

## ARTICLE

# How much capital should be taxed? A review of the quantitative and empirical literature

Luca Spataro<sup>1</sup>  | Tommaso Crescioli<sup>2</sup> 

<sup>1</sup>Department of Economia e Management, University of Pisa, Via C. Ridolfi 10, Pisa, Italy

<sup>2</sup>European Institute, London School of Economics, Houghton St, London, UK

## Correspondence

Luca Spataro, Department of Economia e Management, University of Pisa, Via C. Ridolfi 10, 56124 Pisa, Italy.

Email: [luca.spataro@unipi.it](mailto:luca.spataro@unipi.it)

## Abstract

This paper reviews the literature providing quantitative and empirical results on capital taxation. In doing this, we differentiate between individual and corporate taxes, respectively. From existing literature, it emerges that capital income taxes for individuals increase with the degree of heterogeneity within the population, market competition, and the economy's maturity, being negative (i.e., subsidy) in the presence of monopolistic competition or developing countries, no higher than 15% in Mirrleesian economies and as high as 45% when coupled with incomplete insurance markets and labor income taxes in competitive-closed economies. Excessively high wealth tax rates for redistributive purposes, however, are prevented by the larger tax elasticity of rich (−1.15) with respect to poor (−0.09) individuals. Negative tax elasticities concerning employment (from −0.5 to −0.2), innovation (from −2.8 to −1.3), and investments (−4.7) suggest low corporate taxes, whose magnitude should be negatively related to the degree of the economy's openness, given also the possibility for firms to relocate abroad. Finally, although still inconclusive, the main conclusions concerning dividend taxes

This is an open access article under the terms of the [Creative Commons Attribution](https://creativecommons.org/licenses/by/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2023 The Authors. *Journal of Economic Surveys* published by John Wiley & Sons Ltd.

suggest that tax rates increase with the firm's size and, thus, be set at low levels for start-ups.

**KEYWORDS**

business taxation, empirical and quantitative studies, individual capital taxation, tax elasticities

**JEL CLASSIFICATION**

H2, H3, H71, H87

## 1 | INTRODUCTION

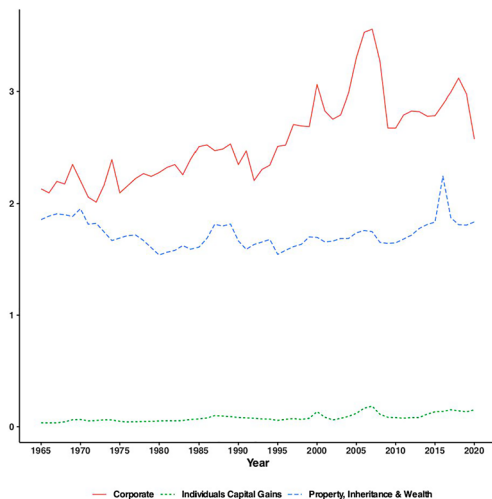
Rising inequalities have re-ignited the debate about capital and wealth taxation. A wealth tax on the super-rich was indeed one of the main proposals of Senators Warren and Sanders—two of the most prominent contenders—during the 2020 US Democratic primary. Moreover, the pandemic has further exacerbated this trend by amplifying the gap between the super-rich and the rest of the population (see Blanchet et al., 2022). Nonetheless, even conceded that a wealth tax is possibly the right policy to address rising inequalities, policymakers should agree on how much capital should be taxed. The tradeoff on this matter is well-known: on the one hand, a capital tax can generate a fairer distribution of wealth, but, on the other, too high tax rates can decrease incentives and production. Furthermore, as Okun's leaky bucket theory suggests, a part of the resources collected through taxation can be lost in the meanders of the bureaucratic apparatus without fulfilling its original purpose.

This paper provides a survey of the main literature concerning the quantitative and empirical results on capital taxes and tax elasticities. In this respect, it completes the excellent surveys on the subject carried out by Mankiw et al. (2009), Diamond and Saez (2011), and, more recently, by Bastani and Waldenström (2020) published in this journal. More precisely, we depart from these works in two main regards. First and foremost, while Bastani and Waldenström (2020) ask when and under which circumstances “is it optimal to tax capital?”—concluding that it can be optimal on both equity and efficiency grounds under several circumstances—we aim to answer a different, although related question: “how much capital should be taxed?”. Therefore, the present work focuses on quantitative and empirical results rather than theoretical contributions. Secondly, we differentiate from previous works by also focusing on taxes that affect or are concerned with business, such as corporate income and dividend taxes.

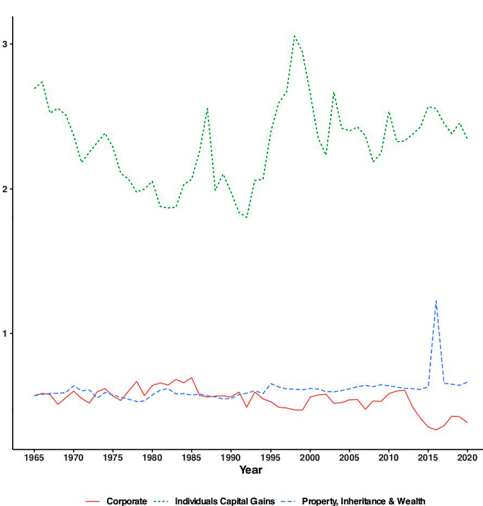
Before delving into the bulk of our investigation, we provide a brief overview of the empirical trends of the last decades concerning capital taxation in OECD economies. Figure 1 provides an insight into the time-path of revenues from capital taxes (average values and their variability) in the period 1965–2020, by dividing them into three main components: corporate taxes, capital gains, and general wealth taxes for individuals.

As we can see from panel (a) of Figure 1, while total revenues from capital taxes amount to less than 6% of GDP in OECD countries, revenues from corporate taxes represent the highest GDP share of capital taxes collected by these governments, followed by capital gains and wealth taxes. Interestingly, revenues from corporate taxes and individuals' wealth were similar in magnitude at the beginning of the period. These two headings, however, show diverging trends from the 1970s, in that, while the revenues from corporate taxation started climbing—especially from the 1990s—

(a) Average for OECD countries, for different components



(b) Coefficient of Variation of Capital Taxes as % of GDP



**FIGURE 1** Revenues from capital taxes as percentage of GDP in OECD countries, years 1965–2020. [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

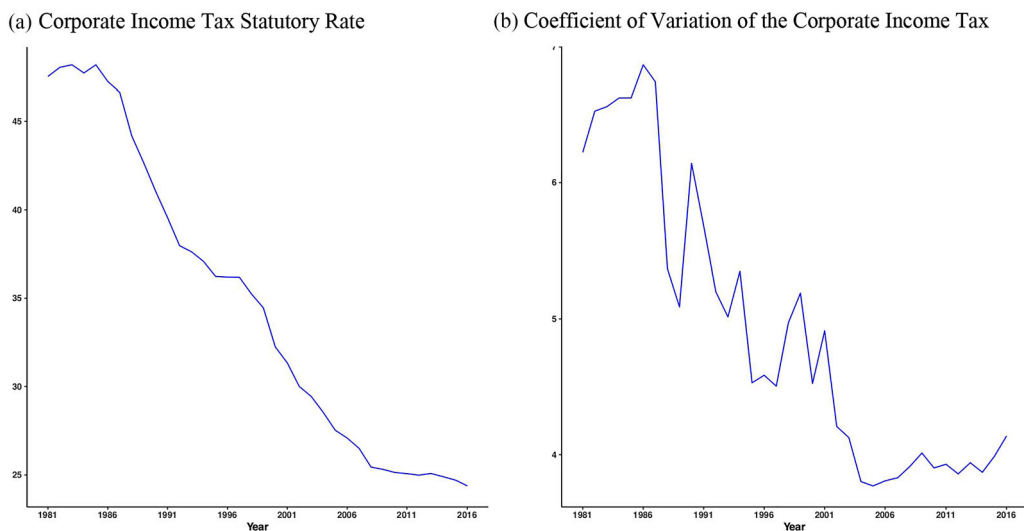
*Note:* Indicators are computed as a simple average across OECD countries. The coefficient of variation is the ratio between the standard deviation and the average.

*Source:* OECD Global Revenue Statistics Database (2018).

the resources collected from individuals' wealth declined with a slight reversal in the mid-2000s.<sup>1</sup> Instead, revenues from capital gains taxes have remained relatively flat throughout the period, and they are negligible both in absolute values and in comparison with the other two forms of taxation.

On average, we observe a tendency towards convergence across countries. As shown by panel 1(b), revenues from individuals' capital gains taxes display the highest variation measured by the coefficient of variation (COV). Yet, the COV of this heading shows a U-shaped trend: it declines until the 1990s and then rises again without coming back to the initial levels. The COV for individuals' wealth taxes, instead, shows a relatively flat behavior, while the revenues collected from corporations across OECD countries seem to converge over time. The latter finding seems in line with increased tax competition on productive activities which have become more mobile across the world due to globalization and digitalization of the economy.

The first interesting feature emerging from Figure 2 is that OECD countries have engaged in a "race to the bottom." On the one hand, the average corporate income tax rate almost halved throughout the period. On the other hand, countries started to set their rates more similarly. It is likely that this phenomenon has to do with the increasing economic interdependence across countries and the high capital mobility brought about by globalization. In fact, globalization has reduced the barriers among economies and increased their level of integration, while businesses are freer to relocate across countries in response to tax incentives. In this scenario, as explained by Keen and Konrad (2013), governments are more likely to have engaged in a "game" with each other to attract business and investments by setting lower tax rates. In turn, this race to the bottom has raised concern about the adequacy of revenues available to governments to finance welfare expenditures (Razin & Sadka, 2004; Wilson, 2014), with the consequence that such competition for attracting investments can result in increasing wealth and income disparities within countries (Piketty, 2014; Verbeek et al., 2015). However, these are only *prima facie* considerations, and in this



**FIGURE 2** Corporate income tax statutory rate in OECD countries, 1981–2016.

[Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

*Note:* Indicators are computed as simple average across OECD countries. The coefficient of variation is ratio between the standard deviation and the average.

*Source:* OECD Global Revenue Statistics Database (2018).

paper, we will present more robust evidence on the effects of corporate income taxes both at the micro and macro levels.

In investigating the range of tax rates proposed by the economic literature, for the sake of comparability of results, we will limit our analysis to the neoclassical literature, albeit exploring the role of different assumptions concerning, for example, the degree of market imperfection and of economy's openness, individuals' and policymakers' preferences, agents' heterogeneity, sources of economic growth and so on. Moreover, for the sake of exposition, we split the presentation of results into two main headings: individual and business taxation. When discussing individual taxation, we will predominantly discuss the results of quantitative studies. In fact, these studies have mainly a normative stance, in that their goal is typically estimating the optimal value of capital tax rates. To a lower extent, however, we will also discuss empirical papers which attempt to estimate the actual behavioral responses of individuals to tax policies and assess if and to what extent these responses conform with theoretical predictions. We will analyze three main models for individual taxation: infinitely living representative agent (ILRA) economies, overlapping generations (OLG) models, and dynamic Mirrleesian frameworks. In ILRA economies, as known, capital taxation creates increasing distortion in the long run, making zero tax on capital income optimal (Chamley, 1986; Judd, 1985). However, in OLG models, positive capital taxation turns out to be optimal since it can either optimally discriminate future consumption over the life-cycle or replicate a tax on leisure, which cannot be directly taxed (Erosa & Gervais, 2002). Finally, in dynamic Mirrleesian economies, individuals differ in their abilities, and optimal positive taxation is also observed, though with welfare gains that are not as large as in OLG models.

We complete the individual taxation section by addressing the results stemming from some extensions of canonical models. These include the study of wealth and inheritance and the political economy of capital income taxation.

The second part of our survey will focus on the results concerning business taxation. More precisely, while we will not address the question of why a corporate tax should exist<sup>2</sup>, we will discuss the effects of two main types of taxes, that is, corporate and dividend taxation. In contrast to the individual tax literature, the papers concerned with business taxation mostly adopt a positive approach, since they are usually aimed at assessing how much businesses respond to taxes along many dimensions. Concerning corporate taxes, the literature seems to converge on the conclusion that a high corporate income tax is detrimental to employment, innovation, and investment. Yet, it is important to emphasize that corporate tax cuts can also have side effects (e.g., increasing stock buybacks and inequality) that limit the positive effects on investments and entrepreneurship. On the other hand, the dividend taxation literature is characterized by a long-lasting and vivid debate between two schools of thought: the Traditional and New Views, respectively. According to the former, dividend taxation implies double corporate income taxation, which decreases investments in the corporate sector and, therefore, should be removed. In contrast, the New View claims that dividend taxes are irrelevant for the investments of mature firms which use retained earnings as the primary source of financing.

The work is organized as follows. Section 2 investigates the magnitude of optimal tax rates for individuals. Section 3 reviews the quantitative literature on the taxation of corporations. This section firstly examines the effect of corporate taxation on such relevant economic dimensions as employment, innovation, and investments. Then, it focuses on empirical studies investigating the impact of dividend taxes on corporate investments. Finally, section 4 concludes.

## 2 | INDIVIDUAL TAXATION

### 2.1 | Infinitely living representative agent economies

As a premise, it is worth recalling that the issue of whether or not exempt savings from taxation is one of the oldest debates in public finance literature. The famous British economist Arthur Pigou (1928) claimed that since savings have high elasticity, they should be exempted from a global income tax and subsidized since they are usually taxed twice: when they are formed and when they earn interests. Nonetheless, Pigou never provided rigorous proof of his claim<sup>3</sup>.

The theoretically grounded proof of such an argument was provided nearly six decades later at almost the same time by Judd (1985) and Chamley (1986). In a nutshell, the thrust of the Chamley-Judd zero tax result is to prevent the long-run distortion caused by capital taxation growing exponentially over time<sup>4</sup>, while, at the steady state, constant consumption elasticity would imply that consumption bears the same tax burden through time. This zero-capital tax theorem, while representing a robust cornerstone of modern optimal taxation theory, appears unsatisfactory under several respects (see Stiglitz, 2015), and consequently, several authors have tried to challenge it in subsequent studies. In this respect, Straub and Werning (2020) represents a groundbreaking study. Using the very same neoclassical framework of Judd (1985) and Chamley (1986), they show that the zero capital tax theorem holds under specific assumptions on the intertemporal elasticity of substitution and the utility function.

Besides theoretically assessing the robustness of the zero-tax result under different assumptions, later works have also investigated quantitatively the welfare effects of fiscal reforms crafted in the spirit of Judd (1985) and Chamley (1986) (the main results of these studies are summarized in Table 1).

TABLE 1 Summary of the main results on capital income taxes in ILRA models.

