments. Finally, the 2006 and 2007 reforms restored the METR to pre-fiscal-consolidation levels, or even lower.

The 1990–1991 tax reform, and the tax reductions that followed, leveled the playing field between different sources of finance, although debt often remained a tax-favored option. For low-return investments, new share issues became the most tax-efficient form of equity financing. With higher returns, the tax advantage for new share issues diminishes, resulting in higher effective taxation.

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[45] In 1992, 1993, and 1994 the capital gains tax was reduced, but the effect for retained earnings was smaller because of the split-rule.

The 2006 reforms strengthened tax incentives for new share issues following the tax increases of the mid-1990s. However, the Swedish postwar policy of providing tax advantages to mature industries, which primarily rely on retained earnings, over entrepreneurs who mostly use new capital (Henrekson and Johansson, 1999), persists for high-income earners undertaking high-return investments. As the tax incentives for investments financed through new share issues diminish as the returns increase, the tax rules implicitly favor low-risk investments over high-risk investments. This is because increased marginal taxation reduces the compensation for taking on risk.

The METR is not only higher for new share issues under many circumstances, but also significantly more volatile over time. Even within a single year, it is, *ex ante*, more difficult to predict the tax outcome of an investment financed through new share issues. This unpredictability arises from factors such as the interaction between the government borrowing rate and inflation, as well as brackets in the labor income tax.

Altogether, the taxation of closely held corporations depends on several factors. As outlined above, the legal framework's definitions play a crucial role, particularly the structure and parameters of the rate of return allowance. In addition to factors that affect effective taxation in general, such as tax rates, depreciation rules, inflation, and source of finance, as well as various special regulations, deductions, and tax credits, the taxation of income from closely held corporations is influenced by at least ten additional factors:[46]

[46] The first seven factors follow directly from the regulatory framework. The rate of return influences the METR through the relative impact of any allowances or inflation. The rate of return may also influence profitability in absolute terms, which determines in which income bracket the surplus is taxed or whether any ceiling rule is applicable. The corporation's financial position is the most complex factor, and it governs the extent to which an active owner can benefit from any income shifting. For example, the rate of return allowance might be larger than the surplus generated by the investment, but this only benefits the active owner if there is additional income available to shift into capital income taxation.

1. acquisition costs of the owner's shares and costs of capital injections
2. imputed rate of return
3. wage bill of the corporation
4. unused rate of return allowance from previous years
5. the highest wage payment to an employee who is not a shareholder
6. owner's wage from the corporation
7. owner's total labor income
8. profitability, measured as the rate of return on investment
9. profitability, measured in absolute terms
10. corporation's financial position

Finally, not all aspects of the tax system are captured within a single model. An important change in the tax code not fully reflected in the figures above is the more favorable treatment of the wage-based allowance introduced in 2006. Under these rules, corporations with a large wage sum can shift significant amounts from wage payments to dividend payments, thereby substantially reducing the METR for their owners. This effect is evident from Equation (2), which calculates the rate of return allowance.

6. Concluding remarks

This paper offers a comprehensive overview of the evolution of the Swedish tax rules for active owners of closely held corporations since the 1990–1991 tax reform. It presents all relevant parameters influencing marginal effective tax rates, including statutory tax rates, inflation rates, government borrowing rates, ceilings, and thresholds on an annual basis, from 1991 to 2024. Additionally, it systematically outlines the factors that affect taxation, such as the acquisition costs of the owner's shares and the wage bill of the corporation.

By applying extensions to the King and Fullerton (1984) model as outlined in Stenkula and Wykman (2026), this paper generates time series of the marginal effective tax rates for varying sources of financing, rates of return, and levels of owners' personal income for active owners of closely held corporations.

My analysis shows that the taxation of closely held corporations is non-neutral and introduces distortions; the METR differs substantially depending on the source of finance, the profit level, and the owner's income. This is due to differences in tax rates, but also to the many factors that affect the taxation of closely held corporations. Taxation is furthermore unstable because both tax rates and the other factors that affect taxation change frequently over time. Different tax rates and the many other factors that affect taxation, together with regulatory instability, create unpredictability. It may be difficult for an owner to *ex ante* estimate taxation of a profitable investment. Further, by design, the rules favor mature firms with large wage sums or large equity bases over fast-growing firms that rely on radical innovations, with few but highly skilled employees and a small equity base.

On average over the period, debt financing is the most tax-efficient form of financing, with an average METR of approximately 30% on an investment generating a 20% return. This is more than 15 percentage points lower than for retained earnings and around 10 percentage points lower than for new share issues. As return levels increase, the average METR decreases for investments financed through debt and retained earnings, but increases for new share issues.

Overall, this study identifies several distortionary effects that could have significant economic consequences, such as increased leverage and overinvestment in mature, low-yielding, labor-intensive firms relative to new, knowledge-intensive companies. However, this issue is a matter for further empirical research. A primary source of these distortions is the higher, progressive tax on labor income.

Taxation is not only non-neutral but also volatile over time, particularly for investments financed through new share issues. This volatility adds risk, which could lead to higher risk premiums for investments in closely held corporations. As the tax system is nominal, inflation has had a significant impact throughout the analyzed period, particularly in high-inflation years such as 1991, 2022, and 2023.

A key conclusion is that the tax system, following the fiscal consolidation phase triggered by the severe economic crisis at the beginning of the 1990s, has evolved in a favorable direction for entrepreneurship, providing stronger incentives to invest. Moreover, tax rules for closely held corporations have stabilized, and several distortions have been reduced over time, although distortions still persist.

Finally, the complexity, instability, and distortions inherent in the tax code create incentives to engage in unproductive activities, like tax planning, within the economy at the expense of productive entrepreneurship and growth-oriented investments. Achieving low distortions to investment and entrepreneurship is simply difficult, and perhaps impossible, to reconcile with high and progressive taxation of labor income.

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Appendix A: A general formula for the size of the rate of return allowance, 1991–2024

The determination of the rate of return allowance and its calculation constitutes the core of the so-called 3:12 rules. This appendix provides a closed-form expression for the rate of return allowance applicable to the entire period under analysis. Equations (1) through (4) in Section 2.3.1 can be written as:

$$Rate\ of\ return\ allowance = \alpha \times Equity\ base + \beta \times Wage\ base + (1+\gamma) \times Unused\ rate\ of\ return\ allowance\ from\ previous\ years, \quad \text{(A1)}$$

where the equity base is the acquisition cost of the shares plus any capital injections made by the owner. The wage base, in turn, represents a time-varying function of the corporation's total wage bill and is defined as:

$$Wage\ base = \delta(wage\ bill - \varepsilon \times owner's\ wage - \theta). \quad \text{(A2)}$$

Table A1. The parameters of the rate of return allowance by year, 1991–2024

Year	α	β	γ	δ	ε	θ
1991–1993	SLR+0.05	0	SLR+0.05	0	-	-
1994–1996	SLR+0.05	SLR+0.05	SLR+0.05	0.1	1	$10 \times PBB$
1997	SLR+0.05	SLR+0.05	SLR+0.05	0.7 and 1*	1	$10 \times PBB$
1998–2003	SLR+0.05	SLR+0.05	SLR+0.05	1	1	$10 \times PBB$
2004–2005	SLR+0.07	SLR+0.07	SLR+0.07	1	1	$10 \times PBB$
2006	SLR+0.09	0.2 or 0.5**	SLR+0.03	1	0	$10 \times IBB$
2007–2013	SLR+0.09	0.25 or 0.5**	SLR+0.03	1	0	0
2014–2024	SLR+0.09	0.5	SLR+0.03	1	0	0

Note: SLR refers to *statslåneränta* (government borrowing rate), PBB to *prisbasbelopp* (price base amount) and IBB to *inkomstbasbelopp* (income base amount).

* In 1997, the wage base (WB) included 70% of the wage bill before 1 July and 100% of the wage bill for the rest of the year.

** For 2006–2013, β takes the lower value for WB<60 IBB and the higher value for WB>60 IBB.

Source: RSV 292, SKV 292.

Appendix B: Tax tables

Table B1. Rules and rates for the rate of return allowances in closely held corporations by year, 1991–2024

Year	Relief amount	Imputed return	Carry-forward interest	Wage base (WB)	Owner’s minimum wage for wage base
1991–1993		SLR+5%	SLR+5%		
1994–1996		SLR+5%	SLR+5%	10%*(W−owner's wage−10 PBB)	150%*Wmax
1997	65%*SLR	SLR+5%	SLR+5%	70%/100%*(W−owner's wage−10 PBB)	Lower amount of 120%*Wmax or 10 PBB
1998–2003	70%*SLR	SLR+5%	SLR+5%	W−owner's wage−10 PBB	Lower amount of 120%*Wmax or 10 PBB
2004–2005	70%*SLR	SLR+7%	SLR+7%	W − owner's wage−10 PBB	Lower amount of 120%*Wmax or 10 PBB

Year	Simplification rule	Imputed return	Carry-forward interest	Wage-based allowance (WBA)	Owner’s minimum wage for wage-based allowance
2006	1.5 IBB	SLR+9%	SLR+3%	20%*(W−10 IBB)<60 IBB and 50%*(W−10 IBB)>60 IBB	Lower amount of 15 IBB or 6 IBB+0.05*W
2007–2008	2 IBB	SLR+9%	SLR+3%	25%*W<60 IBB and 50%*W>60 IBB	Lower amount of 15 IBB or 6 IBB+0.05*W
2009–2011	2.5 IBB	SLR+9%	SLR+3%	25%*W<60 IBB and 50%*W>60 IBB	Lower amount of 10 IBB or 6 IBB+0.05*W
2012–2013	2.75 IBB	SLR+9%	SLR+3%	25%*W<60 IBB and 50%*W>60 IBB	Lower amount of 10 IBB or 6 IBB+0.05*W
2014–2024	2.75 IBB	SLR+9%	SLR+3%	50%*W	Lower amount of 9.6 IBB or 6 IBB+0.05*W

Note:
SLR: Government borrowing rate (*statslåneräntan*).
PBB: Price base amount (*prisbasbelopp*).
IBB: Income base amount (*inkomstbasbelopp*).
W: Total wage bill of the corporation.
Wmax: The highest wage payment to an employee (not shareholder).
SLR, IBB and PBB are presented in Table B4. SLR, IBB and PBB used in calculations in year *t* are taken from year *t-1*.
From 2014, there is a requirement that owners hold at least 4% of the shares to use the wage-based allowance.
In 1997, the wage base was raised from 70% to 100% during the year.
The following restrictions are also applied:
1994–1996: (WB*imputed return) may not exceed the owner's wage.
1997–2005: WB must not exceed 50 times the owner's wage.
2014–2015: Wage used to calculate the WBA must not exceed 50 times the owner's wage.
Source: Own table based on RSV 292, SKV 292

Table B2a. Marginal tax rates on dividends (%) by year, 1991–2024

	Widely held corporations			Closely held corporations			
				Passive owner	Active owner		
Year	Listed shares	Unlisted shares	Within relief amount		Within rate of return allowance	Above rate of return allowance	Exceeding 90 IBB
1991–1993	30	30		30	30	Local tax or local tax + 20	
1994	0	0		0	0	Local tax or local tax + 20	
1995–1996	30	30		30	30	Local tax or local tax + 25	
1997–1998	30	30	0	30	30	Local tax or local tax + 25	
1999–2005	30	30	0	30	30	Local tax or local tax + 20 or 25	
2006–2011	30	25		25	20	Local tax or local tax + 20 or 25	
2012–2019	30	25		25	20	Local tax or local tax + 20 or 25	30
2020–2024	30	25		25	20	Local tax or local tax + 20	30

Note: IBB refers to *inkomstbasbelopp* (income base amount). The relief amount applies to all unlisted shares, both widely and closely held.
Source: Own table based on RSV 292, SKV 292, and SKV 152.

Table B2b. Average local tax rates (%) by year, 1991–2024

Year	Local tax	Year	Local tax	Year	Local tax
1991	31.15	2003	31.17	2015	31.99
1992	31.04	2004	31.51	2016	32.10
1993	31.04	2005	31.60	2017	32.12
1994	31.05	2006	31.60	2018	32.12
1995	31.50	2007	31.55	2019	32.19
1996	31.65	2008	31.44	2020	32.28
1997	31.66	2009	31.52	2021	32.27
1998	31.65	2010	31.56	2022	32.24
1999	31.48	2011	31.55	2023	32.24
2000	30.38	2012	31.60	2024	32.37
2001	30.53	2013	31.73		
2002	30.52	2014	31.86		

Note: The church tax is excluded from the year 2000, which reduces the tax rate by approximately 1 percentage point.
Source: Statistics Sweden (n.d.a)

Table B3. Marginal tax rates on capital gains (%) by year, 1991–2024

	Widely held corporations			Closely held corporations			
				Passive owner	Active owner		
Year	Listed shares	Unlisted shares	Within relief amount		Within rate of re-turn allowance	Above rate of return allowance	Exceeding 100 IBB
1991	30	30		30	30	50% labor; 50% capital (30)	30
1992–1993	25	25		25	25	50% labor; 50% capital (25)	30
1994	12.5	12.5		12.5	12.5	70% labor; 30% capital (12.5)	30
1995–1996	30	30		30	30	50% labor; 50% capital (30)	30
1997–2005	30	30	0	30	30	50% labor; 50% capital (30)	30
2006	30	25		25	20	100% labor	30
2007–2009	30	25		25	20	50% labor; 50% capital (30)	30
2010–2024	30	25		25	20	100% labor	30

Note. IBB refers to *inkomstbasbelopp* (income base amount). Between 1991 and 2000, the ceiling was calculated using the price base amount, not the income base amount. The relief amount applies to all unlisted shares, widely as well as closely held. The numbers within parentheses refer to the tax rate on the capital gains that are taxed as capital.

Source: Own table based on RSV 292, SKV 292, and SKV 152.

Table B4. Inflation, government borrowing rate (SLR), income base amount (IBB) and price base amount (PBB) by year, 1991–2024

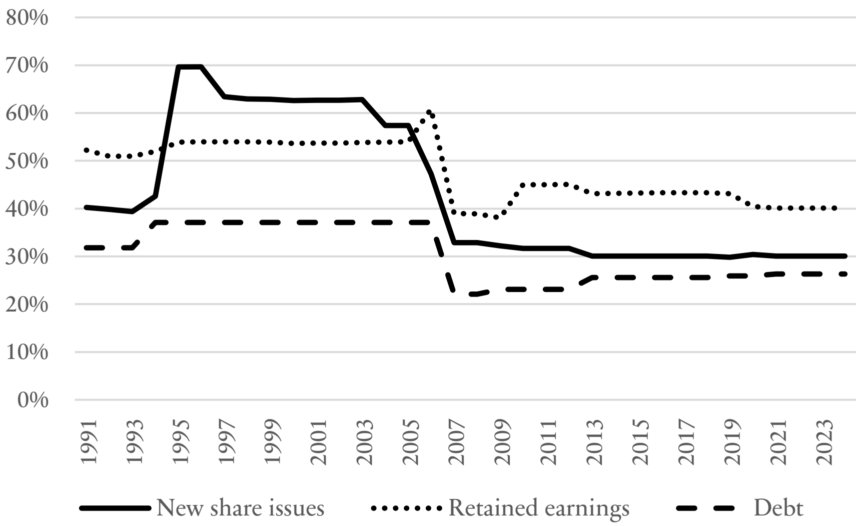
Year	Inflation (%)	SLR (%)	IBB (SEK)	PBB (SEK)
1991	9.3	12.66		32,200
1992	2.3	9.87		33,700
1993	4.7	10.47		34,400
1994	2.2	7.54		35,200
1995	2.5	10.86		35,700
1996	0.5	8.88		36,200
1997	0.5	7.02		36,300
1998	-0.2	6.17		36,400
1999	0.5	4.38		36,400
2000	1.0	5.57		36,600
2001	2.4	5.06	37,700	36,900
2002	2.2	4.94	38,800	37,900
2003	1.9	4.85	40,900	38,600
2004	0.4	4.71	42,300	39,300
2005	0.5	3.95	43,300	39,400
2006	1.3	3.26	44,500	39,700
2007	2.2	3.54	45,900	40,300
2008	3.4	4.16	48,000	41,000
2009	-0.3	2.89	50,900	42,800
2010	1.3	3.20	51,100	42,400
2011	2.6	2.84	52,100	42,800
2012	0.9	1.65	54,600	44,000
2013	0.0	1.49	56,600	44,500
2014	-0.2	2.09	56,900	44,400
2015	0.0	0.90	58,100	44,500
2016	1.0	0.65	59,300	44,300
2017	1.8	0.27	61,500	44,800
2018	2.0	0.49	62,500	45,500
2019	1.8	0.51	64,400	46,500
2020	0.5	-0.09	66,800	47,300
2021	2.2	-0.1	68,200	47,600
2022	8.4	0.23	71,000	48,300
2023	8.5	1.94	74,300	52,500
2024	2.0	2.62	76,200	57,300

Note:
SLR: Government borrowing rate (*statslåneräntan*).
PBB: Price base amount (*prisbasbelopp*).
IBB: Income base amount (*inkomstbasbelopp*).
The relevant government borrowing rate for tax purposes for owners of closely held corporations is the government borrowing rate at the end of November the previous year. For 2024, the inflation target is used as an approximation for the actual rate of inflation.
Source: Swedish National Debt Office (n.d.b), The Swedish Pensions Agency (n.d.), Statistics Sweden (n.d.b) and Statistics Sweden (n.d.c).

Appendix C: The inflation effect on the METR

All the results in Section 5 have been replicated under fixed inflation of 2%, but this appendix only presents the replications of Figures 6 and 8. The rest of the results can be provided upon request. To conduct a fixed inflation analysis, it is necessary to make an additional assumption regarding the government borrowing rate, since the inflation rate affects the nominal interest rate, and hence the government borrowing rate. In the results depicted in Figures C1 and C2, the government borrowing rate is set at a fixed markup of 1 percentage point above the inflation rate. This approach also enhances understanding of the impact of specific tax policies on the METR, which might otherwise be obscured by the variability of inflation and government borrowing rates.

