Trickle-Down Revisited*

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Abstract

In this paper I discuss what can be learned about "trickle-down" ideas from recent empirical evidence on tax incidence. Tax incidence, defined as the effect of tax policies on the distribution of welfare, provides an ideal framework because of the explicit focus on tracing the impacts of a policy beyond the directly affected group (ex. the rich). I arrive at three main lessons. First, recent evidence finds that business income taxes do affect the earnings of workers, but these effects are mostly a result of rent-sharing and taxation of rents, not from traditional supply-side channels. Second, there are systematic differences in the types of workers that are affected by the tax policies, so to understand how taxing businesses or business owners affects the distribution of welfare, it is not sufficient to treat workers/labor as a class. Third, across different income tax policies that statutorily affect the rich, the burden is generally ultimately born by the rich. I conclude with a discussion of fruitful avenues of further research, particularly on how tax incidence depends on various institutional features of labor markets, product markets and tax systems.

There are two ideas of government. There are those who believe that if you just legislate to make the well-to-do prosperous, that their prosperity will leak through on those below. The Democratic idea has been that if you legislate to make the masses prosperous their prosperity will find its way up and through every class that rests upon it.

- William Jennings Bryan (1896)

This election was lost four and six years ago, not this year. They [Republicans] didn't start thinking of the old common fellow till just as they started out on the election tour. The money was all appropriated for the top in the hopes that it would trickle down

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to the needy. Mr. Hoover was an engineer. He knew that water trickles down. Put it uphill and let it go and it will reach the driest little spot. But he didn't know that money trickled up. Give it to the people at the bottom and the people at the top will have it before night, anyhow. But it will at least have passed through the poor fellow's hands. They saved the big banks, but the little ones went up the flue.

- Will Rogers (1932), first use of "trickle down"

1. Introduction

1.1. A Brief History of Trickle-Down

The idea of "trickle-down" originated from political debates to describe the economic policies of a party or politician. There was never a formal concept of "trickle-down economics" in the sense of economic theory. The term-of-art was used to describe policies that directly benefited to rich but were justified by arguments they would ultimately also benefit the middle class and poor. In fact, the term was not originally used by those advocating for such policies, but as a critique of the political discourse promoting such policies. While the term "trickle-down" was not used by William Jennings Bryan in his 1896 speech as he was running for president, the rhetoric was present in the introductory quote above. The term was first introduced by humorist and vaudville performer Will Rogers in a column critiquing then-President Herbert Hoover's economic policies, also quoted above.

The term, and the critique it embodied, stuck with politicians and parties that promoted economic policies where the direct benefits were for the rich, particularly those with respect to tax policies.[1] The relationship between trickle-down ideas, tax policy and economics was secured during the Ronald Reagan administration, when the proposed tax cuts where linked to the recently articulated "supply-side" economic theory. Supply-side economics, broadly developed around the ideas of economists Robert Mundell and Arthur Laffer, focused on growth through reducing marginal income tax rates and promoting investment

[1] William J. Bennett, a conservative politician who served in the administrations of Ronald Reagan and George H. W. Bush, lamented in his 2007 book, "Humorist Will Rogers referred to the theory that cutting taxes for higher earners and businesses was a "trickle-down" policy, a term that has stuck over the years."

through lower capital income tax rates and deregulation. These ideas had a natural relationship with trickle-down ideas in that the direct beneficiaries of lower marginal and capital tax rates were disproportionately the rich - those that faced the highest marginal tax rates and disproportionately owned the capital - but the theory stated that this would ultimately benefit lower income consumers/workers through growth (led by capital investment), employment and lower prices. The Reagan administration turned to "supply-side" rhetoric to promote large marginal rate and business income tax cuts, and the concepts of supply-side and trickle-down tax policies have been linked since.[2] Figure 1 shows the Google Trends of the term "trickle down" since 2005, and reveals that spikes in its use are concentrated around changes in tax policy or U.S. presidential elections where tax policy was on the agenda.

1.2. Economic Analysis of Trickle-Down

In this article I will discuss the idea of trickle-down as it relates to taxes. I will focus on tax policies that have direct effects on the rich and capital owners - tax rates faced by high income households and capital tax policies specifically related to growth (supply-side) - with a focus on how the effects of these policies "trickle down" to lower income households or workers. Given that trickle-down originated as a political debate, I will discuss both positive analyses of these policies and normative frameworks that apply to the policies.

Given this, the best economic framework to study these questions is the theory of tax incidence. Tax incidence is the study of the impact of taxes on the distribution of welfare,

[2]In the wake of this, some supply-side advocates have lamented how it has been used to promote trickle-down ideas. In a 2007 article titled, *How Supply-Side Economics Trickled Down*, Bruce Bartlett, a former Reagan advisor wrote, "most accept the basic ideas of supply-side economics – that incentives matter, that high tax rates are bad for growth, and that inflation is fundamentally a monetary phenomenon. . . . Today, supply-side economics has become associated with an obsession for cutting taxes under any and all circumstances. No longer do its advocates in Congress and elsewhere confine themselves to cutting marginal tax rates – the tax on each additional dollar earned – as the original supply-siders did. Rather, they support even the most gimmicky, economically dubious tax cuts with the same intensity. ... today it is common to hear tax cutters claim, implausibly, that all tax cuts raise revenue." Yet, another former Reagan advisor David Stockman has issued a competing complaint arguing that supply-side economics was always a cover for trickle-down ideas stating, "It's kind of hard to sell 'trickle down,' so the supply-side formula was the only way to get a tax policy that was really 'trickle down.' Supply-side is 'trickle-down' theory."

and it derives from the insight that the person or entity with the the legal or statutory obligation to make the tax payment may not be the only one whose welfare is affected by the tax. In this way, the study of tax incidence maps directly onto trickle-down ideas by taking the direct or statutory beneficiary of the tax policy and following how it affects the distribution of welfare across the economy (whom does it trickle to?).

Therefore, this paper will frame trickle-down ideas through positive and normative applications of tax incidence. I focus primarily on new empirical research about how taxing capital or the rich affect "the distribution of welfare." Various economic models offer competing predictions about whether to expect that taxing capital owners at the top of the income distribution affects lower earning workers, if so, in what direction and by what channel. Therefore, it is ultimately an empirical question as to whether, and how, changes in these tax rates affect workers. Advances in data quality, particularly administrative linked firm-worker data, econometric methods for identifying causal effects of tax policies, and micro-economic theory on product and labor markets have led to new insights about whether and how taxes that directly affect the rich / capital owners ultimately affect lower earning workers.

I review this new literature according to themes related to trickle-down and supply-side tax ideas and arrive at three main lessons. First, recent evidence finds that business income taxes do affect the earnings of workers, but these effects are mostly a result of rent-sharing and taxation of rents, not from traditional supply-side channels. Second, there are systematic differences in the types of workers that are affected by the tax policies, so to understand how taxing businesses or business owners affects the distribution of welfare, it is not sufficient to treat workers/labor as a class. Third, across different income tax policies that statutorily affect the rich, the burden is generally ultimately born by the rich. I conclude by arguing that from a policy standpoint, considering who bears the burden of a tax in isolation is insufficient for addressing trickle-down ideas or critiques and advocate for a more unified discussion of the efficiency and equity consequences of both tax and spending policies.