Tax rate (long run)	Literature	Main assumptions	Policy proposals and main findings
0%	Lucas (1990)	Perfect competition and certainty	Replacing capital with labor taxes increases welfare by 1% in terms of consumption
	Pecorino (1994)		Replacing capital with labor taxes can slow down growth. Instead, replacing capital with consumption taxes can increase growth by 1%
	Cooley and Hansen (1992)		Substituting capital with consumption tax along the transition path
	Laitner (1995)		Gradual removal of the capital tax
	Chari et al. (1994)	Perfect competition and uncertainty	Zero ex-ante long-run capital taxes. However, short-run capital taxes can become positive to absorb shocks
Different from zero	Aghion et al. (2013)	Monopolistic competition	The tax range varies depending on the planner's objective: $-100\%$ to $+27\%$ growth maximization; $-20.80\%$ to $+9.4\%$ welfare maximization. Tax capital (labor) less (more) when the labor elasticity is low (high)
Range: from $-100\%$ to $+70\%$	Itshoki and Moll (2019)	Developing country and credit constraints	For a developing economy, governments should subsidize capital (up to $100\%$ ) in the short run while suppressing wage growth. In the long run, capital taxes should be high (up to $70\%$ )

A first attempt can be found in Lucas' (1990) seminal *supply-side economics*, in which the author develops a Chamley-Judd economy where agents live forever and capital is supplied inelastically in the first period. However, unlike the standard Chamley-Judd framework, the economy production function employs human and physical capital. Lucas calibrates his model on the US economy and investigates the welfare gain associated with substituting the capital tax through an increase of the wage tax. The effect of this zero-capital tax reform is a 1% increase in yearly consumption per capita, which comes from removing distortions in the aggregate capital-labor ratio. Since this gain comes at almost negligible GDP growth costs, Lucas (1990, p. 314) enthusiastically claims the "largest genuinely free lunch" in quantitative welfare economics.

Lucas' (1990) groundbreaking contribution gave rise to a vivid research program on quantitative capital income taxation, which complemented his research in several respects. A characteristic of Lucas' (1990) social planner is, in fact, the lack of consumption taxes in its policy toolbox. Hence, Pecorino (1994) remedies this "fiscal incompleteness" by comparing the replacement of capital with consumption and labor taxes, respectively. The author adopts a general human capital production function where labor is a partially taxed input. Unlike Lucas (1990), increasing labor taxation affects human capital accumulation. Therefore, Pecorino (1994) finds that setting the capital tax to zero and replacing it with labor income taxes has a worse effect on output growth than what was initially discovered because labor taxes slower human capital accumulation. Nevertheless, these adverse economic effects are avoided when the planner substitutes capital for consumption taxes. In this case, Pecorino finds that the GDP per capita grows by 1% per year instead of declining. However, the author does not analyze the distributive effects of such tax reform, which can be relevant, given that the replacement of capital with consumption taxes, while increasing efficiency, may worsen economic disparities due to their regressive nature.

Chari et al. (1994) investigate how fiscal policies should adjust to shocks affecting the economy's growth rate. In line with Lucas (1990), the authors find that the welfare-maximizing policy (roughly) eliminates the ex-ante capital tax rate after the initial period. However, capital taxes have a crucial shock-absorber role in mitigating the impact of unforeseen contingencies on public finances. Therefore, although zero in the long run, the short-run capital tax can become positive in response to shocks (27.3% for a specific parametrization of the model). Hence, although initially set to zero, optimal capital taxes can eventually become positive ex-post.

The papers surveyed so far assumed perfect competition. Judd (1997 and 2002) investigate capital income taxation under monopolistic competition in the intermediate goods markets, which, as known, generates an under-supply of capital goods below the efficient level. For these reasons, Judd concludes that capital income should be subsidized with taxes on monopoly profits, consumption, and labor<sup>5</sup>. Following previous works, Aghion et al. (2013) consider imperfect competition and examine both the effects on growth and welfare of capital income taxation. They start by investigating the capital tax rate that maximizes growth instead of welfare in a Schumpeterian model of creative destruction. The authors find that the optimal capital tax ranges between -100% (a subsidy equal to the return on capital) and 27%. Aghion et al.'s crucial intuition is that the growth-maximizing tax positively relates to the labor income tax elasticity. Given that a low labor elasticity allows to tax wages more heavily, the government has room to subsidize capital accumulation. Conversely, when the labor elasticity is high, wage taxes are highly distortive and reduce innovation. Therefore, the social planner finds it optimal to alleviate labor income taxation through higher capital taxes.

These results are robust to switching the planner's objective from growth to welfare, as in the canonical framework. In the latter case, the welfare-maximizing tax ranges from -20.80% to 9.4% by holding fixed labor elasticity. Moreover, this optimal tax is positively related to the share of



public spending. With low public expenditure, capital subsidies financed by wage taxation are optimal because they remediate the undersupply of intermediate goods due to monopolistic competition. However, when public spending grows, the distortion caused by excessive labor income taxation offsets the gain obtained from subsidies, making it optimal to tax capital.

An essential aspect of the Chamley-Judd result is that the zero-capital tax result holds only at the steady state. Indeed, the picture changes significantly when considering transition dynamics. Chamley (1986) shows that the welfare-maximizing capital reaches 100% for some initial periods, and only after this initial “confiscatory” phase the optimal capital income tax rate monotonically decreases to zero in finite time. Cooley and Hansen (1992) expand the Chamley-Judd result by investigating the optimality of substituting capital income with consumption taxes on the path leading to the steady state. Under the assumption that alternative tax reforms must yield the same present value of government revenues; however, the welfare gains—measured in terms of GNP—are about 60% less than in the standard steady-state comparison (+2.8% vs. +6.7%). Lower welfare gains depend on the fact that this alternative policy reduces agents’ incentives to consume and pushes them to work harder. Ultimately, although such a reform results in a higher long-run steady-state capital stock, lower consumption decreases welfare along the equilibrium transition path. However, transition dynamics, however, can be less painful in that, as shown by Laitner (1995), when the government implements fiscal reforms gradually and not as a single abrupt change, welfare gains are magnified. Indeed, the author replicates the same Lucas’ (1990) welfare gains (in terms of consumption) but with only a 25% reduction of capital income taxation.

Finally, Itshkoki and Moll (2019) adapt Ramsey’s framework to study optimal fiscal policy in developing countries. The model is similar to Judd’s (1985), where agents are divided into a continuum of workers and capitalists. In this scenario, credit constraints prevent the optimal reallocation of capital toward more successful entrepreneurs. The striking feature of this model is that the planner finds it optimal to implement “unconventional” policies from a neoclassical perspective. During the initial developing stage, the planner suppresses wage growth and can subsidize credit up to 100%. This pro-entrepreneurial orientation is then reverted when the economy is mature. In the long run, the planner finds it optimal to revert the subsidy into a tax of about 70% and adopt more labor-oriented policies. As in Aghion et al. (2013), the results obtained are quite different from the standard zero capital income tax reform, although they stem from a different source, namely, credit constraints.

## 2.2 | Overlapping generation economies

One of the most critical assumptions of ILRA models is the presence of a unique, infinitely living household populating the economy. Following the studies of Diamond (1965, 1973), this assumption has been relaxed with the introduction of overlapping generations (OLG) models, which are populated by different generations of individuals who work when they are young and retire when old. The division of life in time periods and the assumption of a limited time horizon create a source of heterogeneity that differentiates OLG from ILRAs models and that, somewhat surprisingly, typically produce the violation of the zero-long run capital tax result. This outcome can be understood by reckoning that in OLG models—contrary to ILRA frameworks—optimal consumption (or, more precisely, the equilibrium elasticity of consumption) is not necessarily constant over life and even at the steady state, due to life-cycle behavior of individuals. If this is the case, then the policymaker can find it (second-best) optimal to discriminate future consumption by levying capital income taxes that typically vary through age (the range of these tax rates is reported in



Table 2). In the absence of age-dependent taxes, however, Erosa and Gervais (2002) show that a constant capital income tax is optimal too and provide the rationale for this result by resorting to Corlett and Hague's (1953) argument about leisure taxation<sup>6</sup>. Erosa and Gervais (2002) estimate the optimal capital income tax to be positive and as high as 18% in their benchmark case with Cobb-Douglas utility and absence of age-dependent taxes<sup>7</sup>. This result is also confirmed numerically by Bastani et al. (2013), who, hinging on the evidence that age-dependent taxes are hardly implementable in practice, estimate that removing capital income taxation results in a welfare loss of about 1.2%.

The difference between ILRA and OLG economies concerning capital income taxation is well illustrated by the quantitative investigation of Fuster et al. (2008). These authors calibrate an infinitely living household and a life-cycle model on the US economy. The most significant welfare gain in terms of consumption is obtained in the dynastic model by substituting the capital income tax with a 35% consumption tax. This reform will likely encounter a widespread consensus since it benefits 75% of the population. However, this is not the case in the OLG version of the economy, where only 9% of individuals turn out to benefit from such a reform.

Gervais (2012) further expanded the set of feasible policies replicating age-dependent taxes. He finds that the Erosa and Gervais (2002) result can also be obtained through a progressive labor income tax schedule with a relatively high 40% capital tax. This happens because progressive taxes increase with earnings, which, like consumption, usually grow with age. We recall that this model assumes perfect capital markets and no uncertainty, and thus, interestingly enough, progressivity and high capital taxes are driven by efficiency and not by redistributive and insurance motives.

De Bonis and Spataro (2010) explore the optimal taxation framework for both inheritance tax and capital income tax in an economy with OLG dynasties and disconnection between them due to migration. It is worth recalling that Weil (1989) showed that the presence of disconnection is the source of violation of Barro's (1974) theorem of public debt neutrality. In this scenario, the authors argue that a differential treatment of consumption in different life periods (i.e., nonzero capital income tax) and of own future and descendants' consumption (i.e., nonzero inheritance taxes) arises based on variations in the general equilibrium elasticity of consumption between life periods and generations, respectively. Moreover, the authors show that the weight attached to individual utility functions by the government in the social welfare function plays an independent role, and if these weights correspond to actual demographic weights, the disconnection brought in by migration is the underlying reason for a non-zero optimal capital income tax<sup>8</sup> which ranges between 10% for young individuals and 8% for oldest ones.

Besides exploring the case of age-dependent taxes, the quantitative literature has addressed taxation in imperfect capital markets. These financial imperfections prevent individuals from freely smoothing consumption between different periods. In this setting, future income is uncertain, whereby savings have the double function of consumption smoothing and insurance. İmrohoroğlu (1998) shows that removing capital income taxation decreases savings accumulation by young individuals because of the higher labor taxes set in replacement. Furthermore, if individuals are assumed to be risk-averse, removing capital taxes reduces welfare, given the precautionary function of savings. For this reason, the author shows that the welfare-maximizing capital tax rate can be as high as 45%, depending on the degree of risk aversion.

Subsequent papers have extended İmrohoroğlu's (1998) framework. Conesa et al. (2009) relax the inelastic labor supply assumption and allow for progressive taxes on labor income. Nevertheless, the optimal steady-state capital income tax is still relatively high, around 36%. Similar results are obtained by Nakajima (2008), who finds the optimal steady-state tax to be about 37%. This result, however, changes when capital is differentiated into houses and financial assets. When

TABLE 2 Summary of the main results on capital income taxes in OLG models with perfect competition.

Long run capital tax	Literature	Main assumptions	Policy proposals and main findings
0%	Bastani et al. (2013)	Certainty and age-dependent taxes are available	Zero capital tax when age-dependent labor taxes are available.
From 8% to 18%	De Bonis and Spataro (2010)	Certainty, age-dependent taxes available and disconnected dynasties due to migration inflows	Non-zero capital taxes (ranging from 8% to 10%) when age-dependent labor taxes are available, to correct for the difference between public and private marginal rate of substitution.
	Nakajima (2008)	Certainty and available differential treatment of real estate and financial wealth	13% capital tax when housing receives a preferential tax treatment.
	Erosa and Gervais (2002)	Certainty and age-dependent taxes are unavailable	18% capital tax to replicate a tax on leisure, thus remedying the incompleteness of the tax system
From 36% to 45%	Gervais (2012)	Certainty and unavailable age-dependent taxes	Progressive labor income tax schedule with a 40% capital income tax
	Nakajima (2008)	Certainty and unavailable differential taxes	43% capital tax when housing and financial assets are treated equally
	Conesa et al. (2009); Fehr and Kindermann (2015). Imrohroğlu (1998)	Uncertainty and incomplete markets	High long-run capital taxes which increase with risk aversion to keep labor taxes low. Short-run capital taxes vary significantly with the planner's objective: from 49% (when the goal is distributing to young individuals) to 0% (when the goal is efficiency)

housing receives a preferential tax treatment (as in the US), the optimal capital income tax is around 13%. By contrast, when financial assets and housing are treated the same, the optimal capital income tax is about 43%, as in İmrohoroğlu (1998). Overall, in Nakajima's (2008) model, taxing capital delivers substantial welfare gains of nearly 2% (as measured by consumption).

Similarly to the ILRA case, however, the shape of optimal policy in OLG models can vary substantially along the transition path. This is shown by Fehr and Kindermann (2015), who quantitatively explore optimal short-run capital taxes in a life-cycle economy with uncertainty. Their key result shows that short-run taxes vary accordingly to the planner's objective. Specifically, when the planner transfers resources to generations with a high marginal utility of consumption (usually younger individuals), the short-run capital tax is around 49%. However, the tax rate is nearly halved when only intragenerational distribution is allowed. Finally, the optimal short-run tax is zero when the planner cares only about efficiency. This happens because, in the short run, the savings distortion caused by capital taxation outweighs the higher welfare gains for young individuals resulting from lower labor taxes and the consequently higher capacity to self-insure. Concerning long-run capital taxation, Fehr and Kindermann (2015) calibrate their model following closely Conesa et al. (2009). The main difference, however, is that they do not restrict the possibility of flat taxes as Conesa et al. (2009) do. For this reason, these authors find a higher long-run capital tax amounting to 43%.

### 2.3 | Dynamic Mirrlees economies

Dynamic Mirrlees economies differ from standard Ramsey and OLG models because individuals are heterogeneous in their abilities. In this setting, the planner faces the well-known equity-efficiency tradeoff, which consists in transferring resources from high-skill to low-skill individuals without excessively distorting the labor supply of the former. However, the government faces considerable uncertainty when designing optimal policies because it cannot observe individual skills. Highly skilled agents, therefore, may be incentivized to mimic low-ability individuals to pay lower taxes. For this reason, any optimal policy forces individuals to reveal their actual ability, or in other words, it must be incentive compatible (see Mirrlees, 1971).

