The case for a benefit-based view of the corporate income tax

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A long-standing challenge for tax theorists is to justify the corporate income tax. Given its uncertain incidence, using it rather than simply taxing corporate stakeholders directly seems to needlessly risk unintended welfare consequences. Theorists typically rely on instrumental justifications for the tax, namely that it supports or substitutes for other desirable policies. In contrast, we explore a more direct justification: that the corporate tax is a benefit-based tax, an idea that is familiar from historical writings on tax and from current thinking on interjurisdictional taxation but generally neglected by modern tax theorists. We show that the benefit-based view converts the uncertain incidence of the corporate income tax from a fault to a virtue, and moreover that it does so by providing an affirmative case for the tax—that it supports a fiscal virtuous cycle—which fits with its widespread popular and policymaker support. Driving these results is a simple but as-yet unrecognized mechanism that causes the incidence of the corporate tax and benefit to align automatically. We formally characterize optimal benefit-based corporate taxation as a function of estimable elasticities, including that of profit with respect to public spending, and we show empirical evidence consistent with existing corporate income taxes being benefit-based.

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1. Introduction

To a modern optimal tax theorist, the corporate income tax is a risky policy. Economists have long understood and taught that corporations, as merely legal entities, cannot bear the burden of the tax. Instead, corporate stakeholders—primarily owners, workers, and consumers—split that burden. But just who bears how much of that burden remains poorly understood despite decades of research.[1] If one's goal is to maximize welfare—as it is for most modern optimal tax theorists—this uncertain incidence makes it risky to tax corporations rather than, for example, taxing those stakeholders directly.[2]

To compensate for that risk, theorists emphasize other reasons to tax corporations. Several of the most prominent such reasons are instrumental, in the sense that they use the corporate tax to bolster policies targeted at other challenges. For example, the corporate tax can be seen as a way to tax away rents when antitrust regulation fails to preserve competition. Or, it can be seen as a backstop to other taxes when enforcement and tax design fail to prevent tax-motivated income shifting.[3] Or, it can be seen as a blunt tool for constraining corporate political power when campaign finance and lobbying rules fail to keep concentrated interests from swaying policymakers.[4] The extent to which these instrumental reasons justify the risk of the corporate tax's uncertain incidence—and outweigh any efficiency costs from the tax—is unclear.[5]

In this paper, we explore an alternative reason for a direct tax on corporate income that is—perhaps surprisingly—inseparable from its uncertain incidence. We consider the case for the corporate income tax as a benefit-based tax, that is a tax designed to correspond to the benefit that corporate stakeholders obtain from the activities of the state through their use

[1] Since at least Harberger (1962) it has been clear that capital may not bear the full burden of the tax, as responses to the tax induce changes in the equilibrium allocation of, and thus returns to, both capital and labor. These effects are difficult to measure in the short term and arguably impossible to measure in the (more important) long term. Empirical studies find a wide range of wage responses to a 1% increase in the corporate tax rate—approximately 0% to –0.6%—implying that labor could bear anywhere from 0% to more than 100% of the burden of the corporate tax (Knaisch and Pöschel 2021). This uncertainty has caused significant disagreement among economists about the division of the burden of the tax (Fuchs, Krueger, and Poterba 1998), leading Clausing (2011) to conclude that "generations of corporate tax incidence models have failed to reach a clear consensus on this question, and empirical work in this area is sparse and suffers from essential limitations." Fullerton and Metcalf (2002), Auerbach (2006) and Gravelle (2010) provide excellent overviews of the literature.

[2] The welfarist framework, due to Ramsey (1927), Mirrlees (1971), Diamond and Mirrlees (1971), and others is explained and defended in Kaplow (2008). In a widely used text on public economics, Myles (1995) says the corporate income tax "would not form part of an optimal tax system for a competitive economy."

[3] Two familiar examples are to prevent income shifting between personal and corporate income and to prevent firms from hoarding profits to avoid dividend taxation. It is also sometimes argued that taxing corporations is simpler than taxing its stakeholders directly. Reasons such as these for the corporate tax are discussed in OECD (2001), Mirrlees et al. (2011), McLure (1979), Gordon and MacKie-Mason (1995), Zucman (2014) and Bank (2001), Schlunk (2002), and Gravelle and Hungerford (2008). As is discussed in some of these references, these administrative goals could also be pursued through enhanced monitoring and enforcement regulations and efforts

[4] See Avi-Yonah (2004).

[5] For example, recent papers by Dávila and Hébert (2019) and Erosa and González (2019) suggest that the optimal corporate income tax rate is zero when dividend taxes or capital gains taxes are available. And Bird (1996) writes: "One important policy question on which most economists appear to agree, however, is that there is very little to be said in favour of taxing corporations."

of the corporate form. Specifically, the privileges that come with the taxable corporate form make it possible for corporations to operate—and benefit from the state's activities—at scale, magnifying the returns to corporate capital. It is an old idea and a popular one, but among tax theorists it is also a largely neglected one (with meaningful exceptions discussed below). We believe it merits reconsideration.

The benefit-based view is the only one (at least of which we are aware) that can make the uncertain incidence of the corporate income tax a reason *for* rather than against the use of the tax. As we show below, a simple but as-yet unrecognized economic mechanism causes the incidence of the tax to correspond to the incidence of benefit from the activities of the state. That is, those stakeholders who benefit more from public spending due to the corporate form are also those who bear more of the incidence of the corporate tax. In a baseline specification, the results are especially stark: a tax rate increase and a suitable increase in public spending have exactly offsetting incidence, yielding zero *net* incidence of a combined policy change on all corporate stakeholders; and the *relative* incidence of any size tax change on capital and labor is the same as the relative incidence of any size change in public spending. In this way, the benefit-based view converts the uncertain incidence of the corporate tax from a fault to a virtue.

Reassuringly, a benefit-based objective for the corporate income tax can also give new force to, or at least coexist with, the instrumental reasons for the tax noted above. Rents can be seen as a particular and highly taxable form of benefit obtained from the activities of the state. Backstopping other taxes is especially justifiable when those taxes are part of a benefit-based system that, as a whole, assigns taxes to beneficiaries.[6] And the pursuit of other, more distant goals, such as limiting excessive corporate political power through the corporate tax, is not any more or less compelling under a benefit-based view than under welfarism.

Perhaps most importantly, the benefit-based view does more than avoid the pitfalls of the welfarist view or support other goals; it provides an *affirmative* case for the corporate income tax. Under the benefit-based view, the primary reason for taxing corporate income is to support a fiscal virtuous cycle in which those who benefit from the state's activities pay for those activities accordingly and, in an important sense, voluntarily. Taxable corporations' stakeholders surely derive benefit from the state's activities in unique ways that they would rather pay to retain than lose. In other words, a benefit view holds that we tax corporations so that their stakeholders get what they pay for and pay for what they get.

This affirmative case for the corporate income tax is consistent with the tax's widespread and persistent popularity as well as with public frustration that corporations do not pay more. The United States has had a corporate income tax for over a century, and the average rate among OECD countries in 2023 was 23.6 percent (all were at least 9 percent).[7] Recent international policy initiatives have aimed to reduce corporate tax avoidance, deter the "race to the bottom"

[6] See Weinzierl (2018b) for an application of the benefit principle to the personal income tax.

[7] Major middle-income countries such as Brazil, China, India, and Nigeria assess still greater rates. See https://stats.oecd.org/Index.aspx?DataSetCode=CTS_CIT.

encouraged by tax havens, and set a floor on corporate income tax rates. Similarly, public opinion research from Gallup has shown that, since at least 2004, approximately two-thirds of Americans have consistently said corporations pay "too little" in taxes.[8] In 2023, 61 percent of respondents said they were bothered "a lot" by corporations who did not pay their "fair share," (Oliphant 2023), and in 2024, only 17 percent of Americans believed that corporations paid their fair share (Gallup Inc 2024). Together, these opinions and choices strongly suggest that the public and policymakers do not see the corporate income tax as risky or only instrumentally useful.[9] In this paper, we consider how a benefit-based view may explain why.

One reason to be optimistic that the benefit-based view has both prescriptive and descriptive power is its continued use in the context of interjurisdictional taxation—that is across countries, states, and localities (Vogel 1988a,b,c; Weinzierl 2018a; Escribano 2019). There, in the tradition of Tiebout (1956), it is standard to see jurisdictions as competing to offer a package of taxes and publicly provided goods and services that is attractive to taxpayers, including corporations—exactly the fiscal virtuous cycle behind the benefit-based idea. At a more granular level, debates over residence-based, source-based, and destination-based taxation of corporate income have tapped into benefit-based reasoning, focusing on which country should be assigned the credit for providing the public goods and services that support corporations (see Musgrave 2000 and Stewart 2015).[10] In sharp contrast, the welfarist approach is poorly suited for this interjurisdictional context, as it typically ignores the benefit side of the cost-benefit tradeoff corporations face in locational decisions.[11] For those who are convinced that the benefit-based view applies well to this setting, our contribution can thus be recast as explaining how—and potentially why—it might apply within jurisdictions as well as it does across them.

The paper is organized as follows, with the hope that it provides the reader with the historical

[8] See Gallup Inc (2007): https://news.gallup.com/poll/1714/taxes.aspx.

[9] As Bird (1996) suggests, it may be tempting to attribute public and policymaker support for the corporate tax to strong beliefs about its incidence, but its incidence can never be more sure than that of direct taxes on stakeholders.

> In sharp contrast, recent events in many countries have once again demonstrated that the general public is almost equally unanimous in holding the opposite conclusion, namely, that corporate taxes are among the best of all taxes. It is, of course, easy for economists to demonstrate that these popular views must largely be wrong, since they are based on fundamentally unconvincing beliefs about the incidence of corporate taxes—and in fact, as already suggested, the inherent uncertainty about corporate tax incidence actually provides another reason for suggesting that there is no place for such taxes in a tax system concerned to achieve efficiency and equity.

At the other extreme, some may argue that the unclear incidence of the tax is the source of its support, as all taxpayers can simultaneously believe they do not bear its burden. Collective delusion on such a long-lasting and often-debated policy seems implausible, however, especially given the prominence of incidence-based arguments in the debate.

[10] To the extent that the activities of states support not just the management, production, or sale of a firm's output, but all three, a mixture of bases would be justified as optimal under a benefit-based view. Ideally, the distribution of tax payments across residence, source, and destination would be proportional to the role each state played in facilitating the return to capital produced by the overall activity.

[11] Becker (2021), while still working within the welfarist paradigm, moves a step closer towards this reason for the imposition of the corporate income tax by assuming that some public good needs to be funded. More generally, welfarist analysis would arguably be more accurate if it incorporated the effect of state activities on corporations in its models.

and conceptual context, theoretical tools, and empirical evidence sufficient to thoroughly and thoughtfully consider the case for the benefit-based view of the corporate income tax. Section 2 surveys the history of this view in policy and academic research, both showing that its recent scholarly neglect stands in stark contrast to its long-standing prominence and offering an explanation for the divergence that clarifies common misconceptions about the benefit-based view. Section 3 formalizes a model of benefit-based corporate taxation, characterizing optimal taxes in this approach. Section 4 uses the model to demonstrate how the incidence of tax and benefit are determined by the same forces and thus, in a baseline case, can deliver zero net incidence and support a fiscal virtuous cycle. It also explores how the benefit-based view may explain some of the many complexities of existing corporate tax design. Section 5 provides a working example of how we might take the model to data, estimating a plausible value for its key parameter. Section 6 provides suggestive evidence that recent, simultaneously announced increases in US corporate tax rates and government spending had—consistent with the theoretical results—zero net incidence on the returns to corporate capital on average and non-zero incidence on corporations with greater exposure to the tax increases. Section 7 presents new survey evidence that affirms widespread support for both the corporate tax and the benefit-based view of it, especially when the spending funded by taxation is made salient. A concluding section provides discussion and suggestions for further research, and an Appendix considers extensions.

2. The history of the benefit-based view of the U.S. corporate income tax

The benefit-based principle is perhaps the oldest foundation for optimal taxation, but it has fallen out of favor among scholars over the last century, who rarely use it today outside of the interjurisdictional context mentioned above. In particular, it is rarely used in the analysis of optimal taxation—of any type—at the national level. As explained below, we attribute this shift to an unfortunate narrowing of the conception of benefit-based taxation, and we return to the broader, classical view of Smith (1776) and Musgrave (1959) and apply it to the taxation of corporations.

The idea that corporations should be taxed based on the benefit they receive from the activities of the state can be traced back centuries. An illustrative example in the context of state-level property taxation in the early United States is provided by Bank (2001, footnotes removed):

> In Massachusetts, for example, a manufacturing corporation resisted the application of a tax assessed in 1817 for the support of the church parish in which the corporation's plant was located. The attorney for the corporation argued that because "corporations have no souls" for the parish to save, the tax cannot possibly apply to them. In rejecting this argument, the court not only noted that a tax is not

> like a fee that may be charged only to those who benefit from it, but it also pointed out that a corporation benefits just as much as an individual when its "[p]roperty is made more secure both by the education of children, and the religious and moral instruction of adults."

This Massachusetts court's benefit-based justification for a corporation paying (property) tax reflects the then-widespread practice of treating corporations as separate entities for tax purposes—for example if, but not only if, they enjoyed special benefits and privileges from their official state or federal charters (Bank 2001). Note how the court's judgment in the quotation above makes explicit reference to benefit derived indirectly from the full set of state activities, including those such as education that are not specifically targeted at supporting corporations.

Benefit-based reasoning retained its prominence when the rise of large, non-chartered, corporations in the mid- and late-nineteenth century brought with it—as part of the Progressive Era movement toward an expanded role for the state in the economy—the first U.S. federal taxes on corporate income. After two temporary impositions, a lasting corporate income tax was adopted in 1909. While policymakers' purposes included reaching shareholder wealth and counteracting personal income tax avoidance (Bank 2001), the explicit justification for it offered at the time by President Taft was as "an excise tax upon the privilege of doing business as an artificial entity and of freedom from a general partnership liability enjoyed by those who own the stock." Taft's explicitly benefit-based justification was useful in preventing charges of unconstitutionality, as the use of direct income taxes would have to wait until the passage of the Sixteenth Amendment in 1913 (Sutherland 1940). But it also reflected the long tradition of seeing the special status of corporations—through the bestowing of charters, access to public equity markets, or protection from unlimited liability—as grounds for their taxation. In other words, supporters drew on a set of justifications for the corporate income tax, and the benefit-based view was an important element of that set.

A quarter century later, a benefit-based justification—in this case tied to the scale that corporations were able to achieve due to the state's activities—motivated the introduction of graduated rates on corporate income. As Sutherland (1940) wrote contemporaneously:

> The Revenue Act of 1935 was passed in answer to a tax message from the President [Franklin D. Roosevelt] to Congress dated June 19, 1935, in which he contended that the advantages conferred by the government upon corporations increased in value as the size of the corporations increased, that the advantages gained by the large corporations engaged in interstate business were derived through the federal government chiefly and that the principle of taxation in accordance with ability to pay, as well as in accordance with benefits received, should apply to corporate taxation much as it had been applied to the individual income tax.