Figure C1. Marginal effective tax rate at a 20% marginal rate of return for a high-bracket income earner, fixed inflation and fixed government borrowing rate by year, 1991–2024

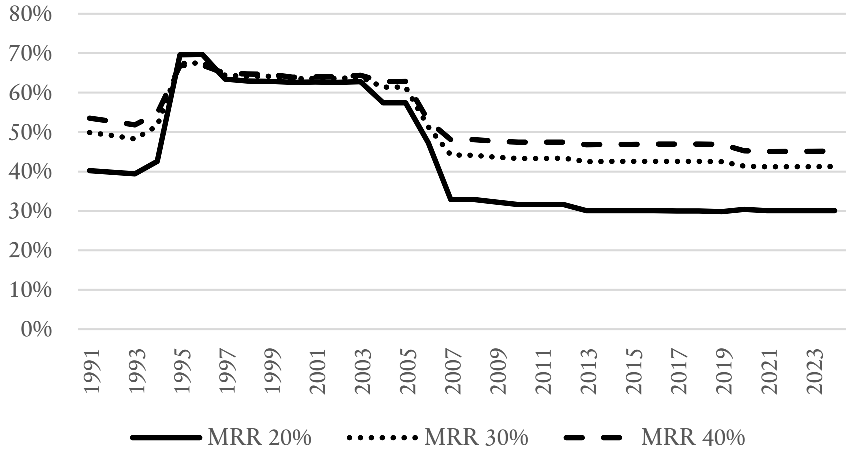


Note: The fixed inflation rate is set at 2%, and the fixed government borrowing rate is set at 3%. The depreciation rate is set at 10%.
Source: Own calculations.

When comparing the results presented in Figures 6 and C1, it is important to note that inflation impacts the METR across all sources of finance, whereas the borrowing rate influences only the METR for new share issues. The mean METR for retained earnings and debt remains approximately the same between the two figures, as the average actual inflation level is approximately equal to the assumed fixed inflation. However, the average METR for new share issues is higher in the fixed case. This discrepancy arises from the generally lower rate of return allowance in the fixed case. However, the focus is not on the absolute level of the METR, but on isolating the changes that are solely driven by taxation.

The seemingly limited impact of the 2006 reform under actual inflation, as depicted in Figure 6, on the owner of a firm with a 20% return underscores the importance of conducting an analysis under fixed inflation. With fixed inflation and a fixed government borrowing rate, the changed regulations in 2006, *ceteris paribus*, lowered the METR. Many changes in the tax regulations throughout the period are detectable in Figures C1 and C2, while others are not, as they are outweighed by simultaneous reforms. A notable example is the abolition of the dividend tax in 1994, which is offset by the abolition of the Annell deduction and tax equalization funds. With the actual government borrowing rate, the METR decreases substantially in 1994, as the rate of return allowance is larger.

Figure C2. Marginal effective tax rate, new share issues at different levels of marginal rate of return, for a high-bracket income earner, fixed inflation by year, 1991–2024



Note: MRR refers to the marginal rate of return on an investment, with the depreciation rate fixed at 10%.
Source: Own calculations.

With fixed inflation, it is clear that raising the rate of return allowance and abolishing the wealth tax benefits investments with lower rates of return relatively more strongly.

Appendix D: Some special rules

To compute the time series for the METR starting from the 1990–1991 tax reform, several special tax rules must be taken into account. The following section describes how these rules are incorporated into the model.

D1. The Annell deduction

The Annell deduction[47] was a measure designed to mitigate the double taxation of returns on investments financed through new share issues. It was introduced in 1960 and abolished in 1994, concurrently with the elimination of double taxation on dividends. However, when double taxation was reintroduced in 1995, the Annell deduction was not reinstated. The deduction provided relief from double taxation of up to 10% on new investments over a 10-year period (SOU 2009:33).[48]

Following Öberg (2003), the value of the tax reduction is calculated as follows:

$$E = y\tau \int_0^z e^{-i(1-m)t} dt. \tag{D1}$$

In Equation (D1), y represents the included portion of the new investment, τ denotes the corporate income tax rate, and z indicates the duration of the deduction in years. For example, based on the information provided above, $y=0.1$ and $z=10$.

The equilibrium condition, i.e., the required present value of an investment project must now be expressed as:

$$V(0) = \frac{1}{1+E}. \tag{D2}$$

This incorporation of the Annell deduction into the model is an approximation motivated by computational considerations. As pointed out in Section 5, it may lead to an underestimation of the METR for two main reasons. First, the corporation may not be able to distribute sufficient dividends to fully utilize the deduction. Second,

[47] Named after the person who proposed the deduction.

[48] In earlier years, different percentages and time spans were applied.

when share repurchases are taken into account, the maximum deduction may fall short of the amount specified in Equation (D1). The first source of potential underestimation can be addressed by reducing *y*, for example to 5%, which could, in turn, allow for an extension of the duration to *z=20*. Regarding the second issue, applicable in the benchmark scenario with continuous share repurchases, the base of the deduction arguably diminishes at the same pace as the repurchases, so that the maximum allowable Annell deduction takes the form:

$$E = y\tau \int_0^z e^{-((\delta-\pi)+i(1-m))t} dt. \tag{D3}$$

To align with earlier work, the Annell deduction is implemented as described in Equation (D1). Allowing for the maximum effect is consistent with the general principle of tax-minimizing behavior and the assumption of full utilization of all available tax advantages within the King and Fullerton (1984) model.

All results are based on the assumption that the entire deduction can be claimed—an assumption that was not always tenable in practice. At the opposite extreme, where the deduction cannot be used at all, the average METR in the benchmark scenario for 1991–1993 would increase by roughly 25 percentage points when the marginal rate of return is 20%, about 15 percentage points when it is 30%, and approximately 10 percentage points when it is 40%. The gap remains approximately the same for high-bracket and low-bracket income earners.

For a more detailed technical description and analysis of the Annell deduction, see Appendix C in King and Fullerton (1984) and Shahnazarian (1997).

D2. The tax equalization funds

During 1991, 1992 and 1993, corporations were permitted to set aside certain funds on a tax-free basis, known as tax equalization funds (*skatteutjämningsreserv*, SURV). Öberg (2003) incorporates this provision into the model as a tax credit, defined as:

$$0.3\tau\frac{i(1-m)}{(1-\tau_c)}e^{-at}. \quad \text{(D4)}$$

This value is incorporated in the same manner as the depreciation allowance, as described in Stenkula and Wykman (2026). For computational reasons, it is preferable to adopt a reasonable assumption, such as $i = 0.08$, in Equation (D4) rather than performing exact calculations, thereby enabling comparisons that are independent of the chosen financial strategy.[49]

D3. Periodization fund

Since 1994, periodization funds (*periodiseringsfond*) have allowed corporations to defer up to 25% of their profits and pay tax on them within six years, thereby lowering the effective tax rate (SOU 2002:52).

Mathematically, it is straightforward to incorporate the periodization fund into the model by defining an effective corporate tax rate as a weighted average of the current corporate tax rate and the future corporate tax rate, discounted by the post-tax nominal interest rate. The precise measure, as employed in Öberg (2003), is:

$$\tau_e = 0.75\tau_{s,t=1} + 0.25e^{-6(1-m)i}\tau_{s,t=6}. \quad \text{(D5)}$$

Here τ_e is the effective corporate income tax rate, $\tau_{s,t=1}$ is the statutory corporate income tax rate for the current year and $\tau_{s,t=6}$ is the statutory corporate income tax rate six years later. However, for a forward-looking investor, it is unclear which nominal interest rate to assume for the coming six years and which future corporate income tax rate to assume. Moreover, the rules have been modified over time: the share of profits that could be allocated to the fund was increased from 20% to 25% in 2002, and from 2005 onward corporate allocations to periodization funds have become interest-bearing (SKV 152). For simplicity, I use a uniform approximation throughout the

[49] The result is not sensitive to this simplification; a one-percentage-point change in i induces approximately a 0.2-percentage-point change in the METR.

entire period, based on a discount rate in Equation (D5) of approximately 8%, so that:

$$\tau_e = 0.93\tau_s. \tag{D6}$$

This simplification does not have a significant impact on the results.

D4. The relief amount

Between 1997 and 2005, a portion of the rate of return allowance was exempt from taxation. This reduction, or relief amount (*lättnadsbelopp*), was calculated in the same way as the rate of return allowance, but using a lower imputed rate of return, initially 65% of the government borrowing rate, and 70% from 1998 onward. The relief amount constituted a subset of the rate of return allowance and did not increase the total share of the surplus subject to capital income taxation.

To incorporate the relief amount, the results presented in Stenkula and Wykman (2026) must be modified. In the benchmark scenario with repurchases of shares, this is straightforward, by splitting the dividend into two parts, where one part is tax-exempt at the personal level. In the alternative financial strategy case, it is far more complicated. First, Equation (18) in Stenkula and Wykman (2026) now takes the following form:

$$V(0) - \frac{TS}{1-\tau_c} =$$

$$= \int_0^{t_d} \left(\frac{1-\tau_w}{1-\tau_c} W(t) + \frac{1-\tau_d}{1-\tau_c}\beta + \frac{1}{1-\tau_c}\,\alpha\right) e^{-\frac{i(1-m)t}{(1-\tau_c)}} dt + \int_{t_d}^{t_f} \left(\frac{1-\tau_d}{1-\tau_c} D(t) + \right.$$

$$\left. + \frac{1}{1-\tau_c}\,\alpha)\right) e^{-\frac{i(1-m)t}{(1-\tau_c)}} dt + \int_{t_f}^{\infty} \frac{1}{1-\tau_c} R(t) e^{-\frac{i(1-m)t}{(1-\tau_c)}} dt. \tag{D7}$$

Second, the expression for tax savings, *TS*, must be modified to:

$$TS = \left(\frac{(1-\tau)(1+\sigma)}{(1-\tau)(1+\sigma)+\varphi}\right)\left(\left(\left(\frac{\sigma+\tau_w}{1+\sigma}\right) - (\tau + \tau_d - \tau\tau_d)\right)\left(\int_{t_d}^{t_f} \frac{\beta-\alpha-D(t)}{1-\tau} e^{-\frac{i(1-m)t}{1-\tau_c}} dt + \right.\right.$$

$$\left.\left.\int_{t_f}^{\infty} \frac{\beta-\alpha}{1-\tau} e^{-\frac{i(1-m)t}{1-\tau_c}} dt\right) + \left(\frac{\sigma+\tau_w}{1+\sigma} - \tau\right)\int_{t_f}^{\infty} \frac{\alpha-R(t)}{1-\tau} e^{-\frac{i(1-m)t}{1-\tau_c}} dt\right). \tag{D8}$$

In Equations (D7) and (D8), t_d is the time t that solves $(1-\tau)$ $MRRe^{-(\delta-\pi)t} + \tau a e^{-at} = \beta$ and t_f is the time t that solves $(1-\tau)$ $MRRe^{-(\delta-\pi)t} + \tau a e^{-at} = \alpha$. Further, $D(t) = (1-\tau)MRRe^{-(\delta-\pi)t} - \alpha + \tau a e^{-at}$, $R(t) = (1-\tau)MRRe^{-(\delta-\pi)t} + \tau a e^{-at}$, β denotes the rate of return allowance, and α the relief amount.

In other words, $D(t)$ represents the dividend payments when they are less than β, and $R(t)$ is the surplus remunerated within the relief amount, when the total surplus is less than α.

Appendix E: Results

Table E1. Marginal effective tax rate (%) at 20% marginal rate of return by year, 1991–2024

Year	New share issues		Retained earnings	Debt
	LBE	*HBE*		
1991	66.3	67.4	73.2	39.4
1992	31.7	27.4	51.8	32.2
1993	39.4	42.3	58.6	34.9
1994	23.4	19.8	52.5	37.4
1995	65.2	51.1	55.4	37.8
1996	57.5	44.0	49.5	34.8
1997	42.5	34.7	49.5	34.8
1998	40.7	33.4	47.4	33.8
1999	47.6	46.7	49.5	34.8
2000	46.3	44.0	50.7	35.6
2001	52.7	55.0	54.8	37.7
2002	52.2	54.4	54.3	37.4
2003	51.8	53.0	53.6	37.0
2004	46.4	39.0	49.2	34.7
2005	48.6	43.3	49.5	34.8
2006	47.0	43.1	58.3	36.1
2007	35.8	32.5	39.5	22.4
2008	39.6	37.0	43.0	24.1
2009	26.4	20.8	31.3	19.4
2010	31.3	27.6	42.6	22.0
2011	36.2	35.1	47.1	24.1
2012	31.3	29.6	41.2	21.3
2013	26.2	24.0	36.3	21.8
2014	25.2	21.3	35.7	21.4
2015	27.2	25.6	36.4	21.8
2016	31.0	31.4	39.9	23.7
2017	34.3	36.6	42.7	25.2
2018	34.8	37.0	43.3	25.6
2019	33.8	35.8	42.4	25.5
2020	29.9	30.5	35.7	23.0
2021	35.8	38.6	40.7	26.7
2022	57.6	67.9	59.7	38.3
2023	55.9	64.1	60.0	38.4
2024	32.0	31.0	40.1	26.3

Note: LBE refers to low-bracket income earners, who fall below the threshold for state income tax liability and HBE refers to high-bracket income earners, who are subject to the top state income tax. The depreciation rate is set at 10%.
Source: Own calculations.

Table E2. Marginal effective tax rate (%) at 30% marginal rate of return by year, 1991–2024

Year	New share issues		Retained earnings	Debt
	LBE	*HBE*		
1991	53.4	63.3	55.2	30.4
1992	36.2	43.2	44.1	26.9
1993	39.1	50.0	47.5	28.2
1994	33.6	40.3	43.7	30.3
1995	54.5	58.3	45.9	30.5
1996	50.8	54.8	43.0	29.1
1997	43.5	50.2	43.0	29.1
1998	42.5	49.6	42.0	28.6
1999	45.9	56.1	43.0	29.1
2000	44.7	54.3	43.5	29.4
2001	47.9	59.8	45.5	30.5
2002	47.7	59.5	45.2	30.3
2003	47.8	59.1	45.0	30.1
2004	45.2	52.2	42.8	29.0
2005	46.3	54.4	43.0	29.1
2006	44.7	49.2	50.1	29.7
2007	39.0	44.0	38.0	22.8
2008	40.8	46.2	39.7	23.7
2009	34.2	38.0	33.5	21.6
2010	36.6	41.3	41.8	22.9
2011	39.0	45.0	44.0	23.9
2012	36.6	42.3	41.1	22.6
2013	34.3	39.5	37.6	23.4
2014	32.9	38.2	37.4	23.2
2015	34.0	40.3	37.8	23.4
2016	35.9	43.3	39.5	24.3
2017	37.5	45.8	40.9	25.1
2018	37.8	46.0	41.2	25.3
2019	37.3	45.4	40.6	25.3
2020	35.4	41.4	36.2	24.1
2021	38.3	45.4	38.5	26.0
2022	49.2	60.0	48.0	31.8
2023	48.4	58.1	48.1	31.9
2024	36.5	41.7	38.2	25.8

Note: LBE refers to low-bracket income earners, who fall below the threshold for state income tax liability, and HBE refers to high-bracket income earners, who are subject to the top state income tax. The depreciation rate is set at 10%.
Source: Own calculations.

Table E3. Marginal effective tax rate (%) at 40% marginal rate of return by year, 1991–2024

Year	New share issues		Retained earnings	Debt
	LBE	*HBE*		
1991	50.5	62.4	49.9	28.2
1992	38.7	48.9	42.2	25.9
1993	40.0	52.9	44.4	26.8
1994	37.3	47.3	41.4	28.6
1995	51.3	60.8	43.3	28.8
1996	49.0	58.6	41.4	27.8
1997	44.1	55.5	41.4	27.8
1998	43.6	55.1	40.7	27.5
1999	45.7	59.3	41.4	27.8
2000	44.6	57.8	41.6	28.1
2001	46.8	61.5	43.0	28.7
2002	46.6	61.3	42.8	28.6
2003	46.8	61.2	42.7	28.5
2004	45.2	56.8	41.3	27.8
2005	45.9	58.2	41.4	27.8
2006	44.3	51.5	47.9	28.2
2007	40.5	48.0	38.0	23.6
2008	41.6	49.4	39.2	24.2
2009	37.2	43.9	34.7	23.0
2010	38.7	46.1	42.0	23.8
2011	40.4	48.6	43.5	24.5
2012	38.8	46.8	41.6	23.6
2013	37.3	44.8	38.5	24.5
2014	35.9	44.0	38.3	24.3
2015	36.6	45.4	38.6	24.5
2016	37.9	47.4	39.8	25.1
2017	39.0	49.1	40.7	25.6
2018	39.1	49.2	40.9	25.7
2019	38.8	48.8	40.4	25.7
2020	37.6	45.3	36.8	24.9
2021	39.5	47.9	38.2	26.3
2022	46.7	57.6	44.4	30.1
2023	46.1	56.3	44.5	30.1
2024	38.4	45.5	38.0	26.1

Note: LBE refers to low-bracket income earners, who fall below the threshold for state income tax liability, and HBE refers to high-bracket income earners, who are subject to the top state income tax. The depreciation rate is set at 10%.
Source: Own calculations.