As known, a famous intuition to indirectly infer the agents' level of skills is using their consumption patterns. Mirrlees (1976, 1986) finds that goods preferred by high-ability individuals must be taxed more because these commodities reveal agents' true innate and otherwise unobservable ability. Golosov et al. (2013) build on Mirrlees (1976, 1986) and apply this reasoning to capital income taxation. In their model individuals have heterogeneous preferences which are perfectly correlated with their skills. The intuition is that since high-ability individuals have preferences for higher savings, savings can be treated as a commodity that high-income earners prefer. This feature, therefore, justifies a non-linear capital income tax schedule which discourages high-ability individuals from decreasing effort and earning less (i.e., mimicking lower-ability individuals) since this will create larger distortions on their consumption choices than those created by paying higher taxes. In the baseline specification, with an intertemporal elasticity of substitution equal to one, the optimal average capital income tax is 2%, with a marginal rate of 4.5% for high-income individuals. However, optimal capital taxes are inversely related to the intertemporal elasticity of substitution: for a low elasticity of substitution, average taxes rise to 15%, with a rate of 23.5% for top earners. This tendency is coherent with the result obtained by İmrohoroğlu (1998), although in an OLG model with incomplete capital markets, where capital taxes increase with the coefficient of relative risk aversion (i.e., the inverse of the intertemporal elasticity of substitution). However,

differently from İmrohoroğlu (1998), in Golosov et al. (2013) the welfare gains of capital income taxation are relatively small.

Besides revealing high-ability individuals, consumption can affect taxes through habit formation, that is, the case in which past consumption choices affect current utility and, thus, violate the standard assumption of time separability of preferences. Koehne and Kuhn (2015) show that habit formation justifies positive savings taxation because capital income taxes incentivize labor supply in the next period by decreasing current savings. At the same time, savings taxes make present consumption more convenient, thereby increasing the habit level in the next period and further stimulating future labor supply. As a result, the optimal saving tax is 7.1%, 3.7% less than in the case with time separable preferences.

In dynamic Mirrleesian economies, governments are not the only actors facing uncertainty. Individuals face random shocks to their future income level and, for this reason, insurance is a fundamental issue. Farhi and Werning (2012) explore optimal capital income taxation in the presence of credit-constrained individuals. Their policy experiment compares welfare in a steady state with and without capital taxes, respectively. They find that the gains associated with optimal positive taxation are small, in the range of 0%–0.25%. This result contrasts sharply with the significant welfare gains obtained in OLG models with borrowing constraints.

Insurance, however, is not limited to savings accumulation. In this respect, human capital can represent an additional source of insurance by providing individuals with the skills to succeed in their working life. Stantcheva (2017) investigates optimal fiscal policies when human capital accumulation is a risky investment and finds that when human capital also has redistributive and insurance functions, the optimal net interest tax starts at 10% and declines to zero in the long run. Similar dynamics are observed when human capital favors more high-ability individuals. However, the initial level of taxation is higher in this case.

Age-dependent taxes are also explored in dynamic Mirrleesian economies, although the results are more ambiguous than in OLGs. Golosov et al. (2011), using microdata on US taxpayers, find that the optimal saving wedge increases with income and age, up to 39%. By contrast, Farhi and Werning (2013) find that when the government can levy age-dependent taxes, the optimal capital income tax starts at 12% for young individuals and then approaches zero at the moment of retirement. In the case of age-dependent taxation, the welfare loss compared with the first-best allocation is very small, around 0.15%. However, the welfare loss doubles when taxes are age-independent, confirming the importance of conditioning taxes on age. When labor and capital taxes are age-independent, Farhi and Werning (2013) estimate an optimal capital tax of 1.36%. However, in contrast to Erosa and Gervais (2002), the welfare cost of imposing a zero-capital tax is negligible, amounting to 0.001% of lifetime consumption. This difference can also be explained by the fact that Erosa and Gervais' (2002) model is deterministic, while Farhi and Werning's (2013) one is stochastic.

Before concluding this section, whose main results are reported in Table 3, it is important to highlight some general differences behind the mechanisms driving the results in ILRA, OLG, and Dynamic Mirrleesian economies. In the first two types of models, the shape of the long-run capital tax is driven by the behavior of the general equilibrium elasticity of consumption. Since this elasticity is constant in the long run, the optimal tax should be zero in ILRA models. This result hinges on the equivalence between a capital tax and a tax on future consumption and the fact that goods with equal elasticities should be taxed the same. By contrast, in OLG models, the general equilibrium elasticity of consumption is not constant, even in equilibrium, thereby making it optimal to tax capital, conditioning the tax burden on age. On the other hand, in dynamic Mir-

TABLE 3 Summary of the main results on capital income taxes in dynamic Mirrleesian economies.

Long run capital tax	Literature	Main assumptions	Policy proposals and main findings
0%	Stantcheva (2017)	Life cycle model where human capital is a risky investment	When human capital is a risky investment, the optimal capital tax starts at 10% and then approaches zero in the long run
	Farhi and Werning (2013)	Life cycle model with age-dependent taxes where individual productivity evolves stochastically	The optimal tax schedule starts at 12% for young individuals and then approaches zero for retired people. A small tax (1.36%) is also obtained in the presence of age-independent taxes
From 2% to 15%	Golosov et al. (2013)	Goods can be taxed according to the individual's ability, and commodity taxes are a nonlinear function of income and consumption	2%–15% average capital taxes (4.5%–23.5% for top-earners) that increase with individuals' risk aversion
	Koehne and Kuhn (2015)	Habit formation in consumption preferences	7.1% capital tax in the presence of habit formation
Greater than 15%	Golosov et al. (2011)	Life cycle model with persistent shocks and non-separable preferences	Optimal savings wedge that increases up to 39% depending on age

relesian economies, the shape of the welfare function is one of the main drivers behind optimal tax policies. Typically, authors design social welfare functions assigning lower (marginal) weights on richer individuals, which implies higher taxes on the wealthy. Hence, we can conclude that the definitions of welfare criteria are not neutral in determining the shape of the optimal tax policy (Golosov & Tsyvinski, 2015).

## 2.4 | Quantitative and empirical studies on wealth taxes

In the previous sections, we reviewed works in which the planner predominantly sets optimal tax rates to pursue efficiency. Yet, equity is another critical determinant characterizing fiscal policy. In his well-known contribution, Piketty (2014) shows that wealth inequality has increased sharply in developed countries after the II World War. Rising wealth inequalities re-ignited the debate over wealth taxation as a tool to fight economic disparities. However, the usual equity-efficiency tradeoff affects wealth tax considerations, and thus the potential lower inequality coming from these taxes must be balanced with possible larger distortions. We will start focusing on quantitative studies aimed at finding the values of optimal taxes and then on empirical studies estimating the behavioral responses of individuals to actual policies.

### 2.4.1 | Quantitative studies

De Nardi and Fang Yang (2016) find evidence of the above-mentioned equity-efficiency tradeoff in an OLG model calibrated on US data. They analyze the effect of replacing the optimal policy with a tax schedule constituted by a 55% rate on wealth and a \$675,000 exemption threshold. Unsurprisingly, this new policy reduces aggregate output and capital. However, these losses are relatively small when compared to the substantial drop in wealth inequality. Therefore, it appears that in countries characterized by high levels of inequality, policymakers could forego efficiency gains in exchange for significant reductions in wealth concentration.

The equity-efficiency tradeoff constantly characterizes the taxation literature generally and capital taxation specifically. However, Guvenen et al. (2019) show that this tradeoff might disappear when individuals earn heterogenous returns on wealth. Because of heterogeneity, a tax on the stock (wealth) differs from a tax on the return (capital income). A capital income tax penalizes more productive entrepreneurs, whereas a wealth tax can stimulate efficient uses of “unproductive” capital. In this setting, these authors find that replacing capital income taxation with flat taxes on wealth (3.06%) and labor (14.1%) increases consumption while reducing inequality. Furthermore, this reform produces a welfare gain consisting of a 9.6% increase (in consumption terms) with respect to the benchmark model calibrated on the US economy.

### 2.4.2 | Empirical studies

In addition to studies investigating capital taxation using calibrated models, other strands of the literature estimate behavioral responses by designing quasi-experiments based on policy changes. As previously discussed, rising wealth inequalities re-invigorated the debate over wealth taxation as a tool to fight economic disparities. In this respect, Berg and Hebous (2021) show that wealth taxes might be an effective policy tool to reduce not only current but also inter-generational



inequality. These authors find that in Norway, without the wealth tax reforms of the late 1990s and early 2000s, the current Gini index would have been higher by 1%.

However, the potential lower inequality following a rise in the wealth tax must be evaluated against its possible detrimental effects on wealth accumulation via a reduction in savings. In this regard, the literature seems to agree that an increase in the wealth tax reduces reported taxable wealth (e.g., Jakobsen et al., 2020; Londoño-Vélez et al., 2021, 2022; Seim, 2017, Zoutman, 2018). Yet, lower reported wealth does not necessarily imply reduced savings in the presence of tax evasion and avoidance (Seim, 2017). Moreover, the difficulty in assessing the link between wealth taxes and savings is not only empirical but also theoretical since these policies generate income and substitution effects that go in opposite directions. A recent paper by Ring (2020) tries to circumvent the abovementioned challenges by employing an estimation technique which exploits the geographical discontinuity of the Norwegian wealth tax schedule. The author finds that for every Krone that becomes taxable, households' yearly savings increase by 0.038 Kroner. Ring justifies this result with income effects that dominate intertemporal substitution ones.

As previously indicated, the extent of tax evasion and avoidance is crucial to determine the effectiveness of wealth tax reforms. Seim (2017), using Swedish tax system data, records an elasticity of taxable wealth to the after-tax rate of return that ranges from 0.09 to 0.27. However, the author finds that a consistent part of the elasticity estimates reflects evasion and avoidance rather than changes in savings. Avoidance responses are quantitatively very large corresponding to a fiscal loss that amounts to 2.6 times the estimated wealth tax revenues.

Londoño-Vélez and Ávila-Mahecha (2021, 2022) extend this literature to developing countries by studying the Colombian tax system. Developing countries might benefit from higher wealth taxes given their high inequality but diffuse tax avoidance can severely impair these reforms. In this respect, Londoño-Vélez and Ávila-Mahecha (2021, 2022) find evidence in support of these concerns by showing that increases in wealth taxes favor tax avoidance and evasion, especially for very wealthy individuals. Yet, by exploiting the Panama Papers leaks the authors also find that the threat of detection significantly increases the likelihood of correct reporting. Therefore, these results seem to suggest that wealth tax policies in developing countries should be paired with reforms aimed at increasing the effectiveness of tax enforcement systems.

Tax avoidance and evasion can be favored by a system in which diverse income sources are taxed at different rates, as in the case of the Swedish tax system studied by Seim (2017). The reason is that this differential tax treatment gives opportunities for individuals to rebalance portfolios to minimize the tax burden. Indeed, Rydqvist et al. (2014) argue that capital tax incentives are the primary driver of a secular trend consisting of replacing direct stock ownership with undirect ownership through mutual funds. Nevertheless, the intensity of the rebalancing effect suggested by Seim (2017) can depend on the assets affected by taxation. For example, Pirttilä and Selin (2011), using the 1993 Finnish wealth tax reduction, do not find evidence of income shifting from labor to capital, a common critique made to these types of reforms.

In addition to shifting the composition of wealth, the change of the fiscal residence is another tool that households can use to minimize the fiscal burden. Agrawal et al. (2022) study the extent of mobility responses by exploiting the fact that Madrid was the only local authority that did not increase wealth taxes following the 2011 aforementioned Spanish reform. Employing a difference-in-differences approach, they find a wealth tax elasticity of  $-0.24$  and that Madrid's relative population rose by 9% following the reform. In a similar vein, Brühlhart et al. (2022) use tax reforms in Switzerland, and although their baseline elasticity estimates are significantly larger ( $-43$  over

a 6 year span, corresponding to approximately a  $-7.17$  yearly elasticity), a substantial part of this variation is due to mobility responses.

Behavioral responses to wealth tax can vary substantially between household income groups. Jakobsen et al. (2020), using the 1989 Danish wealth tax reform, estimate long-run elasticities of taxable wealth to the after-tax rate of return, obtaining a value equal to 0.77 for moderately wealthy and 1.15 for very rich individuals, respectively. The higher sensitivity of more affluent individuals to wealth taxation is also found by Goupille-Lebret and Infante (2018) in France. It is worth noting that an elasticity that increases with wealth seems at odds with the canonical argument for taxing the rich, grounded on their lower responsiveness to taxes. Therefore, the results obtained for Denmark and France are likely to cast doubts on the findings of Smith et al. (2020), who evaluate the effect of Sanders' and Warren's wealth tax proposal without including behavioral responses. In fact, using US administrative data, the authors find that a 1% wealth tax on the top 0.1% generates a mechanical tax revenue of \$112 billion. However, these revenues are likely to be significantly lower when individuals respond optimally to tax changes.

The empirical literature on wealth tax shows a very wide range of elasticity estimates. Among the other factors, this variability can be explained by heterogeneous responses across income groups and the reliance on case studies that focus on different tax systems. Furthermore, another potential explanation is the estimation technique adopted. Empirically, this literature can be broadly divided into studies using bunching techniques relying on discontinuities of national tax systems (e.g., Londoño-Vélez & Ávila-Mahecha, 2022; Seim, 2017) and those using difference-in-differences designs (e.g., Agrawal et al., 2022; Brülhart et al., 2022). The first group of studies usually tends to report smaller estimates predominantly due to tax evasion, while it remains still unclear what drives the larger estimates in the latter group (Durán-Cabré et al., 2019).

## 2.5 | Quantitative and empirical studies on inheritance taxation

One of the crucial results of this literature is that inequalities are rising because inherited wealth has been increasing rather than returns to skills. Therefore, since rising wealth disparities are not resulting from productivity differentials, Piketty (2014) advocates for an inheritance tax to promote a fairer distribution. However, inheritance taxation impacts the labor supply choices of individuals. On the one hand, there can be an income effect consisting of individuals working harder to leave larger bequests. On the other, there can also be a substitution effect since the estate tax increases the cost of inheritance compared to leisure, thereby decreasing the labor supply. Consistently with the theoretical indeterminacy, the empirical literature has found no definite evidence of the sign of the inheritance tax effect on the labor supply. Aside from potential detrimental effects on the labor supply, one of the main practical obstacles to the ability of inheritance taxes to curb inequalities is tax avoidance and evasion. For this reason, the empirical literature on inheritance taxes has mostly focused on the estimation of behavioral responses following inheritance tax reforms. As we have done for wealth taxes, we will first analyze quantitative studies on inheritance and then empirical ones.

### 2.5.1 | Quantitative studies

Piketty and Saez (2013) show how agents adjust to inheritance taxation in a model where wealth directly enters the utility function. Using France and US consumer data, they find that the optimal (nonlinear) inheritance tax schedule comprises a \$1 million exemption threshold and a 60% tax rate until the 90th centile of the bequest distribution. This result implies that US tax rates should be relatively higher than France because of the more skewed wealth distribution of the former. Similarly, Saez and Stantcheva (2018), using a utility function linear in consumption, find comparable wealth tax schedules ranging from 45% to almost 80%.