This enthusiasm among policymakers has continued into the present day. In the 2012 U.S.

Presidential election, much attention was paid to an apparent contrast between how the incumbent President Barack Obama and his challenger, Senator Mitt Romney, understood the factors behind success in business. But a closer reading of their rhetoric reveals a more nuanced story. Start with the following remarks by Obama:

> There are a lot of wealthy, successful Americans who agree with me — because they want to give something back. They know they didn't — look, if you've been successful, you didn't get there on your own....Somebody helped to create this unbelievable American system that we have that allowed you to thrive. Somebody invested in roads and bridges. If you've got a business — you didn't build that. Somebody else made that happen.

Romney's response was as follows:

> He [Obama] said this, "If you've got a business, you didn't build that. Somebody else made that happen." That somebody else is government, in his view. He goes on to describe the people who deserve the credit for building this business. And, of course, he describes people who we care very deeply about, who make a difference in our lives: our school teachers, firefighters, people who build roads. We need those things. We value school teachers, firefighters, people who build roads. You really couldn't have a business if you didn't have those things. But, you know, we pay for those things. Alright? The taxpayers pay for government. It's not like government just provides those to all of us and we say, "Oh, thank you government for doing those things." No, in fact, we pay for them and we benefit from them and we appreciate the work that they do and the sacrifices that are done by people who work in government. But they did not build this business.

These remarks reveal a fundamental *agreement* between Obama and Romney on the ideas at the heart of the benefit-based view of the corporate tax: both see the state's activities as an essential factor in business success, and both believe individuals who benefit from those activities should pay for them. They may disagree over the relative roles, and even primacy, of the state and the individual (or private sector) in driving that success, but that disagreement assumes a common, benefit-based, conceptual foundation.

Those closer to tax policymaking also use the benefit-based logic. In 2014, U.S. Treasury Secretary Jack Lew argued that corporate inversions should be opposed because "The firms involved in these transactions still expect to benefit from their business location in the United States, with our protection of intellectual property rights, our support of research and development, our investment climate, and our infrastructure, all funded by various levels of government. But these firms are attempting to avoid paying taxes here, notwithstanding the benefits they gain from being located in the United States."[12]

[12]For this quotation, and criticism of Lew's argument—though, notably, not of the benefit-based view—see

2.1. Recent skepticism of the benefit-based view, and why it is unjustified

Despite its past and present public prominence, the benefit-based view has been dismissed by most tax scholars over the last several decades as a way of understanding the modern corporate income tax. A particularly stark example is from McDonald (2016), writing about the proper interpretation of the 1909 statute: "The [benefit-based] argument was tenuous at the time. It should not even be raised now."

At the heart of this opposition lie two seemingly powerful critiques: first, the activities of the state from which corporations benefit cost too little to justify a substantial corporate income tax; second, those activities' effects extend too far beyond any specific corporate form to justify a special tax on it. In particular, key privileges granted to corporations—such as asset partitioning, perpetual life, liquidity, and dispersed equity ownership—cost the state little to provide, at least in terms of direct expenditure, and some extend to a variety of corporate forms.

These critiques reflect a particular—and we believe mistaken—view of benefit-based taxation in general (i.e., not just for taxing corporations) that has handicapped its acceptance for the last century. That view holds that the benefit being taxed comes from *specific* activities of the state which have a *direct* effect on the taxpayer. It arises naturally from a focus on the idea that benefit-based taxes are meant to charge a "price" for these specific public services which taxpayers are willing to pay, as in the marketplace for private services, and it suggests that a low cost of provision implies a low price. Justifying modern corporate income taxes as benefit-based taxes of this type would, for the reasons mentioned above, indeed be difficult.

But there exists an alternative, "classical" view (in the words of Musgrave 1959) of benefit-based taxation—extending back to at least Smith (1776), present in Lindahl (1919), and more recently resuscitated by Cooper (1994), Stewart (2015), and Weinzierl (2017). This view holds that benefit for a given taxpayer—and thus the relevant "price" they would be willing to pay—comes not from specific activities of the government, but from the way in which the state's *full set* of activities magnifies the taxpayer's economic capacity, or "ability". Note that this classical view, linking benefit to ability, is explicit in the Massachusetts law, the Roosevelt quote, the Obama-Romney debate, and the Lew remarks quoted above.

Under this classical view, the proper approach to benefit-based taxation is not to assign particular activities of the state to particular beneficiaries, but to use a measure of the benefit from the full set of the state's activities for each actor which best captures their effect on that actor's economic capacity.

In the case of the corporate tax, this classical view suggests seeing the four privileges mentioned above—asset partitioning, perpetual life, liquidity, and dispersed equity ownership—not as isolated activities of the state which benefit taxable corporations but, instead, as the privileges through which a taxable corporation benefits from the full set of the state's activities.[13] While

https://taxfoundation.org/blog/jack-lew-s-misinformation-us-corporate-tax-system/

[13] Note that it is the combination of these four privileges which provides the corporation with a unique advantage

passing the laws establishing these privileges may require little expenditure, their value to corporations relies on the maintenance of an entire economic society through a wide range of costly state activities. Establishing and enforcing the rule of law, preserving peace and political stability, regulating markets, and all other fundamental activities of the state are inseparable pieces of a whole, and corporations benefit from that whole. [14] Even a cursory glance at the global landscape will show that the existence of a corporate form is typically necessary but rarely sufficient for the aggregation of capital and successful business operation at scale.

Of course, corporations are not the only beneficiaries of the broad range of state activities, but the privileges corporations enjoy offer them unique power to make use of them. As the 1935 Act's explanation above emphasizes, they are of particular value to large corporations (or those who wish to become large, and thus choose taxable status), explaining the differential tax treatment across corporate forms.[15] For example, despite the higher tax burden, standard (taxable) C-corporations in the US were 55 times the size of the average (not directly taxed) S-corporation in 2013.[16] In other words, the taxable corporate form brings privileges that enable the activities of the state to substantially magnify the returns to corporate capital.

2.2. Relationship to existing literature

As described above, this paper's primary relationship to the existing literature on corporate taxation is an unusual one. It argues that a now widely dismissed view of the corporate tax, which was important early on in the literature and remains so in some corners of it, has untapped potential for more general use. In so doing, it provides an alternative to the many instrumental or administrative justifications for the corporate income tax that have been offered. None of those justifications makes the link between taxes and benefits that is at the core of the benefit-based view, so the contrast is fundamental. In particular, the benefit-based view is the only justification of which we are aware that focuses on what we have called the fiscal virtuous cycle and the corporate income tax's role in supporting it.

This paper's approach also builds on a second, separate literature that models the role of

that enables scale in capital accumulation within the firm. Asset partitioning protects investors' assets from the liabilities of the corporation (and vice versa). Asset partitioning then enables perpetual life by permanently locking capital into the firm. Perpetual life allows investors to transform the future wealth of the corporation into present wealth through the sale of equity shares, providing liquidity to the individual investor. This liquidity then allows dispersed equity ownership as shares can be easily bought and sold while the corporation lives on. Dispersed equity ownership—a unique feature of the corporation in the U.S.—then makes all the other privileges much more value since together they enable scale in capital accumulation, which allows for greater returns to capital. See Hansmann and Kraakman (2000), Dari-Mattiacci et al. (2017), Livermore (1935), and Stout (2014) for more details.

[14] These arguments are not unrelated to those in Murphy and Nagel's (2016) Myth of Ownership , though we take somewhat different lessons from them for the appropriate normative approach.

[15] At least in the US tax code, the judgment appears to have been made that the benefit from the state's activities for the parties to corporate forms other than the taxable C-corporation—S-corporations, LLCs, partnerships, etc.—can be taxed directly on the incomes of owners, workers, and customers, rather than through the corporate form.

[16] Data from Internal Revenue Service (IRS) SOI Tax Stats - Corporation tax statistics (https://www.irs.gov/statistics/soi-tax-stats-corporation-tax-statistics). See Cooper et al. (2016) and Donohoe, Lisowsky, and Mayberry (2019) for further details on the cost of C-chapter and S-chapter corporations.

specific public goods in private production. In pioneering work, Kaizuka (1965) and Sandmo (1972) derived efficiency conditions for how much of any given public good should be produced, given its impact on firms' production of final consumption goods. The resulting optimality conditions yield shadow prices for those public goods that, as Sandmo notes, efficiently "price" public goods for firms, though he does not pursue the potential link to taxes.[17] Though this separation is also the standard approach in modern optimal tax theory more generally (in the Ramsey or Mirrlees tradition), it is anathema to the idea of benefit-based taxation, according to which the underlying purpose of taxation is not to raise revenue in a minimally distortionary way (or to maximize welfare) but to align the benefit of the state's activities with its funding and thus generate a fiscal virtuous cycle.[18] Similarly, while this literature focuses on how specific public goods benefit corporations, we focus on how the privileges of the corporate form magnify the benefit of the full set of the state's activities for the taxed corporation. As discussed below, this wider definition of the state's activities is essential to the case for a benefit-based view of the corporate tax.

3. A model of optimal benefit-based corporate income taxation

In this section, we formalize a classical benefit-based approach to corporate income taxation and derive results characterizing optimal policy.

We begin by assuming that there are a finite number of corporations, each with an unobservable firm-specific level of productivity z_i. This firm-specific productivity factor affects each firm's total output, which is defined by a constant returns to scale production function $f(z_i, k_i, l_i)$, where k_i and l_i are the capital and labor inputs used by the firm, respectively.[19] Firms may vary in the benefit they obtain from the activities of the state depending on their productivity, and (as we show below) optimal benefit-based corporate taxes will vary across firms accordingly. We assume that firms operate as price-takers in a perfectly competitive market, and there is no strategic interaction between firms.

Next, we specify how the state's activities affect corporations. In keeping with our discussion in previous sections, we adopt a view of benefit in which the privileges of the corporate form turn

[17] Sandmo writes "The revenue which will be necessary to provide the resources for this government production will have to be raised by taxation in some way. If this can be done by non-distortive taxation, the raising of revenue is a completely separate issue and has nothing to do with the efficiency criteria." Other works in this literature which consider similar questions under various settings include: Manning, Markusen, and McMillan (1985), Feehan (1998), Feehan and Matsumoto (2002), Gugl and Zodrow (2015, 2019) Matsumoto and Sugahara (2017). Note that a parallel macroeconomic literature similarly considers the link between productive public spending and taxation, albeit with a focus on economic growth, including Glomm and Ravikumar (1994) and Aschauer (2000).

[18] In related work, Weinzierl 2018b formalizes an approach to having the state's activities affect income-earning abilities that can be readily incorporated into standard modern optimal tax theory.

[19] Unobservable heterogeneity across taxpayers is an important part of modern optimal tax theory, whether in the Mirrleesian tradition or in the Classical Benefit-Based tradition we consider here. In Mirrleesian labor income tax models, an individual's income-earning ability is unobservable because their labor effort is also unobservable. Similarly, here, a firm's productivity is unobservable because at least some its other inputs—including the same labor effort—is also unobservable.

the state's activities into a magnifying force for the return to capital. Formally, we incorporate a level of public spending G into an otherwise-standard model of the profit-maximizing firm. We consider a "baseline" case in which a benefit function $g(G)$ simply multiplies taxable profit: the difference between revenue and labor costs. The corporation solves:

$$\max_{k_i, l_i} \quad g(G)[f(z_i, k_i, l_i) - wl_i] - rk_i - T_i. \tag{1}$$

where T_i is a general representation of the tax on the corporation of type i. We discuss why this is our baseline case, and consider alternatives, below.

With this setup, we can now turn to characterizing optimal benefit-based corporate taxation.

3.1. First-best optimal benefit-based corporate taxation

We follow the canonical Lindahl (1919)[20] approach to benefit-based taxation, which asks the following question: If assigned a given share of total tax liabilities, what level of government spending on the activities of the state would each taxpayer choose as optimal? Then, the Lindahl solution is a vector of shares for which all taxpayers choose the same optimal level of spending and which sum to one, fully funding the state. We apply Lindahl's approach to the context of corporations, rather than human persons.

As this description implies, a central virtue of benefit-based taxation is that taxpayers are choosing their preferred combinations of spending and taxation. In an idealized version, one might even suppose that taxpayers would truthfully reveal their preferences. We will consider a more realistic version below, but first we characterize optimal taxes in such a "first-best" setting. Lindahl himself focused on this case (though not for corporations), and it provides intuitive reference points for the "second-best" setting below.

With truthful revelation of taxpayer preferences, firms can be assigned their preferred (that is, profit-maximizing) type-specific lump-sum tax shares from the Lindahl solution. Formally, we maximize the firm's after-tax profit, choosing not only capital and labor inputs but also G_i, firm i's preferred level of government spending, taking as given a cost share for firm i of total public spending, denoted τ_i:

$$\max_{k_i, l_i, G_i} \quad g(G)[f(z_i, k_i, l_i) - wl_i] - rk_i - \tau_i G_i.$$

Again, the first-best Lindahl equilibrium is a set of cost shares $\{\tau_i^{\text{FB}}\}_i$ and a level of public

[20] The Lindahl approach is not the only approach to benefit-based taxation, but it is the most elegant. Other approaches can be found in Brennan (1976), Moulin (1987), and Hines (2000). Their characteristics are examined thoroughly in Scherf and Weinzierl (2019).

input provision G^{FB} that satisfy the first-order conditions for each firm type i:

$$g(G)\frac{\partial f}{\partial k_i} - r = 0; \quad \frac{\partial f}{\partial l_i} - w = 0; \quad g'(G)[f(z_i, k_i, l_i) - wl_i] - \tau_i = 0,$$

and two additional conditions:

$$G^{FB} = G_i \forall i, \tag{2}$$

$$\sum_i \tau_i^{FB} = 1. \tag{3}$$

In words, expression (2) means that the cost shares τ_i are chosen so that the profit-maximizing preferred level of public spending G_i is the same for all firms i. Expession (3) means that the sum of these cost shares across all types is one, so that taxes exactly fund the provision of the optimal level of public spending.

Conditions (2) and (3) are the heart of the benefit-based approach. They formalize how it yields a fiscal virtuous cycle: an outcome in which taxpayers are choosing optimally as individuals while agreeing collectively to fund a common level of state activities.

For future reference, we calculate the effective linear tax rate on taxable profit for firm type i as:

$$t_i^{FB} = (\tau_i G^{FB})/(g(G^{FB})[f(z_i, k_i, l_i) - wl_i]).$$

To simplify notation, we denote taxable profit as π_i and define η_i as the *direct* elasticity of profit with respect to public spending holding k_i constant:

$$\eta_i = \frac{\partial \pi_i}{\partial G_i}\frac{G_i}{\pi_i}.$$

Substituting in the firm's first order condition for G_i yields:

$$t_i^{FB} = \eta_i. \tag{4}$$

In words, if the corporate tax were non-distortionary, then in this baseline specification of (1) the first-best benefit-based policy would set firm i's effective linear corporate tax rate equal to the elasticity of its profit with respect to public spending. This result immediately implies that the first-best level of public spending is:

$$G^{FB} = \sum_i \eta_i \cdot \pi_i(k_i, G). \tag{5}$$

These first-best values in expressions (4) and (5) will provide useful benchmarks for the

constrained-optimal analysis that follows.