Table E4. Marginal effective tax rate (%) for alternative remuneration strategy, new share issues, low-bracket income earners by year, 1991–2024

Year	MRR=20%		MRR=30%		MRR=40%	
	With tax saving	*Without t saving*	*With tax saving*	*Without t saving*	*With tax saving*	*Without t saving*
1991	67.0	67.0	54.1	54.1	50.8	50.8
1992	39.1	39.1	39.7	39.7	40.9	40.9
1993	43.1	43.1	40.8	40.8	41.1	41.1
1994	11.6	22.9	30.5	31.7	36.3	36.4
1995	72.0	72.4	57.8	57.9	53.6	53.6
1996	65.7	66.8	55.0	55.2	51.8	51.8
1997	37.6	41.4	43.7	43.9	45.1	45.1
1998	35.3	39.8	42.8	43.2	44.6	44.6
1999	46.2	48.4	47.3	47.4	47.2	47.3
2000	43.2	45.4	45.3	45.4	45.6	45.6
2001	51.5	52.4	48.8	48.8	47.8	47.8
2002	51.1	52.0	48.6	48.6	47.6	47.6
2003	50.8	51.9	48.9	48.9	48.0	48.0
2004	44.3	46.8	46.4	46.6	46.6	46.6
2005	47.9	49.8	47.9	48.0	47.5	47.5
2006	39.1	44.3	42.3	42.9	43.2	43.3
2007	33.6	38.9	39.4	39.9	41.1	41.2
2008	37.9	42.2	41.1	41.5	42.2	42.2
2009	22.2	31.1	34.6	35.8	38.2	38.4
2010	23.6	28.8	34.3	34.9	37.7	37.8
2011	30.3	33.9	37.3	37.5	39.6	39.6
2012	24.0	28.4	34.5	34.9	37.9	37.9
2013	18.3	24.9	32.6	33.3	36.9	37.0
2014	16.2	22.7	30.7	31.4	35.0	35.1
2015	19.3	24.5	32.0	32.5	35.9	35.9
2016	24.6	28.4	34.3	34.6	37.3	37.3
2017	29.0	31.8	36.2	36.4	38.5	38.5
2018	29.6	32.3	36.5	36.6	38.6	38.6
2019	28.5	31.4	36.0	36.2	38.4	38.4
2020	25.4	29.8	35.0	35.4	37.9	37.9
2021	33.0	35.7	38.3	38.4	39.9	39.9
2022	57.4	57.4	49.2	49.2	46.8	46.8
2023	55.6	55.6	48.4	48.4	46.2	46.2
2024	27.4	32.2	35.9	36.3	38.4	38.4

Note: MRR refers to the marginal rate of return, with the depreciation rate fixed at 10%. The alternative remuneration strategy is explained in Section 5.2.
Source: Own calculations.

Table E5. Marginal effective tax rate (%) for alternative remuneration strategy, new share issues, high-bracket income earners by year, 1991–2024

Year	MRR=20%		MRR=30%		MRR=40%	
	With tax saving	*Without tax saving*	*With tax saving*	*Without tax saving*	*With tax saving*	*Without tax saving*
1991	68.8	72.6	63.9	63.9	62.8	62.8
1992	36.7	50.5	49.3	51.6	53.6	54.1
1993	49.8	58.4	54.3	55.3	56.2	56.3
1994	11.6	30.4	39.6	42.2	48.3	48.8
1995	50.0	75.7	61.0	65.8	64.0	65.1
1996	42.1	72.0	58.3	64.7	62.8	64.5
1997	29.9	49.7	52.1	55.9	58.7	59.6
1998	28.5	49.4	51.8	55.9	58.7	59.7
1999	45.6	61.3	60.1	62.9	63.9	64.5
2000	41.8	57.0	57.3	59.9	61.6	62.2
2001	55.1	65.4	63.2	64.7	65.2	65.4
2002	54.5	65.2	63.0	64.6	65.1	65.4
2003	52.9	64.6	62.7	64.5	65.1	65.5
2004	35.5	55.4	54.9	58.8	60.5	61.5
2005	41.2	59.6	57.8	61.3	62.4	63.2
2006	36.2	49.8	48.9	50.8	52.5	52.8
2007	29.8	44.0	45.7	47.7	50.3	50.6
2008	35.1	46.8	47.7	49.1	51.4	51.6
2009	15.3	36.3	39.8	43.4	46.8	47.6
2010	21.0	34.3	41.2	43.0	47.2	47.5
2011	30.6	40.1	45.3	46.3	49.7	49.8
2012	23.9	35.7	42.7	44.3	48.2	48.5
2013	17.6	31.6	40.2	42.1	46.7	47.0
2014	13.8	29.5	38.5	40.8	45.7	46.1
2015	19.8	32.9	41.3	43.1	47.5	47.8
2016	27.4	37.4	44.6	45.7	49.4	49.6
2017	34.0	41.6	47.4	48.2	51.1	51.2
2018	34.4	41.9	47.5	48.3	51.2	51.3
2019	33.0	40.9	46.9	47.7	50.8	50.9
2020	27.7	37.6	43.5	44.7	47.8	48.0
2021	37.7	43.8	47.6	48.1	50.2	50.2
2022	68.6	68.6	60.7	60.7	58.1	58.1
2023	64.4	64.4	58.6	58.6	56.8	56.8
2024	27.3	37.3	42.8	43.9	47.2	47.3

Note: MRR refers to the marginal rate of return, with the depreciation rate fixed at 10%.
Source: Own calculations.

Table E6. Marginal effective tax rate (%) at 20% marginal rate of return, fixed inflation by year, 1991–2024

Year	New share issues		Retained earnings	Debt
	LBE	*HBE*		
1991	32.6	40.3	52.2	31.8
1992	30.3	39.8	50.9	31.8
1993	27.6	39.4	50.9	31.8
1994	37.0	42.6	52.0	37.1
1995	63.6	69.6	53.9	37.1
1996	63.7	69.7	54.0	37.1
1997	57.2	63.4	54.0	37.1
1998	56.7	62.9	54.0	37.1
1999	56.6	62.9	53.9	37.1
2000	55.8	62.6	53.6	37.1
2001	55.9	62.6	53.7	37.1
2002	55.9	62.6	53.7	37.1
2003	56.5	62.8	53.8	37.1
2004	56.5	57.4	53.9	37.1
2005	56.5	57.4	54.0	37.1
2006	49.7	47.3	60.8	37.1
2007	35.6	32.9	38.9	22.1
2008	35.6	32.9	38.9	22.1
2009	34.7	32.2	38.1	23.1
2010	33.9	31.7	45.0	23.1
2011	34.0	31.7	45.0	23.1
2012	33.9	31.6	45.0	23.1
2013	31.8	30.1	43.1	25.6
2014	32.0	30.1	43.2	25.6
2015	32.0	30.0	43.3	25.6
2016	32.0	30.0	43.3	25.6
2017	32.0	30.0	43.3	25.6
2018	32.0	30.0	43.3	25.6
2019	31.7	29.8	43.1	25.9
2020	31.9	30.4	40.5	25.9
2021	31.6	30.1	40.1	26.3
2022	31.6	30.1	40.1	26.3
2023	31.6	30.1	40.1	26.3
2024	31.6	30.1	40.1	26.3

Note: The fixed inflation rate is set at 2% and the fixed government borrowing rate at 3%. LBE refers to low-bracket income earners, who fall below the threshold for state income tax liability, and HBE refers to high-bracket income earners, who are subject to the top state income tax. The depreciation rate is set at 10%.
Source: Own calculations.

Table E7. Marginal effective tax rate (%) at 30% marginal rate of return, fixed inflation by year, 1991–2024

Year	New share issues		Retained earnings	Debt
	LBE	*HBE*		
1991	37.4	49.9	44.8	26.7
1992	35.6	49.1	43.7	26.7
1993	33.3	48.3	43.7	26.7
1994	40.2	51.6	43.5	30.2
1995	53.7	67.4	45.2	30.2
1996	53.8	67.5	45.2	30.2
1997	50.6	64.4	45.2	30.2
1998	50.4	64.2	45.2	30.2
1999	50.3	64.1	45.2	30.2
2000	49.4	63.5	44.9	30.2
2001	49.5	63.6	45.0	30.2
2002	49.5	63.5	45.0	30.2
2003	50.0	63.9	45.1	30.2
2004	50.2	61.4	45.2	30.2
2005	50.2	61.4	45.2	30.2
2006	46.0	51.3	51.3	30.2
2007	38.9	44.1	37.7	22.7
2008	38.8	44.1	37.7	22.7
2009	38.3	43.7	36.8	23.4
2010	37.9	43.3	43.0	23.4
2011	37.9	43.3	43.0	23.4
2012	37.9	43.3	43.0	23.4
2013	37.1	42.5	41.0	25.3
2014	36.3	42.5	41.1	25.3
2015	36.4	42.6	41.1	25.3
2016	36.4	42.6	41.2	25.3
2017	36.4	42.6	41.2	25.3
2018	36.4	42.6	41.2	25.3
2019	36.3	42.5	41.0	25.5
2020	36.4	41.4	38.6	25.5
2021	36.2	41.2	38.2	25.8
2022	36.2	41.2	38.2	25.8
2023	36.2	41.2	38.2	25.8
2024	36.3	41.3	38.2	25.8

Note: The fixed inflation rate is set at 2% and the fixed government borrowing rate at 3%. LBE refers to low-bracket income earners, who fall below the threshold for state income tax liability, and HBE refers to high-bracket income earners, who are subject to the top state income tax. The depreciation rate is set at 10%.
Source: Own calculations.

Table E8. Marginal effective tax rate (%) at 40% marginal rate of return, fixed inflation by year, 1991–2024

Year	New share issues		Retained earnings	Debt
	LBE	*HBE*		
1991	39.9	53.6	43.0	25.8
1992	38.3	52.7	41.9	25.8
1993	36.3	51.8	41.9	25.8
1994	41.6	54.7	41.2	28.5
1995	50.8	66.8	42.8	28.5
1996	51.0	66.9	42.9	28.5
1997	48.8	64.9	42.9	28.5
1998	48.7	64.7	42.9	28.5
1999	48.6	64.6	42.8	28.5
2000	47.7	63.9	42.6	28.5
2001	47.8	64.0	42.6	28.5
2002	47.8	64.0	42.6	28.5
2003	48.3	64.4	42.8	28.5
2004	48.5	62.8	42.8	28.5
2005	48.5	62.8	42.9	28.5
2006	45.2	52.9	48.7	28.5
2007	40.4	48.1	37.8	23.5
2008	40.3	48.1	37.8	23.5
2009	39.9	47.7	36.9	24.2
2010	39.6	47.4	42.8	24.2
2011	39.6	47.4	42.8	24.2
2012	39.6	47.5	42.8	24.2
2013	39.1	46.8	40.7	25.7
2014	38.1	46.9	40.8	25.7
2015	38.2	46.9	40.9	25.7
2016	38.2	46.9	40.9	25.7
2017	38.2	46.9	40.9	25.7
2018	38.2	46.9	40.9	25.7
2019	38.2	46.9	40.7	25.9
2020	38.3	45.2	38.4	25.9
2021	38.1	45.1	38.0	26.1
2022	38.1	45.1	38.0	26.1
2023	38.1	45.1	38.0	26.1
2024	38.2	45.2	38.0	26.1

Note: The fixed inflation rate is set at 2% and the fixed government borrowing rate at 3%. LBE refers to low-bracket income earners, who fall below the threshold for state income tax liability, and HBE refers to high-bracket income earners, who are subject to the top state income tax. The depreciation rate is set at 10%.
Source: Own calculations.

Journal of Evolutionary Economics (2023) 33:517–540
https://doi.org/10.1007/s00191-022-00798-z

REGULAR ARTICLE

The evolution of owner-entrepreneurs' taxation: five tax regimes over a 160-year period

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Accepted: 22 October 2022 / Published online: 14 November 2022

Abstract
The institutional literature suggests that long-term tax incentives are crucial for entrepreneurs, but studies on this topic are hampered by problems related to how to define and measure entrepreneurial income. We resolve these problems by drawing on a theoretical definition of the entrepreneur as an owner, which enables us to identify entrepreneurship empirically by means of investments made by active owners of closely held corporations. Using detailed Swedish tax data, we analyze the tax incentives for such owner-entrepreneur investments from 1862 to 2018, thereby highlighting the evolution of a general institutional phenomenon through a long-run, in-depth, country-specific analysis. We calculate the annual marginal effective tax rate (METR) on capital income for investments, distinguishing between average- and top-income entrepreneurs, and between three sources of finance. We identify five tax regimes that indicate substantial differences in institutional quality over time according to the magnitude of the METR and METR differences between average- and top-income entrepreneurs and across sources of finance. Growth-conducive tax incentives shed light on why so many successful entrepreneurial firms were founded in Sweden around 1900, whereas increased taxation helps explain the absence of new large entrepreneurial firms in Sweden after World War II. Improved incentives can be associated with Sweden's recent entrepreneurial renaissance.

Keywords High-impact entrepreneurship · Institutional quality · Marginal effective tax rates · Tax regimes · Tax reforms

JEL Classification L25 · L26 · H21 · H31 · H32 · N44

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1 Introduction

Whether people are able and willing to engage in productive entrepreneurship depends largely on the institutional environment (Baumol 1990; Stenholm et al. 2013), of which the tax system forms a crucial part (Bjørnskov and Foss 2013; Hall and Jones 1999; Henrekson and Johansson 2009). However, while researchers understand the tax system's impact on economic behavior and performance in the short run, few have studied the long-term evolution of the tax incentives that entrepreneurs face. A long-run perspective is informative because formal institutions such as tax systems generally change slowly and entrepreneurs need time to adjust.

That said, three related problems – one theoretical, one empirical, and one data-related – complicate the examination of entrepreneurs' long-term tax incentives. First, there is no clear theoretical consensus on how entrepreneurship should be defined (Hébert and Link 2006). Second, there is an empirical problem related to the fact that tax codes never recognize entrepreneurial income as a distinct tax category. Third, there is a general lack of sufficiently long and detailed time series. By addressing these three problems, we can examine the long-term evolution of the taxation of Swedish owner-entrepreneurs, adding to the literature on institutions and entrepreneurship in several ways.

First, we theoretically associate entrepreneurship with profit-oriented ownership following the argument of Knight (1921) that the pursuit of profit is entrepreneurs' major motivation in introducing innovations and that they can only exercise entrepreneurial judgment when they own productive resources. The judgment-based definition suggests that firm ownership should be concentrated in entrepreneurial firms because entrepreneurs prefer to appropriate as much of the potential profit possible and because entrepreneurs and external investors may disagree about the value of entrepreneurs' investment projects, especially in the early phases. Moreover, scholars holding this view generally argue that the unit of analysis in entrepreneurship should be investments rather than, e.g., opportunities (Foss and Klein 2012: 102).

The solution to the second (empirical) problem follows from our solution to the first. Here, we treat owners of closely held corporations as a relevant pool of potential entrepreneurs. Swedish tax law also differentiates between active owners, i.e., owners who take part in corporate governance and development, and passive owners, who merely provide capital. Thus, the theoretical definition enables us to resolve the problem of the lack of a tax category for entrepreneurial income by capturing entrepreneurship as investments made by active owners of closely held corporations, which serve as an empirical approximation that is theoretically congruent with the judgment-based entrepreneurship perspective.

Third, we resolve the time-series problem by exploiting Swedish tax data from 1862 (when Sweden implemented a major new state central government tax system) until 2018. This period encompasses Sweden's industrialization, urbanization, and democratization, as well as the more recent turn from a managed to an entrepreneurial economy (Audretsch and Thurik 2000). While Sweden is often considered something of an institutional outlier, we argue that the country's institutional evolution has been similar to other OECD countries: the country was in general characterized by high-quality institutions for the entire period, and only really diverged in terms of tax policy for a few decades in the second half of the twentieth century (de la Escosura 2016). We therefore deem the results of our study to be generalizable beyond the Swedish case.

More specifically, we analyze the evolution of capital income taxation of investments faced by owner-entrepreneurs, defined as active owners of closely held corporations. We calculate the marginal effective tax rate (METR) on capital income by means of the King and Fullerton (1984) method, developed with the explicit purpose of comparing tax rates across countries and investment projects. A recent extension enables us to include the tax rules for closely held corporations for the whole period based on the King and Fullerton framework (Wykman 2022).

To further understand how the evolution of the tax system shapes entrepreneurial incentives and distortions, we distinguish the tax effect on investments when entrepreneurial incomes and sources of finance differ, updating and complementing earlier data with recently compiled tax data on closely held corporations (Wykman 2022). Except for Swedish studies (e.g., Henrekson and Stenkula 2015), we are unaware of any other taxation analysis offering a similar level of detail or coverage. In addition to producing long-term tax series for active owners of closely held corporations as a proxy for entrepreneurs' taxation, our focus is on examining whether the tax system has been characterized by distinct periods with different entrepreneurship incentives.

The analysis reveals that the Swedish tax system experienced dramatic changes from 1862 to 2018; the results suggest the emergence (and disappearance) of several tax regimes with distinct conditions for entrepreneurship, a fact that we confirm econometrically by means of structural break analysis. We identify five tax regimes and characterize them according to three metrics indicative of each regime's entrepreneurial incentives: the magnitude of the METR, the difference in the METR between average- and top-income entrepreneurs, and the difference in the METR according to the source of finance.

Regime I corresponds to the period until the middle of World War I. The regime stands out for its particularly favorable entrepreneurial incentives, with a low METR irrespective of income and source of finance. The METR grew during regime II (lasting until late World War II) and III (ending around the mid-1960s) to peak during regime IV (ending around 1990). The increasingly higher general taxation level likely had adverse effects on entrepreneurial incentives to establish and grow firms, as did the pronounced differences in treatment between top- and average-income entrepreneurs. The favorable treatment of retained earnings over new share issues during regimes II–IV likely favored well-established incumbents with prior profits at the expense of new entrants lacking retained earnings. During regime V, which may be labeled corrective, the METR decreased substantially. Differences between average- and top-income taxation virtually vanished, while taxation differences related to the source of finance decreased.