Interestingly, both Piketty and Saez (2013) and Saez and Stantcheva (2018) find a regressive schedule at the top of the wealth distribution. These findings align with the well-known Mirrlees' (1971) zero marginal tax at the top of the skill distribution. This result claims a zero marginal rate for the highest ability individual, given that, while revenues collected through a positive marginal tax rate are the same as in the case of a zero top marginal tax, they come without additional efficiency costs in the latter case. Although this result applies to labor income, Ordober and Phelps (1979) have shown that it also holds in the case of capital, thereby providing a rationale for the regressive tax schedule found by Piketty and Saez (2013) and Saez and Stantcheva (2018).

### 2.5.2 | Empirical studies

As already mentioned, tax avoidance and evasion complicate the implementation of inheritance taxes. Escobar (2017) exploits the 2004 repeal of the spousal bequest taxes in Sweden. The Swedish reform reduced the incentives for under-reporting and tax evasion, which were particularly prevalent among very wealthy individuals. Yet, Mas Montserrat (2019) and Glogowsky (2021), in their study of Spanish and German reforms, find that evasion seems less relevant when compared with tax avoidance. Tax avoidance is often pursued through tax planning, which consists of the use of legal services to minimize the tax burden. Kopzuck (2007) uses US administrative data and exploits heterogeneity in the causes of death to show that households individuals in tax planning report significantly smaller estates (10%–20% less). Ericson and Escobar (2020) extend Kopzuck's work to Sweden by using a comparable set of households. However, they do not find evidence of significant tax planning, which they explain on the ground of the fewer interactions that Swedish taxpayers have with their legal advisers concerning tax issues, compared to Americans. Escobar et al. (2023) study inter-vivos gifts made by parents to children, a potential tax planning strategy, in the context of the Swedish tax system. The authors find that gifts were a widespread means to reduce the tax burden to zero, even though this implied losing control over own wealth. In this respect, they conclude that parents consider their own and their children's wealth as perfect or close substitutes. Also Glogowsky (2021) studies the incidence of tax planning and inter-vivos gifts in Germany. However, the author, while providing evidence of similar behavioral responses, finds that the size of these effects is quantitatively small, meaning that households rarely adapt their transfers to the tax schedule in this country.

Overall, what emerges from both quantitative and empirical studies is that the increase in the equity of opportunity that an inheritance tax can generate can be severely impaired by tax avoidance.

## 2.6 | Political economy of capital taxation

In advanced democracies, tax reforms require parliamentary approval and a significant widespread consensus. Indeed, political candidates often run on platforms through which they propose specific tax reforms. Therefore, political-economic models have abandoned the highly normative approach of the welfare-maximizing planner, which we have reviewed thus far, in favor of a more positive methodology where politicians set taxes. Politicians, in fact, might not be driven only by welfare consideration, but typically, they also choose tax policies designed in such a way to increase their re-election chances.

Garcia-Milà et al. (2010) evaluate the political support for a reform abolishing capital income tax in a model of heterogeneous agents calibrated on the US economy. Although efficient, this reform produces unequal welfare gains. Indeed, only rich agents benefit unambiguously from it, while 40%–60% of the population loses substantially. Therefore, it appears difficult that re-election-seeking politicians will remove the capital income tax. However, this conclusion rests on the assumption of one-person-one-vote. Several studies (see Gulzar et al., 2022 for a review) show that wealthy individuals have a strong influence on post-electoral outcomes via campaign contributions. Arguably, rich individuals will benefit from lower taxes, and thus politicians may still support tax cuts in the expectation of increasing campaign donations. Nevertheless, the support of the rich must not be taken for granted in a Chamley-Judd economy in that, as pointed out by Coleman II (2000), optimal Chamley-Judd reforms will likely encounter solid political opposition from capital owners, due to the 100% capital income levy required in the first period.

Besides simulated models, other studies investigate the preferences for capital taxation by conducting surveys. For example, Alesina et al. (2018) conducted a randomized experiment using survey data from five different countries, France, Italy, Sweden, the UK, and the US. Their study reveals relatively heterogeneous preferences across countries. Surprisingly, in the US the proportion of people who believe that lowering taxes on the wealthy and corporations is more effective than government welfare programs is lower than in historically *etatist* countries such as France and Italy. Perhaps less surprisingly, the authors find that support for the wealth tax is higher among left-wing voters than in the right-wing electorate.

Tax preferences, however, can heavily depend on the type of wealth involved. Fisman et al. (2020) find that Americans prefer lower taxes when wealth is accumulated through labor income. In this case, the authors find preferences for an (implied) wealth tax of 0.8%. However, preferred taxes can reach 3% when wealth is predominantly inherited. The rationale is that individuals perceive unfair inequalities resulting from bequests, while they tolerate disparities arising from individual effort and ability. Similar support for estate taxation is also found in Sweden by Bastani and Waldenström (2021).

The results discussed in this section, as well as those of the quantitative and empirical studies on wealth and inheritance taxes, are summarized in Table 4.

## 3 | BUSINESS TAXATION

The models discussed so far adopt a general equilibrium approach, in which consumers maximize their utility and firms their profits. In this framework, capital links individuals to firms, given that the capital employed by firms in the production process is provided by individual savings via financial markets. However, generally in these models individuals' income, rather than firms'

TABLE 4 Summary of the main results on capital taxes from other studies.

<b>Tax rate/elasticity</b>	<b>Topic</b>	<b>Literature</b>	<b>Policy proposals and main findings</b>
Tax rate: 3%–55% (with exemption threshold)	Wealth	Guvenen et al. (2019)	Replacement of the capital tax with a flat tax on wealth (3.06%) and labor (14.1%)
Tax rate: 45%–80% (with exemption threshold)	Inheritance	De Nardi and Fang Yang (2016) Piketty and Saez (2013), Saez and Stantcheva (2018)	A wealth tax of 55% with a \$675,000 exemption threshold Regressive schedule at the top of the income distribution with an exemption threshold of \$675,000–\$1,000,000
Tax rate: Positive	Political Economy	Piketty and Saez (2013), Saez and Stantcheva (2018)	Although the optimal tax is positive, such a policy can encounter low domestic support
Wealth Elasticities: From –7.17 to –0.09	Empirical Wealth Tax studies	Jakobsen et al. (2020), Goupille-Lebret and Infante (2018), Seim (2017), Rydqvist et al. (2014), Brülhart et al. (2022)	The wealth tax elasticity of high-earners might be larger than what is commonly thought. Tax avoidance can severely impact the effectiveness of tax reforms

income, is taxed, while, as shown in the introduction, corporate taxation generates the largest revenues among capital taxes. In fact, it is well known that tax shifting does not depend on who is the legal taxpayer; rather, it depends on demand-supply price elasticities and the market structure.

Hence, this section investigates the contributions dealing with the consequences of business taxation, and the most significant results are reported in Table 5. In so doing, we focus on the two most relevant taxes affecting corporations: corporate income and dividend taxes. The former is levied on the income generated by the firm, whereas the latter hits such income when it is redistributed among shareholders.

### 3.1 | Corporate income tax

In this section, we will review the studies on corporate income taxation. We will firstly investigate efficiency considerations such as the effect of this tax on employment, innovation, and investments. Then we will consider the challenges posed by international tax competition, predominantly focusing on its impact on inequalities.

#### 3.1.1 | Effects on working conditions: Employment and wages

Does the corporate income tax affect employment and wages? This is perhaps the most asked question in the corporate income taxation literature. The theory indicates that increasing taxes affect the cost of capital and, in turn, firms' marginal incentives to hire (Fullerton, 1984). Similarly, high corporate taxes can decrease employment and wages by inducing firms to relocate (Auerbach, 2006). Other authors, however, argue that the effect of corporate taxes on working conditions is limited (Serrato & Zidar, 2016). This happens when firms can organize production towards more tax-efficient activities, taking advantage of the fiscal system. At the same, relocation possibilities can be constrained by the need for workers with specific skills. Finally, government taxes can be less detrimental when used to finance public goods that benefit production. Overall, it appears that the effect of corporate income taxation on employment and wages remains an open question from a theoretical perspective. Several studies have therefore tried to answer this question empirically. The dimension of analysis varies in granularity: micro-level (i.e., firms), meso-level (counties), and macro-level (states). Overall, we can say that empirical studies seem to agree (with some exceptions) on the negative effects of corporate taxes on employment and wages.

Shuai and Chmura (2013) assess the employment impact of corporate income taxes using data on US states. These authors find that corporate income tax cuts produce a U-shaped effect on employment growth. In the first 5 years, states that decreased the corporate income tax show employment growth of  $-0.10\%$ , more than two percentage points lower than states with no changes. Nevertheless, as more states implement tax cuts, the gap between tax-cutting and states with no change decreases. This gap is reversed in the following 5-year period, where employment grows  $0.33\%$  faster. States that cut taxes, however, seem to suffer more during recessions. Indeed, during the Great Recession, the employment losses were  $67\%$  larger than states which did not change the corporate tax. A possible explanation is that tax cuts result in lower resources to mitigate the recession's impact. Nevertheless, these states grew faster in the years of recovery following the financial crisis. Thus, these results seem to indicate that employment grows more during regular times in tax-cutting states, at the cost of being less insured from employment losses during recessions.



TABLE 5 Summary of the main results on corporate income and dividend taxes.

Tax	Literature	Effect	Policy proposals
Corporate income tax	Shuai and Chmura (2013), Ljungqvist and Smolyansky (2014), Giroud and Rauh (2019), Serrato and Zidar (2016) and Fuest et al. (2018)	Employment: elasticity from $-0.5$ to $-0.2$ Workers appear to bear a significant share of the tax burden, 35%–50%, in terms of lower wages	Decreasing corporate taxes can stimulate employment, wages, innovations, and investments. Yet, the effect of tax cuts on investment can be mitigated by financialization and stock buybacks. Tax systems with low and progressive corporate taxes benefit entrepreneurship. However, low taxes could increase inequality and reduce entrepreneurial activity in the long run
	Akcigit et al. (2022a)	Innovations: elasticity from $-2.8$ to $-1.3$	
	Ohrn (2018)	Investments: elasticity $-4.7$	
	Block (2021), Djankov et al. (2010), Da Rin et al. (2011), Venâncio et al. (2020), Bacher and Brühlhart (2013), Frid et al. (2016)	Entrepreneurship: low taxes and progressive tax systems benefit entrepreneurship	
Dividend tax	Campbell et al. (2013), Yagan (2015), Anagnostopoulos et al. (2012), Becker et al. (2013), Alstadseter et al. (2017)	Investments: negligible effect for mature firms, significant effects for immature firms	Decreasing dividend taxes benefits immature firms predominantly, with more limited effects for mature corporations
	Chetty and Saez (2005)	Payouts: negative effects	
	Auerbach and Hassett (2005)	Returns: negative effects	

Ljungqvist and Smolyansky (2014) study the effects of the corporate income tax on employment and wages at a more disaggregated level. These authors implement a DID quasi-experimental design where US counties are the units of analysis. The main result is that a 1% increase in the corporate tax decreases county employment and wage income by 0.2% and 0.3%, respectively. However, the effect of tax changes is highly asymmetric. While tax increases produce a sizeable decrease in employment and labor income, tax cuts have no significant positive effects. The exception is made in the case of recessions. Specifically, during crises, tax cuts are an effective tool to increase employment and wage income. This countercyclical effect of tax cuts aligns with the results of Shuai and Chmura (2013), suggesting that the timing of tax reforms is essential for their effectiveness.

Giroud and Rauh (2019) find adverse employment effects at the firm level. These authors decompose the tax impact along the extensive margins (number of establishments) and the intensive margin (number of employees per establishment). The results are quantitatively similar on both margins: a 1% increase in the state corporate tax decreases establishments and employees by around 0.4%–0.5%. Furthermore, firm-level employment in a state responds symmetrically also to tax reforms implemented by other states, meaning that if a state increases (decreases) the corporate tax, employment should increase (decrease) in other states. The magnitude of these changes, however, is nearly half of own-state tax changes. This result suggests that the effect of state-level reforms on employment is likely to be moderate at the national level. Precisely, business mobility across states implies that state-level fiscal reforms generate a quasi-zero-sum game at the national level.

Overall, the adverse effects of corporate taxation on employment reviewed so far seem to suggest that workers bear a large portion of the tax burden. This, indeed, is the conclusion of the “conventional wisdom” on tax incidence (see Kotlikoff & Summers, 1987), according to which tax increases are entirely born by workers, in terms of lower wages, in open economies because firms can freely relocate where tax rates are lower.

However, the capacity of firms to relocate freely may be limited in a model where production depends on worker-specific skills. In this respect, Serrato and Zidar (2016) develop a spatial equilibrium model where workers’ and firms’ capacity to relocate is imperfect. The model’s predictions are then tested empirically using US county-level data. The main result is that workers do not bear the entire burden of tax increases, contrary to what was previously thought. By contrast, 40% of this burden falls on firm owners, 25%–30% on landowners, and 30%–35% on workers. More precisely, the impact on wages depends on the extent to which firms adjust their location decisions in response to taxes and labor supply and demand elasticities. The rationale behind the tax burden split found by Serrato and Zidar (2016) is that spatial differentials in productivity limit firms’ capacity to relocate. Hence, their conclusions are somehow in contrast with the widespread view of the adverse effects of corporate taxes since business mobility may be a less valid justification to oppose tax increases when firms employ highly skilled workers. Put it differently, worker-specific skills increase the bargaining power of employees vis-à-vis a corporation, thereby preventing firms from transferring the burden of tax increases on workers.

Fuest et al. (2018), using longitudinal establishments data on German firms, confirm Serrato and Zidar’s (2016) results by showing that workers do not bear the entirety of corporate tax increases via lower wages. Yet, they find a higher tax burden on workers, of approximately 50%, and that this burden falls predominantly on low-skilled, young, and female employees.

### 3.1.2 | Effects on innovation, investments, and entrepreneurship

Besides employment, corporate taxes can affect the economy's innovation rate. Theoretically, if taxes reduce the net return on inventions, increasing taxes reduces innovation. This theoretical mechanism has been confirmed empirically by Lichter et al. (2022) who estimate, using German business-level data, a tax elasticity of patents of  $-0.65$ . Furthermore, this detrimental effect of taxes on innovation appears to be greater for credit-constrained firms. Given the importance of innovations and the potentially adverse effects of taxes, governments have tried to boost innovations with a mix of low taxes and R&D subsidies. In this regard, Akcigit et al. (2022b) study both theoretically and empirically the optimal combination of corporate taxes and R&D policies. In their results, they discourage governments from incentivizing R&D investments of low-productivity firms. The reason is that such a policy can induce high-productivity firms to pretend to have low productivity. For this reason, subsidies should target highly productive firms.