3.2. Second-best, linear optimal benefit-based corporate taxation

Next, we consider a more realistic, "second-best" case, assuming that tax policy is constrained to distortionary (potentially type-specific) linear tax rates rather than lump-sum taxes.[21] Specifically, we assume that $T_i = t_i\pi\left(z_i, k_i, l_i, G\right)$, so that in the baseline case from expression (1) the firm solves:

$$\max_{k_i, l_i} \quad (1 - t_i)g(G)[f(z_i, k_i, l_i) - wl_i] - rk_i. \tag{6}$$

The symmetry with which the distortionary tax and government spending affect the corporation in our baseline case expression (6) is intentional. The corporate income tax operates as a benefit-based tax to the extent that the tax base matches what we call the "benefit base," that is to the extent that the corporate tax and the benefit from the state's activities operate on the same object for the firm. In expression (6), they both operate on the return to capital, so the tax base and benefit base are identical. In practice, the tax base is a policy choice and could be specified in a way that fails to match the benefit base (in Appendix C we study the implications of one such example). The exact match in our baseline case allows us to demonstrate most clearly the benefit-based view of the corporate income tax.[22]

We derive optimal policy in three steps.

The first step is to derive expressions for the firm's optimal choices k_i^* and l_i^*, taking as given tax policy and the activities of the state. The relevant first-order conditions of expression (6) are:

$$g(G) \cdot \partial f\left(z_i, k_i^*, l_i^*\right)/\partial k_i = r/(1 - t_i),$$

and

$$\partial f\left(z_i, k_i^*, l_i^*\right)/\partial l_i = w.$$

Note that (because capital is not expensed), the firm's optimal choice of capital k_i^* depends on the tax rate t_i while its optimal choice of l_i^* does not.[23]

The second step is to identify the values of t_i and G_i that maximize profit for firm type i, taking as given its choices of k_i^* and l_i^* and subject to a constraint that the firm's tax bill will

[21] Coles et al. (2019), for example, finds quite large responses of firm profit to the corporate income tax in the United States.

[22] As we will see in the next section, this exact match also delivers zero net incidence of the tax on all stakeholders, and more broadly the extent to which the tax base matches the benefit base determines the pattern of net incidence.

[23] We therefore assume that the intention of the corporate tax is to levy a tax on the benefit accruing to corporate capital. Other taxes not explicitly included in our analysis may be components of a comprehensive set of benefit-based taxes which address other channels of benefit. For example, the personal income tax may target the benefit accruing to labor and human capital in general (see Weinzierl (2018b) for an exploration of this idea) while value-added taxes may provide a way for the state to tax all parties (even exporters from abroad) who benefit from the support it provides for market transactions within its borders.

cover a share τ_i of G_i, such that:

$$t_i \pi_i = \tau_i G_i. \tag{7}$$

This "cost share constraint" is the connection to Lindahl's first-best approach in this second-best setting. Formally, we solve, for firm type i:

$$\max_{1-t_i, G_i} \quad \mathcal{L}_i = (1 - t_i) g(G_i)[f(z_i, k_i^*, l_i^*) - w l_i] - r k_i^* + \lambda_i (t_i \pi_i - \tau_i G_i). \tag{8}$$

where λ_i is the Lagrange multiplier on the cost share constraint. We can write the first order conditions of this problem as:

$$\frac{\partial \mathcal{L}_i}{\partial G_i}: \quad \left(\frac{1 - t_i}{t_i}\right)\left(\frac{\eta_i}{1 - \eta_i - e_i^G}\right) = \lambda_i \,, \tag{9}$$

$$\frac{\partial \mathcal{L}_i}{\partial 1 - t_i}: \quad \frac{1}{1 - e_i^T\left(\frac{t_i}{1 - t_i}\right)} = \lambda_i \,, \tag{10}$$

where we make use of three elasticities: η_i, e_i^G, and e_i^T. As defined above, η_i is the *direct* elasticity of profit with respect to public spending, holding k_i constant. Next, $e_i^G = \left(\frac{\partial \pi_i}{\partial k_i^*}\frac{\partial k_i^*}{\partial G_i}\right)\frac{G_i}{\pi_i}$ is the *indirect* elasticity of profit with respect to public spending, telling us the impact of an increase in G on profit through the firm's optimal choice of k_i.[24] Finally, $e_i^T = (\frac{\partial \pi_i}{\partial k_i^*}\frac{\partial k_i^*}{\partial (1-t_i)})\frac{1-t_i}{\pi_i}$ is the *indirect* elasticity of profit with respect to the net-of-tax rate $1 - t_i$.[25]

The third step is to identify a set of optimal cost shares $\{\tau_i^*\}_i$ and an optimal level of public spending G^* that satisfy the following conditions:

$$G_i = G^*, \qquad \forall i, \tag{11}$$

$$\sum \tau_i^* = 1. \tag{12}$$

These conditions parallel expressions (2) and (3) of the first-best equilibrium above: namely that all types agree on the optimal level of public spending given tax rates, and that the sum of the optimal cost shares across all types is one. As in that case, these conditions on the individual (firm) taxpayers' optimal choices of taxes and spending are what capture the fiscal virtuous cycle at the heart of the benefit-based approach.

Using these results, we can solve for the constrained-optimal ("second-best") benefit-based

[24] Note that this indirect elasticity is analogous to the difference between general equilibrium elasticities and production function elasticities as discussed in Ramey (2021) for the case of output elasticities of public infrastructure.

[25] See Appendix A for derivations of the first order conditions for the reader's reference.

corporate income tax rate t_i^*:

$$t_i^* = \frac{\eta_i}{1 - e_i^G + \eta_i e_i^T}. \tag{13}$$

We can also solve for the constrained-optimal level of public spending G^* by using conditions (7), (11) and (12) to simplify expression (13) and obtain:

$$G^* = \sum_i \frac{\eta_i \pi_i(k_i, G)}{1 - e_i^G + \eta_i e_i^T}. \tag{14}$$

3.3. Comparing first-best and second-best results

The denominators of (13) and (14) show that two behavioral responses distort the constrained-optimal policy (t_i^*,G^*) away from first-best policy (t_i^{FB}, G^{FB}) in expressions (4) and (5): the corporation's response to a change in public spending (through $-e_i^G$), and the corporation's response to a change in the corporate tax rate (through $\eta_i e_i^T$). As would be expected, the former increases the second-best optimal tax rate and the level of public spending, while the latter decreases them. The second-best policies thus account for the fiscal externality from the firm's responses to changes in the tax rate and public spending.

The size of the gap between first-best and second-best policies is ambiguous in general,[26] but in our baseline case, we find a striking result. When the benefit of state activities enters the firm's problem as in expression (6), namely as a multiplier of taxable profit, we find that $e_i^G = \eta_i e_i^T$, so that the denominator of the optimal corporate tax expression (13) simplifies to 1. That is, the second-best policy corresponds exactly to the first-best policy, with $t_i^* = t_i^{\text{FB}} = \eta_i$, and $G^* = G^{\text{FB}} = \sum_i \eta_i \pi_i(k_i, G)$.

Intuitively, because the tax and spending affect the firm in symmetric ways, the firm's optimal choices are "distorted" in offsetting ways by them. As much as the tax lowers optimal capital, government spending raises it. In this result we see again how the benefit-based corporate income tax supports a fiscal virtuous cycle.

To see this formally, note that we can write $\eta_i = \frac{g'(G)G}{g(G)}$. To obtain e_i^G and e_i^T we need $\partial k_i/\partial G$ and $\partial k_i/\partial(1 - t_i)$ respectively. We obtain these by applying the implicit function theorem to the firm's first order condition for capital and combining with $\partial \pi_i/\partial k_i$. These terms can then be written as:

$$e_i^G = -g(G)\frac{\partial f}{\partial k_i}\left(\frac{g'(G)(\partial f/\partial k_i)}{g(G)(\partial^2 f/\partial k_i^2)}\right)\left(\frac{G}{g(G)[f(z_i, k_i, l_i) - wl_i]}\right)$$

[26] This result provides a generalization of the modifications to the Samuelson (1954) condition due to Pigou (1947), Atkinson and Stern (1974) and Stiglitz and Dasgupta (1971), who showed the importance of including the distortionary effects of taxation when determining the optimal scale of public spending. We add the idea that the effects of public spending itself on government revenue ought to be taken into account (Slemrod and Yitzhaki 2001).

$$e_i^T = -g(G)\frac{\partial f}{\partial k_i}\left(\frac{r(1-t_i)^{-2}}{g(G)(\partial^2 f/\partial k^2)}\right)\left(\frac{1-t_i}{g(G)[f(z_i,k_i,l_i)-wl_i]}\right)$$

The denominator of the optimal tax formula, $1-e_i^G+\eta_i e_i^T$, is then:

$$1+\left(\partial f/\partial k_i-\frac{r}{g(G)\cdot(1-t_i)}\right)\left(\frac{g'(G)}{g(G)(\partial^2 f/\partial k_i^2)}\frac{G(\partial f/\partial k_i)}{f(z_i,k_i,l_i)-wl_i]}\right)$$

Using $\partial f/\partial k_i = r/[g(G)\cdot(1-t_i)]$, this expression reduces to 1, implying that the first-best and second-best optimal policies are identical.

3.4. Specific functional forms

To provide intuitive examples of optimal policy, we assume specific functional forms for $g(G)$.

First, suppose that $g(G)$ takes the form $g(G) = G^\gamma$. Under this case, the direct public spending elasticity is simply $\eta_i = \gamma$. Thus, the optimal corporate tax rates are constant across types and exactly equal to the first-best benefit-based tax rate, $t_i^* = t_i^{\text{FB}} = \gamma$, and the optimal level of public spending is $G^* = G^{\text{FB}} = \gamma\sum_i \pi_i(k_i, G)$. Note that, in this particular case, the exponent γ can be interpreted as a factor share, and the government optimally taxes corporations according to the importance of the state's activities in firm profit. For example, a minimal role for the state will mean a small γ and thus a small justified corporate tax. This result corresponds directly to the idea that corporations should "get what they pay for and pay for what they get," and we can use it to interpret debates such as that between Obama and Romney (from Section 2) as debates over the size of γ.

Second, if $g(.)$ is a function of the firm's productivity type z_i, we can show that the *progressivity* of the optimal benefit-based corporate income tax rate depends on the relationship between η_i and z_i. Suppose, for example that the function $g(G, z_i)$ takes the form of $g(G, z_i) = G^{z_i\gamma}$. Then the optimal benefit-based corporate tax for a firm with productivity i is $t^* = z_i\gamma$; that is, the more productive the firm, the higher its optimal tax rate. At the same time, the optimality condition for capital implies that k_i^* and π_i^* are increasing in z_i, so that the more productive the firm, the larger the firm (measured by capital) and its profits. In other words, under this specification of $g(G, z_i)$, the optimal benefit-based corporate tax is progressive. Multiple corporate income tax brackets, as in the United States, might reflect such a relationship between z_i and η_i

Both of these cases generate policies that have a strong intuitive fit with the idea of the fiscal virtous cycle. In each, corporate stakeholders are paying for the activities of the state according to the relative importance of those activities to their delivering returns to corporate capital.

4. The *virtue* of the corporate tax's uncertain incidence

In this section we explore the—we believe unique—power of a benefit-based view of the corporate tax to convert uncertainty in the incidence of the tax from a fault into a virtue. We show that

the relative elasticities among the parties to the corporate form determine both who bears the burden of the tax and who accrues the benefit of the state's activities. In other words, the fiscal virtuous cycle we have discussed operates not only at the level of the corporation but also at the level of individual corporate stakeholders.

The intuition is as follows. As discussed above, the corporate form brings with it privileges that magnify the corporation's ability to benefit from the broad range of the state's activities. Which party to the corporate form benefits from that magnification will depend on the outside options available to them. For example, the more that shareholders in U.S. C-corporations find partnerships, LLCs, non-U.S. companies, personal consumption, and other possible destinations for their capital comparatively unattractive, the more those shareholders benefit from the C-corporate form and the more inelastically they will supply their capital to it. That increased inelasticity also implies—as is familiar from standard tax theory—that they will bear more of the burden of the tax on C-corporations. As we show below, this correspondence is exact in our baseline case, where the benefit base exactly matches the tax base.

4.1. Extending the model

To formally study incidence, we need to add to our model the supply side of the capital and labor markets. We assume pared-down preferences for capital owners and workers (labor owners), with utility functions of the form:[27]

$$u^k(k) = rk - \frac{k^{1+1/e_k}}{1+1/e_k}, \qquad u^l(l) = wl - \frac{l^{1+1/e_l}}{1+1/e_l},$$

where the terms e_k and e_l are the elasticities of capital and labor supply in the taxable corporate sector with respect to r and w, their respective payments within that sector. These utility functions show that capitalists and workers trade off the direct returns to supplying capital and labor to taxable corporations with the disutility from supplying them (i.e., due to foregone outside options, such as supplying those factors to other types of corporations or using them for personal consumption or leisure). The individuals' optimal choices of k and l are determined by the first-order conditions

$$r^{e_k} = k, \tag{15}$$

$$w^{e_l} = l. \tag{16}$$

[27] Used also by Saez and Zucman (2019) in their incidence analysis. While this approach is familiar for the suppliers of labor, its use for suppliers of capital may be less so. In this context, it allows us to capture in a simple manner that capitalists could invest in non-corporate businesses, foreign corporations, or even personal consumption instead of in the corporations being taxed. Analytically, these forms cleanly deliver the elasticities of supply for both capital and labor which are critical to determining relative incidence.

4.2. Solving for incidence of policy changes

To determine incidence, we start by assuming—for simplicity—a form for $g(G)$ that yields a single optimal tax rate t, as in the case where $g(G) = G^{\gamma}$. We then define $\varphi_{r,t} = \frac{dr}{r} / \frac{dt}{1-t}$ and $\varphi_{r,G} = \frac{dr}{r} / \frac{g'(G)dG}{g(G)}$ as the elasticities of the rate of return to capital with respect to the corporate tax rate and public spending, respectively. The elasticities of the wage, $\varphi_{w,t}$ and $\varphi_{w,G}$ are defined similarly.

Next, we use expressions (15) and (16) to simplify the expression for the corporation's elasticity of substitution in general equilibrium, namely $\sigma = \left(\frac{dk}{k} - \frac{dl}{l}\right) / \left[\frac{dw}{w} - \left(\frac{d\bar{r}}{\bar{r}} - \frac{g'(G)dG}{g(G)}\right)\right]$, where $\bar{r} = r/(1-t)$ is the corporation's tax-inclusive cost of capital. This yields:

$$\sigma\left(\frac{g'(G)\,dG}{g(G)} - \frac{dt}{1-t}\right) = \left(e_k + \sigma\right)\frac{dr}{r} - \left(e_l + \sigma\right)\frac{dw}{w}. \tag{17}$$

Constant returns to scale implies $g(G)\,f(z,k,l) = \bar{r}k + wl$. Differentiating and simplifying, we obtain:

$$\alpha\left(\frac{g'(G)\,dG}{g(G)} - \frac{dt}{1-t}\right) = g(G)\,(1-\alpha)\,\frac{dw}{w} + \alpha\frac{dr}{r}, \tag{18}$$

where $\alpha = \bar{r}k/f(z,k,l)$ is the share of $g(G)\,f(z,k,l)$ accruing to capital and $1-\alpha = wl/f(z,k,l)$ is the share accruing to labor.