Our analysis reveals considerable differences in how the institutions of the tax system have affected entrepreneurial investment incentives in Sweden. When we tie these findings to long-term indicators of entrepreneurship, the results suggest that growth-conducive tax incentives for high-impact entrepreneurship help explain the establishment and success of most of Sweden's largest entrepreneurial firms during the first regime. Likewise, the relative dearth of high-impact entrepreneurship during most of the twentieth century can be partly explained by the meager tax incentives that evolved during regimes II, III, and IV.[1] Conversely, regime V's improved incentives likely help explain why Sweden has experienced an entrepreneurial renaissance.

We contribute to the previous literature in two core ways. First, we use a clear theoretical definition of entrepreneurship (the investment activities of the owner-entrepreneur) to arrive at a legal definition (investments made by active owners of closely held corporations) that is sufficiently discriminant to allow empirical study. Second, while elucidating the tax system's long-term effect on incentives to establish and build entrepreneurial firms in Sweden, the study also has a bearing on the broader literature on institutional evolution and quality, highlighting a general phenomenon through an in-depth analysis of a specific country. The analysis is transparent and potentially applicable to other countries.

2 Taxation and entrepreneurship

2.1 The owner-entrepreneur

The tax system is one of the fundamental institutions shaping a society's entrepreneurial profile (Bjørnskov and Foss 2013; Hall and Jones 1999; Henrekson et al. 2010), a fact that Knight (1921) saw clearly, e.g., when arguing that the entrepreneur's primary motivation is to "get rich" and when warning that an excess-profit tax risked discouraging production because the anticipation of unusual profits was "a vital element in the incentive to business activity" (p. 332). Along similar lines, Schumpeter (1918, p. 22), stressed that if the entrepreneurial and competitive process, "baited by profit … were taxed away, that element of the economic process would be lacking which at present is by far the most important individual motive towards economic progress. Even if taxation merely reduced this profit, industrial development would progress considerably more slowly" (cf. Mair and Laramie 2000; Musgrave 1992).

However, Schumpeter argued that the functions of the entrepreneur and the capitalist owner of the means of production could be separated (Henrekson and Jakobsson 2001). By contrast, Knight and his modern followers who see entrepreneurship as a domain for exercising individual judgment argue that entrepreneurship *presupposes* ownership of a business firm (Bylund 2021; Foss and

[1] We conform to Henrekson et al.'s (2010, p. 276) view that "high-impact entrepreneurial activities commercialize key innovations or create disruptive breakthroughs, extract substantial entrepreneurial rents, spur growth (in both the firm and the economy) and employment, and shift the production possibility frontier outwards.".

Klein 2012), modeling "entrepreneurs as owning, controlling, and combining heterogeneous assets … and deploying these assets within a firm to produce goods and services in anticipation of economic profit" (Foss and Klein 2015: 585; cf. McMullen 2015). As Wennekers et al. (2007, p. 138) state, "(t)here is agreement that entrepreneurs (in the sense of business owners) make judgmental decisions in the face of uncertainty, reap the rewards of perceiving and utilizing opportunities and in the process also run the risk of losing their money and their reputation." Moreover, these scholars argue that the unit of analysis in entrepreneurship should be "the assembly of resources in the present in anticipation of (uncertain) receipts in the future, in other words, investments" (Foss and Klein 2012: 102). However, while scholars holding this view increasingly emphasize and examine how institutional contexts shape entrepreneurship (e.g., Audretsch and Belitski 2021; Foss and Klein 2012), we are unaware of any study that examines how taxation affects owner-entrepreneurs' investment activities in the long run.

2.2 Active owners of closely held corporations as owner-entrepreneurs

In the judgment-based view, entrepreneurship is "the act of committing resources in realizing the plan, that is, investing resources and executing the entrepreneurial plan or project" (Foss et al. 2019: 1204). This definition implies that to capture what entrepreneurship is in a theoretically congruent manner, we should look to active firm owners who make investments. As Brouwer (2002, p. 92), puts it, "Knight's theory portrays investment as a discovery process. Many new ventures will be launched, but only a few will survive and prosper. Such a sketch of events fits actual developments." Thus, because successful entrepreneurs cannot be discernible in advance, identifying the relevant pool of potential entrepreneurs is what matters. Crucially, entrepreneurs generally organize their business activities within limited companies, the organizational form that was likely the most appropriate for firm growth, large-scale activities, and uncertainty management at the beginning of our period of interest (Andersson-Skog and Magnusson 2014). The remuneration accrues to the entrepreneur as an owner, i.e., as the residual once nonowners have been paid. Because sole proprietorships and partnerships generally engage in routine small-business activities (and are usually converted to limited companies if owners wish to expand), we exclude these types of ventures from the analysis.

Closely held corporations make up the lion's share of Sweden's incorporated firms (Andersson et al. 2018), and a major tax reform in 1990–1991 introduced specific tax rates and rules for such firms. In the Swedish tax code (SFS No. 1999: 1229, Ch. 56, §3), a closely held corporation is a limited company where four or fewer owners own stock corresponding to more than half of the votes. An owner is active if (s)he or a close family member is, or during the past five years has been, active to a "considerable extent" in the corporation's income generation. Because passive owners are not active in the corporation's income generation, this study does not regard them as entrepreneurs.

2.3 Taxation of owner-entrepreneurs

Because investments are central to an entrepreneur's exercise of judgment, the evolution of capital income taxation among owner-entrepreneurs who make investments should offer a consistent view on how entrepreneurial tax incentives change over time. The capital income taxation effect depends on three sets of taxes – personal capital income taxation, corporate income taxation, and wealth taxation.

First, *personal capital income taxation* is an owner-level category that includes taxes on physical individuals' income from dividends, capital gains, and interest. Generally, such taxes reduce the returns on the cooperative efforts of entrepreneurs and external financiers while also affecting the occupational choice margin, making it less lucrative to leave a salaried position in pursuit of a new business idea. Analyses taking principal–agent problems into account reveal that dividend taxation and capital gains taxation are distortionary for both mature companies and startups (cf. Chetty and Saez 2010; Henrekson and Sanandaji 2016).

Second, *corporate income taxation* is levied at the firm level. A consistent finding is that corporate taxes reduce investments, discourage equity financing, and encourage debt financing if interest payments are tax deductible, which increases the debt–equity ratio (Huizinga et al. 2008). The disagreements in the tax literature mainly involve the size of the effect and the optimal design of the corporate tax system (e.g., Auerbach et al. 2010). Taxing profits can be expected to negatively affect growth, especially in new and small firms (Michaelas et al. 1999).

Finally, *wealth taxation* matters for entrepreneurship for several reasons. First, the founder's equity often finances a firm's early phase, although external equity financing is usually necessary if a firm is to grow into a significant industry player (Henrekson and Jakobsson 2001). In contexts where debt finance plays a role, founders frequently pledge personal assets and wealth as collateral to obtain loans (Held et al. 2020). Arguably, more private wealth would enable more entrepreneurial venturing by increasing the supply of informal finance. Additionally, wealth taxation directly affects entrepreneurs' incentives when a tax is levied on the value of their stockholdings. High wealth taxes may even make it difficult for successful entrepreneurs to maintain ownership and control.

2.4 Metrics to evaluate owner-entrepreneurs' tax incentives

We combine information on the three components of capital income taxation into a single measure and calculate the METR based on the King and Fullerton method (described in Sect. 3). To understand the incentives, we evaluate the METR based on three metrics impacting the entrepreneurial investment decision.

First, we consider *the magnitude of the METR*. When the tax components underlying capital income taxation are high, the METR is generally higher, indicating meager entrepreneurial incentives that make entrepreneurial investments less profitable. Second, taxation differences based on income should highlight the incentives to make entrepreneurial investments yielding substantial income and wealth. We therefore examine *the difference in METR magnitude between top- and average-income entrepreneurs*. We classify an average-income entrepreneur as an active owner who pays the same marginal income tax rate as the average production worker (as defined by, e.g., OECD 2010). Similarly, a top-income entrepreneur is an active owner paying the top marginal income tax rate. A large difference reveals the entrepreneur's incentives to seek profit by expanding the firm and is mainly reflected in changes in income tax progressivity.

The third metric is *the difference in METR magnitude depending on the source of finance* – new share issues, retained earnings, or debt. This difference is crucial, e.g., because new entrepreneurial firms rely more on new share issues and less on retained earnings than mature firms (Gompers and Lerner 2001). While active owners would rely on their own equity rather than jeopardize their independence, larger firms have easier access to debt financing. This discrepancy means that high corporate tax rates coupled with tax-deductible interest payments put smaller firms and potential entrepreneurs at a disadvantage (Davis and Henrekson 1999) while also reducing the retained earnings that can be used to expand ventures after start-up. Thus, a higher corporate income tax rate *increases* the METR for investments financed with retained earnings and new share issues but *decreases* the METR for debt, as interest payments are deductible expenses at the corporate level. The personal capital income taxation effect is more ambiguous; dividend and capital gains taxes affect new share issues and retained earnings, and the tax on interest income affects debt-financed investments. Wealth taxes increase the METR in all three cases.

3 Methodology and data description

3.1 Case selection

A paragon of interventionist policies in the 1970s, Sweden has morphed into a pioneer of deregulation in recent times. Consequently, the country is often treated as an outlier in political economy debates. This outlier status is not warranted for the entire period of 1862–2018, however, as underscored by an examination of de la Escosura's (2016) reconstruction of the Fraser Institute's Economic Freedom Index (excluding the size of government component, for reasons of data availability) for the period 1850–2007 for countries that were OECD members in 1994. Sweden's economic freedom follows the four overall trends of the sample for the period 1850–2007.

Nor was Sweden a high-tax outlier for the first 100 years under study: as late as 1960, "the relative size of the public sector was only marginally above the OECD average" (Henrekson 2005: 441). The subsequent expansion of the welfare state, although "most pronounced in Sweden … was a salient feature of almost all industrialized countries, in particular during the 1960s and 1970s" (Henrekson 2005: 441). Thus, while Sweden went further than other OECD countries, it did not go in a different direction. Because government spending has declined markedly in recent decades, Sweden today "merely" ranks among the top one-third of OECD countries in terms of general government spending (OECD 2021). It is thus reasonable to assume that our analysis is relevant for other countries and that Sweden's divergence in the 1960s and 1970s illustrates what happens when a "normal" country, characterized by high institutional quality, pursues a not-so-normal tax policy path for a few decades, e.g., in terms of taxation of owner-entrepreneurs.

In conclusion, Sweden was a reasonably representative country in terms of tax policy before the 1960s. Hence, it is plausible to assume that entrepreneurs in other countries with a high-quality institutional environment would react to changed tax incentives in similar ways as Swedish entrepreneurs. We therefore deem the results of our study to be generalizable beyond the Swedish case, and that foreign observers can learn from the Swedish experience, e.g., when designing economic policy, cf. Lindbeck (1997).

3.2 METR: The King and Fullerton method and structural breaks

The METR is a common summary statistic of investment incentives enabling broad interaction of tax rules, deductions, and credits. By permitting us to consider the Knightian notion of the owner-entrepreneur who invests, the METR for active owners of closely held corporations serves as a relevant proxy for taxation of entrepreneurial activities, enabling us to characterize tax regimes according to the three metrics described earlier (Sect. 2.4). To calculate the METR, we use the King and Fullerton (1984) method, a framework developed to compare tax rates across countries and investment projects (see, e.g., OECD 2007). We focus on investments in machinery to ensure tractability. Because Sweden's tax system is nominal-based, we need to interact the three component taxes of capital income taxation with inflation.[2]

Formally, the METR is the difference between the pretax and posttax real rates of return of a marginal investment project divided by the pretax real rate of return. However, the METR is not merely an addition of taxes adjusted for inflation but an equilibrium model that is solved when the present discounted value of the investment profits equals the investment cost and the potential investor is indifferent between the after-tax revenue from the investment project and the after-tax market interest rate.

The model assumes that no (further) tax changes will occur, no repurchase of shares, and that investors can use all tax allowances for investments. A model extension (Wykman 2022) also makes it possible to include specific rules for closely held corporations for the whole period. Moreover, whether the investment is financed with new share issues, retained earnings, or debt alters the equilibrium conditions and affects the results. In summary, we end up with six METR time series (based on two income levels and three sources of finance).

While there have been informal attempts to identify tax regimes (e.g., Du Rietz et al. 2015), we are the first to do so in a formal manner, testing the six METR time series for 1862–2018 for structural breaks individually and jointly. For each series, the purpose is to econometrically examine whether it is possible to identify shorter

[2] Johansson et al. (2015) and Stenkula et al. (2014) analyze the taxation of owners of limited companies with dispersed ownership and labor income taxation, respectively.

periods within the whole period, i.e., tax regimes, during which the annual METR is similar (in a statistical sense). We do this by calculating the average METR for numerous shorter periods and testing whether the average METR statistically differs between the periods. Structural breaks mark the beginning and end of a period.

We stipulate that the METR is a function of time with a shift parameter β and error term μ. Hence, for each year t,

$$METR_t = \beta + \mu_t, \tag{1}$$

where we estimate β using a standard linear regression model. The main idea behind the analysis of structural breaks is to determine whether a segmentation of $t \in [1862, 2018]$ exists that significantly improves the model fit (see, Bai and Perron 2003). Assuming structural breaks, we rewrite Eq. (1) as

$$METR_t = \beta_i + \mu_t (i = 1, \ldots, m + 1), \tag{2}$$

allowing for m breaks in the time interval [1862, 2018] and dividing the METR time series into $m+1$ segments. The underlying hypothesis is

$$H_0 : \beta_0 = \beta_i \forall i, i[x, y] \in [1862, 2018], x < y \tag{3}$$

If H_0 holds, no partition (sequence of regressions) explains the METR significantly better over time than Eq. (1). If we reject H_0, there are between *1* and m structural breaks. To test H_0, we must both choose the optimal number of breaks *and* calculate when they occur. The method that we use minimizes the residual sum of squares using a dynamic programming algorithm (Bai and Perron 2003).

3.3 Data description: Swedish capital income taxation 1862–2018

Publicly available tax law and tax schedules compiled over several years form the basis for the analysis; see Stenkula et al. (2014), Du Rietz et al. (2015), and Wykman (2022) for details. Inevitably, the analysis relies on simplifying assumptions, e.g., concerning income levels and tax allowances, which may affect the magnitude of the METR of any single year when the tax system is progressive. That said, the tax rates differ so much across longer periods that they dominate other effects, meaning that the results mainly reflect the differences in magnitude of the METR between the tax regimes. The tax system's general structure also makes the calculations rather insensitive to different assumptions; for instance, most deductions and allowances are too small to impact the marginal tax rate. The advantage of the King and Fullerton framework is that it illustrates in a straightforward way how capital income is taxed without delimiting the results to a highly specific case with less applicability to the tax system at large (cf. Devereux 2004).

Because earlier studies describe Sweden's corporate income taxation, personal capital income taxation, and wealth taxation at length (Henrekson and Du Rietz 2014; Johansson et al. 2015; Stenkula et al. 2014; Wykman 2022), we only briefly describe the evolution of each category below.

3.3.1 Sweden's personal income taxation

Personal capital income was jointly taxed with other personal income (labor and business income) until the 1990–1991 tax reform, meaning that total income determined the marginal tax rate. However, dividends were tax exempt until 1903 and long-term capital gains until 1965. The tax rate depended on the holding period for capital gains, with a longer holding period corresponding to a smaller proportion of taxable gain. In 1903, a progressive state income tax was implemented, but the local tax system remained proportional. At this time, the top marginal income tax rate was below 10 percent, compared to its peak at approximately 90 percent in the late 1970s. The 1990–1991 tax reform implemented a dual-income tax system and introduced specific rules for closely held corporations. Thereafter, the marginal tax rate on dividends and capital gains from closely held corporations depended only on total income when exceeding a certain amount (the dividend allowance). In practice, this entailed a flat tax rate, generally of 30 percent; however, rules were introduced to prevent the possibility of shifting progressively taxed labor income to capital income, which was taxed at a lower rate. In summary, although the three components of the marginal tax rates of personal capital income followed different trajectories, each increased substantially during the twentieth century until the 1990–1991 tax reform.

3.3.2 Sweden's corporate income taxation

Corporate incomes were taxed according to the same tax tables as personal income before 1911, when personal and corporate income taxation were separated. The corporate tax was progressive, and the top marginal tax rate hovered around 10 percent. When the corporate tax became proportional again in 1939, the rate was approximately 40 percent. After World War II, tax rates increased slowly but consistently, peaking at 52 percent in the late 1980s. Moreover, between 1984 and 1990, the government added an additional profit-sharing tax on corporations to finance so-called wage-earner funds (*löntagarfonder*), increasing the statutory corporate tax rate by approximately five percentage points. However, possibilities abounded to reduce the statutory corporate tax through allowances and grants, meaning the effective corporate tax rate could be substantially lower, especially for large incumbent firms (Heshmati et al. 2010). While the 1990–1991 tax reform removed most of these options, the statutory tax rate was also substantially cut in steps to 22 percent.[3]

3.3.3 Sweden's wealth taxation

Sweden did not tax wealth before 1911. Between 1911 and 1947, wealth taxation was part of the ordinary income tax system, as 1–10 percent (depending on the year) of the taxpayer's wealth was added to his or her taxable income. There were also

[3] We use the average corporate tax rate when the system was progressive. Using the lowest or highest tax rates during this period does not change our general conclusions.