Many papers studying the link between taxation and innovation more or less implicitly assume that profit motives are a key driver behind new discoveries. Yet, several inventions have not been driven by financial motivations. The ambiguity generated by the different drivers of innovation motivates the analysis of Akcigit et al. (2022a). These authors focus on the effect of corporate taxes on innovation at the macro (states) and micro (individual inventors) levels. They also distinguish between the quantity and quality of innovations, which are measured by the number of patents and citations, respectively. Their main result is that taxation affects quantity and location but not the quality of innovations. At the state level, the elasticity of patents and investor location to corporate taxes ranges from  $-2.8$  to  $-1.3$ , while quality is unaffected. These elasticities are larger for firms than for individuals. Lower elasticities suggest that financial motivations are less prevalent for individuals, whereby taxes affect less innovation. Similar results are also found at the firm level. However, lower innovations by firms are mainly due to mobility responses. Therefore, although significant at the state level, this result is likely to be zero-sum at the country level. In a similar vein, also Moretti and Wilson (2017) find that these mobility effects are not limited to firms. They show that prominent scientists in the US respond to both corporate and personal income tax changes by changing their residence to states with lower taxes.

Ohrn (2018) studies the effects of tax cuts on investments. The natural experiment exploited by Ohrn (2018) is the 2005 Domestic Production Activities Deduction (DPAD) in the US, allowing businesses to deduct 3% of their manufacturing income (6% in 2007 and 9% in 2010). The main result is that a 1% reduction in the effective corporate tax rate caused by the DPAD increases investment by 4.7%.

Corporate taxes, however, are not the only fiscal tools that government can use to stimulate investments. Another popular policy is depreciation bonuses, which shorten the time required for firms to deduct investment expenses from taxable income. Zwick and Mahon (2017) study the bonus depreciation introduced in the US in two different periods: 2001–2004 and 2008–2010. They find that this policy increased investments in eligible capital by 10.4% and 16.9% in 2001–2004 and 2008–2010, respectively. At the same time, the bonus depreciation impacted the composition of firms' investments by channeling financial resources into the capital affected by the reform. However, this effect is highly dependent on firm size. Specifically, small firms tend to respond 95% more than big firms to bonus depreciation. The intuition is that small firms face more financial frictions than big firms, thus being more responsive to depreciation bonuses. Indeed, because of the inclusion of small firms in the sample, these authors find larger coefficients than previous studies focusing only on the largest corporations (see also Hassett & Hubbard, 2002).

Maffini et al. (2019) go beyond the US and study the UK 2004 bonus depreciation effects. The reform increased the number of firms that could qualify for accelerated depreciation schedules. As in Zwick and Mahon (2017), the reform increased investments in the newly qualifiable firms. However, the increase in investments found for British firms is significantly lower, ranging from 2.1% to 2.5%.

The positive effects of corporate tax cuts and depreciation bonuses on investments generate questions about the most effective policy among the two. Ohrn (2018) finds that a dollar spent by the government has the same marginal effect on investments for both policies in the US. When neglecting the tax base of these reforms, a 1% reduction on the corporate tax increases investments by 64% more than accelerated depreciation policies. However, corporate income is nearly 60% larger than investment expenditure. This implies that the revenues lost by the government to achieve a 1% reduction in investment costs are 60% larger in the case of corporate tax cuts. Thus, according to Ohrn (2018), because of these “quantity” effects, governments are almost indifferent between tax cuts and depreciation bonuses to increase investments.

The effect of corporate taxes on investment, is likely to be mediated by a worldwide phenomenon affecting firms’ capital allocation decisions: financialization. Although financialization has many meanings, it can generally be intended as the growth of financial profits accrued to non-financial corporations and the payments made by these firms to financial firms (Davis, 2017). The literature on financialization is concerned with the crowding out effect of financial investments on real ones. This crowding out takes the form of an “investment-profit puzzle”: declining capital stock paired with increasing financial assets. A high corporate tax might therefore diminish the return of real investments compared to financial ones, favoring this crowding out effect. The study of Zhu et al. (2023) motivates these concerns by showing that increasing financialization (investments in financial assets) is a deliberate strategy of managers to minimize the corporate tax burden.

In addition to financialization, stock buybacks are another mechanism that can potentially reduce the effect of corporate tax cuts on investments. Some authors argue that corporations spend the gains of lower taxes on buying back shares rather than investing (Gutiérrez & Philippon, 2018; Tung & Milani, 2018). Even though the literature has produced mixed evidence on the effect of buybacks on investment (Turco, 2018), this potentially adverse effect is something a policymaker should consider when using tax cuts to stimulate the economy. Indeed, Chang et al. (2023) show, using a general equilibrium model, that buybacks can severely contract the expansionary effect of tax cuts.

We conclude this section by turning on the effect of corporate taxes on entrepreneurship. High corporate taxes can limit the launch of new businesses by reducing the gains from entrepreneurial activity (Block, 2021) and these negative effects seem to be supported by the empirical literature. Djankov et al. (2010) and Da Rin et al. (2011) find a negative relationship between high corporate tax rates and business entry using multi-country datasets. Venâncio et al. (2020) add causal support to these results using quasi-experimental methodologies that exploit local variation in tax rates in Portugal. However, it is not enough to advocate for a general corporate tax cut to favor entrepreneurial activity. Indeed, Bacher and Brühlhart (2013) show that a progressive corporate tax system increases entrepreneurial activity. Cullen and Gordon (2007) rationalize this result by arguing that progressive tax systems act as a “safety net” encouraging entry from more risk-averse entrepreneurs or poorer entrepreneurs who are more likely to be credit-constrained (Carter, 2011) and to quit entrepreneurial activities in early stages (Frid et al., 2016). Overall, as pointed out by Bruce et al. (2020), we can say that empirical works on the role of taxes on entrepreneurship have been somehow inconclusive deserve further analysis in future work.

### 3.1.3 | Globalization, international tax coordination, and inequalities

The studies analyzed so far predominantly look at the domestic dimension of capital taxation. However, international dynamics as well heavily influence the level of feasible domestic tax rates. As mentioned in the introduction, Keen and Konrad (2013) show that international tax competition triggers a “race to the bottom,” which seriously limits national autonomy over capital tax policies.

This deep cross-country interdependence between domestic choices over tax schedules is well explained by Mendoza and Tesar (1998). The authors model an open economy composed of two countries, the US and Europe. They then investigate the welfare gains resulting from the US replacing the capital income tax with a consumption one. This reform produces an increase in total welfare of 2.9% for the US economy, 34% larger than in a closed economy. The reason is that the policy induces a transfer of capital from Europe to the US. This flow of capital, however, causes a welfare loss in Europe, which is likely to respond by adjusting tax schedules. These results led Mendoza and Tesar (1998: 227) to conclude that removing capital taxes in the global economy is not “a genuine free lunch,” as Lucas (1990) famously suggested.

Relying on corporate tax cuts could be, among others, a possible pro-growth strategy that relies on attracting investments from other countries (Azemar et al., 2020). Firms facing high corporate taxes can decide to relocate to benefit from lower taxation, thereby decreasing employment and investments in the country of origin (Auerbach, 2006; Hines, 2020). This is particularly true in the case of tax havens: countries that set very favorable regimes on foreign firms allowing them to reduce their domestic tax burdens without often involving any actual relocation (Slemrod & Wilson, 2009). Bucovetsky (2014) studies the decisions of countries to become tax havens, and the amount of income multinationals transfer to these countries. Intuitively, the author finds that tax rates in non-tax haven countries influence the number of tax havens; yet, this is not the primary factor determining the amount of income to transfer in these nations. What is key in this respect is instead the credibility of tax haven nations.

Corporate taxes are definitely an important factor influencing the firms’ location choices, yet, many more factors concur with these choices. Haufler and Wooton (2010) show that larger countries can afford to set higher taxes because firms are attracted by the size of their domestic market. In addition to size, Darby et al. (2014) show that the centrality within a trade hub is another factor that increases the possibility of countries setting larger taxes. Nevertheless, not all firms have the same relocation possibilities. Indeed, certain industries are inherently less mobile than others, such as, for instance, the energy generation sector. In this respect, Langenmayr and Simmler (2021) show both theoretically and empirically that local authorities increase profit tax rates when an immobile firm enters the market.

However, corporations do not need to move in order to benefit from low tax regimes. Indeed, it is enough that multinationals open branches in low-taxation countries to engage in tax-minimizing activities, which consist of shifting profits from high-tax to low-tax regimes using intra-firm transactions. The theoretical and empirical literature has individuated three-main channels that multinationals use to shift their profits (Langenmayr & Reiter, 2022): transnational borrowing, transfer pricing, and the relocation of intellectual property<sup>9</sup>. To give an order of magnitude to these activities, several studies have estimated that transfer pricing results in a substantial tax revenues loss ranging from 200 to 600 USD billion per year (Cobham & Janský, 2018; Crivelli et al., 2016; Tørsløv et al., 2018). Nonetheless, tolerating profit shifting can be a deliberate choice of governments in high-tax countries to attract foreign direct investments from foreign multina-

tionals (Haufler et al., 2018). In recent years, however, given the huge amount of fiscal resources lost, governments are introducing a series of rules called “controlled foreign companies” aimed at limiting profit-shifting activities (OECD, 2013). Haufler et al. (2018) show theoretically that these rules can belong to the optimal policy mix of a government, yet, international coordination is crucial to maximizing the effectiveness of these policies. A final note of warning on profit shifting comes from Blouin and Robinson’s (2020) study, which argues that profit-shifting estimates of previous papers should be revised downwards because of issues of double accounting of foreign income and its incorrect attribution to jurisdictions.

A key question concerning international tax competition is whether it is welfare-enhancing. Ferrett et al. (2019) try to answer this question by building a two-period regional model. The authors find that tax competition generates more efficient investment choices than in a system where governments do not try to attract foreign firms. Haufler and Lufelsmann (2015) assess the benefit of tax coordination in the European Union, a region where countries engage in substantial tax competition. The authors find that a Pareto improvement to the current system consists of a federal tax rate commonly chosen by the European Member States and letting national governments set autonomously local tax rates.

Efficiency, however, is not the sole criterion under which tax competition should be assessed. International tax competition and the ensuing race to the bottom can directly affect personal income inequalities. Saez and Zucman (2019) claim that the sharp decline of corporate income tax over the last decades is the main factor behind the low progressivity of the US personal income tax system. The authors estimate that the very top earners in the US pay an average tax lower than the very bottom of the income distribution. Since shareholders usually coincide with wealthy individuals, Saez and Zucman (2019) claim that low corporate taxes decrease fiscal progressivity and contribute to higher inequalities. Moreover, another issue stemming from this trend is the reduction of fiscal resources available to finance welfare programs that benefit low-income individuals in terms of subsidies and employment stability (Piketty, 2014; Verbeek et al., 2015).

However, even by focusing only on equity and leaving aside efficiency considerations, high domestic corporate taxes might not be a proper tool to reduce inequalities (see Faccio & Iacono, 2021 for a complete overview on this issue). Indeed, as shown in previous sections, firms can respond to high corporate taxes by increasing prices and reducing wages, thereby shifting the burden on consumers and workers (Ablett & Hart, 2005; Arulampalam et al., 2012; Fuest et al., 2018). Given the difficulties associated with orthodox domestic fiscal measures, authors have proposed international solutions (see Faccio & Iacono, 2021). Piketty (2014), for example, proposes a global capital tax to limit tax avoidance and elusion. Similarly, Saez and Zucman (2019) propose a 25% minimum global tax rate. These authors estimated that implementing this proposal by G20 countries would result in effective taxation of 90% of global corporate profits. Finally, although ambitious, the OECD/G20 framework, which aims to implement a minimum global corporate tax on multinational enterprises at 15%, seems a promising step in this direction.<sup>10</sup>

The issue of coordination is particularly relevant for the effectiveness of environmental policies, given that, as argued by Millimet (2014), there are three types of externalities that may arise when countries make policy decisions: resource, pecuniary, and fiscal externalities. However, although strategic interactions among governments regarding the provision of public goods have been studied extensively, little attention has been given to interactions in environmental issues. The extent and direction of strategic interactions in environmental policies are still unclear, in that some authors suggest that decentralized environmental policies result in overly lenient environmental standards, leading to a “race to the bottom”, while others support the idea of a “race to the top”<sup>11</sup>.



Hence, the analysis of the most effective environmental policy instruments, including corporate taxes, deserves further study in future research.

### 3.2 | Dividend taxes

As in the case of savings, the debate over dividend taxes is strictly concerned with the issue of double taxation. Given that dividend taxes are levied when net profits are redistributed among shareholders after the firm's income has already been taxed via the corporate income tax, several authors claim that dividend taxation is unfair. This argument was embraced by the "Traditional View" of dividend taxation, which dates back to the pioneering works of Harberger (1962, 1966) and has been later extended by Feldstein (1970) and Poterba and Summers (1983, 1985). According to the Traditional View, corporate investments financed through equity issuance should bear only the corporate income tax and not the dividend one, which should be set to zero. The reason is that the dividend tax will alter both the equilibrium financing decisions of firms' equity and debt and the allocation of capital between the corporate and the non-corporate sector in favor of the latter, where usually returns are lower.

However, this school of thought was challenged by the "New View" (Auerbach, 1979; Bradford, 1980, 1981; King, 1974a, 1974b, 1977), according to which dividend taxation is irrelevant, particularly for mature firms, in that the latter finance their investments mainly through retained earnings and only after this investment, do they redistribute the residual profits as dividends to their shareholders. Moreover, in a system where capital gains are taxed less than distributed profits (as it is the case in many countries), a firm should always prefer retained earnings (which increase stock values) to new equity issuances because the former is a less taxed form of financing (Sørensen, 1995). Therefore, in this case, dividend taxes turn out to be irrelevant because they do not affect the firm's marginal financing source.

As it often happens, several empirical studies have tried to solve an unsettled theoretical debate. While empirical evidence supporting the Traditional View should show that tax changes affect mature firms' investment decisions, investment elasticities close to zero offer support to the New View.

Perhaps, the 2003 "Jobs and Growth Tax Relief Reconciliation" Act implemented by the first Bush administration has been the natural experiment most studied in this literature. The reform introduced a sharp dividend tax reduction of nearly 60%, from 38.6% to 15%. Campbell et al. (2013) empirically investigate the consequences of the 2003 tax act without finding evidence unambiguously in favor of one of the two views. These authors find that investments increased by 8.5%–10.2% following the tax cut, in line with the Old View's predictions. However, Campbell et al. (2013) find that large firms with substantial retained profits tended to increase payouts rather than investments following the reform—a result that supports the New View.

On the other hand, Yagan (2015), adopting a DID methodology that uses as control the firms not affected by the US reform, finds a zero elasticity of investments to the dividend tax, in line with the neutrality result of the New View.

Also Anagnostopoulos et al. (2012) study the effects of dividend taxes on US firms. However, differently from previous studies, these authors design a model and calibrate it on US data rather using regression techniques. The paper's main result is that dividend tax cuts decrease investments and, rather surprisingly, it is in contrast with both views: clearly against the Traditional View, but also against the New View predicting the neutrality of investments to tax reforms. The central intuition is that dividend tax cuts increase the market value of corporations' capital, whereby investors want a higher return to hold additional wealth. Consequently, firms

respond by reducing capital stock and investments. The authors estimate that because of reduced investments, dividend tax cuts reduce welfare by 0.5% in consumption terms.