Finally, we can use expressions (17) and (18) to produce expressions for the incidence of the corporate tax and public spending on capital and labor:

$$\varphi_{r,t} = -\varphi_{r,G} = -\frac{\alpha\left(e_l + \sigma\right) + (1-\alpha)\,\sigma g(G)}{\alpha\left(e_l + \sigma\right) + (1-\alpha)\left(e_k + \sigma\right)g(G)}; \tag{19}$$

$$\varphi_{w,t} = -\varphi_{w,G} = -\frac{\alpha e_k}{\alpha\left(e_l + \sigma\right) + (1-\alpha)\left(e_k + \sigma\right)g(G)}. \tag{20}$$

As expected, increases in the corporate tax tend to reduce returns to the factors of production while increases in public spending tend to raise them, as all terms are individually non-negative.

4.3. Alignment between tax and benefit incidence

Results (19) and (20) reveal that a single mechanism is behind the incidence on the factors of production of both the tax and the benefit. The elasticities of capital and labor supply, in particular, enter in the same ways in the expressions for the incidence on both the corporate tax and public spending on each factor.

Some extreme cases help with intuition. For example, in the case of capital, we can see that

as $e_k \to \infty$, $\varphi_{r,\tau}$ and $\varphi_{r,G}$ both shrink to zero, so that infinitely elastic capital bears no burden from the tax and enjoys no benefit from corporate privileges that magnify the effects of the state's activities on corporate profit. The former effect is familiar, but the latter reflects that infinitely elastic capital suppliers must be indifferent between—and thus obtain no particular benefit from—the corporate form versus other options for their capital. The same holds for labor, in expressions for $\varphi_{w,\tau}$ and $\varphi_{w,G}$, as $e_l \to \infty$. Away from these limit cases, the relative elasticities of capital and labor supply determine the shares of the burden and the benefit for capital and labor. The more elastic is capital supply relative to labor, the less of the burden capital bears and the less of the benefit it enjoys.

We define *net incidence* as the combined effect on r or w of a joint policy change in both the corporate tax and public spending. Using this notation, we can express net incidence generally as:

$$\frac{dr}{r} = \varphi_{r,t}\frac{dt}{1-t} + \varphi_{r,G}\frac{g'(G)\,dG}{g(G)}, \tag{21}$$

$$\frac{dw}{w} = \varphi_{w,t}\frac{dt}{1-t} + \varphi_{w,G}\frac{g'(G)\,dG}{g(G)}, \tag{22}$$

for capital and labor, respectively. It may be worth noting that standard modern optimal tax theory judges the corporate tax's appeal based on its direct incidence alone, namely the $dt/(1-t)$ terms, rather than on its net incidence as expressed here.

An immediate implication of results (21) and (22) is that, in our baseline case, any policy experiment in which $\frac{g'(G)dG}{g(G)} = \frac{dt}{1-t}$ will have $\frac{dr}{r} = \frac{dw}{w} = 0$, so that net incidence is zero for both capital and labor. In other words, in this case the incidence of the corporate tax increase precisely matches the incidence of the increase in the benefit of public spending on both capital and labor.[28]

We can also define *relative incidence* as the ratio of the incidence on capital and labor of a policy change. For example, the ratio $\varphi_{r,t}/\varphi_{w,t}$ shows the ratio of the incidence of a tax change on capital and labor. In our baseline case, results (19) and (20) imply a particularly stark result: the relative incidence of any corporate income tax change is identical to that of any change in public spending.

4.4. Complexity in corporate tax policy: a possible explanation due to heterogeneity in benefit, and an example with deductibility

One common source of skepticism toward a benefit-based approach is that no simple corporate income tax can hope to match the heterogeneity with which different corporations benefit

[28] This is analogous to what Louis Kaplow describes as being the case where the "incidence of the tax adjustment matches the incidence of the benefits of the public good" (Kaplow 1998).

from the activities of the state. Benefit may vary in complex ways with firm size, sector, capital intensity, financial structure, exposure to liability through its operations, and more. How could a corporate income tax be subtle enough to accommodate all this variation?

One response is that simplicity in a tax has its own value, such that matching benefit "on average" may be preferable to a more precise but cumbersome system.

A more conceptually interesting response is that the myriad subtleties of the corporate income tax system may be seen—with this benefit-based view in mind—as attempts to tailor the tax to how different corporations benefit from the state's activities. Multiple progressive marginal rates, industry-specific clauses, the asymmetric treatment of debt and equity financing, regulatory provisions, partial and variable expensing of investment: all of these and more may be seen as additional tools within the broad corporate tax system that tailor its impact across these and other dimensions of heterogeneity. By way of example, we now turn to exploring the last of these variations.

Most corporate tax systems around the world allow some portion of the cost of capital to be deducted from the corporate tax base, with that portion varying across industries, types of capital, and the business cycle. A benefit-based view suggests that these variations correspond to variations in how much the taxed corporation's return to capital is due to the state's activities. For example, greater deductibility implies less taxable benefit.

We generalize our results to the case of partially deductible investment costs. Let θ be the share of the cost of capital which can be deducted from the corporate tax base, where $0 \leq \theta \leq 1$. The corporation's first order condition with respect to capital becomes:

$$g(G) f_k = \frac{(1 - \theta t)}{(1 - t)} r.$$

We can define υ as the marginal effective tax rate, where $(1 - \upsilon) = (1 - t)/(1 - \theta t)$, and thus redefine the tax inclusive cost of capital to be $\hat{r} = r/(1 - \upsilon)$.

Our preceding analysis can be directly extended to this case if tax policy changes are always thought of as changes in the effective tax rate υ; that is, as a combination of changes in the corporate tax rate t, the deductibility of capital costs θ, or both. Then, our incidence and net incidence results can be readily used so long as they are understood in terms of this marginal effective tax rate rather than the statutory tax rate.

The policy pairing which would give a zero net incidence is now $\frac{g'(G)dG}{g(G)} = \frac{d\upsilon}{1-\upsilon}$, a result which has at least two implications of interest. For a larger initial θ (that is, an increase in the deductibility of capital), a smaller increase in public spending offsets any given change to t. Intuitively, the larger θ makes the increase in the statutory rate t less burdensome, so a smaller increase in public spending benefit is required to offset it. Second, an increase in t and a decrease in θ both imply that a larger increase in public spending is required to offset the greater burden on corporations.

Our results on relative incidence are unchanged: in our baseline case, for a suitably defined change in the corporate tax, any size corporate tax change has the same relative incidence on capital and labor as does a change in public spending.

5. Empirical illustration of the optimal tax formula

One appealing feature of the benefit-based view is that, in our baseline case, there is a sufficient statistic for the optimal corporate income tax rate that may be estimable from macroeconomic data. That sufficient statistic is the elasticity of profit with respect to government spending, the parameter η. The results of the previous section showed that, in the baseline case, one requires data on only G and corporate pre-tax profits to derive an estimate of η. This simplicity stands in stark contrast to welfarist approaches, which struggle to provide guidance on the optimal corporate tax given, among other challenges, the difficulty of estimating its incidence. In this section, we provide a simple illustration of how we might estimate η and thereby put the optimal tax formula into practice. The idea behind our approach is to provide a baseline for estimating the elasticity of before-tax profit with respect to public spending that is sufficiently simple to be replicable across countries—including developing states with limited data.[29]

5.1. Approach

The basic approach we use is to estimate the elasticity η by regressing the log of corporate profits on the log of a measure of public spending. Our framework is fundamentally an equilibrium approach, requiring some measure of responses beyond the short term. Denote Δ_h as the time difference between profit at time period $s-1$ and $s+h$. We use the local projection approach (Jordà 2005) to estimate the equation:

$$\Delta_h \log(\pi_{is}) = \hat{\eta}_h \Delta_h \log G_s + \mu_h' X_s + \alpha_i + u_{is} \tag{23}$$

As discussed by Jordà and Taylor (2024), measuring the cumulative elasticity requires a two step approach: first measuring the impact of $\Delta_0 \log(G)$ on $\Delta_h \log(G)$ for $h = 0, 1, \ldots, h$; and then measuring the impact of $\Delta_h \log(G)$ on $\Delta_h \log(\pi)$. This can be done using a two-stage least squares

[29] Despite this relative simplicity, we confront a number of challenges in the estimation of this parameter. The first is to appropriately define G. In the theoretical model we describe G as the total activities of the government. The simplest way to take this definition to the data is to measure G as the total spending of the federal government. The second challenge is that it is the long-run that matters rather than a short-run impact. Using an approach and data that enables measurement of the long-run elasticity is ideal. The third challenge is that the estimate of η may vary by firm type, but how to choose firm type and at what level to aggregate firms is both a modeling choice and a policy choice. A fourth challenge is that the elasticity may vary over time, and an appropriate measure of the elasticity is a forward-looking one. The fifth challenge is that public spending does not provide us with cross-sectional variation within a country, and we are instead forced to rely on temporal variation to estimate the elasticity. This requires us to use macroeconomic empirical methods rather than microeconomic methods. The sixth and final challenge we point out is that both government spending and corporate profits may be driven by the business cycle. Dealing with this requires including an appropriate measure of the business cycle as a control.

estimator, with $\Delta_0 \log(G)$ as an instrument for $\Delta_h \log(G)$. As in Boehm, Levchenko, and Pandalai-Nayar (2023), if $\hat{\eta}_h$ stabilizes over the horizon of the shock, we interpret it as convergence to the long-run estimate of the elasticity.

5.2. Data

We use quarterly data from 1969 through 2024 for the sample of U.S. public corporations available in the Compustat dataset.[30] We keep only firms that have a "US" country code and report their financial accounts in U.S. dollars. We remove observations where total sales or gross plant, property and equipment is negative. We restate before-tax profits in real terms using the PCE price index and winsorize the top and bottom 1 percent of profit outliers.

Our measure of G is quarterly federal government total expenditures, restated in real terms using the GDP deflator from FRED. These estimates are not likely to be affected by the same type of endogeneity that researchers face when estimating fiscal multipliers. In any case we include four lags of profits and government spending. This is equivalent to the Blanchard and Perotti (2002) shock used in the fiscal multiplier literature.[31] However, government spending and corporate profits might both be affected by the macroeconomic cycle. To adjust for this, we use the lagged output gap as a control variable. We also control for lagged total assets (deflated by the PCE price index) so as to get a partial elasticity that holds capital constant.

5.3. Results

We estimate the effect of a 1 percent increase in government spending on corporate profits and use a time horizon of 16 quarters (4 years) to estimate the impulse responses. Figure 1 shows that the estimated elasticity converges to around 0.27 after 3 years. The initial impact is negative, but it increases over time to its long-run value. The elasticity is statistically significant at the 1% level. Were the reader to take this as a convincing estimate of η, it would imply that the optimal benefit-based corporate tax rate would be around 27 percent. For comparison, the average (top) corporate income tax rate in the United States over this time period was just over 37 percent, falling to an average of just over 32 percent after the 1986 Tax Reform Act. Therefore, we generate optimal benefit-based tax rates that are reasonable compared to actual U.S. corporate tax rates.

Though this is only a first pass at estimating η (or any of the model's other parameters), our results demonstrate that the benefit-based approach provides estimable elasticities that generate economically sensible estimates.

[30] This approach limits us to private corporations. However, the U.S. Bureau of Economic Analysis does not split aggregate corporate profit data between S-corporations and C-corporations.

[31] As discussed in Ramey and Zubairy (2018).

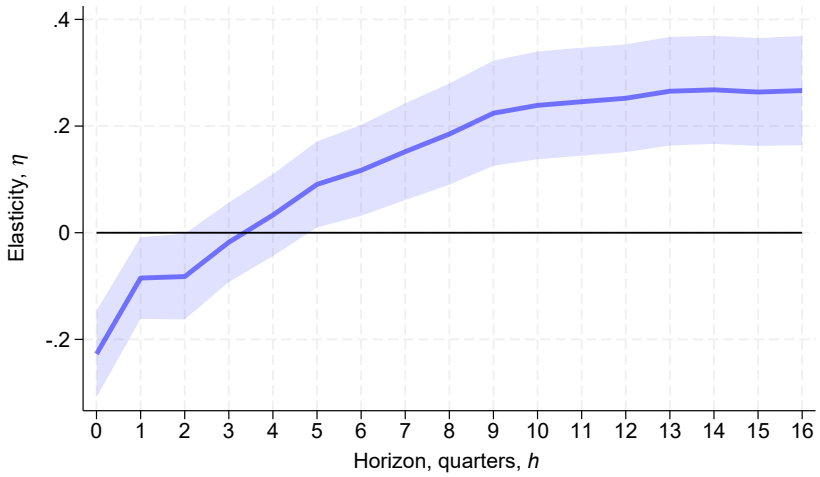


FIGURE 1. Estimated elasticity, η, for public U.S. corporations

The outcome is the estimated elasticity of pre-tax profits with respect to public spending. Control variables are four lags of profits and government spending, along with one lag of the output gap and total assets. The sample is U.S. public corporations from Compustat for 1969q4-2024q3. Shaded areas are 95% confidence bands.

6. Empirical illustration of zero net incidence

To make a first attempt at testing the empirical plausibility of our results on net incidence, we explore the announcement of the American Jobs Plan in March 2021, which proposed policy changes similar to the experiment described in the theoretical section: a combined increase in government spending and the corporate income tax.

On March 31, 2021 the United States Administration announced the American Jobs Plan (AJP) and the Made in America Tax Plan (MATP). The AJP intended to invest $2.3 trillion over a decade in physical, social, and digital infrastructure—exactly the type of broad investment expected to benefit corporations. The MATP proposed raising the CIT rate from 21 to 28 percent and imposing a 15 percent minimum tax on book income of large corporations.

6.1. The government's benefit rationale

In outlining the rationale for the accompanying MATP, the Biden Administration relied on explicitly benefit-based reasoning:

> The Made in America tax plan recognizes that corporate investment depends on far more than the headline tax rate. Investment also depends on the factors that truly shape business climate, including the health and education of our workforce, the strength of our institutions, and smooth and stable relations with other countries. [32]

[32] See https://home.treasury.gov/system/files/136/MadeInAmericaTaxPlan_Report.pdf.

Note the specific connection to the model in Section 3 through the idea that the corporation's choice of k depends also on the full set of the state's activities.

