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Abstract

The institutional literature suggests that long-term tax incentives are crucial for entrepreneurs, but studies on this topic are hampered by theoretical and empirical 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 firms. 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. Increased taxation of owner-entrepreneurs helps explain the absence of new large entrepreneurial firms in Sweden after World War II, while improved incentives can be associated with Sweden's recent entrepreneurial renaissance.

JEL codes : L25, L26, H21, H31, H32, N44

Keywords: high-impact entrepreneurship, institutional quality, marginal effective tax rates, tax regimes, tax reforms

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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 (Williamson, 2000) and entrepreneurs need time to adjust fully.

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 1862–2018, a period encompassing Sweden's industrialization, urbanization, and democratization, as well as the more recent turn from a managed to an entrepreneurial economy (Audretsch and Thurik, 2001). 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 for most of the period under study. More specifically, we analyze the evolution of capital income taxation of investments faced by owner-entrepreneurs, defined as active owners of closely held firms. 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 to that in the current paper. 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 and 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 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 were reduced to virtually zero, 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 20th 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 firms) 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

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.”

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., Musgrave, 1992; Mair & Laramie, 2001).

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 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 firms 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 (Foss and Klein, 2012), 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 tax 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). When 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.

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 Section

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' easier access to debt financing means 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 4 overall trends of the sample for the period 1850–2007.

Nor was Sweden a 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, Sweden went further than other OECD countries, not 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.

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 (Section 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.

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.

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

$$METR_t = \beta + \mu_t, \quad (1)$$

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 Equation (1) as

$$METR_t = \beta_i + \mu_t \quad (i = 1, \dots, m + 1), \quad (2)$$

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

$$H_0: \quad \beta_0 = \beta_i \quad \forall i, i[x, y] \in [1862, 2018], x < y \quad (3)$$

If H_0 holds, no partition (sequence of regressions) explains the METR significantly better over time than Equation (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 time 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 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 firms. 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 20th 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 was approximately 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

Wealth was not taxed in Sweden 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 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.

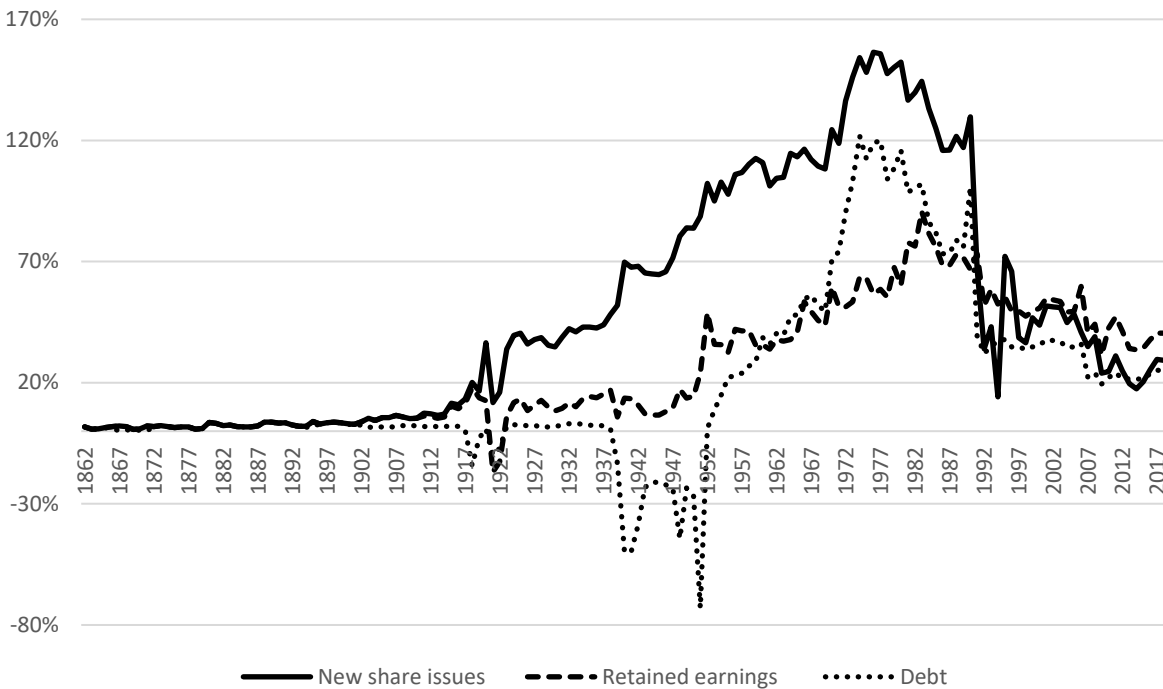
³ We use the average corporate tax rate when the system was progressive. Using the lowest or highest tax rates during this period does not change our general conclusions.