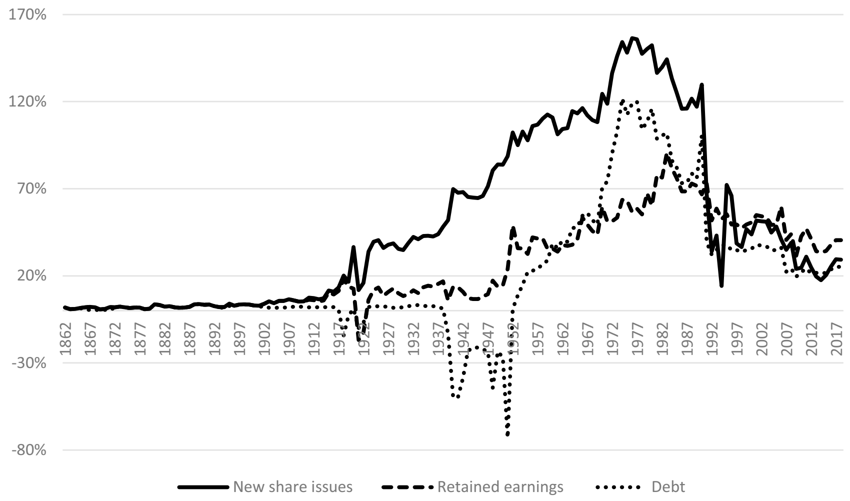

Fig. 1 Evolution of the marginal effective tax rate (METR) for an average-income entrepreneur, by source of finance (new share issues, retained earnings, and debt) 1862–2018. *Note*: An average-income entrepreneur is defined as an active owner of a closely held corporation paying the same marginal labor income tax rate as the average production worker. *Source*: Johansson et al. (2015), Wykman (2022) and own calculation

additional income and wealth taxes during and between the world wars and a separate wealth tax on assessed net wealth initiated in 1934. The separate wealth tax increased stepwise from approximately 0.5 percent and peaked at four percent in the early 1980s. Valuation relief and average tax caps occasionally limited the total tax on income and wealth. The tax rate was reduced from the mid-1980s and abolished in 2006.

4 Empirical analysis

4.1 The METR: An overview

Figure 1 shows how the METR has differed by the source of finance for an average-income entrepreneur. As seen, the METR for new share issues and retained earnings began to increase in the early 1900s. Following World War I, new share issues became the least favorable option by far, with a METR above 100 percent from 1956 until the 1990–1991 tax reform.[4] Debt finance was generally more favorable than

[4] We calculate the postreform METR for retained earnings with the same capital gains tax for top-income and average-income entrepreneurs, because investments financed with retained earnings do not increase the dividend allowance, meaning that the marginal tax on capital gains equals the labor income tax or equals half of the capital and half of the labor income tax. We consider selling shares as equivalent to overshooting the threshold for the top marginal tax rate on labor income, but this fact does not impact the structural break calculations.

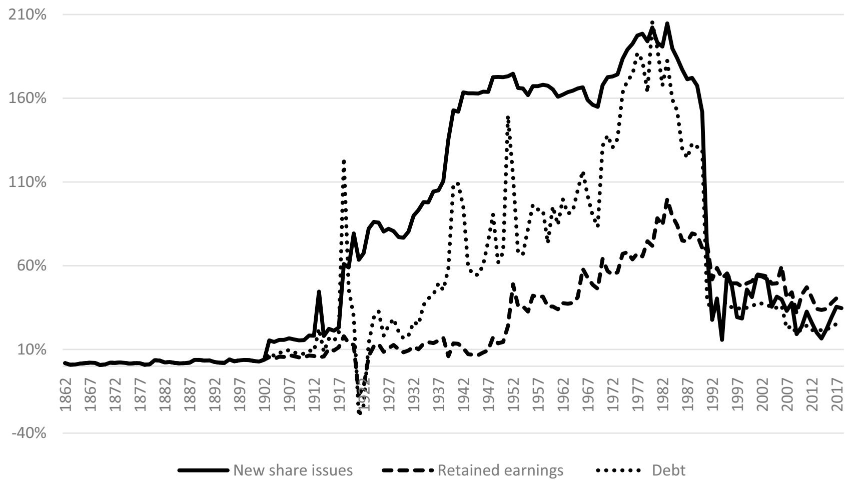

Fig. 2 Marginal effective tax rate (METR) for a top-income entrepreneur, by source of finance (new share issues, retained earnings, and debt) 1862–2018. *Note*: A top-income entrepreneur is defined as an active owner of a closely held corporation paying the top marginal labor income tax. *Source*: Johansson et al. (2015), Wykman (2022) and own calculation

retained earnings until 1960, when their order of preference reversed. Nevertheless, the METR for retained earnings rose from below 20 percent before the 1950s to peak at approximately 85 percent in the mid-1980s.

The METR decreased substantially after the 1990–1991 tax reform, especially for new share issues and debt. Retained earnings became the least favorable financing option, but both the magnitudes and differences between sources of finance were smaller than before. Overall, new share issues were on the same level as debt, arguably because the tax rules for closely held corporations implied a permanent increase in the dividend allowance when investments were financed with new shares issues (in contrast to retained earnings; cf. Wykman 2022). That said, the annual variation was considerable.

The general picture from Fig. 1 is echoed in Fig. 2, where we recalculate the METR for top-income entrepreneurs. The METR was basically the same irrespective of the source of finance until the 1903 tax reform made new share issues the least favorable alternative – a situation that persisted until the 1990–1991 tax reform. However, the METR for debt financing fluctuated substantially. At its peak, the top-income METR was 200 percent for new share issues and debt financing but never exceeded 100 percent for retained earnings. After the 1990–1991 tax reform, the top-income METR for all three sources of finance fell, making retained earnings the least favorable option.

Thus far, the analysis highlights several important aspects of the tax incentives facing active owners of closely held corporations. First, in the first fifty years, taxes were low, with negligible differences by entrepreneurial income and source of finance. Second, from then until the 1990–1991 tax reform, new share issues

Table 1 METR series by source of finance and income: years for structural breaks

Source of finance	Level of income	
	Top income	Average income
New share issues	1916, 1939, 1967, 1990	1921, 1944, 1967, 1990
Retained earnings	1923, 1949, 1972, 1995	1923, 1949, 1972, 1995
Debt	1916, 1939, 1967, 1990	1963, 1990

Note: For top-income entrepreneurs using new share issues, a fifth break in 1893 has equal explanatory power

Source: Own calculation

usually received the least favorable treatment. Third, retained earnings were consistently taxed at lower rates than newly issued equity, which favored incumbent firms relative to entrants. Fourth, top-income entrepreneurs received a less favorable tax treatment for debt financing than for retained earnings from the end of World War I until the 1990–1991 tax reform. Fifth, regime V leveled the playing field, and if anything, retained earnings are the most disfavored source of finance today. As new share issues are considered the most important source of finance for new ventures, this development suggests that the tax conditions for novel entrepreneurship have improved.

4.2 Structural breaks and tax regimes

We use OLS models to estimate all regressions. We analyze intercept differences since we are interested in changes in the level of the METR rather than changes in its development over time. The number of structural breaks corresponds to the partition associated with the overall lowest Bayesian information criterion (BIC). First, we calculate structural breaks for the series based on the source of finance presented in Figs. 1 and 2, i.e., three series for both average-income entrepreneurs and top-income entrepreneurs.

Table 1 reveals that five out of six series have four structural breaks occurring at approximately the same time, i.e., during or after World War I, during or after World War II, during the late 1960s/early 1970s, and in the early/mid-1990s. The average-income entrepreneur's METR for debt has only two breaks, in 1963 and 1990.

For tractability, we proceed by creating a new series that is an equally weighted average of the six METR series.[5] As Fig. 3 shows, this merged time series has structural breaks in 1917, 1944, 1967, and 1990, roughly corresponding to those in the individual series.

Four structural breaks imply five tax regimes between 1862 and 2018. The first regime stretched until the middle of World War I, the second until the end of World War II, the third until the late 1960s, and the fourth until the 1990–1991 tax reform,

[5] Analyses for the six individual series yield qualitatively similar conclusions.

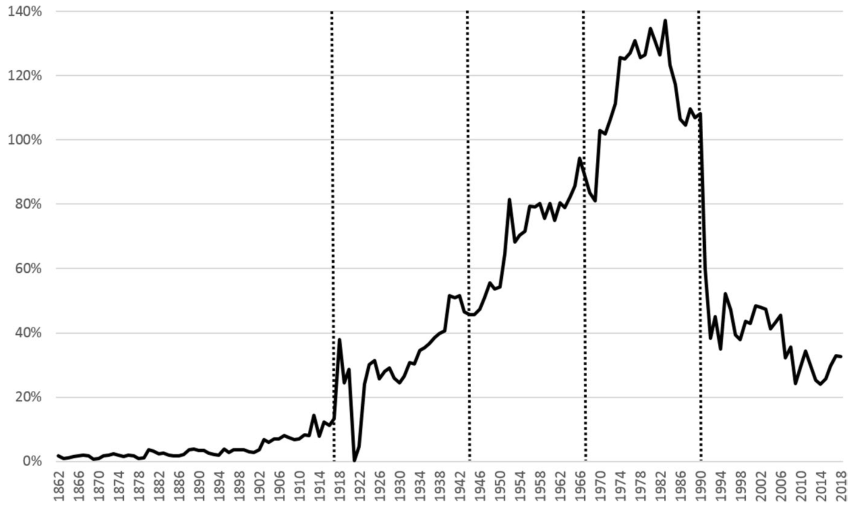

Fig. 3 Evolution of the merged METR series, including structural breaks and tax regimes, 1862–2018. *Note*: Top income refers to an entrepreneur defined as an active owner of a closely held corporation paying the top marginal labor income tax. Average income refers to an entrepreneur defined as an active owner of a closely held corporation paying the same marginal labor income tax as the average production worker. The merged series is an equally weighted average of the average-income and top-income entrepreneurs' METR for new share issues, retained earnings, and debt. *Source*: Own calculation

when the current regime began. The regimes largely coincide with those Du Rietz et al. (2015) propose concerning the evolution of the Swedish tax system and economic policy regimes, based on a graphical analysis of household income taxation.

4.3 Robustness checks

We undertook several robustness checks to ensure the validity of our results, as there are several ways to implement a structural change analysis in time series data. To begin with, the results rely on an underlying OLS regression minimizing the residual sum of squares. The regression is on a constant, i.e., only the intercept is analyzed. An immediate extension is to control for a time trend in the data, but this does not significantly affect where the breakpoints take place. The same is the case when we change the penalty criterion (such as BIC, MBIC) and the imposed cost. Additionally, we examine methods that rely on optimizing Gaussian negative log-likelihood instead of minimizing the residual sum of squares. Applying such methods does not significantly change the results either.

4.4 Regime characteristics

The first metric by which we characterize the tax regimes (Sect. 2.4) is *the magnitude of the METR*. Table 2 shows that the METR was low for top- and average-income

Table 2 Merged METR series by income: average marginal effective tax rates (%) across tax regimes

	Regime I (1862–1916)	Regime II (1917–1943)	Regime III (1944–1966)	Regime IV (1967–1989)	Regime V (1990–2018)
$METR_{Top}$	4.75	47.87	94.36	133.36	40.61
$METR_{Average}$	2.93	14.44	44.79	95.67	40.70
Difference	1.82	33.43	49.57	37.69	-0.09

Note: The merged series are equally weighted averages of the METR for new share issues, retained earnings, and debt for the top-income and average-income entrepreneur, respectively

Source: Own calculations

entrepreneurs during regime I. It then increased over time and peaked during regime IV, when it exceeded 100 percent for top-income entrepreneurs. The METR decreased during regime V, making it reasonable to talk of this period as corrective.

The second relevant characteristic is *the difference in METR magnitude between top- and average-income entrepreneurs*. Table 2 shows that the magnitude difference was negligible in the first regime and high in the intervening period (especially during regime III), before being reduced to virtually zero during regime V. This evolution suggests that a substantial disincentive to expand firms appeared and then disappeared in the twentieth century.

The third characteristic is *the difference in METR magnitude depending on the source of finance*. As seen in Fig. 2, issuing new shares was the least favorable source of finance for top-income entrepreneurs during regimes II–IV. Whereas debt occupied an intermediate position, the treatment of retained earnings was the most favorable. The differences between sources of finance were reduced during regime V to the point that debt and new share issues became more favorable than retained earnings. Corresponding data for the average-income entrepreneur in Fig. 1 convey a roughly similar picture for new share issues and retained earnings, although the differences were smaller in magnitude.

The three metrics highlight the impact that each tax regime had on entrepreneurial activities. First, the generally high METR during regimes III and IV – with levels above 100 percent – likely dampened economic aspirations and incentives to invest. Second, the pronounced differences between top-income and average-income entrepreneurs during regimes II–IV probably disincentivized firms to expand and strive for higher income through high-impact entrepreneurship. Third, the favorable treatment of retained earnings over new share issues as a source of finance during regimes II–IV likely benefited well-established incumbents with prior profits at the expense of new entrants lacking retained earnings. The favorable treatment of debt financing over new share issues during regimes III and IV further favored large, capital-intensive incumbent firms with readily available collateral over new, small firms with less capital.

It is also useful to consider the regimes in a historical perspective. Such an account suggests that the institutional framework of the polity and economy is "a function of the shared mental models and ideologies of the actors" (Denzau and

North 1994, p. 27). For starters, regime I, with its low METR irrespective of income and source of finance, overlaps with a period of liberalization of the Swedish economy in which the liberal minister of finance Carl Johan Gripenstedt played a pivotal role. He was heavily influenced by the French liberal economist Frédéric Bastiat.

The second tax regime coincides with a shift in the balance of power to the Social Democratic Party. The party would govern Sweden for most of regimes II, III, and IV, during which the METR increased and diverged considerably depending on income and source of finance. The Social Democrats had a unique opportunity to form society according to their largely egalitarian ideology, and economists favoring a big state and government interventionism had considerable influence on economic policy, e.g., Nobel laurate in economics Gunnar Myrdal. Tax policy was deliberately designed to convert companies to 'social enterprises without owners' and to create an economic system of 'capitalism without capitalists' (Henrekson et al. 2020). This policy became most pronounced throughout tax regime IV, during which the Swedish economy started showing several shortcomings, e.g., lagged economic growth.

Kjell-Olof Feldt, the Social Democratic minister of finance during the 1980s, identified the tax system as a major cause of the poor economic performance. He therefore initiated the 1990–1991 tax reform together with the Liberal Party. This marked the beginning of the fifth tax regime, which may be labeled corrective. The objective was to increase efficiency without lowering the tax burden, for instance by financing reduced marginal tax rates by broadened tax bases.

5 Discussion: Tax regimes and high-impact entrepreneurship

Our results suggest that the increased taxation of active owners' investments made high-impact entrepreneurial initiatives less favorable after regime I and particularly during regimes III and IV. The 1990–1991 tax reform made the tax system friendlier to entrepreneurship by sharply reducing the magnitude and differences in the METR depending on owners' income and source of finance. Table 3 summarizes the tax regimes' characteristics and entrepreneurial incentives while also including three entrepreneurial proxies gathered and employed in previous research that cover this extensive period. The proxies suggest that regimes characterized by favorable entrepreneurial incentives exhibit a greater degree of entrepreneurial and innovative activity than regimes characterized by meager incentives.

The first and second measures center on the establishment year of Sweden's largest entrepreneurial firms in terms of turnover and employment. Both measures are based on Bornefalk's (2017) systematic analysis of Sweden's 100 largest corporations in 2013 (an update of Axelsson 2006). Bornefalk (2017) classifies 36 of the largest firms by turnover and 31 of the largest firms by employment as genuinely entrepreneurial. The definition means that these firms were founded on individual entrepreneurs' intention to commercialize radically new innovations, with firm growth emanating from one core company centered on one innovation. The firms originate and operate within a diverse set of industries, encompassing traditional sectors like forestry (Holmen), building (Skanska), and manufacturing (Atlas Copco), to name a few, but also industries like

Table 3 Tax regimes characteristics, entrepreneurial incentives, and three entrepreneurship indicators

Tax regime	Characteristics	Incentives for entrepreneurship	Largest entrepreneurial firms (turnover)	Largest entrepreneurial firms (employment)	Important entrepreneurial innovations
Regime I (1862–1916)	The METR is low and stable, with negligible differences between owners' income and source of finance	Entrepreneurs are provided with incentives conducive to the entry and growth of firms	19	15	25
Regime II (1917–1943)	The METR increases and varies according to owners' income and source of finance. New share issues are the least favorable option	The incentives for entrepreneurship are weakened, especially for high-impact entrepreneurs	6	5	5
Regime III (1944–1966)	The METR increases further, especially for new share issues	The incentives for high-impact entrepreneurs are meager. Large, mature and capital-intense firms are favored	6	8	14
Regime IV (1967–1989)	The METR peaks at over 100 percent for top-income entrepreneurs and close to 100 percent for average-income entrepreneurs. Political risk and lack of foresight increase	The incentives for entrepreneurs are meager. Large, mature, and capital-intense firms are favored	1	0	5
Regime V (1990–2018)	The magnitude and differences in the METR depending on owners' income and sources of finance are sharply reduced	The incentives for entrepreneurship are strengthened	4	3	10

Note: Regime break years are based on the merged series displayed in Fig. 3

Largest entrepreneurial firms(turnover) shows how many of the 36 largest entrepreneurial turnover firms in 2014 were founded during each tax regime. *Largest entrepreneurial firms(employment)* shows how many of the 31 largest entrepreneurial employment firms were founded during each tax regime. *Important entrepreneurial innovations* shows how many of the 59 greatest innovations in 2017 were entrepreneurially generated during the different tax regimes

Source: Bornefalk (2017), Sandström (2014) telecom (Ericsson), food (Axel Johnson, Bergendahl & Son), staffing and resource consulting (Proffice), and health- and elderly care (Capio, Team Olivia AB).

Focusing on the period when firms were founded is warranted given that early growth is an important characteristic of large entrepreneurial firms (e.g., Henrekson and Johansson 2010; Coad and Karlsson 2022). That said, comparisons over time using this data risk being complicated by the fact that firms founded during the earlier regimes have had more time to grow, but also potentially experienced more economic downturns and periods of economic distress. If the growth effect dominates, which seems reasonable as firms that have already grown large should be more robust to downturns, there is a risk that comparisons over time underestimate entrepreneurship in the latter periods relative to the earlier periods.