If the government relied on benefit-based reasoning in designing this combined policy package, we can infer its assumptions on the effect of government spending on corporate profits. Assuming the functional form $g(G) = G^{\gamma}$, zero net incidence obtains when the following condition holds:

$$\gamma = \frac{dt/(1-t)}{dG/G}.$$

To roughly size the right-hand-side ratio, first note that the proposed changes translate to an 8.9% change in the net of tax statutory rate, $dt/(1-t)$. For dG/G, the spending package of $2.3 trillion over a decade is a measure of dG, but the outstanding question is how to size the relevant G for the corporation-focused policy package. One natural approach is to scale total federal government spending by the share of total federal government tax revenue that comes from the corporate income tax. In the Congressional Budget Office's official ten-year forecasts from 2022, total federal government spending was forecast to be $72.2 trillion and the share of corporate income tax revenue in total federal revenue to be 8.4 percent, implying a relevant G of $6.1 trillion. Plugging in, we obtain $\gamma = 0.089/(2.3/6.1)$ or 0.24, quite close to the value estimated in Section 5.

Of course, the U.S. government might not have wanted (or designed) this policy package to have zero net incidence, but by assuming it did in this specific case, we again have found suggestive evidence that this benefit-based approach can imply reasonable optimal corporate tax rates.

6.2. The market's reaction

We rely on a long-standing idea from Summers (1985): that tax incidence can be observed, at least partially, through asset markets.[33] Assuming that the market share price for corporation i (given by p_i) reflects the discounted sum of future returns to equity r, then changes to r would be reflected in the share price. Specifically, using equation 21 and assuming $g(G) = G^{\gamma}$, a policy that changes both G and t would give us a change in p_i of:

$$\frac{\Delta p_i}{p_i} = \sum_{m=0}^{\infty} \delta^s \Delta \nu \cdot \varphi_r \left(\gamma \frac{dG}{G} - \frac{dt_i}{1-t_i} \right), \tag{24}$$

where s indexes time, δ is the discount rate, and ν is the probability of this package being passed and implemented. If this equation holds—as we propose in Section 4—then the impact on p_i is ambiguous and would depend on the relative changes to dG, dt, and the market's perception of γ. If the markets perceive no benefit of government spending for profits, then we would expect that they perceive $\gamma = 0$ and the net impact of the policy package on market prices would be

[33] This idea is explored most recently in Ardalan et al. (2023).

negative.

As is usual with policy changes, the announcement was not entirely unexpected: President Biden had made the increased corporate tax rate part of his 2020 election platform and had earlier indicated that he would propose a large infrastructure plan. However, we argue that the announcement led to a significant increase in the probability of this combined spending and tax increase materializing. In fact, corporations were reported to initially put a low probability on the event even in December 2020, after the election. See, for example, the CNBC Global CFO Council Survey, where 58% of respondents thought it "unlikely" that the corporate tax rate would be hiked within two years, and a further 32% thought it "somewhat unlikely". [34]

We observe a significant increase in public interest in the United States in the search terms "infrastructure" and "corporate tax" using Google Trends in April 2021: searches for "infrastructure" reached the highest since the start of Google Trends data in 2004; searches for "corporate tax" reached the highest level since the passing of the Tax Cuts and Jobs Act. Similarly, LexisNexis shows an increase in articles including those search terms at the same time. The News on the Web Corpus shows a 35% increase in references to "infrastructure" and a 160% increase in references to "corporate tax" or "corporate income tax" in the three months from April to June 2021 compared to the three months from January to March 2021.

6.3. Data

Abnormal returns of the S&P 500 corporations at time s are defined as the actual returns minus expected returns: $AR_s = R_s - R_s^e$. Following Johannesen and Larsen (2016) and Dutt et al. (2019), we use two approaches to defining expected returns; first, we simply take as expected returns the actual returns on the 700 other companies which make up the S&P Global 1200;[35] second, we use a linear model of the relationship between each corporation's returns and S&P 700 returns to predict expected returns. We calculate average abnormal returns on day s as the mean of abnormal returns across all firms: $AAR_s = \sum_i^n AR_s$. Cumulative average abnormal returns for the event period $s = 0$ to $s = S$ are the sum of average abnormal returns for that period: $CAAR = \sum_{s=0}^{s=S} \frac{AR_{i,s}}{n}$.

The plan was released after the end of trading on March 31, 2021. We split our event dates into three periods—each three days long as is standard (Johannesen and Larsen 2016; Dutt et al. 2019). First, we consider the three trading days between the announcement being previewed by White House press secretary Jen Psaki on Fox News Sunday March 28, 2021 and the announcement itself on March 31, 2021. Second, we consider the three trading days after the announcement: from April 1 to April 6, 2021.[36] Third, we consider the three trading following that, from April 7,

[34] Note that by the end of 2021, the plan had been partially passed. The Infrastructure Investment and Jobs Act was passed, amounting to $1.2 trillion.

[35] These 700 firms are a composite of the S&P Europe 350, S&P TOPIX 150 (Japan), S&P TSX 60 (Canada), S&P ASX All Australian 50, S&P Asia 50 and S&P Latin America 40.

[36] The markets were closed on April 2, 2021 for Good Friday and April 3-4 were weekend days.

2021 to April 9, 2021.

Following Wagner, Zeckhauser, and Ziegler (2018), we use data from Compustat to calculate effective tax rates (ETRs) for these corporations. Specifically, we calculate the Cash ETR as cash taxes paid divided by pre-tax income adjusted for special items. We also use the GAAP ETR, which is calculated as tax expenses divided by pre-tax income. We focus on one-year ETRs for the year 2019, and exclude any companies with either negative pre-tax income or an ETR greater than 100%.[37]

6.4. Results

Table 1 presents the cumulative average abnormal returns for the three 3-day periods we study. We find statistically insignificant cumulative average abnormal returns in both specifications over all three event periods. Either the policy package was perceived by the market to have approximately net zero incidence, or the announcement did not alter the market's perception of the probability of the package being implemented (we have already shown that the announcement was salient).

Event Period	Simple Difference	Linear Model
March 29 to March 31	0.001	–0.002
	(0.070)	(–0.241)
April 1 to April 6	–0.000	0.001
	(–0.026)	(0.122)
April 7 to April 9	0.002	0.000
	(0.236)	(0.046)

TABLE 1. Cumulative average abnormal returns for S&P 500 Companies around American Jobs Plan announcement

Standard errors in parentheses. ***, ** and * denote statistical significance at the 1, 5, and 10 percent levels respectively. The American Jobs Plan was announced after the end of trading on March 31, 2021 so that April 1 to April 6 are the three trading days after announcement.

One way to test the hypothesis that the market did not respond to the announcement is to explore variation in the intensity of the change in tax burden across corporations. Given that corporations face different effective tax burdens, firms would face differential impacts of a higher corporate tax burden. Specifically, our model-based prediction of firm-specific price changes in expression (24) suggest that corporations with higher effective tax rates should have more negative changes in returns to equity in response to the policy announcement. This is because corporations beginning with higher tax rates will have a higher value of $dt/(1-t)$ if the tax rate increases from 21% to 28%. This prediction is analogous (in the opposite direction) to

[37] We use 2019 data to calculate ETRs due to the unusual nature of economic activity in 2020.

the findings of Wagner, Zeckhauser, and Ziegler (2018), who find that the increased probability of a corporate tax cut after the 2016 U.S. presidential election generated higher abnormal returns to firms with higher effective tax rates. If the market did not respond to the announcement, then we should see no patterns in abnormal returns relating to firms' tax burdens around the announcement data.

Event Period	Simple Difference		Linear Model	
	Cash ETR	GAAP ETR	Cash ETR	GAAP ETR
March 29 to March 31	–0.009	–0.003	–0.007	0.001
	(–1.069)	(–0.404)	(–0.796)	(0.080)
April 1 to April 6	–0.018*	–0.025***	–0.028***	–0.035***
	(–1.69)	(–2.643)	(–2.776)	(–3.797)
April 7 to April 9	0.002	0.004	0.001	0.004
	(0.180)	(0.462)	(0.065)	(0.464)

TABLE 2. Cross-sectional variation in cumulative abnormal returns by effective tax rate

The numbers in this table are coefficients of linear regressions of CAR on corporate tax rates. Standard errors in parentheses. ***, ** and * denote statistical significance at the 1, 5, and 10 percent levels respectively. The American Jobs Plan was announced after the end of trading on March 31, 2021 so that April 1 to April 6 are the three trading days after announcement.

Table 2 presents the coefficients of linear regressions of cumulative abnormal returns over the 3-day periods on the effective corporate tax rates, both the cash ETR and the GAAP ETR. In the three days prior to the announcement, there is no relationship between abnormal returns and ETRs. In the three days following the announcement, we observe a negative relationship between CARs and ETRs.[38] Again, in the three-day period after the announcement period, we observe no corresponding relationship. These results clearly suggest that there was a market response to the policy announcement.

If γ had been perceived by markets to be zero, then we should see negative effects in the CAAR, given that it implied a future tax hike. However, we show that there were differential effects in a pattern implying that market prices responded to the higher probability of a tax increase. Taken together, these findings imply that markets both perceived γ to be positive and economically significant and viewed this policy package as having net zero incidence on corporations in aggregate, consistent with the benefit-based view of the corporate tax.

7. Survey evidence on benefit-based CIT

In this section, we present new survey evidence showing widespread support among respondents for the corporate income tax and the benefit-based justification of it, with support for

[38]This pattern holds if we extend the sample to Russell 3000 companies and apply the Capital Asset Pricing Model (CAPM) and the Fama-French Three-Factor Model (FF) to calculate excess returns.

the benefit-based view increasing when the state's beneficial activities are made more salient. These findings suggest that the historical popularity of the benefit-based view carries through to the present, despite modern scholarly skepticism of it, and that it may be an important factor behind the popularity of the corporate tax.

7.1. Survey design

We field short surveys through Amazon Mechanical Turk to U.S.-based respondents in two waves of 150 participants each. The surveys for each wave differ only slightly, and both have four parts (both surveys are reproduced in the Appendix)

First, both surveys ask respondents to complete some simple accounting tables to test their understanding of the mechanical relationship between revenue, cost, pre-tax profit, taxes, and after-tax profit of a corporation.

Second, both surveys have respondents consider an increase in the tax rate on corporate profit and assign its incidence across customers, workers, capital equipment suppliers, and shareholders. Specifically, respondents identify the group most likely to bear the incidence of the tax and then assign shares of the incidence they expect to be borne by each group. In the second wave, half of the respondents are asked a similar incidence question for an increase in government spending.

Third, both surveys ask respondents to indicate whether they support the corporate income tax and choose their preferred corporate income tax rate. Then, they are presented with three possible reasons for a tax on corporate profit, described as follows: 1) A tax on corporate profit taxes the wealthy owners and executives of corporations (*wealth taxation rationale*); 2) A tax on corporate profit taxes those who benefit from the government activities that taxes fund (*benefit-based rationale*); 3) A tax on corporate profit constrains the economic and political power of corporations (*power constraint rationale*). Respondents in the both waves are asked whether they support each reason as a justification for the tax. Respondents in the first wave are also asked whether the "average American" would support each reason, and respondents in the second wave are asked whether each reason accurately describes what the corporate income tax does in reality. To be clear, these reasons are not in conflict, and multiple could be simultaneously endorsed both normatively and positively. Our argument in this paper is simply that the benefit-based view is one particularly compelling and relevant reason.

Finally, we ask the respondents for demographic information at the end of both surveys. We use this information to re-weight the data to match the Gallup 2021 poll of political ideology and the U.S. census for age and education.

7.2. Survey results

Table 1 summarizes our results.

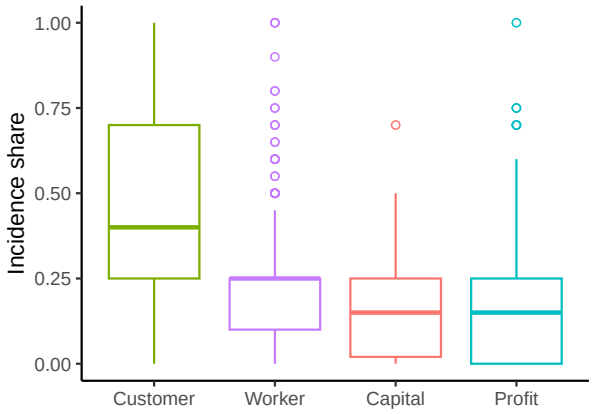


FIGURE 2. Tax incidence reported by survey respondents

The y-axis shows the share of tax incidence allocated to each group of stakeholders. Respondents are asked to allocate a dollar amount of additional tax burden. The upper and lower "hinges" correspond to the first and third quartiles (the 25th and 75th percentiles). The upper whisker extends from the hinge to the highest value that is within 1.5 times the inter-quartile range of the hinge. The lower whisker extends from the hinge to the lowest value within 1.5 times the inter-quartile range of the hinge. Data beyond the end of the whiskers are outliers and plotted as points.

We find strong support for the *existence* of the corporate income tax, with 88 percent of all respondents believing there should be such a tax. As for the preferred rate, 42 percent believe the U.S. corporate tax rate should be higher than the current rate (at the time of the survey) of 21 percent, 29 percent believe the current rate is appropriate, and 28 percent think it should be lower. This distribution of preferences is consistent with the rate having been both higher in recent decades and a subject of persistent political debate.

We also find strong support for the benefit-based *reason* for the corporate income tax, with 73.4 percent of respondents endorsing it. The other two reasons attract similar levels of support, with 72.2 percent endorsing the wealth taxation rationale and 71.1 percent the power constraint rationale. Interestingly, the benefit rationale is slightly more popular among those who identify as conservatives (78% support) and moderates (72% support) than among liberals (69% support). The opposite is true for both the wealth taxation rationale and the power constraint rationale. There are no clear patterns by age or educational attainment.[39]

Consistent with the idea that all patterns of incidence are consistent with the benefit-based view, we find no significant correlation between respondents' beliefs on the incidence of the tax and their support for the different reasons. As Figure 1 shows, on average respondents think

[39] When we ask them to rank the reasons in importance, the wealth taxation rationale comes out slightly on top, with the benefit rationale second and the constraining power rationale third. When the first wave of respondents is asked about the normative views of the average American, the wealth taxation rationale leads with 84.6 percent compared to 71.1 percent for the benefit-based rationale and 65.3 percent for the power constraint rationale. Similarly, when the second wave of respondents are about their views of what the corporate tax actually does, the wealth taxation rationale is cited by 68.4 percent, the benefit-based mechanism by 65.7 percent, and the constraining power rationale by 57.4 percent.

	Control	Treatment	Effect	Std. Error
	(Share)			
Indicate support for:				
Normative				
Benefit rationale	0.564	0.766	0.202***	0.076
Power constraint rationale	0.700	0.568	–0.132*	0.078
Wealth taxation rationale	0.744	0.650	–0.094	0.075
Positive				
Benefit rationale	0.573	0.764	0.191**	0.076
Power constraint rationale	0.700	0.530	–0.170**	0.078
Wealth taxation rationale	0.613	0.706	0.093	0.077
Ranks as number 1:				
Normative				
Benefit rationale	0.321	0.477	0.157**	0.079
Power constraint rationale	0.289	0.223	–0.067	0.071
Wealth taxation rationale	0.390	0.300	–0.090	0.078
Positive				
Benefit rationale	0.324	0.408	0.084	0.079
Power constraint rationale	0.196	0.183	–0.013	0.064
Wealth taxation rationale	0.480	0.409	–0.071	0.081

TABLE 3. Impact of treatment on support for proposed rationales

***, ** and * denote statistical significance at the 1, 5, and 10 percent levels respectively. Treated respondents are those who are asked to assign the incidence of both taxation and government spending, while control respondents are only asked to assign incidence of taxation. The measured effect is the difference between the treated and control groups in the share indicating support for a specific rationale or ranking it as number 1.

that customers bear 46.5 percent of the burden of tax increases, workers 23.8 percent, capital 14.9 percent, and profit 14.7 percent (with substantial variation in their beliefs).