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 an METR above 100 percent from 1956 until the 1990–1991 tax reform.⁴ Debt finance was generally more favorable than 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.

Figure 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



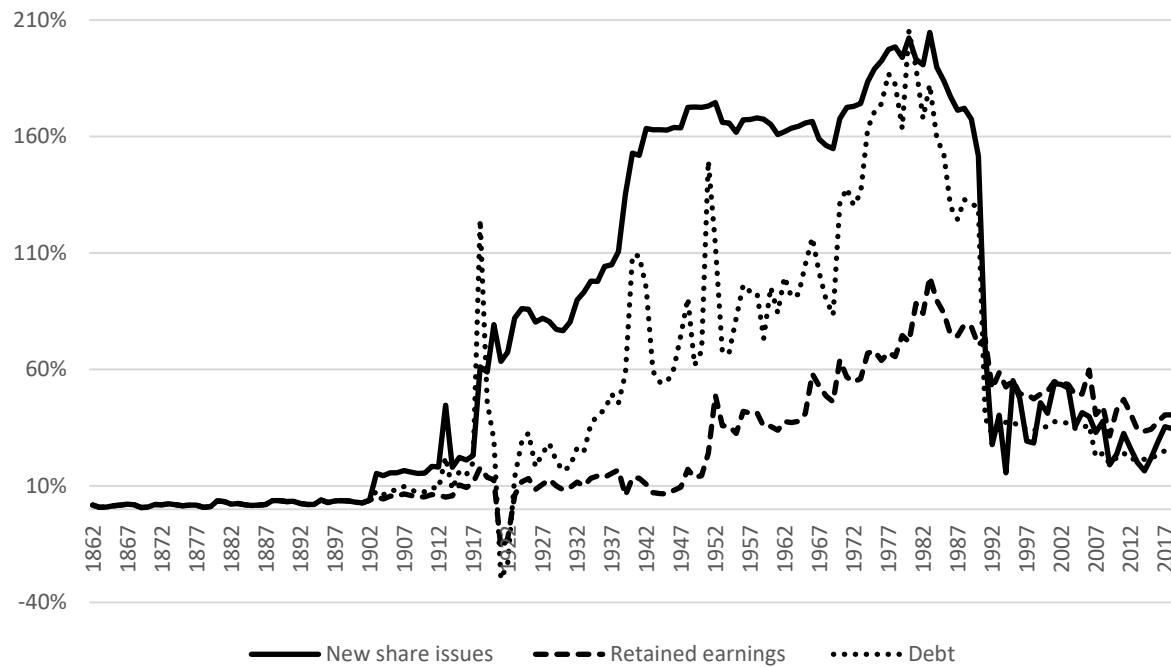
Note: An average-income entrepreneur is defined as an active owner of a closely held corporation paying the same marginal labor income tax rate as the average production worker.

Source: Johansson et al. (2015), Wykman (2022) and own calculation.

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 Figure 1 is echoed in Figure 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.

Figure 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.

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 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 Figures 1 and 2, i.e., three 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.