As many as nineteen of the largest entrepreneurial firms in terms of turnover started during tax regime I. Another six started during regime II, and another six started during regime III. Regime IV, however, produced only one entrepreneurial firm, while regime V had already produced four such firms by 2013. The pattern is similar when we consider the largest entrepreneurial firms in employment terms. Fifteen started during regime I, five during regime II, and eight during regime III. Again, regime IV scores worst, producing zero such firms, whereas regime V had produced three such firms by 2013. These indicators suggest that more successful entrepreneurial firms were founded during regime I, when tax incentives were beneficial, and probably somewhat understate the positive change during regime V, as firms founded during this period have had less time to grow.

The third measure is based on Sandström's (2014) analysis of Sweden's 100 most prominent innovations. He classifies 59 of them as originating with individual inventor entrepreneurs or with established entrepreneurial firms from four innovative sectors (this includes obvious top innovations like spherical ball bearings, the milk separator, and the tetrahedron). As seen, most top innovations were generated during regime I. Even though the number of innovations was relatively high in the postwar period during regime III, it was markedly lower during regimes II and IV but increased again during regime V. Again, the numbers probably understate the trend during regime V, as innovations in this group have had less time to have a worldwide impact.[6]

Other (more fragmented) evidence also suggest that regime V has ushered in something of an entrepreneurial renaissance. Notably, while data for the period 1920–1991 suggest that the average startup rate in the manufacturing industry declined considerably during regimes II–IV (Braunerhjelm and Carlsson 1993), microdata analysis on the share of all young firms for the period 1990–2013 shows "fewer signs of a declining share of entrants. This evolution thus seems to have been

[6] In an earlier contribution, Granstrand and Alänge (1995) examine data on the 100 economically most important innovations during the period 1945–1980, i.e., Regime III and the first half of Regime IV. They find that only 20 percent of the period's innovations were launched by new firms, and that most of these new firms were spun-off or acquired by large corporations, who dominated in launching innovations in almost all industrial sectors and in all subperiods.

halted in the early 1990s" (Heyman et al. 2019, p. 1811).[7] Regime V also saw a substantial increase in the number of new jobs in the private sector (Bjuggren and Johansson 2009) and an increase in the share of employees in medium-sized Swedish firms (Henrekson et al. 2012), which had decreased substantially during regime IV (Henrekson and Johansson 1999). In contrast, the number of new and young firms and their level of employment deteriorated during the post-1990 period in the United States (Heyman et al. 2019). Likewise, following a relatively stable period during the twentieth century, stock market capitalization skyrocketed during regime V (Henrekson and Jakobsson 2012) with a record number of newly listed firms (Holmén and Högfeldt 2005). Sweden has also come to have one of Europe's largest buyout sectors, enabling successful spin-outs of numerous divisions from old incumbents (Tåg 2012). In fact, Sweden is presently second only to Silicon Valley in spawning multibillion-dollar tech companies per capita (Frier 2018). The improved conditions of owner-entrepreneur taxation during regime V likely helped pave the way for this increased diversity.

6 Conclusion

The tax system affects the structure of payoffs for society's economic actors, notably entrepreneurs. Presently, however, there are few rigorous studies tracing the long-run evolution of tax system incentives for entrepreneurship, possibly because real entrepreneurship taxation is a complicated combination of several taxes, financing options, and inflation. Specifically, problems arise from the lack of a generally accepted definition of entrepreneurship, the fact that tax codes do not recognize entrepreneurial income as a distinct tax category, and the absence of detailed, long-term data. We addressed these problems as follows. First, we theoretically emphasized the importance of ownership for entrepreneurship and investment as its most important manifestation. Second, because it is reasonable to assume that a subset of the active owners of closely held corporations have entrepreneurial intentions, we identified the study of such owners' tax incentives when they make investments as highly relevant from an entrepreneurial perspective. Third, the compilation of detailed Swedish data enabled us to study these issues by examining Sweden's capital income taxation of entrepreneurial owners between 1862 and 2018. Thus, the study highlighted a general phenomenon through an in-depth, long-run analysis of a specific country.

We made calculations for average- and top-income entrepreneurs who make an investment financed with new share issues, retained earnings, or debt and included the effects of corporate income taxation, capital income taxation, and wealth taxation (and the interactions of these taxes with inflation). The exercise enabled us to econometrically identify five tax regimes, which we characterized in terms of the magnitude of

[7] Before making this cautious comparison, Heyman et al. (2019) explicitly state that this data is not directly comparable to Braunerhjelm and Carlsson's (1993) data. The average startup rate in the manufacturing industry declined from 3.98% during regime II, to 2.62% during regime III, and 1.58% during regime IV.

the METR and differences in the METR depending on owners' income and source of finance. Regime I provided entrepreneurs with incentives conducive to the establishment and growth of firms: income taxes were low, in principle flat, stable, and relatively neutral regarding the source of finance. These incentives weakened during the second regime and more still during regimes III and IV, a development that likely resulted in significant impediments to high-impact entrepreneurship in the postwar era. Notably, progressivity made it challenging to increase personal income by expanding firms, a tendency strengthened by the high taxation of investments financed with new share issues, the preferable financing source for novel entrepreneurship. The relatively more favorable treatment of retained earnings (on which mature firms mainly relied for financing) also impeded industry renewal. These differences help explain why so many successful entrepreneurial firms were founded in Sweden around 1900, and why few such firms were founded after World War II. Arguably, the fifth regime has played a corrective role by strengthening entrepreneurial incentives, as the evidence points to an entrepreneurial renaissance.

7 Contributions

This study makes two key contributions. First, we demonstrate how a clear theoretical definition of entrepreneurship (the investment activities of the owner-entrepreneur) facilitates the empirical study of entrepreneurial taxation by focusing on the taxation of investments made by active owners of closely held corporations. Because we can follow the taxation of this group for almost 160 years and distinguish between different income and financing categories, we add scope and detail to a literature that has previously focused on short periods. We find evidence of substantial institutional change, as the period saw the emergence of five tax regimes with distinct entrepreneurial incentives. Thus, this long-run perspective on institutional evolution sheds additional light on our understanding of economic performance. The framework makes the analysis transparent and potentially applicable to other countries, offering a promising way to understand observed intra- and intercountry variances in entrepreneurship activity over time. Future studies could also consider the heterogeneous effects of taxation on investments depending on the firm's financial situation and ownership structure.

Second, while our study elucidates the tax system's strong effect on the incentives to establish and build entrepreneurial firms, it also has a bearing on the broader literature on institutional quality and institutional change, highlighting a general phenomenon through an in-depth analysis of a specific country. Connecting our results with the economy's entrepreneurial activity – such as the prevalence of large entrepreneur-founded firms – suggests that the institutions surrounding the tax system critically influence entrepreneurial behavior.

7.1 Limitations

Like any study, ours has its limitations. Notably, we do not econometrically establish a link between the identified tax incentives and empirical manifestations of entrepreneurship. This problem arises, first, because we only have one long time series, and second, because there is, to our knowledge, no single satisfying entrepreneurial proxy covering the entire period that offers sufficient annual variation to be meaningfully included in a regression framework. This is the cost of undertaking a long-term study of one country instead of a cross-country analysis covering several economies for a limited period (cf. Stenholm et al. 2013). However, it seems beyond doubt that Sweden's postwar period, and especially regime IV, was less entrepreneurial than regimes I and V (in terms of, e.g., the founding of new, successful entrepreneurial enterprises). Our analysis suggests that these entrepreneurial ebbs and flows depended, at least in part, on entrepreneurship incentives embedded in the tax system. Future studies exploring these issues should try to apply econometric but also qualitative approaches, e.g., a process-tracing approach, which would make it possible to formally examine the strength of evidence linking potential causes to consequences.

Second, other tax-related and broader institutional conditions, such as inheritance taxation (Johansson et al. 2020) or credit market regulations (Henrekson and Jakobsson 2005), may also have affected entrepreneurial activity during the examined period. Taking such changes into account is an important issue for future research delving deeper into how the institutions of the tax system evolved to constrain or facilitate entrepreneurship.

Third, the King and Fullerton method is, admittedly, based on a simple framework incorporating only the most basic elements of the tax system and the costs involved in an incremental investment. In principle, a more detailed analysis of a hypothetical firm's tax behavior could be done based on a mix of different forms of (intangible, fixed and financial) assets, including more complex effects from accounting items from the balance sheet and profit and loss accounts. That said, the relative simplicity of the King and Fullerton framework is also an advantage, and the more detailed and specific the analysis is, the less general the results will be.

Acknowledgements We are grateful for comments on an earlier version from Marcos Demetry, Magnus Henrekson, Jacob Lundberg, Daniel Waldenström, and participants in seminars at the Research Institute of Industrial Economics (IFN), the 86th Annual meeting of the Southern Economic Association, and Örebro University.

Funding Open access funding provided by Örebro University. Elert and Stenkula acknowledge financial support from the Jan Wallander och Tom Hedelius stiftelse and the Marianne and Marcus Wallenberg Foundation.

Data Availability The datasets generated for the current study are available from the corresponding author upon reasonable request.

Declarations

Conflict of interest We have no conflicts of interest to declare.

Ethical conduct The research does not involve human or animal subjects. We comply with the Journal's ethical standards.

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Article

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The Taxation of Industrial Foundations in Sweden (1862–2018)**

https://doi.org/10.1515/ntaxj-2019-0006
Received May 10, 2019; accepted Oct 06, 2019

Abstract: It has been argued that the Swedish tax system has favored firm control through industrial foundations, which should have inhibited entrepreneurship and economic growth. However, research has been hampered because of a lack of systematic historical tax data. The purpose of this study is to describe the evolution of tax rules for industrial foundations in Sweden between 1862 and 2018 and to calculate the marginal effective tax rate (METR) on capital income. The results show that the METR for an equity-financed investment is typically below 20% and occasionally peaks at approximately 40%. When the requirement that industrial foundations have to donate the bulk of capital income (less capital gains) for charitable purposes is treated as a tax, the METR is seldom below 50% when financing investments with new share issues and often exceeds 100%.

Keywords: business groups; entrepreneurs; family firms; foundations; taxation

JEL codes: K34; N23; N24

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** We are grateful for the comments received from Daniela Andrén, Niclas Berggren, Magnus Henrekson, Johan Karlsson, Peter Melz, and participants at the 87th Annual SEA conference in Tampa, Florida, and at Örebro University.

1 Introduction

Industrial foundations have been an important means for a few influential family business groups to exercise far-reaching control over Swedish industry, possibly because they have been tax exempt. This has provided them an advantage over firms controlled through personal ownership. It has been argued that this has hampered entrepreneurship and, consequently, economic growth [16–18, 20]. However, there are no time series on the taxation of industrial foundations, and it has, therefore, been impossible to estimate the extent to which they have been favored. Hence, there is a need to produce long, homogeneous time series on their taxation to further our understanding of the governance and development of Swedish industry.

An industrial foundation is a legal entity that is typically founded by an entrepreneur who wishes to avoid dividing his or her assets among several heirs, losing capital to the inheritance tax, or, in other ways, weakening the ownership or voting structure. Normally, the charter of the foundation dictates a philanthropic purpose–alongside the goal of developing the business–because a philanthropic goal is a necessary condition for achieving favored tax status. The board that governs the foundation is obligated to fulfill the goals expressed in the charter. The donation of the firm's shares to the foundation is irrevocable [32, p. 7; 59, pp. 119–121].

As will be described later in greater detail, Swedish foundations with charitable purposes (Swedish: *allmännyttiga stiftelser*) are exempt from taxes on capital income, wealth, inheritance, and gifts. Nevertheless, their real after-tax return on investments in firms depends on corporate income taxation, inflation (because Sweden applies a nominal tax system), and source of finance (because different sources of finance are treated differently by tax law). They may also pay other taxes, for example, property taxes or taxes on business activity.

The purpose of this study is, first, to describe the evolution of tax rules for industrial foundations. Second, we calculate the marginal effective tax rate (METR) on capital income for industrial foundations. The analysis covers the years from 1862 to 2018.

The METR is an established tax measure used to compare tax rates across countries and types of investment projects [31]. It analyzes the effect of capital taxation on a marginal investment while accounting for the total effects of corporate income taxation, capital income taxation, and wealth taxation and the interactions of these taxes with inflation.

The analysis complements earlier studies on the taxation of industrial foundations, which only cover occasional years from the 1960s onward [e.g., 18, 48, 49].[1] Furthermore, they do not consider that industrial foundations have to donate the bulk of their capital income (less capital gains) for charitable purposes, which has a considerable negative effect on the use of industrial foundations as a control vehicle. In fact, this donation requirement parallels the cash flow effect caused by the personal capital income tax on dividends. Our study is part of a comprehensive project to characterize the Swedish tax system from 1862, when Sweden introduced a new tax system, until the present.[2]

Notably, the founding wealth of the industrial foundations emanates from individuals acting as entrepreneurs during the period when Sweden was industrialized in the second half of the 19th century. These entrepreneurs established diversified business groups comprising firms active across industries. The growth of the business groups resulted from solving coordination problems of financing complementary investments in different sectors, leading to large-scale synergies.[3]

The Swedish experience stands in contrast to the traditional so-called "big-push" policy, which stresses the importance of a centralized and government-coordinated expansion of interdependent industries to overcome externalities and hold-up problems [44]. The historical experience has, however, shown that such initiatives often fail because of government failure and rent-seeking activities by lobbying elite tycoons. A notable example is Japan, where the government first pursued a centralized big push policy to encourage swift industrialization that failed. Mass privatization followed and diversified business groups spanning across industries and governed by entrepreneurs became instrumental for Japan's growth [38].

We find that the METR for an equity (new share issues and retained earnings) financed investment is generally below 20% and occasionally peaks at approximately 40%. If the donation requirement is treated as a tax, the METR is seldom below 50% when financing investments with new share issues and often exceeds 100%.

The remainder of the article is organized as follows. Section 2 discusses the use of industrial foundations as a means for the family control of firms. Section 3 describes the taxation of industrial foundations between 1862 and 2018. Section 4 introduces the King-Fullerton framework and calculates the METR for industrial foundations. Section 5 concludes the article.

2 Industrial foundations and family control

Foundations in Sweden date back to the country's Christianization when people made donations to the church, for instance, for poor relief. Since the 18th century, foundations have been used to support education and care for the poor. Higher education and scientific research became more important for foundations in the late 19th century [52]. However, foundations were not separately regulated by law until 1929 through the so-called Supervision Act (*Tillsynslagen*). In 1996, foundations received an unambiguous legal definition in the Foundation Act (*Stiftelselagen*, 45) [14]. The tax legislation is separate and described in Section 3.

Foundations are heterogeneous, but they share some common traits. First, a foundation is established when assets are permanently separated and dedicated to the promotion of a particular purpose [56]. Second, foundations are self-owned (i.e., lack owners) and governed by their statutes [14].

Foundations can be sorted into different categories depending on what features are of interest. One distinction is between *dependent* and *independent*, that is, whether a foundation is controlled within a structure, such as a non-profit organization or a company, or whether its board is independent and controls itself [45].

Foundations can also be divided into *return foundations* (*avkastningsstiftelser*) and *business foundations* (*näringsdrivande stiftelser*), where the former fulfills their purpose by funding various activities, primarily using the return on their capital, and the latter by conducting business. Foundations that conduct business are rare because

1 These studies denoted foundations with charitable purposes as "tax-exempt foundations."

2 Seven key aspects have been treated in previous studies: the taxation of capital income of households, consumption, gifts and inheritance, labor income, real estate, wealth, and taxation of the owners of closely held firms [see, 21, 29, 54, 64].

3 The government paved the way by implementing a number of institutional reforms that liberalized the economy and improved the business climate.

a foundation does not offer the same flexibility as a limited company [14].

Foundations also differ by purpose, and they are normally divided into the following categories [46]:

1. ordinary foundations (*vanliga stiftelser*);
2. collection foundations (*insamlingsstiftelser*);
3. collective agreement foundations (*kollektivavtalsstiftelser*);
4. pension and employee foundations (*pensions- och personalstiftelser*).

Ordinary foundations are a broad category and include foundations with a wide variety of purposes, for example, local charity work and scholarships, family foundations[4] and the Nobel Foundation. A condition for being classified as an ordinary foundation is that the founder(s) of the foundation transfer(s) assets to the foundation for a particular purpose. These assets are generally not allowed to be distributed; only the return on the assets can be distributed. However, if the foundation's statues declare that it is allowed to use its capital, it can do so as long as it can fulfill its purpose over time (*varaktighetskravet*) [26].

Collection foundations are similar to ordinary foundations. The difference is that the founder(s) do(es) not transfer any wealth when founding the foundation, instead a collection foundation raises money to meet its objectives. The funds are normally meant to be spent for the predetermined purpose, even though some funds may be saved, and there are hybrids between collection foundations and those that only use their return to finance their purpose.[5] This distinction is not relevant from a tax perspective [14].

Collective agreement foundations are a part of the Swedish labor market model, and their purpose is to support the security and transformation of the labor market. This can be performed in a number of ways, such as education, financial support for accepting lower paid jobs, and early retirement. These foundations are funded by employers as part of a collective agreement and are jointly controlled by the trade unions and employer organizations.

Pension and employee foundations are used to guarantee employers' pension obligations and personnel benefits to employees.

For the purpose of this article, the most relevant property of foundations is their tax condition. In general, ordinary foundations pay tax on all income; that is, they are fully taxable [46]. A collection foundation has the same tax conditions as an ordinary foundation. Collective agreement foundations belong to a small number of foundations that are exempted from tax on all incomes. They only have to pay property taxes (*fastighetsskatt*) and taxes on any income from real estate (*fastighetsinkomst*).

Pension foundations are taxed for property income and real estate, and their return is taxed at a rate of 15% on net assets multiplied by the government borrowing rate (*statslåneräntan*) [14, p. 76]. Employee foundations normally have full tax liability (*oinskränkt skattskyldighet*).