Perhaps most important for our purposes in this paper, we find that increasing the salience of beneficial state activities increases support for the benefit-based view of the corporate income tax. In the second wave of the survey, half the respondents are asked to assign the incidence of both an increase in the corporate tax and, separately, an increase in government spending.

Table 3 shows the shares of treated and control respondents supporting each rationale and ranking each rationale as the most important. We also confirm the statistical significance of these effects with a simple regression with demographic controls, and the table reports the coefficients and standard errors on the treatment dummy in explaining both the share of respondents who endorse the benefit view and the number who rank it most important. All of these analyses tell the same story: making tax-funded government spending more salient increases the support for the benefit-based view, and only for that view.

Our surveys are small, the respondent sample may not be representative, and subsequent

research could substantially build on the simple design we use. Nevertheless, these results suggest that popular support for the benefit-based view of the corporate income tax is widespread and based on the connection between taxes and the beneficial activities they fund, i.e., on the fiscal virtuous cycle.

If a benefit view is such a promising way to understand the CIT, why has its influence among scholars declined? In addition to the reasons discussed earlier, which we argued are not convincing, we suspect that an important reason is simply lack of attention. We have just shown that public support for the benefit view appears to increase significantly and substantially with even just a small nudge toward thinking about the fiscal virtuous cycle. Our hope is that tax theorists might be similarly inspired to give the benefit view another look.

8. Conclusion

In the conventional welfarist approach, the case for a corporate tax depends entirely on a question which decades of research have left unanswered: Who bears the burden of paying it? The problem posed for the welfarist optimal tax model by uncertain incidence is fundamental. If we do not know who bears the burden of the tax, we cannot make a welfarist evaluation of it. Moreover, because direct taxation of stakeholders is possible, a welfarist should want to avoid the corporate tax so as to not risk inadvertently burdening the wrong individuals.

In contrast, according to the benefit-based view, a properly designed corporate tax has a normative justification that holds for any pattern of incidence. Put another way, it is *preferable* to impose a tax directly on corporations, through which its burden will fall wherever—but precisely wherever—benefit accrues, rather than attempting to tax parties for benefit they may not enjoy.

A reason to *prefer* the taxation of the corporation—and its uncertain incidence—to the certain incidence of direct taxation of corporate stakeholders is important not just from a normative perspective but also to understand the robust popular support for corporate taxes.

In this paper, we suggest and try to demonstrate that a classical benefit-based view of the corporate income tax provides such a reason; a reason with solid historical, theoretical, and empirical foundations despite its modern scholarly dismissal. We hope, thereby, to provide a more robust framework for policymakers and scholars seeking to design corporate tax policy as part of a virtuous cycle of public investment and private activity.

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Appendix A. Solving the second-best, linear optimal benefit-based corporate tax

In this section, we show the derivation of the first order conditions for the second-best linear optimal benefit-based corporate tax case. For simplicity, we rewrite the objective function to substitute $\pi_i = g(G_i)[f(z_i, k_i, l_i) - wl_i]$:

$$\max_{1-t_i, G_i} \quad \mathcal{L}_i = (1-t_i)\pi_i^* - rk_i^* + \lambda_i(t_i\pi_i - \tau_i G_i).$$

The first order conditions are:

$$\begin{aligned}
\frac{\partial \mathcal{L}_i}{\partial G_i}: \quad & (1-t_i)\frac{\partial \pi_i}{\partial G_i} + \lambda_i\left(t_i\frac{\partial \pi_i}{\partial G_i} + t_i\frac{\partial \pi_i}{\partial k_i}\frac{\partial k_i}{\partial G_i} - \tau_i\right) = 0, \\
\frac{\partial \mathcal{L}_i}{\partial 1-t_i}: \quad & \pi_i + \lambda_i\left(-\pi_i + t_i\frac{\partial \pi_i}{\partial k_i}\frac{\partial k_i}{\partial (1-t_i)}\right) = 0 \\
\frac{\partial \mathcal{L}_i}{\lambda_i}: \quad & t_i\pi_i - \tau_i G_i = 0.
\end{aligned}$$

A.1. First order condition for G_i

Substituting the first order condition for λ_i into the first order condition for G_i, we get:

$$(1-t_i)\frac{\partial \pi_i}{\partial G_i} + \lambda_i\left(t_i\frac{\partial \pi_i}{\partial G_i} + t_i\frac{\partial \pi_i}{\partial k_i}\frac{\partial k_i}{\partial G_i} - \frac{t_i\pi_i}{G_i}\right) = 0,$$

then multiplying throughout by G_i/π_i:

$$(1-t_i)\frac{\partial \pi_i}{\partial G_i}\frac{G_i}{\pi_i} + \lambda_i\left(t_i\frac{\partial \pi_i}{\partial G_i}\frac{G_i}{\pi_i} + t_i\frac{\partial \pi_i}{\partial k_i}\frac{\partial k_i}{\partial G_i}\frac{G_i}{\pi_i} - \frac{t_i\pi_i}{G_i}\frac{G_i}{\pi_i}\right) = 0.$$

Using the definitions for e_i^G and η_i:

$$\begin{aligned}
(1-t_i)\eta_i + \lambda_i\left(t_i\eta_i + t_i e_i^G - t_i\right) &= 0 \\
(1-t_i)\eta_i &= \lambda_i t_i\left(1 - \eta_i - e_i^G\right) \\
\left(\frac{1-t_i}{t_i}\right)\left(\frac{\eta_i}{1-\eta_i - e_i^G}\right) &= \lambda_i.
\end{aligned}$$

A.2. First order condition for $1 - t_i$

Dividing the first order condition for $1 - t_i$ by π_i throughout, we get:

$$1 + \lambda_i\left(-1 + \frac{t_i}{\pi_i}\frac{\partial \pi_i}{\partial k_i}\frac{\partial k_i}{\partial (1-t_i)}\right) = 0,$$

and multiplying the final term in parenthesis by $(1 - t_i)/(1 - t_i)$, we get:

$$1 + \lambda_i \left(-1 + \frac{(1 - t_i)}{(1 - t_i)} \frac{t_i}{\pi_i} \frac{\partial \pi_i}{\partial k_i} \frac{\partial k_i}{\partial (1 - t_i)} \right) = 0.$$

Using the definition of e_i^T, we get:

$$1 + \lambda_i \left(-1 + e_i^T \left(\frac{t_i}{1 - t_i} \right) \right) = 0$$

$$\frac{1}{1 - e_i^T \left(\frac{t_i}{1 - t_i} \right)} = \lambda_i.$$

Appendix B. Solving for incidence

In this section, we show how to solve for the net incidence expressions for capital and labor.

B.1. Objective function

The corporation maximizes after-tax profit:

$$(1-t)g(G)[f(k,l)-wl]-rk.$$

with first order conditions:

$$(1-t)g(G)f_k = r$$
$$(1-t)g(G)(f_l - w) = 0 \quad \text{or} \quad f_l = w.$$

B.2. Euler's theorem

Assuming that the production function alone $f(k,l)$ is constant returns to scale in private factors, then we have Euler's theorem: $f(k,l) = f_k k + f_l l$. However, note that $Y \neq f(k,l)$, rather $Y = g(G)f(k,l)$. Substituting into this expression using the first-order conditions, we get: $f(k,l) = \frac{\bar{r}}{g(G)}k + f_l l$. Taking the derivative of this, we get:

$$f_k \cdot dk + f_l \cdot dl = \frac{k}{g(G)} \cdot d\bar{r} - \frac{\bar{r}k}{g(G)^2}g'(G) \cdot dG + \frac{\bar{r}}{g(G)} \cdot dk + w \cdot dl + l \cdot dw.$$

$$0 = \frac{k}{g(G)} \cdot d\bar{r} - \frac{\bar{r}k}{g(G)^2}g'(G) \cdot dG + l \cdot dw.$$

Then dividing throughout by $g(G)$, we get:

$$0 = k \cdot d\bar{r} - \bar{r}k \cdot \frac{g'(G)dG}{g(G)} + g(G)l \cdot dw$$

$$\bar{r}k \cdot \frac{g'(G)dG}{g(G)} = k \cdot d\bar{r} + g(G)l \cdot dw$$

B.3. Defining shares

We write: $y - wl$ as the total output accruing to capital, so that: $\alpha = \frac{y-wl}{y}$. Total output is: $y = g(G) \cdot f_k k + f_l l$. Then capital's share of income is:

$$\alpha = \frac{g(G) \cdot f_k k + f_l l - f_l l}{y}$$

$$\alpha = \frac{g(G) \cdot f_k k}{y}.$$

Since we can define $\bar{r} = g(G) \cdot f_k$ according to the firm's FOC, we can rewrite this as:

$$\alpha = \frac{\bar{r}k}{y}.$$

Labor's share of income is:

$$1 - \alpha = \frac{wl}{y}, \quad \text{or} \quad l = \frac{(1-\alpha)\,y}{w}.$$

Plugging this into the equation we get from differentiating Euler's theorem:

$$\bar{r}k \cdot \frac{g'(G)dG}{g(G)} = k \cdot d\bar{r} + g(G)l \cdot dw$$

$$\alpha y \cdot \frac{g'(G)dG}{g(G)} = \alpha y \frac{d\bar{r}}{\bar{r}} + g(G)(1-\alpha)\,y\frac{dw}{w}$$

$$\alpha \cdot \frac{g'(G)dG}{g(G)} = \alpha \frac{d\bar{r}}{\bar{r}} + g(G)(1-\alpha)\frac{dw}{w}$$

B.4. Tax rate

We know that

$$\frac{d\bar{r}}{\bar{r}} = \frac{dr}{r} + \frac{dt}{1-t}.$$

Plugging this in above, we get:

$$\alpha \cdot \frac{g'(G)dG}{g(G)} = \alpha\left(\frac{dr}{r} + \frac{dt}{1-t}\right) + g(G)(1-\alpha) \cdot \frac{dw}{w}$$

Solving this for dw/w is:

$$\alpha\left(\frac{g'(G)dG}{g(G)} - \frac{dr}{r} - \frac{dt}{1-t}\right) = g(G)(1-\alpha) \cdot \frac{dw}{w}$$

(A1)
$$\frac{\alpha}{g(G)(1-\alpha)}\left(\frac{g'(G)dG}{g(G)} - \frac{dr}{r} - \frac{dt}{1-t}\right) = \frac{dw}{w}$$

We can also solve for dr/r:

$$\alpha\left(\frac{g'(G)dG}{g(G)} - \frac{dt}{1-t}\right) - g(G)(1-\alpha) \cdot \frac{dw}{w} = \alpha\left(\frac{dr}{r}\right)$$

(A2) $$\frac{g'(G)dG}{g(G)} - \frac{dt}{1-t} - \frac{g(G)(1-\alpha)}{\alpha} \cdot \frac{dw}{w} = \frac{dr}{r}$$

B.5. Elasticity of substitution

The elasticity of substitution is the ratio of the percentage change in the capital-labor ratio and the percentage change in the marginal rate of technical substitution. Note that the latter relies on the marginal products f_k and f_l, which are $f_k = \bar{r}/g(G)$ and $f_l = w$. Define:

$$\sigma \left[\frac{dw}{w} - \frac{d\bar{r}}{\bar{r}} + \frac{g'(G)dG}{g(G)} \right] = \frac{dk}{k} - \frac{dl}{l}.$$

Plugging in $e_k \frac{dr}{r} = \frac{dK}{K}$ and $e_l \frac{dw}{w} = \frac{dL}{L}$:

$$\sigma \left[\frac{dw}{w} - \frac{d\bar{r}}{\bar{r}} + \frac{g'(G)dG}{g(G)} \right] = e_k \frac{dr}{r} - e_l \frac{dw}{w}$$

$$\sigma \left[\frac{dw}{w} - \frac{dr}{r} - \frac{dt}{1-t} + \frac{g'(G)dG}{g(G)} \right] = e_k \frac{dr}{r} - e_l \frac{dw}{w}$$

(A3) $$\sigma \left(\frac{g'(G)dG}{g(G)} - \frac{dt}{1-t} \right) = (e_k + \sigma)\frac{dr}{r} - (e_l + \sigma)\frac{dw}{w}$$

B.6. Solving

Putting these two equations together, and solving for dr/r and dw/w, we get:

$$\sigma \left(\frac{g'(G)dG}{g(G)} - \frac{dt}{1-t} \right) = (e_k + \sigma)\frac{dr}{r} - (e_l + \sigma)\frac{dw}{w}$$

Plugging in dw/w from equation A1:

$$\sigma \left(\frac{g'(G)dG}{g(G)} - \frac{dt}{1-t} \right) = (e_k + \sigma)\frac{dr}{r} - (e_l + \sigma) \left[\frac{\alpha}{g(G)(1-\alpha)} \left(\frac{g'(G)dG}{g(G)} - \frac{dr}{r} - \frac{dt}{1-t} \right) \right]$$

Pulling like terms together:

$$\frac{g'(G)dG}{g(G)} \left(\sigma + \frac{(e_l + \sigma)\alpha}{g(G)(1-\alpha)} \right) - \frac{dt}{1-t} \left(\sigma + \frac{(e_l + \sigma)\alpha}{g(G)(1-\alpha)} \right) = \frac{dr}{r} \left(e_k + \sigma + \frac{(e_l + \sigma)\alpha}{g(G)(1-\alpha)} \right)$$

Multiply throughout by $g(G)(1-\alpha)$ and further combine terms:

$$\left(\frac{g'(G)dG}{g(G)} - \frac{dt}{1-t} \right) \left(\sigma g(G)(1-\alpha) + (e_l + \sigma)\alpha \right) = \frac{dr}{r} \left((e_k + \sigma)g(G)(1-\alpha) + (e_l + \sigma)\alpha \right)$$

$$\text{(A4)} \qquad \left(\frac{g'(G)dG}{g(G)} - \frac{dt}{1-t}\right)\left(\frac{\sigma g(G)(1-\alpha) + (e_l+\sigma)\alpha}{(e_k+\sigma)g(G)(1-\alpha) + (e_l+\sigma)\alpha}\right) = \frac{dr}{r}$$