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

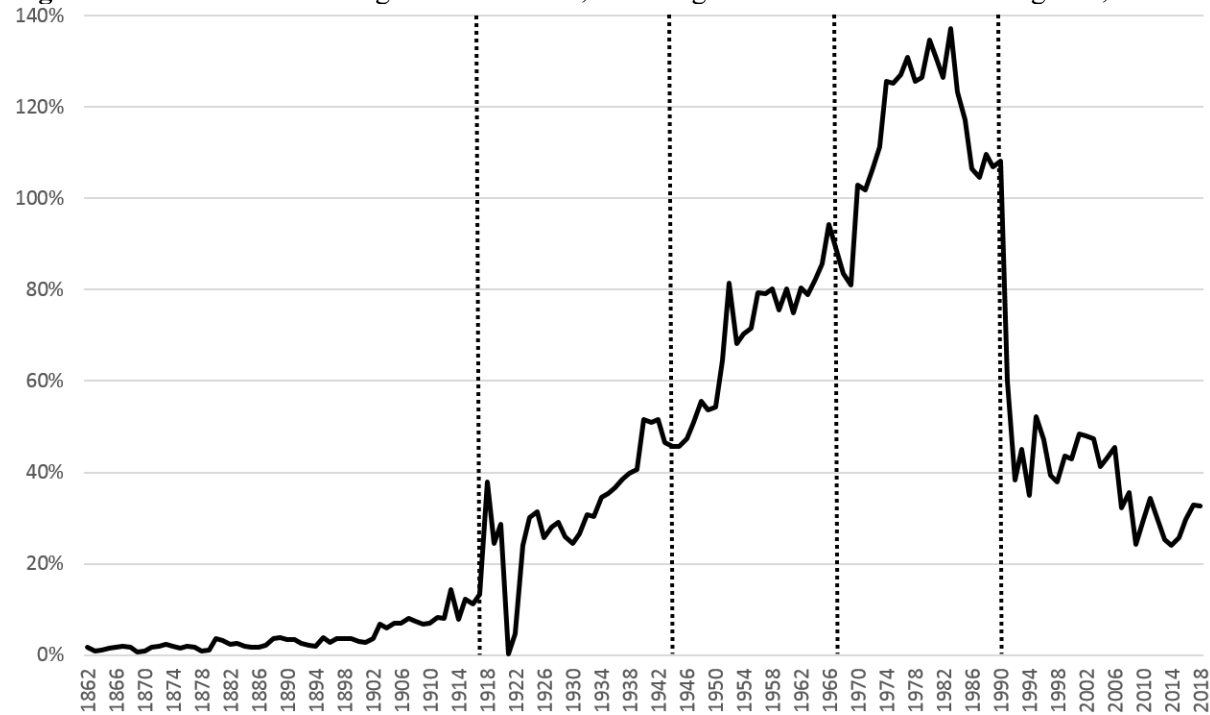
Note: For top-income entrepreneurs using new share issues, a fifth break at 1893 has equal explanatory power.

Source: Own calculation.

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

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

Figure 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.

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, 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 (Section 2.4) is *the magnitude of the METR*. Table 2 shows that the METR was low for top- and average-income entrepreneurs during regime I. It 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.

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 is an equally weighted average of the METR for new share issues, retained earnings, and debt for the top-income and average-income entrepreneur.

Source: Own calculations.

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 20th century.

The third characteristic is *the difference in METR magnitude depending on the source of finance*. As seen in Figure 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 Figure 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 supported large, capital-

intensive incumbent firms with readily available collateral over new, small firms with less capital.

5 Discussion: Tax regimes and high-impact entrepreneurship

Our results suggest that the 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. They are based on Bornefalk's (2017) systematic analysis of Sweden's 100 largest corporations in 2013 (an update of Axelsson, 2006). Bornefalk (2017) classifies 37 of the largest firms by turnover and 32 of the largest firms by employment as genuinely entrepreneurial, i.e., founded on individual entrepreneurs' intention to commercialize radically new innovations, with firm growth emanating from one core company centered on one innovation. 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 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 0 such firms, whereas regime V had already 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.

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 Figure 3.

Largest entrepreneurial firms(turnover) shows how many of the 37 largest entrepreneurial turnover firms in 2014 were founded during each tax regime. *Largest entrepreneurial firms(employment)* shows how many of the 32 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).

The third measure is based on Sandström's (2014) analysis of Sweden's 100 most prominent innovations. He classifies 59 of them, including obvious top innovations such as spherical ball bearings, the milk separator, and the tetrahedron, as originating from individual inventor entrepreneurs or within established entrepreneurial firms from four innovative sectors. As seen, most top innovations were generated during regime I, and 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, the period 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 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 same period in the United States (Heyman *et al.*, 2019). Likewise, following a relatively stable period during the 20th 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

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.

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, 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 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, likely serving as 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 so 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.

6.1 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 firms. Because we can follow the taxation of this group for more than 150 years and distinguish different income and financing categories, we add scope and

detail to a literature that has previously focused on only 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.

6.2 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, 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, that 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 our examined period. Taking such changes into account is an important issue for future research delving deeper into how the crucial 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 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.

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