1.3. This paper

I begin by summarizing classical theories of tax incidence. The main insight of these theories is that i) the burden of capital income taxes may be born by labor/workers and/or land owners in addition to capital owners, and that the distribution of the burden depends on key elasticicities, particularly the elasticity of capital supply. Whether labor or capital bears (more of) the burden of the tax depends on elasticities and features of the capital and labor market - the elasticity of capital supply, whether the taxed sector can be seen as part of a closed or open economy and relative capital and labor mobility across (newly) taxed and untaxed sectors. The focus on the elasticity of capital supply in these models provides a natural corollary to supply-side ideas of income taxation. While these models provide fundamental insights that have framed subsequent theoretical and empirical work on tax incidence, recent work has found that additional considerations are also important to understanding how capital taxes affect workers. In particular, these models generally assumed perfect competition in product and labor markets. Recent work has shown empirically that considering imperfect product or labor markets and the taxation of resulting rents may be equally, if not more important, for understanding how capital taxes affect workers.

In the next section, I focus on the evidence on how taxing businesses affects workers. In doing so, I center two questions. First, *how* does taxing businesses affect workers? In particularly, distinguishing between supply-side channels and other potential channels such as rent-sharing. Much of the recent evidence suggests that i) most of business income taxation is taxing rents rather than normal returns to investment, and ii) that the effects of taxing businesses on workers may predominantly work through rent-sharing. I review empirical evidence in this area and highlight the implication that tax incidence is endogenous to the labor and product markets that the firms and workers operate in. I discuss the implications of this for incidence theory and welfare analyses and push for more purposeful discussion

of the institutional context surrounding empirical results and heterogeneity of responses to facilitate meaningful policy discussion.

Second, I focus on what we have learned about the effects of these policies on the distribution of welfare. To address this question it is not sufficient to understand whether taxing businesses affects workers, but also which workers they affect, particularly where they are in the income or earnings distribution. While capital owners are disproportionately at the top of the income distribution, labor income is also unequally distributed and the labor share of top incomes is large.[3] I review the recent evidence of the effect of taxes on the distribution of incomes, which finds that it is workers at the top of the income distribution that are affected by the tax policies. This suggests that focusing on the effects of business taxes on workers as a class somewhat obscures the more salient economic question about the distribution of welfare or the corollary political question about whether this is actual trickle-*down*. Clearly, this also has normative implications if society places differential welfare weights on its citizens based on their income, rather than the source of the reported income (labor or capital).

In the next section, I discuss other taxes, besides statutory tax rates on business income, where the direct effect is on the rich or capital owners, but that could affect the distribution of welfare, potentially through supply-side responses. These include dividend taxation, capital gains taxation, (implicit) taxation on innovation, local tax incentives and top marginal tax rates on personal income. I provide a brief survey of recent literature on each of these and conclude that, taken together, there is not much evidence that these taxes have a substantial effect on those not subject to the tax. The majority of recent empirical evidence suggests that the economic incidence is close to the statutory incidence and that most behavioral responses are shifting (either bases or location) and not "real" responses in the supply-side

[3]Recent work in the U.S. suggests that top 1% labor income is between 8-10% of national income and top 1% capital income is between 7-11% (Piketty et al. (2018), Smith et al. (2022)).

framework.

I conclude with a discussion of remaining challenges in interpreting existing estimates and the implications for future research. In particular, credibly estimating long-run responses to these policies is very challenging as confounding shocks accrue, making it difficult to attribute observed outcomes to a particular policy. Wage effects of capital deepening may be significantly lagged, and therefore more difficult to capture with current econometric tools. For this reason, evidence of investment responses are generally used as proxies, or necessary first stages, for potential supply-side incidence on workers. The lack of current evidence on supply-side responses, does not necessarily preclude the existence of supply-side incidence in the longer run, but instead highlights the value of further empirical research to credibly identify long-run effects of theses policies. Nevertheless, I conclude that the recent, and growing, body of empirical work provides important new insights into the mechanisms by which taxing the rich are likely to affect lower-income households (that may be at least as important as channels traditionally considered), which types of households these policies are likely to effect, and which institutional features may mediate the trickle-down (or lack-there-of) of these policies.

2. Business Tax Incidence: Trickle-Down to Whom and How?

In this section, I discuss recent evidence on how taxing businesses and business owners affects workers. The purpose is not to provide a comprehensive review of the literature on tax incidence, but to highlight key insights from recent empirical work that informs how we can understand and conceptualize tax incidence as it relates to trickle-down and supply-side ideas. I conclude that recent causal evidence from high-quality linked panel datasets suggests that business income taxes often do affect the earnings of workers, but that these effects are mostly a result of rent-sharing and taxation of rents, not from traditional supply-side channels. I discuss the resulting implication that the incidence of the tax depends on

the labor and product markets that the taxed firms operate in. Further, many recent studies go beyond estimating aggregate effects on workers to estimate which workers are affected. The evidence suggests that when workers are affected by business income taxes, they are mostly workers at the top of the firm's earnings distribution. I show that this heterogeneity is critical for analyzing the ultimate incidence of these taxes.

2.1. Theory of Tax Incidence

It is useful to begin with an introduction to the classical theory of tax incidence. Tax incidence is the study of the impact of taxes on the distribution of welfare, and it derives from the insight that the person or entity with the the legal or statutory obligation to make the tax payment may not be the only one whose welfare is affected by the tax. The canonical model of corporate income tax incidence was developed by Harberger (1962). He introduced a closed economy model with a fixed stock of capital and labor and perfectly competitive firms operating in two sectors, a corporate sector that would face a tax increase and a non-corporate sector. In this model, the incidence is a function of the substitutablity between capital and labor and capital intensity across the taxed and untaxed sectors.[4] Under his preferred assumptions, capital owners bear the full incidence of the tax as capital returns are ultimately equalized between sectors at a lower rate than prior to the tax and workers would also freely shift sectors following the capital and because of the fixed capital and labor stock, equilibrium wages do not change. But another key result is that "anything goes" in general equilibrium, and labor can theoretically bear anywhere between 0-100% and even over 100% of the tax.