Then solving for dw/w using the above solution for dr/r and equation A2:

$$\frac{g'(G)dG}{g(G)} - \frac{dt}{1-t} - \frac{g(G)(1-\alpha)}{\alpha}\cdot\frac{dw}{w} = \left(\frac{g'(G)dG}{g(G)} - \frac{dt}{1-t}\right)\left(\frac{\sigma g(G)(1-\alpha) + (e_l+\sigma)\alpha}{(e_k+\sigma)g(G)(1-\alpha) + (e_l+\sigma)\alpha}\right)$$

$$-\frac{g(G)(1-\alpha)}{\alpha}\cdot\frac{dw}{w} = \left(\frac{g'(G)dG}{g(G)} - \frac{dt}{1-t}\right)\left(\frac{\sigma g(G)(1-\alpha) + (e_l+\sigma)\alpha}{(e_k+\sigma)g(G)(1-\alpha) + (e_l+\sigma)\alpha}\right) - \left(\frac{g'(G)dG}{g(G)} - \frac{dt}{1-t}\right)$$

$$-\frac{g(G)(1-\alpha)}{\alpha}\cdot\frac{dw}{w} = \left(\frac{g'(G)dG}{g(G)} - \frac{dt}{1-t}\right)\left(\frac{\sigma g(G)(1-\alpha) + (e_l+\sigma)\alpha}{(e_k+\sigma)g(G)(1-\alpha) + (e_l+\sigma)\alpha} - 1\right)$$

$$\frac{dw}{w} = \left(\frac{g'(G)dG}{g(G)} - \frac{dt}{1-t}\right)\left(\frac{\sigma g(G)(1-\alpha) + (e_l+\sigma)\alpha}{(e_k+\sigma)g(G)(1-\alpha) + (e_l+\sigma)\alpha} - 1\right)\left(-\frac{\alpha}{g(G)(1-\alpha)}\right)$$

$$\frac{dw}{w} = \left(\frac{g'(G)dG}{g(G)} - \frac{dt}{1-t}\right)\left(\frac{\sigma g(G)(1-\alpha) + (e_l+\sigma)\alpha - (e_k+\sigma)g(G)(1-\alpha) - (e_l+\sigma)\alpha}{(e_k+\sigma)g(G)(1-\alpha) + (e_l+\sigma)\alpha}\right)\left(-\frac{\alpha}{g(G)(1-\alpha)}\right)$$

$$\frac{dw}{w} = \left(\frac{g'(G)dG}{g(G)} - \frac{dt}{1-t}\right)\left(\frac{-e_k g(G)(1-\alpha)}{(e_k+\sigma)g(G)(1-\alpha) + (e_l+\sigma)\alpha}\right)\left(-\frac{\alpha}{g(G)(1-\alpha)}\right)$$

$$\frac{dw}{w} = \left(\frac{g'(G)dG}{g(G)} - \frac{dt}{1-t}\right)\left(\frac{\alpha e_k}{(e_k+\sigma)g(G)(1-\alpha) + (e_l+\sigma)\alpha}\right)$$

Appendix C. Alternative benefit base specifications; an example of benefit through increased Hicks-Neutral productivity

In addition to providing an explanation for heterogeneity in the corporate tax base, our formalization also allows us to analyze the incidence implications of alternative specifications of the benefit base—that is, of how the state's activities benefit corporations—given a statutory corporate tax base. We can therefore formalize the concerns of Devereux (2019) and Devereux et al. (2021), who ask whether the burden of the corporate tax aligns with the benefit from public goods.[40]

Before turning to an example, we note that one related and interesting implication of this analysis is that our benefit-based approach to incidence may help to explain why local and national governments experiment with changes to the corporate tax base. If the corporate tax is meant to tax the same income which is magnified by the corporation's privileged access to the benefits of the activities of the state, changes in how policymakers perceive those benefits accruing to corporations—changes to the "benefit base"—should translate into adjustments to the tax base.[41] Examining early attempts to tax corporations in the nineteenth-century United States, we find substantial variation in how individual states defined the tax base; that variation may suggest that states were themselves trying to find the base which best corresponded to the benefit they were providing.

For example, consider an alternative formalization in which the benefit from the full set of state activities enters as a Hicks-neutral magnifier of corporate productivity. We believe this approach less precisely captures the specific benefit which the corporate tax intends to target than does our baseline case (where it enters as a magnifier of the returns to capital), but it will be a familiar and mathematically natural case for most readers. Moreover, its analysis will help to clarify the drivers of our main incidence results by showing how a mismatch between the way in which benefit accrues to the corporation and the corporate tax base typically generates non-zero net incidence.

In this case, the corporation's after-tax profit is:

$$(1 - t)[g(G)\, f(k, l) - wl] - rk.$$

We assume production exhibits constant returns to scale in capital and labor, while government spending increases the marginal productivity of both capital and labor in similar proportions.[42]

For changes in r and w due to changes in t and $g(G)$, and using our notation from before,

[40] See also Weichenrieder (2005) and De Mooij (2005).

[41] Schlunk (2002, pg. 364) notes that the under a benefit-based tax, the government should define the tax base (entity income) as whatever base it believes would best correlate with the benefits produced by the use of the corporate form.

[42] This approach is similar to Manning, Markusen, and McMillan (1985), Feehan (1998), Gugl and Zodrow (2019), among others, albeit for public inputs rather than the privileges of the corporate form.

the relevant incidence results are:

$$\varphi_{r,t} = -\frac{\sigma + \alpha e_l}{(1-\alpha)e_k + \alpha e_l + \sigma}, \quad \varphi_{r,G} = \frac{\sigma + e_l}{(1-\alpha)e_k + \alpha e_l + \sigma}; \tag{A5}$$

$$\varphi_{w,t} = -\frac{\alpha e_k}{(1-\alpha)e_k + \alpha e_l + \sigma}, \quad \varphi_{w,G} = \frac{\sigma + e_k}{(1-\alpha)e_k + \alpha e_l + \sigma}. \tag{A6}$$

As before, the signs on the right-hand sides of these expressions indicate that increases in the corporate tax tend to reduce returns to the factors of production while increases in public spending tend to raise them. However, contrary to our previous incidence result, the numerators of these expressions differ within each factor. This suggests that the mechanism which produced an exact correspondence under our previous formulation may not have the same effect under the Hicks-neutral benefit.

Under this setting, the incidence of the tax and of the benefit from public spending will, other than in special cases, only imperfectly correspond. For zero net incidence to hold, given expressions A5 and A6, the following conditions must hold for capital and labor, respectively:

$$\left(\frac{\sigma + \alpha e_l}{(1-\alpha)e_k + \alpha e_l + \sigma}\right)\left(\frac{dt}{1-t}\right) = \left(\frac{\sigma + e_l}{(1-\alpha)e_k + \alpha e_l + \sigma}\right)\left(\frac{g'(G)\,dG}{g(G)}\right),$$

$$\left(\frac{\alpha e_k}{(1-\alpha)e_k + \alpha e_l + \sigma}\right)\left(\frac{dt}{1-t}\right) = \left(\frac{\sigma + e_k}{(1-\alpha)e_k + \alpha e_l + \sigma}\right)\left(\frac{g'(G)\,dG}{g(G)}\right).$$

These expressions imply that, for $\alpha \in (0, 1)$ and positive σ, e_l, and e_k, a policy experiment can have zero net incidence on both capital and labor in only three cases: namely if $e_k \to \infty$, $e_l \to \infty$, or $\sigma = 0$.[43]

When either elasticity of supply is very large, incidence of the tax and benefit are both shifted entirely to the other factor, and the tax and public spending changes can be scaled to offset each other on the less elastic factor. For example, if $e_k \to \infty$, then $\varphi_{r,t} = 0$ and $\varphi_{r,G} = 0$, while $\varphi_{w,t} = -\frac{\alpha}{1-\alpha}$ and $\varphi_{w,G} = \frac{1}{1-\alpha}$, so a policy in which $\frac{g'(G)dG}{g(G)} = \alpha\frac{dt}{1-t}$ will have zero net incidence for both factors. Intuitively, the large elasticity of capital allows workers to capture the benefit from the state's activities just as it forces them to bear the burden of the tax. A similar story applies if $e_l \to \infty$.

If $\sigma = 0$, the fixed proportions of capital and labor in production neutralize an asymmetry—in this section's setting—between the way in which the corporate tax and the benefit from public spending affect the corporation's choices. While the corporate tax is imposed only on the returns to capital (i.e., because wages are expensed while the costs of capital are not), the Hicks-neutral $g(G)$ benefits both factors symmetrically. Only when $\sigma = 0$, so that corporations must always

[43] Outside of the three special cases, the ratio of the net incidence expressions can be written as: $\frac{dr/r}{dw/w} = -\left(\frac{1-\alpha}{\alpha}\right)$. In this case, the factor supply elasticities e_k and e_l do not matter for the *relative* changes in r and w. Consider a simple example of how this works: when $\frac{g'(G)dg}{g(G)} = \alpha\frac{dt}{1-t}$ and $\alpha = 0.4$, the percentage change in r is always –1.5 times the percentage change in w.

scale capital and labor inputs in the same ratio, does this asymmetry not distort the incidence of tax away from that of benefit. In particular, with $\sigma = 0$ we can show that $\frac{\eta_{r,t}}{\eta_{w,t}} = \frac{e_l}{e_k}$, $\frac{\eta_{r,G}}{\eta_{w,G}} = \frac{e_l}{e_k}$, so that the relative incidence of the change in taxes and the change in benefit are both spread across capital and labor in inverse proportion to their relative elasticities of supply.

Positive σ distorts this simple correspondence so that net incidence diverges from zero for both factors. Specifically, labor enjoys a positive net incidence while capital bears a negative net incidence, as $dw/w > 0$ and $dr/r < 0$. The magnitude of these deviations from zero net incidence are increasing in σ.

Thus, outside these three special cases, in this setting the asymmetry between how capital and labor are affected by tax and benefit can lead to non-zero net incidence. Recall from earlier that this non-zero net incidence does not arise when the tax base and the benefit base are aligned, as when benefit accrues as magnified returns to corporate capital in the context of a typical modern corporate tax.

Appendix D. Survey Wave 1

Thank you for participating in this study. First, we're going to ask a few questions to clarify your understanding of taxes. Please answer the following questions with what you believe are the correct answers.

(1) Suppose that, in a given year, a corporation spends $500 million on wages, $200 million on capital equipment, and $100 million on other inputs to produce services which it sells for $1000 million, earning a pre-tax profit of $200 million. A reminder: corporate profit is defined as revenues (or what the company sells) minus costs (or what the company spends). If the tax rate on corporate profit is 20%, the corporation has to pay $40 million in taxes. What is the corporation's after-tax profit? (Note: after-tax profit is defined as pre-tax profit minus taxes).

- $240 million
- $200 million
- $160 million
- $40 million

(2) Now, suppose that the corporation decides to pay higher wages, so that it spends $600 million on wages, but all other spending and revenue amounts remain the same as in the question above (that is, it also spends $200 million on capital equipment and $100 million on other inputs to produce services which it sells for $1000 million). If the tax rate also remains the same, at 20%, what is the corporation's after-tax profit in this situation?

- $120 million
- $80 million
- $60 million
- $40 million

(3) Instead, suppose that the corporation decides to pay lower wages, so that it spends $400 million on wages, but all other spending and revenue amounts remain the same as in the question above (so, it also spends $200 million on capital equipment and $100 million on other inputs to produce services which it sells for $1000 million). If the tax rate also remains the same, at 20%, what is the corporation's after-tax profit in this situation?

- $240 million
- $200 million
- $180 million
- $120 million

Ok. Now we will begin the main study. We will be asking you a series of questions about tax policy. There are no right or wrong answers–we are interested in your opinions. Let's get started!

(4) Please consider the corporation described in the earlier questions. In 2010, it spent $500 million on wages, $200 million on capital equipment, and $100 million on other inputs to produce services which it sold for $1000 million, earning a pre-tax profit of $200 million. It paid a tax rate on corporate profits of 20%, so it paid $40 million in taxes and earned $160 million in after-tax profit. Suppose that, in 2011, the tax rate on corporate profit rose to 30%. The corporation could respond in a number of ways. Which do you think is most likely?

- The corporation would raise prices on its customers so it could pay the higher tax rate without reducing spending or profit.
- The corporation would spend less on wages so it could pay the higher tax rate without reducing other spending or profit.
- The corporation would spend less on capital equipment so it could pay the higher tax rate without reducing other spending or profit.
- The corporation would accept lower after-tax profit so it could pay the higher tax rate without reducing spending or raising prices.

(5) Let's get more specific. Please enter numbers to indicate what you expect the size of each response would be to the situation just described. The four boxes must add up to $20 million, because the increase in the tax rate from 20% to 30% increases the corporation's tax bill by $20 million (10% of $200 million in pre-tax profits).[44]

- Decrease in spending on wages (from a base of $500 million), in millions of dollars
- Decrease in spending on capital equipment (from a base of $200 million), in millions of dollars
- Increase in prices on customers to raise revenue (from a base of $1000 million), in millions of dollars
- Decrease in after-tax profit (from a base of $160 million), in millions of dollars

(6) How confident are you in the accuracy of your answers to the questions on this screen?

- Not confident at all
- Slightly confident
- Moderately confident
- Strongly confident

[44]Note, when we have the responses sum to $20 million, we're ignoring feedback effects of the responses on pre-tax profit.

(7) Next, please answer with your opinion on this yes/no question: "Should there be a tax on corporate profit?"

- Yes
- No

(8) We're interested in what you think the tax rate on corporate profit should be. The current tax rate on corporate profit in the United States is 21%. In what range do you think that tax rate should fall?

- 0% (choose this option if you think there should not be a tax on corporate profit)
- 1% - 10%
- 11% -20%
- 21% (choose this option if you think the tax rate should stay the same as it is now)
- 22%-30%
- 31% or greater

(9) Two questions ago, we asked you: "Should there be a tax on corporate profit?" People who answer "yes" to this question offer different possible reasons for why they think there should be a tax on corporate profit. We've listed three of those possible reasons below. Please read these reasons carefully and think about them for a moment. When you have done your best to understand each possible reason, click on it to highlight it. You must click on all three reasons to move on to the next screen.

- A tax on corporate profit taxes the wealthy owners and executives of corporations.
- A tax on corporate profit taxes those who benefit from the government activities that taxes fund.
- A tax on corporate profit constrains the economic and political power of corporations.

(10) Now, for each possible reason, please indicate which statement best describes your opinion on whether it offers a good reason for why there should be a tax on corporate profit.

(i) A tax on corporate profit taxes the wealthy owners and executives of corporations.

- I strongly agree
- I somewhat agree
- I somewhat disagree
- I strongly disagree

(ii) A tax on corporate profit taxes those who benefit from the government activities that taxes fund.

- I strongly agree
- I somewhat agree
- I somewhat disagree
- I strongly disagree

(iii) A tax on corporate profit constrains the economic and political power of corporations.

- I strongly agree
- I somewhat agree
- I somewhat disagree
- I strongly disagree

(11) Now, please rank these three possible reasons by entering 1, 2, or 3 next to each reason, where 1 indicates the reason with which you most strongly agree.

(i) It taxes the wealthy owners and executives of corporations.

(ii) It taxes those who benefit from the government activities that taxes fund.

(iii) It constrains the economic and political power of corporations.

(12) If there's another reason for why there should be a tax on corporate profit that you think is a better reason than the three given above, please use the box below to explain it to us.

In the next two questions, we'd like to ask you to think about the opinion of a typical American, not your own opinion.