However, foundations that promote charitable purposes are exempted from taxes on capital income, wealth, inheritance, and gifts.[6] To be exempted from the tax on capital income, certain rules have to be met (as explained in greater detail in Section 3).[7] This possibility provides an opportunity for entrepreneurs to keep firms under family control for generations despite taxation.[8] By establishing an industrial foundation with the purpose of promoting charitable aims, the foundation will have limited tax liability, and its assets are not allowed to be distributed.[9]

In addition to tax incentives and the willingness to promote charitable purposes, another motive for establishing industrial foundations can be to avoid inheritance division. By bequeathing to a foundation, the founder avoids dividing the assets among several heirs, making it easier

4 Family foundations hold funded assets with the purpose of promoting a particular family's prosperity.

5 A collection foundation has to use at least 75% of its income during a period of 3 years.

6 There is also a category of foundations that do not have to be charitable to achieve the same tax advantages described below. Such foundations have been listed separately in the law since 1855. The first such foundation is Jernkontoret, supporting the iron industry [53]. Although the catalog has grown over time, it does not include foundations able to function as a substitute for private ownership; instead, it consists of foundations such as the Nobel Foundation and foundations in memory of persons.

7 Family foundations are taxed as a natural person [56] because their purpose is to favor a particular family, and they cannot be philanthropic by definition.

8 Because the wealth is meant to be distributed, collection foundations are not used as an instrument to exercise control over firms.

9 Ordinary foundations with the purpose of promoting charitable purposes share commonalities with private foundations in the United States; they are independent legal entities established solely for charitable purposes; the funding typically comes from a single individual or a family; the founder determines the foundation's mission, whom to include on the board, investment strategy, and how and to what funds are given away; the foundations are governed by their own board of directors, which consists of the founder(s), family, and/or other individuals chosen by the founder(s); they must make charitable distributions and are classified as tax exempt, but they still may have to pay some taxes. One important difference compared to Sweden is that the donor is allowed to deduct the amount given to the foundation from taxation.

to maintain a critical level of capital within a single voting structure. Heirs are further prohibited from squandering the inheritance (except through mismanagement of the firms they may indirectly control through the foundation), and the family may also gain social status by financing charitable activities.[10]

In 2018, there were approximately 17,000 ordinary and collection foundations in Sweden [6].[11] It has been estimated that approximately 90% of all registered foundations are tax exempt [53]. Most foundations are small. Nevertheless, a few foundations are used to control a large share of Swedish industry, as described in the next section.

2.1 Industrial foundations and family business groups

Sweden was a poor agricultural country until industrialization leveled off in the second half of the 19th century. A small number of successful entrepreneurs took the lead and established family business groups controlling a large share of Swedish industry [see, e.g., 7, 9, 11, 12, 34, 39–43, 47]. Because of their economic significance, they have received attention from policy makers and analysts investigating their influence [e.g., 23, 24, 57]. However, no systematic examination of their influence emerged until the early 1960s when the government launched an inquiry to investigate the control of Swedish industry [51], the so-called concentration inquiry (*Koncentrationsutredningen*).

The inquiry found that 17 ownership spheres controlled one-third of the largest firms' capital and that one-fifth of all private sector employees were employed in firms controlled by these ownership spheres (excluding bank and insurance companies). Fourteen of these spheres were controlled by family business groups.[12] Of the other three, two were controlled by managers (who did not hold any controlling shares) and one did not have any controlling ambition.[13] In 8 of the 17 spheres, foundations were used as the main control vehicle.[14] A more detailed analysis of the foundations reveals that most of the foundations used to control Swedish industry were established in the post-war era (see Johansson *et al.* 28 for a detailed description).[15] Starting in 1985, Sundqvist [57] made yearly updates of ownership spheres. Hence, SOU 51 and Sundqvist are major sources of information when studying Swedish ownership spheres and family business groups.

The control of the business group was typically organized as a four-level control-ownership pyramid. The family is at the top of the pyramid. It *controls* one or several industrial foundations, the second level, through board representation. The foundation(s), in turn, is(are) dominant *owner*(s) in a listed, closed-end investment fund, representing the third level, that owns the listed and/or unlisted firms at the bottom of the pyramid. For instance, the *Knut och Alice Wallenbergs Stiftelse* is the most important industrial foundation in the Wallenberg sphere. It controls the closed-end investment fund Investor, which in turn controls firms such as Atlas Copco and Ericsson [e.g., 25, pp. 525–527]. In combination with differentiated voting rights (by means of dual-class shares) and pyramid building, several companies could be controlled with a relatively small amount of capital [15].

Hence, by controlling the industrial foundation(s), the family is the ultimate decision maker in a large business group without any, or negligible, personal ownership. The foundation's charter, which states that the board appoints its successors, guarantees the founding family's control over the foundation and family business group over generations. When the family business group is controlled by direct ownership, there is only a three-level control-ownership pyramid; the family directly owns the closed-end investment fund.

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10 For instance, the Wallenberg family is highly regarded even if Sweden is an egalitarian society. One reason for this is that the Wallenberg foundations are substantial supporters of research, culture, and other charitable causes.

11 There is also a small number of employee, pension, and collective agreement foundations.

12 See Andersson *et al.* [2] for the importance of family firms in Sweden.

13 This refers to the so-called "Dunker sphere," which was controlled by Helsingsborg's city council and independent persons.

14 The ownership spheres controlled by foundations were the Ax:son Johnson family, the Dunker sphere, the Ericsson family, the Kempe family, the Söderberg family, the Wallenberg family, and the Åhlén family. The spheres that were not controlled by foundations (or where the foundations were of less importance for control) were Bergengren, Bonnier, Broström Custos/Säfveån–Skandinaviska Banken, Edstrand, Klingspor and Stenbeck, Kockum, Mark and Carlander, and Wehtje.

15 The founding year is listed in parentheses: Axel och Margaret Ax:son Johnsons Stiftelse för allmännyttiga ändamål (1947), Axel och Margaret Ax:son Johnsons Stiftelse (1947), Henry och Gerda Dunkers Stiftelse (1953), Åhléns-stiftelsen (1954), Ollie och Elof Ericssons Stiftelse för Vetenskaplig Forskning (1958), Stiftelsen Marcus och Amalia Wallenbergs Minnesfond (1960), Torsten Söderbergs Stiftelse (1960), Ragnar Söderbergs Stiftelse (1960), Ollie och Elof Ericssons Stiftelse för Välgörande Ändamål (1961), Stiftelsen Henry och Gerdas Donationsfond Nr 1 (1962), Stiftelsen Henry och Gerdas Donationsfond Nr 2 (1962), and Marianne och Marcus Wallenbergs Stiftelse (1963).
The main exceptions are Knut och Alice Wallenbergs Stiftelse (1917), Stiftelsen J.C. Kempes Minne (1936), and Stiftelsen Seth M. Kempes Minne (1941).

Three of the 17 ownership spheres identified in SOU 51 still exercise significant control over Swedish industry: the Ax:son Johnson, the Klingspor and Stenbeck, and the Wallenberg family business groups. The Wallenberg family business group is still the most influential of all business groups in Sweden, and the Ax:son Johnson family business group is one of the most influential business groups. The Wallenberg family business group is controlled by the fifth generation of family members and the Ax:son family business group by the fourth generation, which makes them the oldest of the large ownership spheres in terms of generational control. This indicates that industrial foundations may be effective in creating and sustaining large family business groups. This may be explained by the motives for establishing an industrial foundation, mentioned above: First, when tax favored, industrial foundations have a financial advantage; second, the risk of inheritance division is reduced; and third, heirs are hindered from squandering their inheritance.

Family governance was long considered inferior to managerial governance [see, e.g., 4, pp. 13–14]. A growing separation between ownership and control in the largest American corporations led to support for this view. It was confirmed in the late 1970s that the proportion of managerial enterprises among the 200 largest corporations in the United States had increased from 50% in 1929 to more than 80% [3, 22]. Later research examining corporate ownership around the word indicates that family control seems to be the general form of corporate governance and is prevalent among listed firms [e.g., 5, 10, 33]. This is also the case in Sweden, despite deregulations of financial markets and increased globalization, which have increased the possibilities for convergence toward the Anglo-American model of corporate control [19].

Research also finds that corporate control differs significantly across countries [e.g., 37]. For instance, industrial foundations play an important role as controlling owners in several countries, especially in northern Europe [e.g., 61, 62]. This is especially notable in Denmark, where foundation-controlled companies constitute approximately 70% of stock market capitalization [60], and in Sweden, where a few influential family business groups, notably the Wallenberg group as discussed above, have used foundations to exercise far-reaching control over Swedish industry. An explanation proposed, but not systematically examined, is that the tax system has favored industrial foundations over direct individual ownership. Next, we, therefore, turn our interest to the taxation of industrial foundations.

3 Taxation of industrial foundations

The calculation of the METR requires data on the evolution of the corporate income tax, the foundation's income tax, the wealth tax, and the inflation rate. Section 3.1 describes how the tax rules for industrial foundations have evolved and how foundation's income has been taxed over time. Section 3.2 presents the evolution of the corporate income tax, and Section 3.3 depicts the inflation rate. We refer to Henrekson and Stenkula [21], Johansson *et al.* [27], Stenkula *et al.* [55] for a more thorough presentation of the tax system.[16]

3.1 Tax rules for industrial foundations

Industrial foundations do not have to pay taxes on capital income, such as dividends, interest, and capital gains. They have also been exempted from taxes on wealth, inheritance, and gifts (when applicable for natural persons). However, they pay taxes on real estate, property income, and business income (*rörelseinkomst*). These rules have evolved over time because of changes in statutory laws and case law (*rättspraxis*).[17]

The roots of tax rules for foundations date back to the regulation from 1810, where the so-called pious foundations (*fromma stiftelser*) were exempted from taxation. The law stated that foundations were exempted from paying tax on chattels, immovables, gifts, and inheritance [56]. In the Appropriation Law (*Bevillningsförordning*) introduced in 1862, the tax exemption was extended to several areas such as research, education, childcare and healthcare.

The main idea behind a pious foundation was that all payouts should be used for charitable purposes. One rationale for the tax exemption was that these foundations spent money on activities that otherwise had to be financed by taxes. A foundation could have more than one purpose (and, as a consequence, use its revenues in more than one way). If only part of the foundation had charitable purposes, then these rules applied only to that part. If, for example, half of the foundation's activity had charita-

16 Note that the inheritance and gift tax, introduced in Sweden in 1885 and abolished as of 17 December 2004, is not included in the calculation of METR. The tax gave incentives to transfer ownership of private firms to industrial foundations after World War II; see Du Rietz *et al.* [8] for an analysis.

17 Case law is the set of decisions of courts that can be cited as precedent.

ble purposes (as stated, e.g., in the statutes of the foundation), half of the income must be spent on charitable purposes, and *this half* was exempted from income taxation. A foundation with multiple purposes could, in this way, both keep some money within the foundation and spend money on non-charitable purposes without being required to pay taxes on all income.[18]

In 1942, the legal framework was formalized and the current legal framework instituted [26]. The legislation was preceded by a long process based on a proposal from a tax committee in 1936. The rules have then remained largely unchanged. Before 1942, the main focus of the tax authorities was whether a foundation should be regarded as a pious foundation. Classification as a pious foundation was based on case law, but the case law was inconsistent because administrative courts could differ in their judgment of whether a foundation fulfilled the requirements to be tax exempt.

A main concern with the statutory law before 1942 was that it was possible for an industrial foundation to retain income and accumulate funds to be spent on charitable activities in the future that were instead spent on non-charitable activities. Although unlikely and difficult, the purpose of a foundation could be changed, or the foundation could be dissolved and liquated. Hence, there was a risk that tax-exempt income could be used for non-charitable activities (if the purpose of the foundation was changed) or could be obtained by ordinary people (if the foundation was liquidated).[19]

The new legislation clarified that foundations supporting charitable activity should be taxable only for income from property and business activity.[20] However, three conditions had to be met for other foundation income to be tax exempt:

- *The purpose requirement* (*ändamålskravet*) states that the foundation must have (a) charitable purpose(s). A list of charitable purposes was specified in the law [53]. This list replaced the concept of piousness in the law.[21]
- *The activity requirement* (*verksamhetskravet*) states that the aim of the foundation must be to *mainly* (*huvudsakligen*) promote charitable purposes. In practice, this means that 90–95% of the resources used must promote these charitable purposes.
- *The completion requirement* (*fullföljdskravet*) states that foundation's return must to a *reasonable extent* (*skälig omfattning*) be used to promote the purpose. "Reasonable" has, in case law, been defined as 80% of the *net* return (see below). Normally, this requirement could be fulfilled either in the current fiscal year or as an average for the last 4 years and the current year [14].

With a formal *completion requirement*, it would not be possible to accumulate (all or the bulk of) tax-exempted income in the foundation over time (on the grounds that it will be spent on charity sometime in a distant future). With the *activity requirement*, the foundation was, on the other hand, not obliged to use everything it spent (but only the main part) on charitable activities.[22]

The rules were now also made binary, meaning that either the tax exemption criteria were fulfilled–and then all income (with the exception of income from property and business income) was tax exempt–or the criteria were not met–and then all income had to be taxed (as if earned by a limited company). Hence, foundations could no longer divide their income into nontaxable (the charitable part) and taxable (the non-charitable part) income. Failing to satisfy one requirement was sufficient to be fully taxable. An alternative tax rule, which would keep the tax incentives for foundations with charitable purposes in place, could be to allow foundations to deduct all expenditures for charitable purposes and then tax the residual net income in the same way as other businesses. This option was rejected for two reasons: high administrative burden for the foundation and weakened opportunities for consolidation because new investments would have to be carried out with post-tax incomes [52]. Note that the sharp reduction in the corporate income tax rate since the 1980s has made the latter argument less valid.[23]

18 See SOU 50 and SOU 53 for more detailed discussions.

19 There is a limited possibility to change the taxation of past income. Current tax law allows the tax authority to change the taxation of income 2 years in the past after an appeal and at most 5 years in the past if incorrect information was reported on the tax return.

20 At this time, the property tax had two components, local and national, and these foundations had to pay only the local part. It was argued that removing the local part would reduce municipal financing in a non-legitimate manner.

21 With the 1942 legislation, the definition of research was broadened, but the change in practice was negligible because the interpretation was already generous [56].

22 All activity must, however, be in line with the purpose of the foundation.

23 The statutory corporate income tax has decreased from above 50% during the 1980s to slightly above 20% (see Section 3.2).

In practice, the new rules implied that, on average, approximately 80% of the net return had to be spent every year, and of these expenditures, 90–95% must be on activities that the tax authority regards as charitable.

There have been some changes since 1942, but the idea behind the rules has remained basically unchanged. In 1964, the definition of charitable purposes was widened to include Nordic cooperation, and in 1984, the municipal taxation of legal entities was abolished. No specific changes in the taxation of industrial foundations were made as part of the major Swedish tax reform in 1990–1991. In 1999, the *activity requirement* was changed from *mainly* (*huvudsakligen*) to *solely or virtually solely* (*uteslutande eller så gott som uteslutande*). The tax laws for foundations were made more liberal in 2014 (including that the concept of philanthropic purposes was widened again), but these changes did not essentially change the possibility to own or control firms via foundations [14].

Importantly, *no exact numbers* are mentioned directly in the law. Both case law and circumstances are relevant for the exact determination of how much of the return has to be used for charitable purposes to exempt a foundation from most taxes instead of being liable for full taxation on all its net income.

3.1.1 The completion requirement and the requirement base

As described in the section above, approximately 80% of the net return has to be spent on charitable purposes to fulfill the completion requirement. However, when calculating this net return, several costs and revenues are deductible from the total return. We will denote remaining amount, from which 80% has to be donated, as "the requirement base."

The requirement base includes the current income in the form of all revenues from interest and dividends, whereas capital gains are excluded.[24] Income from business activity and property is likewise not included because such income is not tax exempt for industrial foundations [14].

Gifts and inheritances donated to the industrial foundation after its establishment have to be included in the requirement base if it is stated in the will that they must be used to promote the charitable purposes of the foundation. This is in contrast to the original endowment, where only the return is to be distributed. However, without this explicit statement in the will, bequests and other gifts are normally not included in the requirement base, that is, a foundation is not committed to spend 80% of these bequests and gifts on charitable purposes, only 80% of their return [46].

Finally, direct and indirect costs associated with earning the income (*kostnader för intäkternas förvärvande)*, such as remuneration to board members, are deductible. The general rule is that costs that would be tax deductible in a situation where the income is taxable are deductible from the gross income when calculating the requirement base [58].[25]

The requirement base can be expressed as follows:

$$\begin{aligned}\text{Requirement base} = {} & \text{Total income} - \text{Business income} \\ & - \text{Property income} - \text{Capital gains} \\ & - \text{Gifts and bequests} - \text{Costs} \\ & \text{associated with earning the tax} \\ & \text{exempt income}\end{aligned} \tag{1}$$

Although it is not clearly stated in the law, costs associated with fulfilling the completion requirement (*fullföljdskostnader*), such as costs for distributing information about scholarships or costs for evaluating scholarship applications, are normally included in the 80% so that 20% can always be reinvested [13].

For the purpose of this article, the most important thing to note in Equation (1) is that dividends and interest are included in the requirement base, but capital gains are not. As dividends and capital gains are not treated equally, it is possible to influence how much of the total return the foundation has to use to promote its purpose.[26]

3.1.2 Summary and conclusion concerning foundations

In the modern era, it has been possible to use foundations to avoid taxes on personal income, wealth, gifts, and inher-

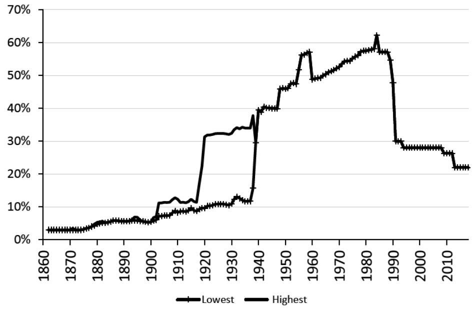
24 For certain financial instruments, it is difficult to distinguish between the current income and capital gains. There are well-defined rules for some instruments, but for other instruments, one must use a case-by-case methodology.