While subsequent models added more realistic and complex assumptions, the most consequential of which was to introduce an open economy and international capital flows, the influence of Harberger's model and the focus on elasticities associated with relative capital

[4]Kotlikoff and Summers (1987) present a linearlized version of the model as functions of key elasticities.

and labor mobility laid the foundation for incidence analysis going forward.[5] A next wave of analyses introduced an open economy and the importance of relative capital and labor mobility across borders. Under the assumption that capital is more mobile across countries than labor, these models find that labor can bear some (or all) of the burden of the tax. The basic intuition is that a tax increase will cause capital to leave the country, labor becomes relatively more abundant which drives down wages and bolsters returns to capital. Yet, depending on underlying assumptions, these models can predict very different incidences on labor. Kotlikoff and Summers (1987) shows that the incidence on labor depends on the size of the country/market and, for small countries, labor can bear the entire burden. Randolph (2006) presents a model with perfect substitution between domestic and international produce markets and simulates that labor may bear 70% of the burden. Gravelle and Smetters (2006) allow for imperfect substitutability and show that labor may bear little of the burden in this case. Gravelle (2013) reviews the open economy analyses and concludes that, under reasonable assumptions, labor likely bears no more than 40% of the burden in the U.S.[6]

As articulated in Auerbach's (2018) review of the literature on tax incidence, analyses of tax incidence that follow the insights from these models typically adopt a "supply side" approach, focusing on long-run capital supply as the mechanism by which capital income taxes affect workers. Depending on the long-run capital accumulation incentives, substitutability of capital and labor and relative capital and labor mobility across jurisdictions, sectors or industries, the models can predict that capital bears the full burden of the tax, that labor bears the full burden, or anything in between. Early empirical work did not clarify much, with some estimates suggesting labor bear essentially none of the burden (ex.

[5] As did the result that capital bears the full burden. Extensions of the Harberger model by Shoven (1976), which allowed for multiple sectors, and by Gravelle and Kotlikoff (1989), which allowed the corporate and non-corporate sectors to to produce similar goods, also found that the burden falls primarily on capital. Resultingly, until 2012, the Congressional Budget Office (CBO) assumed that incidence of business income taxes fell on capital owners when conducting distributional analyses of potential tax reforms.

[6] Reviews of this literature include Auerbach (2006), Gentry (2007), Auerbach (2018) and Gravelle (2021).

Clausing (2013)) and others finding labor bears almost as much as 400% of the burden (Hassett and Mathur (2015)). Gravelle (2021) reviews the empirical work stemming from these models and highlights flaws in the cross-country designs used, concluding that there is not much convincing evidence of labor bearing a substantial portion of the burden through these supply-side channels.

Notably, these models generally assume perfect competition in product and labor markets. Recent literature has focused on the role of the domestic labor market in mediating the incidence of corporate taxation. Labor market models with rent-sharing between firms and workers can predict that increases in business income taxation will lead to direct effects on worker earnings, independent of general equilibrium capital supply responses. These models differ in their underlying assumptions, but each involves rent-sharing such that employees are earning above their reservation wages, thereby leaving room for the taxation of the firm to affect the earnings of employees at that firm.[7] These models include those with imperfect competition in the labor market (e.g. search and bargaining, union bargaining, or monopsony models) as well as models with perfect competition but other information asymmetries or costs (e.g. incentive pay, efficiency wages, specific human capital).

Papers by Felix and Hines Jr. (2009) and Arulampalam et al. (2012) use wage bargaining models as a basis for estimating the direct effect of corporate income taxation on employee earnings. Risch (2022) shows how marginal and average tax rates have competing incentives in bargaining models and finds that workers' earnings responses are associated with increases in the average tax rate, or total tax liability, faced by firms, consistent with direct rent-sharing mechanisms. Fuest et al. (2018) and Risch (2022) incorporate taxes into wage-posting models, a form of monopsony model, and show that a higher marginal tax rate on business income is associated with lower offered wages as long as labor or capital are less than fully

[7]If a worker is earning above their reservation wage (the lowest wage they will accept to work at that firm), then firms have labor-market power and may unilaterally adjust wages in response to a tax shock. The degree to which this is true and the types of workers this is true for, depends on the underlying model.

deductible. The higher tax rate reduces the marginal benefit to growing the firm, so firms reduce wages; inframarginal workers will receive lower wages and remain with the firm while marginal workers will no longer want to work at the firm. Fuest et al. (2018) incorporate income taxes into a number of other such models, including efficiency wage models like those in Solow (1979), Shapiro and Stiglitz (1984) and Acemoglu and Shimer (1999), and fair wage models (Akerlof and Yellen (1990) and Amiti and Davis (2012)), and show that these can predict that tax increases can have direct negative effects on worker wages.

2.2. Evidence on Rent-sharing and Tax Incidence

A tax on business can tax returns from different sources, and which of these sources are taxed (more heavily) will have implications for the incidence of the tax. To provide a simple benchmark for discussing the potential effects of capital income taxes on workers, we can divide the return on capital investment into two components: normal returns and supernormal returns, where the normal return is that required to put the capital in place, and "supernormal" returns are earned above that. An income tax taxes both components. The supply-size literature primarily focuses on the effect of income taxes on the normal return. A tax on this component would reduce the long-run supply of capital (at least in the location where the tax is imposed), which could affect returns to other factors, particularly labor. By contrast, a cash-flow tax exempts the normal return from taxation and taxes only supernormal returns. The standard is to assume that a tax on supernormal returns is non-distortionary - it does not affect capital accumulation nor worker wages - so the full burden of the tax on these returns is borne by capital owners.[8]

There has been substantial recent work dedicated to understanding the share of the businesses income tax base associated with the normal returns relative to supernormal returns,

[8]For example, the U.S. Treasury assumes that 63% of the corporate tax base is supernormal returns and assumes that 100% of taxation of supernormal returns is borne by capital (Cronin et al. (2013)). Returns to risk are treated supernormal returns in the Treasury model, and following standard models, the full incidence of which is also assumed to be borne by capital owners.

or rents.[9] One form of such studies compares revenues from corporate taxes under existing income tax systems to what would be raised under a cash-flow tax that would exempt the normal return from taxation. Recent papers by Fox (2020) and Patel and McClelland (2017) find that in the U.S. revenues from a corporate cash-flow tax would have closely approximated patterns of revenues from the existing U.S. tax system over the previous decades, so most of the corporate tax base (at least since the mid-1990s) has been rents.[10] The main implication of this are i) supply-side responses to changes to corporate tax rates are limited, and ii) that effects of tax changes on workers may be primarily through rent-sharing mechanisms. This perhaps explains why recent empirical evidence using credible causal designs and focusing more on the rent-sharing channel finds relatively consistent evidence that business income taxation has direct effects on workers.

Rents can come from a number of sources, particularly labor market frictions (including, but not limited to, monopsony power, search frictions, or collective bargaining) or product market imperfections like monopoly or oligopoly power, including patents. Regardless of the source, substantial recent evidence has shown that rents are shared with workers. Manning (2011) and Card et al. (2018) provide recent reviews, and show very consistent empirical evidence that firm-specific shocks to rents or quasi-rents get passed onto worker wages. Kline et al. (2019) estimate firm-specific pass-through from an exogenous increase in operating revenue associated with receiving a successful patent award and find significant earnings responses, consistent with rent-sharing being shared between owners and employees.[11]

[9] I use supernormal returns and rents interchangeably, but note that rents in this context can include classic economic rents and quasi-rents. Quasi-rents are not necessarily associated with monopoly rights over a factor, but instead i) (perhaps temporary) market advantages that provide excess returns or ii) ex-post excess returns that were necessary to incentive the initial investment ex-ante. A cash-flow tax exempts the latter from taxation but not the former, thus remaining non-distortionary in a standard model. The rent-sharing literature discussed below typically focuses on the sharing of rents and quasi-rents alike.