Becker et al. (2013) broaden the geographical scope of analysis by using a dataset covering 25 countries and containing 29 tax reforms equally split between dividend tax cuts and increases. The authors find that tax cuts reduce the investment gap between firms with low cash-flow (immature) and high cash-flow (mature) corporations, from 7.27% to 5.54% in terms of assets. In contrast, when dividend taxes increase, the investment gap expands from 5.33% to 7.59%. This result has two main implications. Firstly, dividend taxes change the allocation of capital between different firms, in that dividend taxes block capital into mature firms with sufficient retained earnings at the expense of those firms which need to raise equity. In practical terms, this can increase investment in established industries at the cost of limiting start-ups growth and, thus, it shows a bimodal effect of dividend taxes, in that new firms are disadvantaged while mature firms are neutral or can even benefit, as in the case of the above-mentioned study. Secondly, the impact of dividend taxes depends on the accessibility to the equity market and governance and, in this respect, the finding of Becker et al. (2013) aligns with the New View since large firms with easier access to capital markets are less affected by the reform.

Alstadsæter et al. (2017) studies the 2006 Swedish dividend tax cuts and, differently from most studies, the paper focuses on unlisted firms. The authors find that the tax cuts increased investments, ranging from 18% to 32% of pre-reform levels and this increase was more significant for firms relying on external equity financing with respect to cash-rich firms. Precisely, the investment decrease in cash-rich corporations has corresponded to an increase in cash-constrained ones, showing a flow of capital from the former to the latter. In other words, capital has shifted to corporations with insufficient internal resources to finance their investments from richer corporations and this finding pretty much aligns and is specular to Becker et al.'s (2013) results. While in Becker et al. (2013), dividend taxes lock in the capital in mature firms, in Alstadsæter et al. (2017), conversely, tax cuts favor a transfer of resources from large and cash-rich firms to cash-constrained ones.

In addition to investments, other critical variables studied are returns and payouts. For example, Chetty and Saez (2005) find that the 2003 US dividend cut significantly increased payouts, amounting to \$5 billion per quarter, although this effect was not *una tantum*. Indeed, the authors find that firms were more likely to increase regular dividend payments after the reform, thus offering support to the critical position of the New View towards dividend tax cuts, since this policy seems to increase more payouts than investments.

Another possible cause of the heterogeneous responses of firms to dividend tax cuts is the composition of top management. Chetty and Saez (2005) show that US firms where top executives own a significant fraction of shares increase payouts, thus revealing that agency is crucial for payout redistribution, in that top executives' preferences, besides efficiency criteria, influence firms' responses to taxation. A similar finding was obtained by Alstadsæter and Jacob (2016) in their study of Swedish firms, according to which owner-managers of closely held corporations tend to reclassify earned income as dividends in order to benefit from dividend cuts. On average, following the 2006 Swedish tax cut shift, about 6% of managers' gross income was shifted from wages to dividends.

With agency issues, shareholders' conflicting objectives can induce highly different responses of firms to tax reforms. This was documented by Jacob and Michaely (2017) in their study of Swedish firms, according to which shareholders' heterogeneous preferences over taxation and coordination issues make dividend payouts less responsive to tax cuts.

Moreover, not only dividend payout but also performance can evolve unevenly following a tax cut. Auerbach and Hassett (2005) study the 2003 US tax reform and define immature firms as those firms that never pay a dividend. The authors find that immature outperformed mature firms after the reform, in that the former group earned excess returns in the range of 3.7–8.6%, whereas, for the latter, returns were 0.5%–1.5%. Again, this result shows heterogeneous effects of dividend tax cuts along the firm's maturity dimension.

## 4 | DISCUSSION AND CONCLUSIONS

How much capital should be taxed? After reviewing the results of the economic literature on such an issue, perhaps unsurprisingly, the answer is it depends. Primarily, it depends on who holds capital—individuals or firms—and on efficiency/equity issues.

On efficiency grounds, as for individuals, in ILRA economies, optimal (i.e., efficient) individual capital income tax rates tend to be about zero. This zero-tax result follows from the continuously increasing long-run distortion caused by capital taxation. However, this finding crucially depends on agents' homogeneity assumption. In OLG models where agents differ in age, the zero-tax result no longer holds. The intuition behind this finding is that consumption and leisure tend to grow over the individual's life cycle. Capital income taxation is, therefore, optimal because it can either discriminate against future consumption or it mimics an age-dependent leisure tax, which, otherwise, would be unavailable. Optimal capital income taxes can be particularly high in this framework, reaching almost a 45% rate, in presence of market imperfections. High tax rates are mainly observed when individuals face uninsurable income shocks and this happens because substituting capital with labor taxes decreases the agent's capacity to self-insure through savings.

Similarly, as far as efficiency is concerned, the heterogeneity in skills characterizing dynamic Mirrlees economies brings about a positive optimal tax on capital. The key intuition is that if savings are preferred by high-ability individuals—as it usually is—then capital income should be taxed because it reveals agents' true innate and unobservable ability. In this setting, optimal capital income taxes can reach 23.5% for top earners. Yet, they are significantly lower than in OLG models because of the lower welfare gains associated with positive taxation.

It is worth noting that the limit of the general equilibrium neoclassical models is, with some notable exceptions, to overlook the role of the structure of markets, which are typically assumed perfectly competitive. In this case, profits are zero in the long run, and thus, while there is no difference between stock and debt owners, dividend taxes turn out to be irrelevant. Hence, as an avenue for future research, a deeper understanding of the possible general equilibrium effects of capital taxes is needed in neoclassical models—as well as in neo-Keynesian and/or heterodox frameworks, which we did not cover in the present work—, with a focus on the role of market structure.

As for inheritance—a particular form of capital that is received rather than produced, empirical data from surveys show that individuals are more likely to support taxation of inherited capital than wealth resulting from individual merits and skills. The studies surveyed indicate that the efficient inheritance tax rate can reach 80% for high levels of bequests beyond a certain exemption threshold. However, the tax schedule can be regressive at the very top of the distribution. This finding aligns with the Mirrlees' (1971) zero top marginal rate result, subsequently extended to capital income by Ordover and Phelps (1979). Furthermore, the effectiveness of the inheritance

tax as a redistributive tool might be severely impacted by tax avoidance and relocation choices by individuals.

Like other forms of taxation, capital taxation is unlikely to be decided autonomously by a benevolent planner. By contrast, capital tax schedules are often the result of a complex political process and in this political-economic framework, the removal, or the drastic decrease, of capital income taxes advocated in ILRA models is likely to find stronger and more widespread opposition. The reason is that such reforms will benefit only the more affluent individuals. Yet, wealthy individuals might use campaign contributions to align the policymakers' preferences with their own and obtain favorable tax policies despite popular opposition.

When we instead look at the inter-governmental dynamics concerning capital income taxation, the literature has pointed out that lowering capital taxes is likely to trigger a race to the bottom between countries. This finding is indeed coherent with the corporate income statutory rate pattern observed in recent decades.

Empirical studies focusing on individual behavioral responses to wealth taxation find elasticities that vary substantially across countries (between  $-7.17$  and  $-0.09$ ) and depend on individuals' income-shifting capacity and, in particular, on the level of individuals' wealth.

Given these insights from different literature strands concerning individuals' capital income taxation, it can be concluded that rates should be, in several circumstances, positive and significantly greater than zero. In particular, on efficiency grounds, the removal of capital taxation reduces the self-insuring capacity of individuals in presence of uncertainty and incomplete markets and reduces the government's capacity to infer the true skills of taxpayers. At the same time, capital taxes can remedy the incompleteness of the fiscal system by mimicking age-dependent taxes. On the equity side, positive capital taxes can find political support especially when set on inherited wealth. Indeed, the meritocratic argument for tolerating inequalities loses validity when these disparities result not from individual efforts but from inherited wealth.

Conclusions on capital taxation may differ when dealing with business taxation and moving from the microeconomic to the macroeconomic level. We have divided our analysis of corporate taxation by studying separately the corporate income and dividend taxes. Concerning the former, the literature seems to converge on the detrimental effects of high taxes along different dimensions, such as employment, investments, and innovations. Nonetheless, adequate tax policies need to be more elaborated than simple tax cuts, given that these reforms might generate unintended effects such as stock buybacks and rising inequalities that can negatively impact investments and entrepreneurship. In particular, given that empirical literature on the effects of corporate taxes on entrepreneurship has been somehow inconclusive, the study of this issue deserves much effort in future research. Moreover, conclusions on the corporate tax, may change when corporate taxes are evaluated on equity grounds in a globalized economy. Yet, standard domestic solutions, such as increasing corporate taxes, can even exacerbate the problem. Thus, authors and such international organizations as OECD have proposed global tax solutions based on coordination between countries. We recognize these proposals as promising and ambitious first steps. However, the feasibility of these proposals seems still uncertain, given the lack of a global tax enforcing authority and the different incentives characterizing countries.

Concerning the dividend tax, results are still ambiguous. Overall, the empirical studies discussed suggest that dividend taxes affect investments dynamically according to the different phases of firms' growth cycle. Dividend tax cuts primarily affect firms that need to issue new equity to finance investments while producing an insignificant effect for mature firms with substantial retained earnings. Therefore, the Traditional View seems a more appropriate descriptive tool of reality for firms in their start-up phase, while the New View describes better already long-

established corporations. This bimodal effect of dividend tax cuts also applies to performance, in that immature firms are more likely to outperform mature ones following dividend tax cuts.

Regarding future research directions, it is essential to further investigate the extent and nature of strategic interactions in fiscal and environmental policies. While capital taxation and other fiscal and regulatory tools can incentivize firms to transition towards sustainable practices, the provision of transnational collective efforts is critical given the cross-border nature of environmental damage. Therefore, studying the emergence and the quality of joint international actions in this area is of great significance and requires further examination also in relation to the increasing within-country wealth inequalities. Further research is also needed to fully understand the complex relationships between corporate bailouts, tax policy, and economic stability. Corporate bailouts after financial crises have been a subject of much debate in the academic literature, especially for the banking sector, and, in particular, it has been argued that corporate bailouts and public guarantees can be used as a tool to redistribute wealth from taxpayers to (well-connected) firms.<sup>12</sup> In such cases, tax policies that favor the corporate sector might exacerbate the problem by increasing the risk of moral hazard, reducing the incentives for firms to invest in precautionary savings and increase the likelihood of corporate failures and consequent bailout. The analysis of such an issue deserves further study. Finally, future studies should address the issue of the long-term empirical relationship between wealth taxes and inter-generational inequality. In fact, much of the current literature focuses on assessing the implication of wealth taxes on static equity-efficiency tradeoffs. Nevertheless, the bulk of the current wealth inequality mainly stems from inherited wealth. While in the past, the study of inter-generational effects of wealth taxes was limited by the lack of adequate data, now, this represents an issue of lower concern given the increasing data quality and availability of long-run time series.

## ACKNOWLEDGMENTS

We would like to thank the Editor and three anonymous Referees for providing valuable comments on a previous version of the manuscript. The usual disclaimer applies.

## CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest to declare that are relevant to the content of this article.

## DATA AVAILABILITY STATEMENT

Data sharing not applicable—no new data generated.

## ORCID

Luca Spataro  <https://orcid.org/0000-0002-5202-8879>

Tommaso Crescioli  <https://orcid.org/0000-0002-4365-2522>

## ENDNOTES

<sup>1</sup>The increase in corporate tax revenues, also in comparison with the other tax components, can be most likely attributed to the rise of globalization and digitalization, which began in the early 1990s. These processes have resulted in more business activities and a greater share of profits in the economy, leading to a larger tax base for corporate taxation (for a deeper insight, see Devereux and Sørensen 2006, Hines 2007, Autor et al. 2020). However, it is worth nothing that revenues from corporate taxes as a share of GDP have not grown in all countries. A notable exception is, indeed, the US, where these revenues have steadily declined since 1950s (FRED 2023 database).

<sup>2</sup>For a recent in-depth insight into this and other related issues on corporate taxes, see de Mooij et al. (2021).

- <sup>3</sup> At almost the same time, the mathematical economist Frank Ramsey (1927, 1928) came out with two articles that set the basis of modern tax theory. As it emerges from Ramsey's notes, published by Duarte (2009a, 2009b), the economist had the intuition that the highly elastic long-run nature of savings represents the main reason to exempt capital from taxation. Nevertheless, although Ramsey's treatment was richer and more complete than Pigou's one, his results were never published.
- <sup>4</sup> Judd (2002) provides a relatively simple explanation of this result. To see this, divide the marginal rate of substitution (*MRS*) between consumption at *t* and at 0 by the respective marginal rate of transformation (*MRT*),  $\frac{MRS(c_0, c_t)}{MRT(c_0, c_t)} = \left( \frac{1+r}{1+(1-\tau_k)r} \right)^t$ , where *r* is the interest rate and  $\tau_k$  the capital tax. The capital tax creates a distortion since it alters the equality between the *MRS* and *MRT*. Moreover, although the tax is constant such distortion is increasing exponentially as time passes.
- <sup>5</sup> Judd's basic intuition rests upon Robinson's (1969) insights recognizing a similarity between markups and taxes. Since, in ILRA models, capital taxes generate a distortion that grows over time, the same holds true for a markup on capital. At the same, a tax on monopoly profits is non-distortionary since extra profits should be zero under perfect competition (Coto-Martinez et al. 2007). Thus, the proceedings from monopoly profits taxation can be used to subsidize capital remedying the undersupply caused by the monopolistic market structure.
- <sup>6</sup> Corlett and Hague argued that although leisure cannot be taxed directly due to its non-market nature, it can be taxed indirectly through consumption taxation since consumption is a complementary good with respect to leisure. Thus, since leisure tends to increase with age, consumption should be taxed more heavily as time passes. In the absence of age-dependent taxes, a constant tax on capital income is equivalent to an increasing-with-time tax on future consumption (as shown by Feldstein 1978 and Judd 1999) and, consequently, it allows indirect and age-dependent taxation of leisure.
- <sup>7</sup> It is worth recalling that the incompleteness of fiscal instruments as a source of the violation of the zero-capital income tax has been firstly unveiled by Correia (1996). See also Reis (2011).
- <sup>8</sup> This situation corresponds to the case of a social intertemporal discount rate that differs from the private one and, as shown in De Bonis and Spataro (2005, 2018), this gives room to Pigouvian corrective taxation.
- <sup>9</sup> Financial companies, however, tend to use other channels like the relocation of assets held for proprietary trading (Langemayr and Reiter 2022).
- <sup>10</sup> The details of the OECD/G20 framework are available at <https://www.oecd.org/tax/beps/international-tax-reform-oecd-releases-technical-guidance-for-implementation-of-the-global-minimum-tax.htm>.
- <sup>11</sup> For an extensive review of policy instruments concerning environmental issues, see Bovernberg and Goulder (2002). As for recent normative and positive analyses concerning capital taxes/subsidies in a decentralized production economy with environmental pollution, see Renström et al. (2019, 2021), respectively. Finally, for a recent empirical analysis on strategic interaction in environmental policies, see Le Gallo and Ndiaye (2021) and the references contained therein.
- <sup>12</sup> See, for example, Vukovic (2021). For survey on this topic, see Jackson and Pernoud (2021).