25 Generally, a cost can reduce the requirement base or be included in the completion requirement. However, there are court cases in which costs have not been allowed to reduce the requirement base or to be included in the completion requirement. For a detailed description, see Melz [36].

26 This is possible if the foundation can influence the dividend strategies of the firms in which it holds shares. This condition provides incentives for the foundation to control sufficiently large voting rights to have such influence.

itance.[27] Although there have been discussions about extending tax liability, no such change has been effected. In essence, the regulatory changes for industrial foundations have mainly entailed the transformation of case law into statutory law. However, several court cases have assessed the boundaries of the possibility of being a tax-favored industrial foundation.

However, tax exemption comes at a cost. There are three major disadvantages of exercising control through a foundation instead of direct ownership. First, to control a company via a foundation, one must relinquish ownership of the capital. Second, the bulk of income must be used for purposes determined by the legislature (as described in Section 3.1). Finally, there is a lock-in effect; entrepreneurs can emigrate, whereas foundations cannot.[28] When taxation on entrepreneurs is eased, the opportunity cost of controlling firms through industrial foundations increases.



Note: The statutory marginal corporate income tax rate refers to the total effect of local and state corporate income taxes. The progressive state corporate income tax was replaced by a proportional tax in 1939. *Source*: Johansson *et al.* [27] and updated by the authors.

Figure 1: The highest and lowest statutory marginal corporate income tax rate, 1862–2018.

3.2 Corporate income taxation

Profits made by corporations controlled by industrial foundations are subject to corporate income tax. Figure 1 depicts the evolution of the marginal corporate income tax rate from 1862 to 2018. Corporate taxes were paid to the state (national government) and, until 1985, to the municipality (local government). Corporate taxation was progressive between 1903 and 1939, and the figure shows the highest and lowest statutory tax rates during this period.

In the first 50 years of our study, corporate tax rates were low (below 13%) compared to later tax rates. The highest marginal tax rate increased sharply after World War I. The lowest marginal tax rate increased markedly in 1939 when the system was made proportional. The statutory tax rates continued to increase during the post-war period and exceeded 50% by the mid-1950s. The 1990–1991 tax reform decreased the statutory tax rate to 30%. The tax rate was lowered in four subsequent steps, reaching 22% in 2013. Between 1984 and 1990, an additional “profit sharing tax” on corporations was levied to finance the so-called wage-earner funds (*löntagarfonder*).[29]

There have been ample opportunities to reduce the statutory corporate tax by allowances and grants–particularly between 1939 and 1991, when the effective corporate tax rate could be substantially lower than the statutory corporate tax rate [48, 49]. The tax reform in 1990–1991 abolished most of these options, thus making the statutory and effective corporate tax rate much more equal.[30]

3.3 Inflation

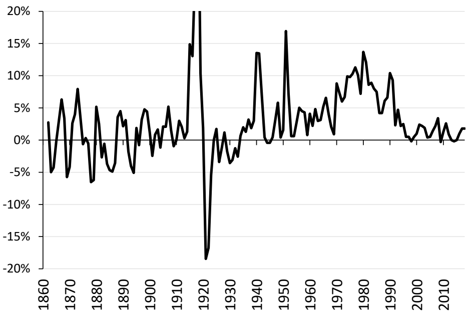
The inflation rate varied, with few exceptions, between −5% and +5% until World War I, but it was zero, on average, and the price level was virtually stable (see Figure 2). Inflation peaked during World War I and was close to 50% in 1918. Deflation followed the war with a policy to restore the price level to their pre-war levels, and deflation was nearly

27 Fully taxable foundations also have been favored over personal ownership. The marginal inheritance tax rate for natural persons has been as high as 60%, whereas, at the same time, it was 30% for taxable foundations [56], and as long as the wealth tax rate was progressive, foundations were favored because their tax rate was flat [14].

28 Of course, the foundation can own a subsidiary that pays no or little dividends and instead reinvest the profit under the same conditions as any other company. However, this (and other) more advanced ownership or tax structures are beyond the scope of this article.

29 It has been estimated that this tax increased the statutory corporate tax rate by approximately 5 percentage points [1]. However, there was a fear among businessmen that the rules might be sharpened. Unimplemented proposals with the purpose of transferring private ownership to the funds–which had been suggested before the formal rules came into effect–was seen as a threat to business by many owners [18, pp. 352–354]. This effect is not included in the METR because the King–Fullerton framework does not take business or political risks into account.

30 See Lodin [35, chapter 7] for further discussion about the design of the new corporate taxation.



Note: The inflation rates for 1917 (26%) and 1918 (47%) are excluded to increase clarity.

Source: http://www.scb.se/hitta-statistik/statistik-efter-amne/priser-och-konsumtion/konsumentprisindex/konsumentprisindex-kpi/pong/tabell-och-diagram/konsumentprisindex-kpi/inflation-i-sverige/

Figure 2: The inflation rate, 1862–2018.

20% in 1921. Sweden also experienced deflation at the end of the 1920s and the beginning of the 1930s. On average, the price level was roughly stable for approximately 80 years between 1862 and 1939. Inflation peaked again during World War II and during the Korea boom in the 1950s. In addition, inflation was moderate during the 1950s and 1960s and rarely exceeded five percent. It increased during the 1970s and 1980s and occasionally exceeded 10%. The central bank was granted independence, price stability was the prime goal of monetary policy, and an inflation target to keep inflation at approximately 2% was established in the 1990s. Inflation fell and was approximately 1%, on average, between 1994 and 2018.

4 The marginal effective tax rate on capital income (METR)

4.1 The model

The King and Fullerton [31] framework is a standard method for measuring the METR on investment projects in the nonfinancial corporate sector in both research and practice, for example, by the OECD. The framework accounts for all capital income taxes, corporate taxes, wealth taxes, and inflation that concern the investment decisions of the owner. Consequently, it accounts for the source of finance–new share issues, retained earnings, or debt–because capital incomes are taxed differently. Similarly, the METR will depend on ownership because different categories of owners are treated differently in tax law.

The METR is formally the difference between the pre- and post-tax real rate of return of a marginal investment project, divided by the pre-tax real rate of return. For example, if the pre-tax real rate of return on an investment project is *10%* and the post-tax real rate of return is *6%*, the METR will be *40% ((10-6)/10)*.

However, note that the METR is not simply an addition of corporate and owner-level taxation adjusted for inflation. It is an equilibrium model that is supposed to be solved where

(1) the present discounted value of the profits from the investment must equal the cost of the investment,
(2) the potential investor must be indifferent between receiving the after-tax revenue from the investment project and receiving the after-tax market interest rate (which in the model corresponds to the best alternative return).

4.2 Assumptions

Using the King–Fullerton framework and considering the rules and evolution of the tax system as presented in Section 3, we can calculate the METR for industrial foundations, with new share issues, retained earnings, and debt as sources of finance for the investment.[31] However, as always, when using a model, some assumptions must be made.

The *corporate income tax rate* is straightforward to incorporate when the corporate income tax system is proportional. We will use the top tax rate when the system is progressive (1903–1939).[32]

The *capital income tax rate* is first set to zero, because industrial foundations are exempt from paying tax on their capital income. This is in line with the analysis performed in earlier studies [30, 31, and, for Sweden, 48, 49].

However, industrial foundations are obliged to pay out the bulk of their capital income (less capital gains) for charitable purposes, as described in section 3. This imposes a

31 In the King–Fullerton framework, investments in machinery, buildings, and inventories are analyzed. In this study, we will analyze investments in machinery. We adopt to the standard assumptions of 20 percent marginal rate of return and 10 percent rate of exponential depreciation using the fixed-p model as described in King and Fullerton [31].

32 Using, for example, the lowest or the average of the highest and lowest tax rates in 1903–1939 would not change our general conclusions.

cash flow effect that weakens the ability to maintain control over the "sphere companies" and, hence, provides a negative incentive for entrepreneurs to use industrial foundations as a control vehicle. In fact, this effect parallels the cash flow effect caused by the personal capital income tax on dividends and interest. This cash flow effect has not been discussed or considered in previous analyses. To illustrate the impact on the incentives to control firms through direct individual ownership or through industrial foundations, we will make a complementary calculation of the METR where the requirement to donate a large part of the return for charitable purposes is treated as a tax. Although not formally correct, this calculation will capture the cash flow effect and further our understanding of the incentives to use industrial foundations to control companies.[33]

This complementary calculation requires an assumption regarding how large a share of its net income the foundation is obliged to donate. As described above, no exact numbers are mentioned in the statutory law, and both case law and the specific circumstances of the foundation are relevant for the exact determination of how much of the income has to be used for charitable purposes. Case law after World War II implies that, on average, approximately 80% of the net return has to be spent on charitable causes; we will use this percentage in our calculations for the whole period.

The *wealth tax rate* is set to zero, because industrial foundations are exempted from the wealth tax. Actual *inflation rates* are used in the calculations, as presented in Section 3.3.

There are special tax rules that must be accounted for during the period, for example, the Annell deduction, the investment fund system, a special additional allowance given between 1976 and 1978 and in 1980, and the SURV (*Skatteutjämningsreserv*, tax equalization reserve). These allowances lower the effectiveness of corporate taxation in different ways. The Annell deduction, however, only reduces corporate tax liability when new share issues are the source of finance. Between 1939 and 1951, the immediate write-off of investments was possible. These rules and how they are incorporated are described in Wykman [64]. Finally, the model assumes that no (further) tax changes will occur and that all tax allowances for investments can always be used.

33 A tax is formally defined as compulsory unrequited payments to general government.

4.3 Results

Figure 3 describes the METR with new share issues and retained earnings as a source of finance.[34] The METR for equity-financed investments was below 10% before World War I. It increased during World War I and in the interwar period. The highest level was reached, with spikes exceeding 40%, during the 1950s. The METR for new share issues and retained earnings differed between 1960 and 1993 because of the abovementioned Annell deduction, a tax deduction given only to investments financed with new share issues. After 1993, the METR fluctuates between 10% and 20%.

In the ordinary METR calculations, the income tax for the foundation is set to zero. In a strict sense, this is a true interpretation because donating a part of one's income cannot be equated with a tax. However, as discussed above, it can be argued that the METR calculated in this way does not correctly capture the incentive effects and that it may be misleading. The requirement to donate the bulk of the net income for charitable purposes has a negative cash flow effect similar to a dividend tax. This effect is not addressed in the ordinary King–Fullerton framework, but the METR can be recalculated to include this effect, as discussed in Section 4.2.

Figure 4 depicts the results when including this cash flow effect. In the case of new share issues, the METR generally fluctuates around 100% and 150%.[35] There are also occasional spikes reaching 200% or more.[36] The METR for retained earnings coincides with the earlier METR without any cash flow effect. Retained earnings enable investors to accumulate at a rate of return that is taxed by capital gains, and there is no cash flow effect because industrial foundations do not have to redistribute capital gains for charitable purposes. When including the donation requirement, the METR for new share issues increases substantially and is unfavorable as a source of finance compared to retained earnings.

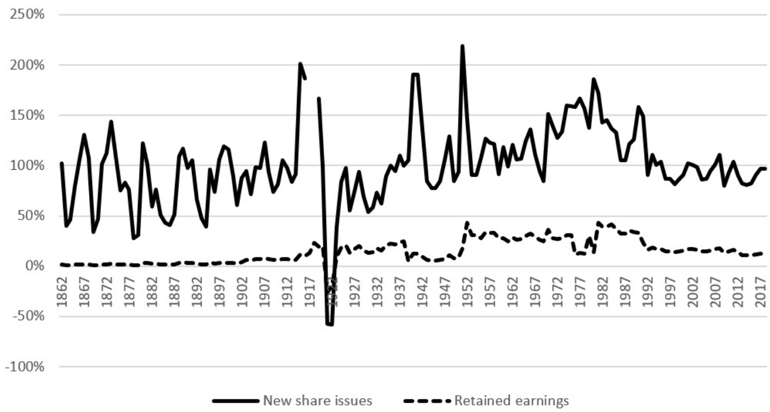
34 As control is exercised through ownership, debt is a less relevant source of finance for industrial foundations. The METR for debt is presented in Johansson *et al.* [28].

35 In the case of new share issues, the potential investor will require the return net of the dividend tax to be equal to the alternative investment, corresponding to the nominal interest rate net of the interest tax, that is, the investor will value the investment as if the investor will be remunerated through dividends only (see Wykman 64 for a more detailed description).

36 During World War I, the METR could exceed 300%, because of the very high inflation rate–which could be close to 50%–in combination with the requirement to donate the bulk of the net income for charitable purposes.

Source: Own calculation.

Figure 3: The marginal effective tax rate (METR), new share issues, and retained earnings, 1862–2018.

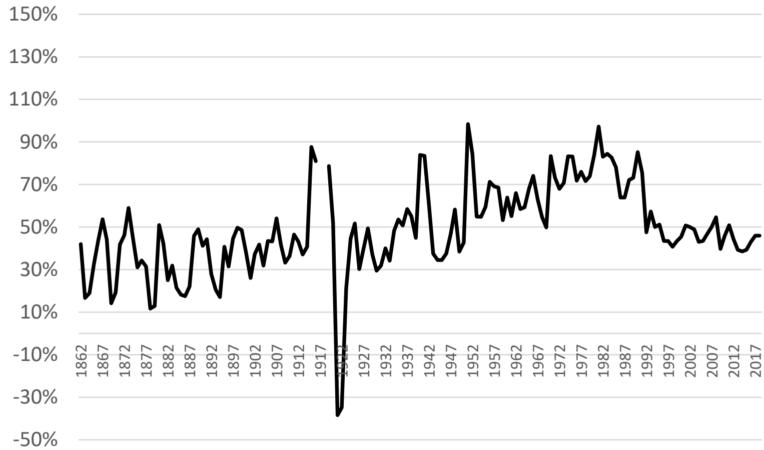


Note: The METR is calculated under the assumption that the foundation has to pay 80% of its net income for charitable purposes. The figure is truncated, and extreme spikes because of inflation (26% in 1917 and 47% in 1918) during World War I are excluded to increase clarity.
Source: Own calculation.

Figure 4: The marginal effective tax rate (METR), new share issues, and retained earnings, 1862–2018, including the cash flow effect.

The favorable treatment of retained earnings over new share issues favors incumbent, well-established, and mature firms, which historically have generated profits, in contrast to new entrants that lack retained earnings to use. Industrial foundations also generally prefer to finance investments with retained earnings to avoid the risk that ownership will be diluted, which is possible when using new share issues.

The METR for new share issues in Figure 4 should, however, be considered a maximum ceiling for two reasons: the donation requirement could be somewhat lower



Note: The METR is calculated under the assumption that the foundation has to pay 80% of its net income for charitable purposes. The calculations are made under the assumption that the stock return follows the average pattern in the stock market, that is, that dividend yields account for 40% of the return and price changes (capital gains) for 60%. The figure is truncated, and extreme spikes because of inflation (26% in 1917 and 47% in 1918) during World War I are excluded to increase clarity.
Source: Own calculations.

Figure 5: The marginal effective tax rate (METR), mixed case, 1862–2018.

than 80%, and the company may not distribute all profit as dividends but rather reinvest it.

As the foundation does not pay tax on capital gains, a complementary analysis is to decompose the true return on ownership into dividends and price changes on the underlying stocks, that is, capital gains, and use that as the basis for the calculation of the incentives. The share of dividend yields of the return on the public stock exchanges for the period 1870–2012 is, on average, approximately 40% [63], and a recalculation of the METR using this number is shown in Figure 5.

The METR fluctuates around 20–50% until World War II (ignoring the spikes). After the war and until the tax reform in 1990–1991, the METR fluctuates around 50–85%. After the tax reform, the METR decreases to approximately 40–50%. Under these assumptions, the METR will be lower and not exceed 100% (ignoring the spikes during World War I), even if the negative cash flow from donating the bulk of the dividends for charitable purposes is included.

5 Concluding remarks

This study has described the evolution of tax rules and calculated the METR on capital income for industrial foundations. The METR includes the effects of corporate income taxation, capital income taxation, and wealth taxation and the interactions of these taxes with inflation. It is calculated for an investment financed with new share issues and retained earnings. The investigation covers the period from 1862 to 2018.

Industrial foundations have been used by a few influential ownership spheres to exercise far-reaching control over Swedish industry because they do not have to pay taxes on capital income, wealth or inheritance and gifts. On the other hand, this tax exemption requires that they donate the bulk of their net capital income (less capital gains) for charitable purposes, which entails a negative cash flow that reduces the ability to retain control over companies. The donation requirement, therefore, creates a disincentive to control firms through industrial foundations. The requirement could be circumvented by selling shares instead of receiving dividends. However, this comes at the cost of losing control and has, therefore, generally been avoided.

Earlier analyses on the taxation of industrial foundations were conducted for occasional years from the 1960s and onwards. They have also disregarded the donation requirement, which is misleading if one wants to understand the ownership and control of Swedish industry. Furthermore, they excluded the time period when the most influential foundations were founded. We, therefore, perform a complementary analysis and calculate annual time-series data covering a longer time period than that in previous research, and we include the donation requirement in the METR calculations.

Our analysis shows that the METR is generally below 20% and occasionally peaks at approximately 40%. When taking the donation requirement into account, the METR is seldom below 50% when financing investments with new share issues and often exceeds 100%. When including the donation requirement, new share issues is a much less favorable source of finance than retained earnings. The results can be used to analyze the ownership and control of the Swedish industry in greater detail.

Acknowledgement: Stenkula gratefully acknowledges financial support from the Jan Wallander and Tom Hedelius Foundation and the Marianne and Marcus Wallenberg Foundation.

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