[10] A number of other studies have provided similar evidence, which include those focusing on the implications of cash flow taxes for revenues and those estimating the share of the tax base associated with normal returns (Gordon et al. (2004), Power and Frerick (2016)). Gale and Thorpe (2022) provide a nice review of this literature.

[11] Relatedly, work on the role of the firm for income inequality has found variation in earnings of similarly

Recent empirical work on tax incidence has used high quality linked firm-worker panel data to estimate the direct effects of business taxes on workers using firm or industry-level variation. This work has found relatively consistent evidence that workers bear some portion of business income taxes, ranging from 10-50%, with the estimates deriving from a variety of settings related to the tax incentive, the level of variation (firm, region, industry) and labor market institutions. Arulampalam et al. (2012) uses a bargaining framework and cross-country variation in Europe and estimates 49% of corporate tax burdens are borne by workers. Fuest et al. (2018) estimates responses to regional variation in corporate tax rates in Germany and find that about half of the burden is born by workers on average. They discuss how their results are broadly consistent with rent-sharing mechanisms, and that the extent of the burden borne by labor depends on collective bargaining (with significantly larger worker earnings responses to corporate taxes in more unionized plants) and the availability of profit shifting opportunities. In Risch (2022), I estimate the effect of a national increase in the pass-through business income tax rates in the U.S. on worker earnings, comparing outcomes of workers in similar firms that were differentially exposed to the tax increase. I find that 10-20% of the burden is borne by workers while the remainder is borne by business owners. The results are associated with direct pass-through of firm tax liabilities, implying that the observed responses come from rent-sharing of after-tax firm surplus.

Another set of recent papers isolates variation in effective business income taxation from differential exposure to credits and deductions. Carbonnier et al. (2022) uses firm-level variation in exposure to the introduction of tax credits in France related to the share of low earning workers employed at the firm and finds that about half of the credits are captured by workers through higher wages, consistent with rent-sharing mechanisms. Ohrn (2022) uses industry-level variation in exposure to "bonus depreciation" (which increased the ability to

skilled workers across firms, consistent with rent-sharing (Abowd et al. (1999), Card et al. (2013), Song et al. (2018)).

expense investment) and the Domestic Production Activities Deduction and finds that 17-25 cents per dollar of tax savings was passed onto the top five highest paid executives in publicly traded firms in the U.S. The responses were stronger among firms with weaker governance, suggesting that they may be associated with executive rent extraction.

2.2.1. Endogenous Incidence: Implications for Economic and Policy Analysis

Taken together this recent evidence shows that business income taxes can affect the earnings of workers, but the effects are likely associated predominantly with rent-sharing as opposed to traditional supply-side responses. One implication is that the incidence of the tax is endogenous to the prevailing product and labor markets, and therefore interacts with non-tax policies that affect the relationships between firms and workers. Not only will features of the tax code of the tax code affect the incidence of the tax, for example those the make the tax more or less like an income or cash flow tax which imply more or less of the tax base is normal returns, but also policies that affect the level and transmission of rents.[12] In Risch (2022), I show that when incidence is associated with rent-sharing, the welfare effect does not only depend on the magnitude of burden borne by workers but also the labor market mechanism that mediates the incidence. When labor markets are less competitive, for example in a monopsony framework, the welfare loss associated with the direct effect on workers can be substantially larger than the welfare loss in a more competitive model of rent-sharing like incentive pay arrangements.[13] In addition to taxes, the government designs policies which affect the interaction between workers and firms in the labor market, for example the minimum wage, health care policy, unemployment insurance, and regulations of monopoly and monopsony power. The discussion above suggests that these policies interact

[12]This is similar to the result from Slemrod and Kopczuk (2002) which argues that the elasticity of taxable income (ETI) is a policy parameter. Trickle-down from taxing business owners is also a policy parameter.

[13]Using a simple calibration, Risch (2022) shows that the welfare effect associated with moving from a more to a less competitive can be larger than doubling the level of the burden from 20 to 40% in a more competitive model.

with the equity and efficiency of business income taxation and therefore it may be appropriate to jointly consider optimal tax and labor market policies.

This also points to some fruitful areas for research on tax incidence. First, studying the direct mechanisms by which taxes affect workers, beyond general concepts of supply-side or rent-sharing. For example, incorporating information on occupations, the burgeoning literature using job postings, considering internal labor markets and tools from organizational economics to learn more about what is going on inside the firm and how this mediates tax incidence. Second, a better understanding of the interaction between tax policy and labor market or social-safety net policies would be quite beneficial. For example, various studies have already found quantitatively important heterogeneity across more or less unionized labor markets. What other policies interact meaningfully with tax incidence, does this vary by tax instrument, and what are the implications for optimal tax policy? There is substantial room for theoretical and empirical work on these questions.

Further large administrative panel datasets have allowed for more precise estimation of heterogeneous responses to tax policies. Continued documentation of heterogeneous responses across types of firms, workers and tax instruments provides welfare and policy-relevant insights. Relatedly, more clearly interpreting results as endogenous to the setting in which they are derived can provide meaningful context to trickle-down debates.[14] This can help ensure that the most appropriate estimates are invoked for relevant policy discussions, can allow for more meaningful analysis of packages of policies, and can help clarify what questions remain unanswered.

2.3. The Distribution of Welfare: Not all Workers are the Same

The key feature of the trickle-*down* idea is that taxing rich capital owners effects *lower income* workers. Since capital ownership is highly concentrated at the top of the income distribution

[14]For example documenting labor and product market conditions (unionization, tradeables v. non-tradeables, large or small firms, multi-nationals) and sources of variation (firm-level, industry-level, regional).

and the majority of income below the top is labor income, debates have centered how these taxes affect workers or labor broadly as a proxy for how they trickle-down. Public discourse around these tax policies is largely about "rank-and-file" workers, but labor income is also highly concentrated and capital and labor income are increasingly intermingled at the top of the income distribution (carried interest, compensation through stock options, ownership of pass-through businesses).[15] Returning to the key debate surrounding trickle-down or supply-side ideas and the fundamental question of tax incidence about the effects on the distribution of welfare, it is important to understand which individuals, and not only which sources of income, are affected by these policies.[16] Estimating aggregate effects on workers or labor as a whole can mask important, welfare relevant heterogeneity. With improvements in firm-worker micro data, there is new evidence about which workers are affected by capital taxes and taxes on the rich, particularly through rent-sharing mechanisms.

Taken together, recent evidence suggests that i) rent-sharing is disproportionately at the top of the earnings distribution, ii) much of the evidence on the effects of taxes on labor are associated with rent-sharing mechanisms, and iii) well-identified studies of the effects across the earnings distribution find that the incidence of business income taxes on labor is largely at the top of the distribution. Estimates of aggregate responses among workers can obscure this welfare-relevant heterogeneity. Focusing on the heterogeneity of affects is important for positive and normative economic analysis of tax incidence, but it is potentially much more important for policy debates around trickle-down and supply-side policies if aggregate effects on workers/labor are mis-attributed to the effects on rank-and-file workers.