(13) For each possible reason, please indicate which statement best describes the opinion of a typical American on whether it offers a good reason for why there should be a tax on corporate profit.

(i) A tax on corporate profit taxes the wealthy owners and executives of corporations.

- The average American strongly agrees
- The average American somewhat agrees
- The average American somewhat disagrees
- The average American strongly disagrees

(ii) A tax on corporate profit taxes those who benefit from the government activities that taxes fund.

- The average American strongly agrees
- The average American somewhat agrees
- The average American somewhat disagrees
- The average American strongly disagrees

(iii) A tax on corporate profit constrains the economic and political power of corporations.

- The average American strongly agrees
- The average American somewhat agrees
- The average American somewhat disagrees
- The average American strongly disagrees

(14) Finally, please rank these three possible reasons by entering 1, 2, or 3 next to each reason, where 1 indicates the reason with which the typical American most strongly agrees.

(i) It taxes the wealthy owners and executives of corporations.

(ii) It taxes those who benefit from the government activities that taxes fund.

(iii) It constrains the economic and political power of corporations.

(15) How would you answer along the following scale?

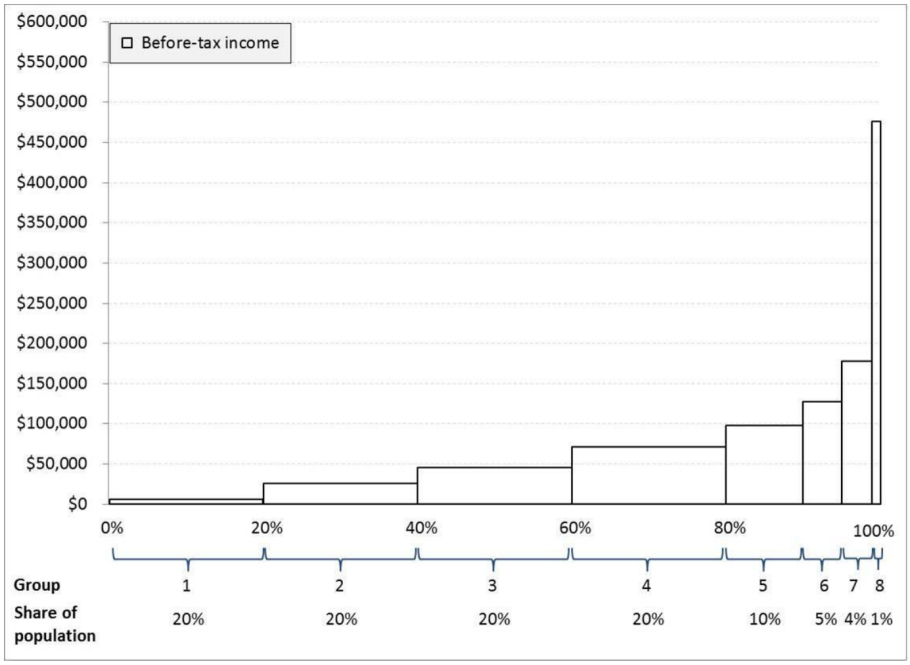
- 1. Government is obligated to guarantee that all people have their basic needs met, in terms of food, housing, education, etc.
- 2.
- 3.
- 4. Individuals are responsible for meeting their own basic needs.

(16) Which best describes your political perspective on economic issues (such as taxes, Social Security, etc.)?

- Left-leaning, or Liberal
- Centrist, or Moderate
- Right-leaning, or Conservative
- I'm not sure

Finally, please consider a few questions about you.

The figure below shows the distribution of income in the United States divided into 8 groups. The width of each column in the figure shows the percentage of the total population in each group, while the height of each column shows the average income for a household in each group. For example, group 3 makes up 20 percent of the population, and the average household in group 3 earns a little less than $50,000 in before-tax income.



(17) Which of the households in this figure did your household resemble most when you were 45 years old (or which do you expect your household to resemble most when you are 45 years old)?

- Type 1
- Type 2
- Type 3
- Type 4
- Type 5
- Type 6
- Type 7
- Type 8

(18) Which of the households in this figure did your household resemble most when you were 10 years old?

- Type 1
- Type 2
- Type 3
- Type 4
- Type 5
- Type 6
- Type 7
- Type 8

(19) What is your age?

- 18-25
- 26-40
- 41-64
- 65+

(20) Which best describes the education you completed (or expect to have completed) by age 30?

- Some high school
- High school graduate
- Some college
- College graduate

Appendix E. Survey Wave 2

Thank you for participating in this study. First, we're going to ask a few questions to familiarize you with the setup we're going to use for much of the study. Please answer the following questions with what you believe are the correct answers.

(1) Suppose that, in a given year, a corporation has the following activity:

Revenue	$100
Costs	
Wages	$50
Capital equipment	$20
Other inputs	$10
Total costs	$80
Pre-tax profit (Revenue - Total costs)	$20
Taxes (at 20% rate)	$4
After-tax profit (Pre-tax profit - Taxes)	___

After-tax profit equals pre-tax profit minus taxes. What is the corporation's after-tax profit?

- $24 million
- $20 million
- $16 million
- $4 million

(2) Now, suppose that the corporation decides to pay higher wages, so that it spends $60 million on wages. Then, the following information describes the corporation's activity:

Revenue	___
Costs	
Wages	$60
Capital equipment	$20
Other inputs	$10
Total costs	$90
Pre-tax profit (Revenue - Total costs)	$20
Taxes (at 20% rate)	$4
After-tax profit (Pre-tax profit - Taxes)	$16

You might notice that we've left the Revenue line blank in this scenario. What value for Revenue is consistent with the rest of the information above?

- $120 million

- $110 million
- $70 million
- $60 million

(3) Instead, now suppose that the corporation's revenue decreases to $90 million. Then, the following information describes the corporation's activity:

Revenue	$90
Costs	
Wages	$60
Capital equipment	___
Other inputs	$10
Total costs	$90
Pre-tax profit (Revenue - Total costs)	$20
Taxes (at 20% rate)	$4
After-tax profit (Pre-tax profit - Taxes)	$16

You might notice that, in the Costs section of the table, we've left the Capital equipment line blank. What value for Capital equipment is consistent with the rest of the information above?

- $40 million
- $30 million
- $20 million
- $10 million

Ok. Now we will begin the main study. We will be asking you a series of questions about the effects of taxing corporate profit. There are no right or wrong answers—we are interested in your opinions. Let's get started!

(4) Please consider the corporation described in the earlier questions. In a given year, its activity was as follows:

Suppose that, a few years later, the tax rate on corporate profit increased to 40%. We're interested in what you think will happen as a result of this tax increase.

Even though the corporation will write the check to the government to pay the tax, the money to pay that check will have to come from someone. For example, the corporation's customers might pay higher prices, its workers might receive lower wages, its capital equipment suppliers might receive lower payments, or its shareholders might receive less after-tax profit. In other words, some group of people, not the corporation itself, ends up "paying for"

Revenue	$100
Costs	
Wages	$50
Capital equipment	$20
Other inputs	$10
Total costs	$80
Pre-tax profit (Revenue - Total costs)	$20
Taxes (at 20% rate)	$4
After-tax profit (Pre-tax profit - Taxes)	$16

the tax increase by paying more money or getting less money. Which group do you think is most likely to end up "paying for" the tax increase in this way?

- Customers (who will pay higher prices)
- Workers (who will receive lower wages)
- Capital equipment suppliers (who will receive lower payments)
- Shareholders (who will receive less after-tax profit)

(5) Let's get more specific. More than one of these groups of people may end up "paying for" some of the tax increase. What shares of the tax increase do you expect each group will end up "paying for"?

- Customers (who will pay higher prices)
- Workers (who will receive lower wages)
- Capital equipment suppliers (who will receive lower payments)
- Shareholders (who will receive less after-tax profit)

How confident are you in the accuracy of your answers to the questions on this screen?

- Not confident at all
- Slightly confident
- Moderately confident
- Strongly confident

Great. Now we will ask similar questions, but about the effects of government spending, not taxes.

(6) Please consider, again, the corporation described in the earlier questions. Here's a reminder that, in a given year, its activity was as follows:

Revenue	$100
Costs	
Wages	$50
Capital equipment	$20
Other inputs	$10
Total costs	$80
Pre-tax profit (Revenue - Total costs)	$20
Taxes (at 20% rate)	$4
After-tax profit (Pre-tax profit - Taxes)	$16

Suppose that, a few years later, increases in government spending on infrastructure (such as roads and broadband internet) and public services (such as education and public safety) have made it easier for corporations like this one to operate successfully. When the corporation finds it easier to operate successfully, someone ends up with more money. For example, the corporation's customers might pay lower prices, its workers might receive higher wages, its capital equipment suppliers might receive higher payments, or its shareholders might receive more after-tax profit. In other words, some group of people, not the corporation itself, ends up benefiting from the government spending increase by paying less money or getting more money. Which group do you think is most likely to end up benefiting from the government spending increase in this way?

- Customers (who will pay lower prices)
- Workers (who will receive higher wages)
- Capital equipment suppliers (who will receive higher payments)
- Shareholders (who will receive more after-tax profit)

(7) Let's get more specific. More than one of these groups of people may end up benefiting from the government spending increase. What shares of the benefit from the government spending increase do you expect each group will end up getting?

- Customers (who will pay lower prices)
- Workers (who will receive higher wages)
- Capital equipment suppliers (who will receive higher payments)
- Shareholders (who will receive more after-tax profit)

(8) How confident are you in the accuracy of your answers to the questions on this screen?

- Not confident at all
- Slightly confident
- Moderately confident
- Strongly confident

(9) Next, please answer with your opinion on this yes/no question: "Should there be a tax on corporate profit?"

- Yes
- No

(10) We're interested in what you think the tax rate on corporate profit should be. The current tax rate on corporate profit in the United States is 21%. In what range do you think that tax rate should fall?

- 0% (choose this option if you think there should not be a tax on corporate profit)
- 1% - 10%
- 11% -20%
- 21% (choose this option if you think the tax rate should stay the same as it is now)
- 22%-30%
- 31% or greater

(11) Two questions ago, we asked you: "Should there be a tax on corporate profit?" People who answer "yes" to this question offer different possible reasons for why they think there should be a tax on corporate profit. We've listed three of those possible reasons below. Please read these reasons carefully and think about them for a moment. When you have done your best to understand each possible reason, click on it to highlight it. You must click on all three reasons to move on to the next screen.

- A tax on corporate profit taxes the wealthy owners and executives of corporations.
- A tax on corporate profit taxes those who benefit from the government activities that taxes fund.
- A tax on corporate profit constrains the economic and political power of corporations.

(12) We'd like to know what you think of these reasons from the previous screen. For each possible reason, please indicate your opinion on two questions (as shown in the columns below):

(i) Is this an accurate description of what the tax does?

i. It taxes the wealthy owners and executives of corporations.

- Yes

- No

ii. It taxes those who benefit from the government activities that taxes fund.
- Yes
- No

iii. It constrains the economic and political power of corporations.
- Yes
- No

(ii) If this were an accurate description of what the tax does, would it be a good reason for having the tax?

i. It taxes the wealthy owners and executives of corporations.
- Yes
- No

ii. It taxes those who benefit from the government activities that taxes fund.
- Yes
- No

iii. It constrains the economic and political power of corporations.
- Yes
- No

(13) Now, we'd like you to rank these possible reasons, using the same two questions.

(i) First, which reason is the most accurate description of what the tax on corporate profit does? (1=the most accurate reason)

i. It taxes the wealthy owners and executives of corporations.
ii. It taxes those who benefit from the government activities that taxes fund.
iii. It constrains the economic and political power of corporations.

(ii) Second, if each reason were an accurate description of what the tax does, which would be the best reason for having the tax on corporate profit? (1=the best reason)

i. It taxes the wealthy owners and executives of corporations.
ii. It taxes those who benefit from the government activities that taxes fund.
iii. It constrains the economic and political power of corporations.

(14) If there's another reason for why there should be a tax on corporate profit that you think is better than the three given above, please use the box below to explain it to us.

(15) How would you answer along the following scale?

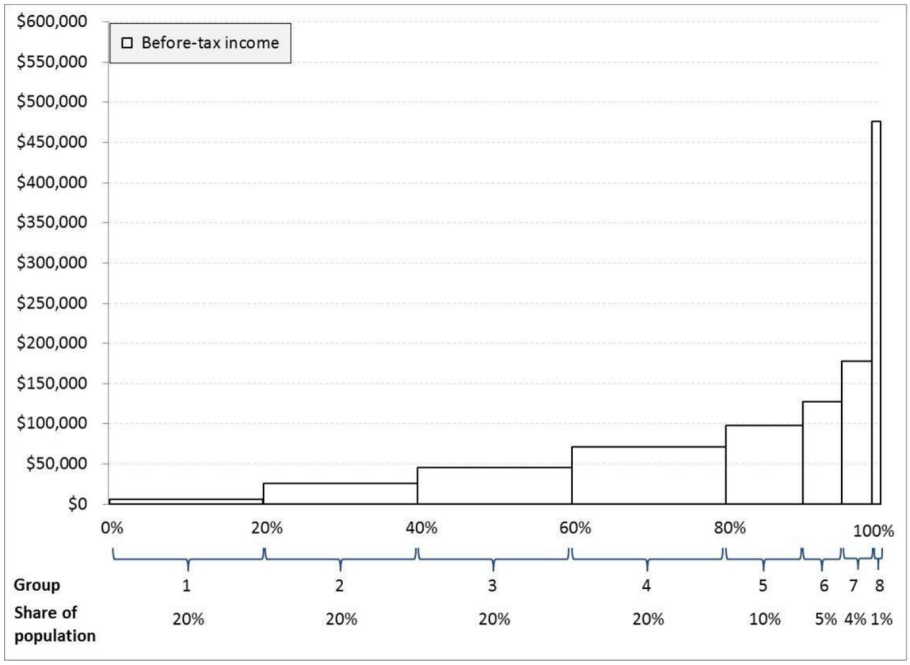
- 1. Government is obligated to guarantee that all people have their basic needs met, in terms of food, housing, education, etc.
- 2.
- 3.
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(16) Which best describes your political perspective on economic issues (such as taxes, Social Security, etc.)?

- Left-leaning, or Liberal
- Centrist, or Moderate
- Right-leaning, or Conservative
- I'm not sure

Finally, please consider a few questions about you.

The figure below shows the distribution of income in the United States divided into 8 groups. The width of each column in the figure shows the percentage of the total population in each group, while the height of each column shows the average income for a household in each group. For example, group 3 makes up 20 percent of the population, and the average household in group 3 earns a little less than $50,000 in before-tax income. Which of the households in this figure did your household resemble most when you were



45 years old (or which do you expect your household to resemble most when you are 45 years old)?

(17)
- Type 1
- Type 2
- Type 3
- Type 4
- Type 5
- Type 6
- Type 7
- Type 8

(18) Which of the households in this figure did your household resemble most when you were 10 years old?

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(19) What is your age?

- 18-25
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(20) Which best describes the education you completed (or expect to have completed) by age 30?

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- Some college
- College graduate