## REFERENCES

- Ablett, J., & Hart, N. (2005). Corporate income tax reform: The neglected issue of tax incidence. *Economic Analysis and Policy*, 35(1-2), 45–60.
- Aghion, P., Akcigit, U., & Fernández-Villaverde, J. (2013). Optimal capital versus labor taxation with innovation-led growth (No. w19086). National Bureau of Economic Research.
- Agrawal, D. R., Foremny, D., & Martínez-Toledano, C. (2022). Wealth tax mobility and tax coordination. Available at SSRN, 3676031.
- Akcigit, U., Grigsby, J., Nicholas, T., & Stantcheva, S. (2022a). Taxation and innovation in the 20th century. *Quarterly Journal of Economics*, 137(1), 329–385.
- Akcigit, U., Hanley, D., & Stantcheva, S. (2022b). Optimal taxation and R&D policies. *Econometrica*, 90(2), 645–684.
- Alesina, A., Stantcheva, S., & Teso, E. (2018). Intergenerational mobility and preferences for redistribution. *American Economic Review*, 108(2), 521–54.
- Alstadsæter, A., & Jacob, M. (2016). Dividend taxes and income shifting. *The Scandinavian Journal of Economics*, 118(4), 693–717.
- Alstadsæter, A., Jacob, M., & Michaely, R. (2017). Do dividend taxes affect corporate investment. *Journal of Public Economics*, 151, 74–83.



- Anagnostopoulos, A., Cárceles-Poveda, E., & Lin, D. (2012). Dividend and capital gains taxation under incomplete markets. *Journal of Monetary Economics*, 59(7), 599–611.
- Arulampalam, W., Devereux, M. P., & Maffini, G. (2012). The direct incidence of corporate income tax on wages. *European Economic Review*, 56(6), 1038–1054.
- Auerbach, A. J. (1979). Wealth maximization and the cost of capital. *The Quarterly Journal of Economics*, 93(3), 433–446.
- Auerbach, A. J. (2006). Who bears the corporate tax? A review of what we know. In J. M. Poterba (Eds.), *Tax policy and the economy* (Vol. 20, pp. 1–40). MIT Press.
- Auerbach, A. J., & Hassett, K. (2005). The 2003 dividend tax cuts and the value of the firm: An event study.
- Autor, D., Dorn, D., Katz, L. F., Patterson, C., & Van Reenen, J. (2020). The fall of the labor share and the rise of superstar firms. *The Quarterly Journal of Economics*, 135(2), 645–709.
- Azémard, C., Desbordes, R., & Wooton, I. (2020). Is international tax competition only about taxes? A market-based perspective. *Journal of Comparative Economics*, 48(4), 891–912.
- Barro, R. J. (1974). Are Government Bonds Net Wealth? *Journal of Political Economy*, 82, 1095–117.
- Bastani, S., & Waldenström, D. (2020). How should capital be taxed? *Journal of Economic Surveys*, 34(4), 812–846.
- Bastani, S., & Waldenström, D. (2021). Perceptions of inherited wealth and the support for inheritance taxation. *Economica*, 88(350), 532–569.
- Bastani, S., Blomquist, S., & Micheletto, L. (2013). The welfare gains of age-related optimal income Taxation. *International Economic Review*, 54(4), 1219–1249.
- Bacher, H. U., & Brühlhart, M. (2013). Progressive taxes and firm births. *International Tax and Public Finance*, 20(1), 129–168.
- Becker, B., Jacob, M., & Jacob, M. (2013). Payout taxes and the allocation of investment. *Journal of Financial Economics*, 107(1), 1–24.
- Berg, K., & Hebous, S. (2021). Does a wealth tax improve equality of opportunity? IMF working paper 21/85.
- Blanchet, T., Saez, E., & Zucman, G. (2022). Real-time inequality. Working paper. <https://gabriel-zucman.eu/files/BSZ2022.pdf>
- Block, J. (2021). Corporate income taxes and entrepreneurship. IZA world of labor.
- Blouin, J., & Robinson, L. A. (2020). Double counting accounting: How much profit of multinational enterprises is really in tax havens?. Available at SSRN. 3491451.
- Bovenberg, A. L., & Goulder, L. H. (2002). Environmental taxation and regulation. In *Handbook of public economics* (Vol. 3, pp. 1471–1545). Elsevier.
- Bradford, D. F. (1981). The incidence and allocation effects of a tax on corporate distributions. *Journal of Public Economics*, 15(1), 1–22.
- Bradford, D. F. (1980). *The economics of tax policy toward savings*. In G. M. von Furstenberg (Eds.), *The Government and Capital Formation*. Ballinger Publishing Company.
- Bruce, D., Gurley-Calvez, T. J., & Norwood, A. (2020). Taxes and entrepreneurship: A literature review and research agenda. *Foundations and Trends in Entrepreneurship*, 16(5), 393–443.
- Brühlhart, M., Gruber, J., Krapf, M., & Schmidheiny, K. (2022). Behavioral responses to wealth taxes: Evidence from Switzerland. *American Economic Journal: Economic Policy*, 14(4), 111–150.
- Bucovetsky, S. (2014). Honor among tax havens. *Journal of Public Economics*, 110, 74–81.
- Campbell, J. L., Chyz, J. A., Dhaliwal, D. S., & Schwartz, W. C. Jr. (2013). Did the 2003 tax act increase capital investments by corporations. *The Journal of the American Taxation Association*, 35(2), 33–63.
- Carter, S. (2011). The rewards of entrepreneurship: Exploring the incomes, wealth, and economic well-being of entrepreneurial households. *Entrepreneurship Theory and Practice*, 35(1), 39–55.
- Chamley, C. (1986). Optimal taxation of capital income in general equilibrium with infinite lives. *Econometrica*, 607–622.
- Chang, J. J., Kuo, C. H., Lin, H. Y., & Yang, S. C. S. (2023). Share buybacks and corporate tax cuts. *Journal of Economic Dynamics and Control*, 151, 104622.
- Chari, V. V., Christiano, L. J., & Kehoe, P. J. (1994). Optimal fiscal policy in a business cycle model. *Journal of political Economy*, 102(4), 617–652.
- Chetty, R., & Saez, E. (2005). Dividend taxes and corporate behavior: Evidence from the 2003 dividend tax cut. *The Quarterly Journal of Economics*, 120(3), 791–833.

- Cobham, A., & Janský, P. (2018). Global distribution of revenue loss from corporate tax avoidance: Re-estimation and country results. *Journal of International Development*, 30(2), 206–232.
- Coleman II, W. J. (2000). Welfare and optimum dynamic taxation of consumption and income. *Journal of Public Economics*, 76(1), 1–39.
- Conesa, J. C., Kitao, S., & Krueger, D. (2009). Taxing capital? Not a bad idea after all!. *American Economic Review*, 99(1), 25–48.
- Cooley, T. F., & Hansen, G. D. (1992). Tax distortions in a neoclassical monetary economy. *Journal of Economic Theory*, 58(2), 290–316.
- Corlett, W. J., & Hague, D. C. (1953). Complementarity and the excess burden of taxation. *The Review of Economic Studies*, 21(1), 21–30.
- Correia, I. (1996). Should capital income be taxed in the steady state? *Journal of Public Economics*, 60, 147–151.
- Coto-Martinez, J., Sánchez-Losada, F., & Garriga, C. (2007). Optimal taxation with imperfect competition and aggregate returns to specialization. *Journal of the European Economic Association*, 5(6), 1269–1299.
- Cullen, J. B., & Gordon, R. H. (2007). Taxes and entrepreneurial risk-taking: Theory and evidence for the US. *Journal of Public Economics*, 91(7–8), 1479–1505.
- Crivelli, E., De Mooij, R., & Keen, M. (2016). Base erosion, profit shifting and developing countries. *FinanzArchiv/Public Finance Analysis*, 72(3), 268–301.
- Da Rin, M., Di Giacomo, M., & Sembenelli, A. (2011). Entrepreneurship, firm entry, and the taxation of corporate income: Evidence from Europe. *Journal of Public Economics*, 95(9–10), 1048–1066.
- Darby, J., Ferrett, B., & Wooton, I. (2014). Regional centrality and tax competition for FDI. *Regional Science and Urban Economics*, 49, 84–92.
- Davis, L. E. (2017). Financialization and investment: A survey of the empirical literature. *Journal of Economic Surveys*, 31(5), 1332–1358.
- De Bonis, V., & Spataro, L. (2005). Taxing capital income as Pigouvian correction: The role of discounting the future. *Macroeconomic Dynamics*, 9(4), 469–477.
- De Bonis, V., & Spataro, L. (2010). Social discounting, migration, and optimal taxation of savings. *Oxford Economic Papers*, 62(3), 603–623.
- De Bonis, V., & Spataro, L. (2018). Optimal income taxation and migration. *International Tax and Public Finance*, 25(4), 867–882.
- de Mooij, R. A., Klemm, M. A. D., & Perry, M. V. J. (2021). *Corporate income taxes under pressure: Why reform is needed and how it could be designed*. International Monetary Fund.
- De Nardi, M., & Yang, F. (2016). Wealth inequality, family background, and estate taxation. *Journal of Monetary Economics*, 77, 130–145.
- Devereux, M. P., & Sørensen, P. B. (2006). The corporate income tax: International trends and options for fundamental reform. European Commission, *Directorate-General for Economic and Financial Affairs*.
- Diamond, P. A. (1973). Taxation and public production in a growth setting. In J. A. Mirrlees and N. H. Stern (Eds.), *Models of economic growth*. MacMillan.
- Diamond, P. A. (1965). National debt in a neo-classical growth model. *Journal of Political Economy*, 55, 1126–1150.
- Diamond, P., & Saez, E. (2011). The case for a progressive tax: From basic research to policy recommendations. *Journal of Economic Perspectives*, 25(4), 165–90.
- Djankov, S., Ganser, T., McLiesh, C., Ramalho, R., & Shleifer, A. (2010). The effect of corporate taxes on investment and entrepreneurship. *American Economic Journal: Macroeconomics*, 2(3), 31–64.
- Duarte, P. G. (2009a). Frank Ramsey's Notes on Saving and Taxation. *History of Political Economy*, 41(3), 471–489.
- Duarte, P. G. (2009b). Frank P. Ramsey: A Cambridge economist. *History of Political Economy*, 41(3), 445–470.
- Duran-Cabré, J. M., Esteller-Moré, A., & Mas-Montserrat, M. (2019). Behavioural responses to the (re) introduction of wealth taxes. Evidence from Spain.
- Erixson, O., & Escobar, S. (2020). Deathbed tax planning. *Journal of Public Economics*, 185, 104170.
- Erosa, A., & Gervais, M. (2002). Optimal taxation in life-cycle economies. *Journal of Economic Theory*, 105(2), 338–369.
- Escobar, S. (2017). Inheritance tax evasion: Spousal bequests and under-reporting of inheritances in Sweden. Uppsala Center of Fiscal Studies Search in.
- Escobar, S., Ohlsson, H., & Selin, H. (2023). Giving to the children or the taxman?: Lessons from a Swedish inheritance tax loophole. *European Economic Review*, 153, 104382.

- Faccio, T., & Iacono, R. (2021). Corporate Income Taxation and Inequality: Review and Discussion of Issues Raised in The triumph of injustice—How the rich dodge taxes and how to make them pay (2019). *Review of Income and Wealth*, 68(3), 819–829.
- Farhi, E., & Werning, I. (2012). Capital taxation: Quantitative explorations of the inverse Euler equation. *Journal of Political Economy*, 120(3), 398–445.
- Farhi, E., & Werning, I. (2013). Insurance and taxation over the life cycle. *Review of Economic Studies*, 80(2), 596–635.
- Fehr, H., & Kindermann, F. (2015). Taxing capital along the transition—Not a bad idea after all? *Journal of Economic Dynamics and Control*, 51, 64–77.
- Ferrett, B., Hoefele, A., & Wooton, I. (2019). Does tax competition make mobile firms more footloose? *Canadian Journal of Economics/Revue canadienne d'économique*, 52(1), 379–402.
- Feldstein, M. (1978). The welfare cost of capital income taxation. *Journal of Political Economy*, 86(2, Part 2), S29–S51.
- Feldstein, M. S. (1970). Corporate taxation and dividend behaviour. *The Review of Economic Studies*, 37(1), 57–72.
- Fisman, R., Gladstone, K., Kuziemko, I., & Naidu, S. (2020). Do Americans want to tax wealth? Evidence from online surveys. *Journal of Public Economics*, 188, 104207.
- FRED Database (2023). Federal Government: Tax Receipts on Corporate Income/Gross Domestic Product. <https://fred.stlouisfed.org/graph/?g=3p5> Accessed on 03/05/2023
- Frid, C. J., Wyman, D. M., & Coffey, B. (2016). Effects of wealth inequality on entrepreneurship. *Small Business Economics*, 47, 895–920.
- Fuest, C., Peichl, A., & Siegloch, S. (2018). Do higher corporate taxes reduce wages? Micro evidence from Germany. *American Economic Review*, 108(2), 393–418.
- Fullerton, D. (1984). Which effective tax rate? *National Tax Journal*, 37(1), 23–41.
- Fuster, L., İmrohoroğlu, A., & İmrohoroğlu, S. (2008). Altruism, incomplete markets, and tax reform. *Journal of Monetary Economics*, 55(1), 65–90.
- Garcia-Milà, T., Marcet, A., & Ventura, E. (2010). Supply side interventions and redistribution. *Economic Journal*, 120(543), 105–130.
- Gervais, M. (2012). On the optimality of age-dependent taxes and the progressive US tax system. *Journal of Economic Dynamics and Control*, 36(4), 682–691.
- Giroud, X., & Rauh, J. (2019). State taxation and the reallocation of business activity: Evidence from establishment-level data. *Journal of Political Economy*, 127(3), 1262–1316.
- Glogowsky, U. (2021). Behavioral responses to inheritance and gift taxation: Evidence from Germany. *Journal of Public Economics*, 193, 104309.
- Golosov, M., & Tsyvinski, A. (2015). Policy implications of dynamic public finance. *Economics*, 7(1), 147–171.
- Golosov, M., Troshkin, M., & Tsyvinski, A. (2011). Optimal dynamic taxes (No. w17642). National Bureau of Economic Research.
- Golosov, M., Troshkin, M., Tsyvinski, A., & Weinzierl, M. (2013). Preference heterogeneity and optimal capital income taxation. *Journal of Public Economics*, 97, 160–175.
- Goupille-Lebret, J., & Infante, J. (2018). Behavioral responses to inheritance tax: Evidence from notches in France. *Journal of Public Economics*, 168, 21–34.
- Gulzar, S., Rueda, M. R., & Ruiz, N. A. (2022). Do campaign contribution limits curb the influence of money in politics? *American Journal of Political Science*, 66(4), 932–946.
- Gutiérrez, G., & Philippon, T. (2018). Ownership, concentration, and investment. In AEA Papers and Proceedings (Vol. 108, pp. 432–437). American Economic Association.
- Güvener, F., Kambourov, G., Kuruscu, B., Ocampo-Diaz, S., & Chen, D. (2019). Use it or lose it: Efficiency gains from wealth taxation (No. w26284). National Bureau of Economic Research.
- Harberger, A. C. (1966) *Efficiency Effects of Taxes on Income from Capital*. In M. Krzyzaniak (Ed.) *Effects of Corporation Income Tax*. Wayne State University Press.
- Harberger, A. C. (1962). The incidence of the corporation income tax. *Journal of Political Economy*, 70(3), 215–240.
- Hassett, K. A., & Hubbard, R. G. (2002). Tax policy and business investment. In A. J. Auerbach & M. Feldstein (Eds.), *Handbook of public economics* (Vol. 3, pp. 1293–1343). Elsevier.
- Haufler, A., & Lalfesmann, C. (2015). Reforming an asymmetric union: On the virtues of dual tier capital taxation. *Journal of Public Economics*, 125, 116–127.
- Haufler, A., & Wooton, I. (2010). Competition for firms in an oligopolistic industry: The impact of economic integration. *Journal of International Economics*, 80(2), 239–248.