[15] Using Piketty et al. (2018) DINA tables, about 10% of labor income is held by the top 1% of households and 38% is held by the top 10%, with only 12% being held by the bottom 50%.

[16] In welfare analyses, society's welfare weights are generally assigned to households based on their income level (or marginal utility of consumption), not based on the source of that income.

2.3.1. Recent Literature

Recent literature has found that majority of the burden of business income taxation is borne by workers at the top of the earnings distribution, with much smaller effects on likely "rank-and-file" workers. These empirical findings could be associated with classical (supply-side) channels, rent-sharing or a combination of the two.

The literature on rent-sharing has found that rents are disproportionately shared with high earning workers at a firm, particularly among officers or executives. Kline et al. (2019) estimate the effects of firms' patent awards on worker earnings. They estimate that workers capture approximately 30% of the rents, but that this is mostly among those in the top quartile of the firm's earnings distribution and particularly among officers. Numerous other studies find that rents are disproportionately shared with high skilled workers proxied by education or occupation (ex. Gürtzgen (2009), Stansbury and Summers (2020)). Analyses of earnings inequality have found that firm characteristics play an important role in the growth of earnings inequality, consistent with increasing excess returns to top firms and top earners disproportionately benefiting (ex. Song et al. (2018), Barth et al. (2016), Furman and Orszag (2018)). While rent-sharing may be disproportionate at the top, evidence also suggests rents can be present in low earning sectors (Goldschmidt and Schmieder (2017) and Dube et al. (2019)).

Recent studies that have been able to estimate heterogeneity in responses to business income taxes across worker types have also generally found that the majority of the burden is borne by those at the top of the income or earnings distribution. In Risch (2022), I find that 10-20% of the burden of business income taxes were passed-through to workers. A decomposition of the aggregate response shows that this burden was not borne equally by all workers - approximately 85% was borne by workers in the top 30% of the earnings distribution with no substantive burden among workers below the median of the earnings distribution. The remainder (approximately 80%) of the burden was borne by the top-

bracket (top 1%) owners that directly faced the tax increase. Many of these owners are owner-employees (active owners) so some portion of the burden may be associated with their returns to labor and another portion returns to capital, but at the fundamental level of assigning tax burdens across the distribution of welfare, it was those at the top, directly facing the tax change that bore the burden.[17] The Carbonnier et al. (2022) study discussed above finds that the entire incidence on labor (about 50%) was associated with workers in "high-skill" occupations.

Ohrn (2022) found that the top 5 highest paid executives received 17-25% of the benefit of two corporate tax breaks, bonus depreciation and the Domestic Production Activities Deduction (DPAD) in the U.S., which, given the magnitudes of the estimates of rent-sharing, could represent a large share of the total benefit to workers. Dobridge et al. (2021) study the introduction of (DPAD) in the U.S., which reduced the effective tax rate differentially for businesses in more exposed industries. They estimate that workers capture 80% of the reduction, but that about half of the benefits go to those in the top 1% of earners in their firms and about 75% go to those in the top 10% of the firms' earnings distributions. These two studies leverage industry-level variation associated with investment incentives which have also been found to induce supply-side responses (discussed further in Section 3), so the estimated effects on workers could be associated with some combination of supply-side and rent-sharing responses.[18] Top executives in public corporations may have ownership stakes associated with their labor contributions similar to active owners in pass-through businesses , and top 1% workers in exposed private companies may themselves be business owners. Regardless of the channel (rent-sharing or supply-side) and the relative returns from capital or labor at the top, the evidence suggests that it is not rank-and-file workers that are most affected by the business tax rates.[19]

[17]Together, about 80% of the burden was borne by the firm owners, 20% by workers in the top third of the earnings distribution and 0% by workers in the bottom two-thirds.

[18]Both studies explain why the estimates are plausibly associated with rent-sharing mechanisms.

[19]A notable exception is Fuest et al. (2018), who find that the low and medium-skill workers bore the

2.3.2. Implications in a Supply-Side Approach

In 2017 the Tax Cuts and Jobs Act (TCJA) was passed in the U.S., the centerpiece being on overhaul of business income taxation. In particular, TCJA reduced the statutory corporate income tax rate from 35 to 21%, introduced (temporarily) full expensing of most forms of capital investment, and it moved U.S. closer to a territorial tax system.[20] In his article applying lessons about tax incidence to the recent Tax Cuts and Jobs Act (2017) in the U.S., Auerbach (2018) provides a simple calculation of the potential effect on workers from a supply-side approach using estimates of the investment responses to the reform. He shows that applying a Cobb-Douglas constant-income-shares assumption to the estimated potential GDP growth implies that annual labor income could increase by approximately $500 per household, or $62.5 billion in total across the 125 million U.S. households. Compared to estimates of the lost revenue of $130.5 billion from the rate cut implies a 48% share going to labor. To set an example, let's assume that these simple assumptions hold, but add an attempt to distribute the aggregate estimate. One way to do this is to distribute the total estimate for labor of $62.5 billion according to the distribution of the labor income share using the distributional national accounts (DINA) tables from Piketty et al. (2018).

Table 1 presents the distribution of income for various definitions of labor and business income in 2019 derived from the DINA tables. The pre-tax income tables show that in 2019 8.6% of labor income goes to the top 1% of the income distribution, 31.5% to the top 10% and only 18.1% to the bottom 50% (Col. 4). Applying these shares would imply that the effect of the TCJA would increase annual labor income by $4,304 for those in the top 1%, by $1,272 for those between the 90-99th percentiles and by only $181 for those in the bottom half of the income distribution. Whether this is the correct way to distribute is uncertain,

tax burdens. They also find that responses are substantially larger in the presence of collective bargaining agreements, underscoring that labor market institutions may interact with the distribution of the burden in addition to the level of the burden borne by workers.

[20] Auerbach (2018) provides a nice review of the details of the Act.

but given the available evidence it appears likely to be closer to the truth than assuming a $500 increase for each worker.

For completeness, the effect on capital owners could also be distributed. This relates to the argument in Auerbach (2006) that for the portion of the burden that may not be shifted, the distribution of share ownership is empirically relevant to the incidence of business taxes. The article also documents a number of reasons that assigning ownership can be extremely difficult, including the growth of multinational corporations and foreign ownership of U.S. corporations.[21] Taking a simple approach and distributing the remainder of the estimated revenue reduction ($68 billion) to owners of corporate equity would imply that 56% of this direct benefit would go to the top 1%, 81.5% to the top 10% and only 3.7% to the bottom 50% (Col. 1). Taken together, this implies that under simple supply-side assumptions the annual benefit for capital and labor combined would be $189,663 (18.2% of the benefit) for the top 0.1%, $34,686 (33.2%) for the top 1%, $2,819 (24.3%) for the 90-99th percentiles, $831 (31.8%) for the 50-90th percentiles and only $222 (10.6%) for the bottom half of the distribution. This paints quite a different rhetorical picture of the potential supply-side effects than does simply presenting statistics that labor could ultimately see approximately half of the benefit.[22]

2.3.3. Discussion

As data improve and as we are able to better find natural experiments, there is much more scope to understand the heterogeneity in responses to these policies among different types of

[21] The discussion throughout this article suggests that continued work tracing the distribution of ownership should not be abandoned.

[22] Table 1 also presents other distributions of income that could be relevant for distributing incidence, depending on the tax or policy in question. Column 2 shows the distribution of income for pass-through business owners, including both the capital and labor income of the business owners; column 3 shows the combined distribution business income including both corporate and pass-through ownership; column 5 shows the distribution of all labor income, including workers and labor income of pass-through business owners; column 6 shows the distribution of capital income, including corporate equity and capital returns to pass-through ownership.

workers and owners.[23] This allows us to get closer to the fundamental goal of tax incidence - tracing the burden back to individuals to understand the distribution of welfare consequences. Focusing on the distributional aspect is particularly relevant as capital and labor income become more difficult to delineate, especially at the top of the income distribution, where there may also be shifting between income sources in response to tax policy. This also maps better to welfare analyses that embed the equity and efficiency trade-offs of tax policies and to the political discourses surrounding these ideas.

This points to further research to be done on the mechanisms by which different types of labor may be affected by tax policy, related to the rent-sharing mechanisms discussed in the previous subsection, and through further exploration of supply-side mechanisms. For instance, what types of capital investment respond to different tax incentives and how do these interact with labor? The growing literature on skill-biased technological change and labor replacing versus labor augmenting technologies shows that different types of technological investments can have different impacts on different types of labor (ex. Autor et al. (2022), Acemoglu and Restrepo (2022)). Uncovering heterogeneity in investment in response to various tax incentives could be informative to a number of incidence questions.

3. Considering Different Taxes

So far I have focused on business income taxes, for which there is a robust theoretical and empirical tax incidence literature. There are many other tax policies that relate to trickle-down or supply-side ideas - those with direct effects on rich capital owners, but with potential investment incentives that could ultimately affect lower income households. Different policies could have different implications for incidence through their supply-side or rent-sharing implications. I provide a brief survey of various tax instruments including dividends and

[23] Gale and Thorpe (2022) discusses current work pushing in this direction using the Tax Policy Center (TPC) Microsimulation Model to provide distributional analysis of corporate tax burdens in the U.S. accounting for rent-sharing responses.

capital gains taxes, top marginal personal income tax rates, direct investment incentives and (implicit) taxation on innovation. I conclude that the current evidence suggests that for most taxes it is likely that those directly affected by the tax, capital owners or the rich, bear the majority of the burden of the tax. Real economic responses or supply-side growth effects are limited, and there is no compelling evidence to suggest that any potential trickle-down effects would be anywhere near as large as the main effects.[24] The exception to this is tax policies directly incentivizing immediate investment. Here there is substantial evidence of investment responses, allowing for potential supply-side effects, but direct evidence on the ultimate incidence of these policies is lacking.

3.1. Dividend and Capital Gains Taxes

Dividend and capital gains taxes can be seen as "payout taxes", or taxes on the income flows from owning a business. In a simple cost of capital formula, both of these taxes can increase the cost of capital.[25] Therefore, reductions in these tax could stimulate investment, which could, in turn, benefit workers. Chetty and Saez (2005, 2006) study how firms respond to a large cut in dividend tax rates and find that it resulted in large increases in dividend payments to shareholders, including inducing many firms to issue dividends for the first time. They find heterogeneity by ownership structure - the increase in dividends varied by whether substantial shareholders were taxable or not and by the shareholding of top executives.[26] Yagan (2015) complements this analysis by estimating various real responses to the same dividend tax cut. He finds that the tax cut did not stimulate investment and

[24]Yet, I also underscore that estimating the long-run incidence of these policies is very challenging and there is substantial room for continued research on these questions, which I discuss further in Section 4.

[25]The cost of capital parameterization by Desai and Goolsbee (2004) gives $C_K = \frac{r}{(1-\tau_c)[(1-\tau_d)\rho+(1-\tau_{acg})(1-\rho)]}$ where r, τ_c, τ_d, τ_{acg}, and ρ are the expected rate of return, corporate income tax rate, dividend tax rate, tax rate on accumulated capital gains, and share of earnings paid out to shareholders rather than retained, respectively. Note, other cost of capital formulations can offer competing predictions about the effect of capital gains taxes.

[26]Ohrn (2022) found heterogeneous incidence of DPAD by corporate governance. Heterogeneity in response to tax policy by ownership structure is another fruitful avenue for further work on any of the issues discussed here.

had no effect on worker compensation. From either a supply-side or rent-sharing perspective this would imply that the burden of dividend taxes are borne by corporate shareholders, not workers (except for the top executives and officers that are both owners and employees). As already discussed, the distribution of corporate equity ownership is extremely concentrated as is dividend income in the U.S.[27]

A recent study of the effect of an effective capital gains tax cut in South Korea. Moon (2022) finds large increases in investment in response to the effective decrease in the cost of capital. This result stands in contrast to that of Yagan (2015). Moon discusses the potential reasons for the contrasting results, all of which could be framed as arguing that the responses to the taxes may be specific to the institutional context. Among the sample of Korean firms being studied most were small but growing and were more likely to have credit constraints (the subset of firms for which the responses were largest). Also, Moon points to difference in the distribution of equity ownership, with much less ownership among tax-exempt investors in Korea, and discusses potential differences in rules governing other behaviors such as share repurchases.

Read together, the evidence suggests that dividend tax cuts generally lead to increased payouts but not substantial new investment, at least in the medium-run,[28] but capital gains tax cuts may effectively stimulate investment, particularly among smaller newer firms. Whether the contrasting results are attributable to difference in the tax instruments or the settings in which the studies are conducted merits further work.[29] The short-run benefi-

[27]In another paper studying this tax cut Love (2022) finds an increase in "non-capital" investment such as R&D spending in response to the tax cut.

[28]Other studies on dividend taxes generally find no substantial investment response, but point to some potential hetererogeneity. Boissel and Matray (2021) find positive investment effects of a dividend tax hike in France, but Bach et al. (2019) find weakly negative investment effects using a different dataset. Alstadsæter et al. (2017) find aggregate null effects of a dividend tax cut in Sweden, but find some evidence of a response among cash-constrained firms.

[29]It is particularly challenging to estimate the effect of capital gains tax changes, which are taxed on realization instead of accrual and depend critically on other institutional features such as tax treatment of transfers at death. Timing and avoidance responses make it difficult to directly map capital gains rate changes to effective tax rates faced by capital owners.

ciaries of dividend tax cuts are owners of firms that have cash available to distribute, and the short-run beneficiaries of capital gains tax cuts are those with accrued gains from prior investments. The long-run incidence of these policies depend on whether they lead to capital investment or less distorted capital allocations. For neither tax is there great evidence on how, if at all, short-run windfalls or any resulting long-run changes in investment affect workers, nor the overall impact on the distribution of welfare.