- Haufler, A., Mardan, M., & Schindler, D. (2018). Double tax discrimination to attract FDI and fight profit shifting: The role of CFC rules. *Journal of International Economics*, *114*, 25–43.
- Hines, Jr J. R. (2007). Corporate taxation and international competition. In A. J. Auerbach, J. R. Hines, and J. Slemrod (Eds.), *Taxing corporate income in the 21st century* (pp. 268–95). Cambridge Univ. Press.
- Hines, Jr J. R. (2013). Income and substitution effects of estate taxation. *American Economic Review*, *103*(3), 484–488.
- Hines, Jr J. R. (2020). Corporate taxation and the distribution of income (No. w27939). National Bureau of Economic Research.
- İmrohoroğlu, S. (1998). A quantitative analysis of capital income taxation. *International Economic Review*, *39*(2), 307–328.
- Itskhoki, O., & Moll, B. (2019). Optimal development policies with financial frictions. *Econometrica*, *87*(1), 139–173.
- Jacob, M., & Michaely, R. (2017). Taxation and dividend policy: The muting effect of agency issues and shareholder conflicts. *The Review of Financial Studies*, *30*(9), 3176–3222.
- Jakobsen, K., Jakobsen, K., Kleven, H., & Zucman, G. (2020). Wealth taxation and wealth accumulation: Theory and evidence from Denmark. *The Quarterly Journal of Economics*, *135*(1), 329–388.
- Jackson, M. O., & Pernoud, A. (2021). Systemic risk in financial networks: A survey. *Annual Review of Economics*, *13*, 171–202.
- Judd, K. L. (1985). Redistributive taxation in a simple perfect foresight model. *Journal of Public Economics*, *28*(1), 59–83.
- Judd, K. L. (1997). The Optimal Tax Rate for Capital Income is Negative. NBER Working Paper, w6004.
- Judd, K. L. (1999). Optimal taxation and spending in general competitive growth models. *Journal of Public Economics*, *71*(1), 1–26.
- Judd, K. L. (2002). Capital-income taxation with imperfect competition. *American Economic Review*, *92*(2), 417–421.
- Keen, M., & Konrad, K. A. (2013). The theory of international tax competition and coordination. Handbook of public economics. *Elsevier*, *5*, 257–328.
- King, M. A. (1974a). Taxation and the cost of capital. *The Review of Economic Studies*, *41*(1), 21–35.
- King, M. A. (1974b). Dividend behaviour and the theory of the firm. *Economica*, *41*(161), 25–34.
- King, M. A. (1977). *Public policy and the corporation*. Chapman and Hall.
- Koehne, S., & Kuhn, M. (2015). Optimal taxation in a habit formation economy. *Journal of Public Economics*, *122*, 31–39.
- Kopczuk, W. (2007). Bequest and tax planning: Evidence from estate tax returns. *The Quarterly Journal of Economics*, *122*(4), 1801–1854.
- Kotlikoff, L. J., & Summers, L. H. (1987). Tax incidence. In A. J. Auerbach & M. Feldstein (Eds.). *Handbook of public economics* (Vol. 2, pp. 1043–92). Elsevier.
- Laitner, J. (1995). Quantitative evaluations of efficient tax policies for Lucas' supply side models. *Oxford Economic Papers*, *47*(3), 471–492.
- Langenmayr, D., & Reiter, F. (2022). Trading offshore: Evidence on banks' tax avoidance. *The Scandinavian Journal of Economics*, *124*(3), 797–837.
- Langenmayr, D., & Simmler, M. (2021). Firm mobility and jurisdictions' tax rate choices: Evidence from immobile firm entry. *Journal of Public Economics*, *204*, 104530.
- Le Gallo, J., & Ndiaye, Y. (2021). Environmental expenditure interactions among OECD countries, 1995–2017. *Economic Modelling*, *94*, 244–255.
- Lichter, A., Löffler, M., Ispording, I. E., Nguyen, T. V., Poege, F., & Siegloch, S. (2022). Profit taxation, R&D spending, and innovation. *ECONtribute Discussion Paper*, 202.
- Ljungqvist, A., & Smolyansky, M. (2014). *To cut or not to cut? On the impact of corporate taxes on employment and income* (No. w20753). National Bureau of Economic Research.
- Londoño-Vélez, J., & Ávila-Mahecha, J. (2021). Enforcing wealth taxes in the developing world: Quasi-experimental evidence from Colombia. *American Economic Review: Insights*, *3*(2), 131–48.
- Londoño-Vélez, J., & Ávila-Mahecha, J. (2022). Behavioral responses to wealth taxation: Evidence from Colombia. *R&R Review of Economic Studies*.
- Lucas, Jr R. E. (1990). Supply-side economics: An analytical review. *Oxford Economic Papers*, *42*, 293–316.
- Maffini, G., Xing, J., & Devereux, M. P. (2019). The impact of investment incentives: Evidence from UK corporation tax returns. *American Economic Journal: Economic Policy*, *11*(3), 361–89.

- Mankiw, N. G., Weinzierl, M., & Yagan, D. (2009). Optimal taxation in theory and practice. *Journal of Economic Perspectives*, 23(4), 147–74.
- Mas Montserrat, M. (2019). What Happens When Dying Gets Cheaper? Behavioural Responses to Inheritance Taxation.
- Mendoza, E. G., & Tesar, L. L. (1998). The international ramifications of tax reforms: Supply-side economics in a global economy. *American Economic Review*, 226–245.
- Mirrlees, J. A. (1971). An exploration in the theory of optimum income taxation. *The Review of Economic Studies*, 38(2), 175–208.
- Mirrlees, J. A. (1976). Optimal tax theory: A synthesis. *Journal of Public Economics*, 6(4), 327–358.
- Mirrlees, J. A. (1986). The theory of optimal taxation. In K.J. Arrow, M.D. Intriligator (Eds.), *Handbook of mathematical economics*. Elsevier.
- Millimet, D. L. (2014). Environmental federalism: a survey of the empirical literature. *Case Western Reserve Law Review*, 64(4), 1669–1757.
- Moretti, E., & Wilson, D. J. (2017). The effect of state taxes on the geographical location of top earners: Evidence from star scientists. *American Economic Review*, 107(7), 1858–1903.
- Nakajima, M. (2008). Optimal capital income taxation with housing. Unpublished working paper available at <https://users.nber.org/~confer/2008/si2008/EFACR/nakajima.pdf>. Accessed: 01/09/2023.
- OECD (2013). *Action Plan on Base Erosion and Profit Shifting*. OECD Publishing. <https://www.oecd.org/ctp/BEPSActionPlan.pdf>
- OECD (2018). *Revenue Statistics 2018*. OECD Publishing. [https://doi.org/10.1787/rev\\_stats-2018-en](https://doi.org/10.1787/rev_stats-2018-en)
- Ohrn, E. (2018). The effect of corporate taxation on investment and financial policy: Evidence from the DPAD. *American Economic Journal: Economic Policy*, 10(2), 272–301.
- Ordovery, J. A., & Phelps, E. S. (1979). The concept of optimal taxation in the overlapping-generations model of capital and wealth. *Journal of Public Economics*, 12(1), 1–26.
- Pecorino, P. (1994). The growth rate effects of tax reform. *Oxford Economic Papers*, 46(3), 492–501.
- Pigou, A. C. (1928). *A study in public finance*. Macmillan.
- Piketty, T. (2014). *Capital in the 21st century*. Harvard University Press.
- Piketty, T., & Saez, E. (2013). A theory of optimal inheritance taxation. *Econometrica*, 81(5), 1851–1886.
- Pirttilä, J., & Selin, H. (2011). Income shifting within a dual income tax system: Evidence from the Finnish tax reform of 1993. *Scandinavian Journal of Economics*, 113(1), 120–144.
- Poterba, J. M., & Summers, L. H. (1985). The economic effects of dividend taxation. In E. Altman & M. Subrahmanyam (Eds.), *Recent Advances in Corporate Finance*. Richard D. Irwin Publishers.
- Poterba, J. M., & Summers, L. H. (1983). Dividend taxes, corporate investment, and ‘Q’. *Journal of Public Economics*, 22(2), 135–167.
- Ramsey, F. P. (1927). A contribution to the theory of taxation. *The Economic Journal*, 37(145), 47–61.
- Ramsey, F. P. (1928). A mathematical theory of saving. *The Economic Journal*, 38(152), 543–559.
- Razin, A., & Sadka, E. (2004). *Capital income taxation in the globalized world*. Technical report, National Bureau of Economic Research.
- Reis, C. (2011). Entrepreneurial labor and capital taxation. *Macroeconomics Dynamics*, 15, 326–335.
- Renström, T. I., Spataro, L., & Marsiliani, L. (2019). Optimal taxation, environment quality, socially responsible firms and investors. *International Review of Environmental and Resource Economics*, 13(3–4), 339–373.
- Renström, T. I., Spataro, L., & Marsiliani, L. (2021). Can subsidies rather than pollution taxes break the trade-off between economic output and environmental protection? *Energy Economics*, 95, 105084.
- Ring, M. A. K. (2020). Wealth taxation and household saving: Evidence from assessment discontinuities in Norway. Available at SSRN 3716257.
- Robinson, J. (1969). *The economics of imperfect competition*. Springer.
- Rydqvist, K., Spizman, J., & Strebulaev, I. (2014). Government policy and ownership of equity securities. *Journal of Financial Economics*, 111(1), 70–85.
- Saez, E., & Stantcheva, S. (2018). A simpler theory of optimal capital taxation. *Journal of Public Economics*, 162, 120–142.
- Saez, E., & Zucman, G. (2019). *The triumph of injustice: How the rich dodge taxes and how to make them pay*. WW Norton & Company.



- Seim, D. (2017). Behavioral responses to wealth taxes: Evidence from Sweden. *American Economic Journal: Economic Policy*, 9(4), 395–421.
- Serrato, J. C. S., & Zidar, O. (2016). Who benefits from state corporate tax cuts? A local labor markets approach with heterogeneous firms. *American Economic Review*, 106(9), 2582–2624.
- Shuai, X., & Chmura, C. (2013). The effect of state corporate income tax rate cuts on job creation. *Business Economics*, 48(3), 183–193.
- Sinn, H. W. (1991). The vanishing Harberger triangle. *Journal of Public Economics*, 45(3), 271–300.
- Slemrod, J., & Wilson, J. D. (2009). Tax competition with parasitic tax havens. *Journal of Public Economics*, 93(11–12), 1261–1270.
- Smith, M., Zidar, O. M., & Zwick, E. (2020). *Top wealth in America: New estimates and implications for taxing the rich* (No. w29374). National Bureau of Economic Research.
- Sørensen, P. B. (1995). Changing views of the corporate income tax. *National Tax Journal*, 48(2), 279–294.
- Stantcheva, S. (2017). Optimal taxation and human capital policies over the life cycle. *Journal of Political Economy*, 125(6), 1931–1990.
- Straub, L., & Werning, I. (2020). Positive long-run capital taxation: Chamley-Judd revisited. *American Economic Review*, 110(1), 86–119.
- Stiglitz, J. E. (2015). In praise of Frank Ramsey's contribution to the theory of taxation. *The Economic Journal*, 125(583), 235–268.
- Tørslov, T. R., Wier, L. S., & Zucman, G. (2018). *The missing profits of nations* (No. w24701). National Bureau of Economic Research.
- Tung, I., & Milani, K. (2018). *Curbing stock buybacks: A crucial step to raising worker pay and reducing inequality*. Roosevelt Institute.
- Turco, E. M. (2018). Are stock buybacks crowding out real investment? Empirical evidence from US firms.
- Venâncio, A., Barros, V., & Raposo, C. (2020). Corporate taxes and high-quality entrepreneurship. *Small Business Economics*, 58, 1–30.
- Verbeek, J., & Rodarte, I. O. (2015). *Increasingly, inequality within, not across, countries is rising*. Published at Worldbank.org. <https://blogs.worldbank.org/developmenttalk/increasingly-inequality-within-not-across-countries-rising>
- Vukovic, V. (2021). The politics of bailouts: Estimating the causal effects of political connections on corporate bailouts during the 2008–2009 US financial crisis. *Public Choice*, 189(1–2), 213–238.
- Weil, P. (1989). Overlapping families of infinitely-lived agents. *Journal of public economics*, 38(2), 183–198.
- Wilson, J. D. (2014). Tax havens in a world of competing countries. *CESifo Dice Report*, 12(4), 32–39.
- Yagan, D. (2015). Capital tax reform and the real economy: The effects of the 2003 dividend tax cut. *American Economic Review*, 105(12), 3531–63.
- Zhu, G. P., Gui, H. F., Peng, T., & Jiang, C. H. (2023). Corporate tax avoidance and corporate financialization. *The moderating effect of managerial myopia*. Managerial and Decision Economics.
- Zoutman, F. T. (2018). The elasticity of taxable wealth: Evidence from the Netherlands. Manuscript, November.
- Zwick, E., & Mahon, J. (2017). Tax policy and heterogeneous investment behavior. *American Economic Review*, 107(1), 217–48.

**How to cite this article:** Spataro, L., & Crescioli, T. (2023). How much capital should be taxed? A review of the quantitative and empirical literature. *Journal of Economic Surveys*, 1–38. <https://doi.org/10.1111/joes.12586>