3.2. Top Marginal Personal Income Tax Rates

Personal income taxation taxes a mix of capital and labor income, including wage and salary earnings, interest dividend and capital gains income, pass-through business income, rents and royalties, estate and trust income and retirement income. At the top of the distribution, higher shares are associated with capital income and specifically businesses income.[30] Two recent papers have estimated the effect of increasing top marginal personal income tax rates on workers in the U.S. Risch (2022) estimates the response through business income taxation embededed in the personal income tax system and finds that about 20% of business income taxation was passed through to workers with the rest being borne by top-bracket business owners through a rent-sharing mechanism, and that business owners did not pass higher tax rate on non-business income (including other capital income sources) to workers. Kindsgrab (2022) studies the same increase in top marginal tax rate, and uses a local labor markets approach to estimate local spillovers from increase in top tax rate to workers, finding no evidence of any such spillovers. Miller et al. (2020) estimate responses of owner-managers

[30]In the U.S. over half of all business income is taxed through the personal income tax code and this business income is extremely concentrated at the top of the income distribution. See Cooper et al. (2016), Smith et al. (2019) and Risch (2022) for further discussion in the U.S. There is little comprehensive cross-country evidence on pass-through business ownership. A JCT report "Foreign Pass-through Entity Use in Five Selected Countries." (2013) reports estimates of business income taxed through the personal income tax code and the corporate tax code in five countries and finds that there is non-trivial pass-through business activity in Australia, Canada, Japan, the UK and Germany, but that there is also substantial variation across these countries. In Australia 18% of business income is taxed through the personal income tax code, in Canada 26%, in Germany 66%, in the Japan 50%, and in the UK 33%. Further research on the tax implications of these arrangements in other countries would be valuable.

to personal income tax rates in the U.K. and find that substantial intertemporal income shifting, but no reductions in real business activity.

Highly related to the trickle-down debate and the associated trade-offs in targeting benefits to the top or the bottom of the income distribution, Zidar (2019) estimates the effects of tax changes faced by different income groups on aggregate economic activity. He finds that, over decades, it was tax cuts for lower-income households that have stimulated employment growth in the U.S., while tax cuts for the top 10% of the income distribution have had little impact on aggregate employment.

Piketty et al. (2014) develop a rent-sharing model where a change in the top marginal tax rate can affect the earnings of those in lower tax brackets by changing the marginal incentives of those at the top (business owners, managers, executives) to engage in bargaining over rents. If there are rents in the economy (derived from any source) that accrue disproportionately to the top, a higher marginal tax rate reduces the incentive to engage in costly bargaining activities (a "compensation-bargaining elasticity"), thus leaving more rents on the table to be shared with those in lower-brackets. Therefore, unlike the rent-sharing models that center firm-worker matches in the labor market, this model predicts that an increase in the top marginal tax rate leads to increases in employee earnings.[31]

Taken together, recent empirical work suggests that top marginal tax rates likely have only moderate potential to affect lower income workers and primarily through rent-sharing mechanisms associated with the business income taxation embedded in the personal tax system. But, some theoretical work implies that long-run incentives of top marginal tax rates associated with career choice or business formation could have "trickle-down" effects

[31]The empirical literature cited throughout this article shows that the tax induced rent-sharing response between firms and their workers goes in the opposite direction (tax increases lead to lower earnings for workers), implying that the compensation bargaining elasticity does not dominate on aggregate in response to business income taxation. This does not mean that the compensation-bargaining response does not exist: i) it could exist between firms and their workers, in which case the observed earnings responses would have been even larger absent the compensation bargaining response among owners/managers, or ii) it could manifest over different time horizons or through mechanisms other than direct firm-worker relationships.

(for example, Scheuer (2014), Rothschild and Scheuer (2013), Ales et al. (2017) and Ales and Sleet (2016, 2022)). Further empirical work on the long-run affects of top personal income taxes, particularly for career and occupation choice, would be extremely valuable.

3.3. Direct Investment Tax Incentives

One area where there has been substantial evidence of real responses to tax policies is among those related to immediate and direct investment incentives. Analyses of accelerated depreciation policies (for example, "bonus depreciation" in the U.S.) and production incentives like the Domestic Production Activity Deduction (DPAD) in the U.S. have found economically significant investment responses and have uncovered heterogeneity relevant for policy evaluation. That these policies more directly affect the taxation of the normal returns to capital, whereas broader tax instruments have rents as a substantial portion of their base, may explain the divergence in empirical evidence of supply-side responses across these policies. Yet, the evidence on the distributional consequences of these investment incentives - particularly how these responses affect workers and which workers - could still be further developed.

House and Shapiro (2008) and Zwick and Mahon (2017) find large investment elasticities in response to the introduction of accelerated investment depreciation ("bonus depreciation") in the U.S. Zwick and Mahon (2017) uncover important heterogeneity, finding that smaller, more credit constrained firms responded much more strongly to these incentives than did larger, more established, firms.[32] A number of subsequent studies have found responses to tax incentives tied to investment (see Ohrn (2018), Garrett et al. (2020) and Curtis et al. (2021) for evidence from the U.S., Liu and Mao (2019) for evidence from China and Maffini et al. (2019) for evidence from the U.K.).

These studies provide consistent evidence that tax policies related to direct and immediate

[32]They provide a comparison across a number of previous studies that found smaller investment elasticises and explain the difference through a focus on heterogeneity across the firm-size distribution.

investment affect real firm behavior. Garrett et al. (2020) and Curtis et al. (2021) find that this can affect workers through increased employment at more exposed firms, but find no increase in average wages or productivity, leaving the ultimate incidence a question. Another question is whether the evident heterogeneity in responses is associated with differential incidence.[33] Is there a difference in the distributional effects of a policy to which smaller, more credit constrained firms are more likely to respond? When comparing these policies to those discussed previously, an important area for further investigation is whether the differences in supply-side responses, and the potential resulting incidence, stem from differences in the particular policies or from differences in the composition of the firms that respond to the polices, and what this teaches us about the equity-efficiency trade-offs of these various tax instruments.[34]

3.4. Evidence on Tax Incentives and Innovation

A salient argument about the relationship between taxes and growth is that they can deter risk-taking, innovation or entrepreneurship, which can be drivers of broad economic growth. There has been recent work linking patent records to administrative data to understand the relationship between taxes and innovation. Akcigit et al. (2022) develops a long time series of patent data to estimate the effects of state-level personal and business taxation on innovation in the U.S. They find that the location of innovation is highly sensitive to state tax rates, both for innovative businesses (corporate tax rates) and inventors (personal tax rates). In aggregate, they find that taxes discourage the quantity of innovation, but not the average quality of innovation.

Other work linking patent data to administrative tax records has studied the long-run

[33]Moon (2022) similarly found that small more credit constrained firms were more responsive to capital gains rates

[34]In a paper that also points in this direction, Smith and Miller (2021) develop a model to study the effect of various capital taxes faced by small businesses on entrepreneurial activities in the U.K. They find that statutory income or capital gains tax rates have little effect on entrepreneurial activities, but that targeted tools like tax deductions for new equity investments can stimulate investment among small firms.

determinants of becoming an inventor in the U.S. Bell et al. (2019b) find that children's chances of becoming inventors vary sharply with characteristics at birth, such as race, gender, and parents' socioeconomic class even conditional on math test scores. They show that this is driven by a child's exposure to innovation through their family or the community they live, which has causal impacts on the propensity to become an inventor. In a companion piece, Bell et al. (2019a) build a stylized model of inventor career choice that matches this evidence. The model predicts that financial incentives, such as top income tax reductions, have limited potential to increase aggregate innovation because they only affect individuals who are exposed to innovation and have essentially no impact on the decisions of star inventors. Together these studies suggest that innovation responds to tax rates, but leave the implications of this for broad-based growth (and for the economic incidence) an open question. Alternatively this work suggests that even if taxes play a role in long-run innovation, they are not likely to be the key determinant; other socioeconomic factors and policies may be more influential for finding "lost Einsteins."

4. Discussion: Caveats and Further Research

4.1. Challenges to Interpreting Current Evidence

It is important to note that it is very challenging to credibly estimate long-run responses to these tax policies. To the degree that different types of responses (ex. supply-side v. rent-sharing) may manifest over different horizons, recent empirical work may be better suited to estimate certain aspects of the aggregate response and the long-run incidence may not perfectly mirror current estimates discussed here. Current econometric techniques are not always well suited for estimating long-run effects, so generally more structure and theory (and therefore more assumptions) are required. Longer panels of consistent data are required and confounding (tax and non-tax) shocks accrue over time making it difficult to credibly assign observed responses to a specific policy. On the other hand, rent-sharing responses

to business income taxation, distribution responses to dividend taxation and time- or base-shifting responses may materialize more quickly and therefore be easier to credibly estimate. Wage effects of capital deepening may be significantly lagged. For this reason, evidence of investment responses are generally used as proxies, or necessary first stages, for potential supply-side incidence on workers. Though I note that there is quite little evidence of real investment responses to most of the policies discussed in the short and medium-runs, it still may be that investment responses may only manifest over longer horizons and may be harder to measure precisely in the data.

Together this implies that, while the best current empirical evidence finds limited supply-side responses and that the majority of the incidence falls on those at the top of the distribution, this does not preclude the existence and potential importance of supply-side responses impacting the aggregate incidence in the longer-run. Clearly, the follow-on implication is that further empirical work designed to capture credible long-run effects of these policies would be extremely valuable.

Nevertheless, the recent empirical evidence suggests that the potential for substantial supply-side responses is somewhat limited and that other channels may be at least as important in determining the aggregate incidence.[35] It provides new insights into the mechanisms by which taxing the rich are likely to affect lower-income households, the types of households these policies are likely to effect, and which institutional features may mediate how, and the degree to which, the benefits or burdens of these policies are distributed throughout society.

4.2. Other Fruitful Avenues of Research

The discussion throughout this article suggests two major areas for future work that directly complements and expands upon the existing evidence. First, as detailed above, more

[35]While these channels may only be a piece of the long-run incidence, this evidence suggests that they may be at least as important as channels traditionally considered. Plus they are more certain to materialize independent of potential future policy reforms and therefore have real welfare consequences for taxpayers throughout the distribution.

credible empirical evidence on the long-run effects of these policies, along various margins (ex. quantity and form of investment, wage effects and for whom, location decisions, etc.) are needed. Particularly, long-run effects on innovation, risk-taking, entrepreneurship and occupation choice are very much an open question. This is extremely challenging and will likely require more structure and assumptions, but even incremental progress will be very valuable. Second, it highlights the value of further estimates of heterogeneous responses (among different types of firms and workers) and how different institutional features shape the incidence of these taxes. Some areas that seem particularly important are the interaction of tax policies with labor market policies and product market regulations. Additionally, how various tax instruments or various non-rate features of a given tax interact, and to what degree the effects depend on the size of the tax change or the level of the prevailing rate.[36]

In addition there are a number of issues that I do not address here, but that speak to trickle-down debates. To list a few: 1) The relationship between tax incidence and evasion and avoidance opportunities. An immediate issue would be international tax avoidance of the corporate tax and the role of loopholes, enforcement policies and international agreements in determining the incidence of the tax. Further, evasion and avoidance possibilities in the personal tax code, surrounding differential taxation of different bases (ex. capital or labor income), available deductions and/or tax treatment at death may all affect how top taxpayers respond to rate changes and the incidence of those responses. 2) Wealth taxes or similar proposals for taxing accrued (but unrealized) gains. These proposals are being actively debated and the incidence surely matters. Many of the considerations discussed here will overlap (ex. how much of the base is normal returns v. rents, potential differences between long and short-run incidence, dependence of responses on prevailing tax and non-tax institutions), but there will also be distinct issues to examine. 3) Place-based tax

[36]Are responses non-linear in the rate? Are there asymmetric responses to tax increases or decreases? Does the rate change have to be a certain size to change capital investment decisions in an economically meaningful (or statistically identifiable) way?

policies, particularly to incentive local investment. Here, salient concerns are not only about the incidence across the income distribution, but also across specific locations. 4) The literature reviewed and discussed here disproportionately centers the United States and Western Europe. Understanding how the incidence of these policies in other contexts, particularly in low-income countries that may have different tax capacity and rely more heavily on revenues from different taxes (VAT, tariffs, property taxes), would be very fruitful. 5) The degree to which tax benefits to lower income households (ex. EITC, child tax credits) trickle up through the distribution.

5. Conclusion

This study reviews what can be learned about trickle-down ideas from recent empirical advances in the study of tax incidence. I highlight three main lessons. First, recent evidence finds that business income taxes do affect the earnings of workers, but these effects are mostly a result of rent-sharing and taxation of rents, not from traditional supply-side channels. Second, there are systematic differences in the types of workers that are affected by the tax policies, so to understand how taxing businesses or business owners affects the distribution of welfare, it is not sufficient to treat workers/labor as a class. Third, across different income tax policies that statutorily affect the rich, the burden is generally ultimately born by the rich, at least in the medium-run. These lessons underscore that there is likely not a "holy grail" structural parameter that governs the incidence of a tax, but that the incidence depends critically on prevailing (tax and non-tax) institutional features. This points to numerous areas of further research that can contribute to a larger project on understanding which features are most significant in shaping how the benefits and burdens of these policies trickle down (or up) through society.

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Tables and Figures

Table 1: Distribution of Equity, Labor and Business Income (2019)

	Corporate equity (1)	Pass-through owners (2)	All business owners (3)	Workers (4)	All labor (incl. mixed) (5)	All equity (incl. mixed) (6)
top 0.1%	32.3%	22.4%	27.7%	2.7%	3.7%	35.8%
top 1%	55.8%	48.2%	52.3%	8.6%	11.0%	62.8%
90-99th ptile	25.6%	24.7%	25.2%	22.9%	23.1%	24.1%
top 10%	81.5%	72.9%	77.5%	31.5%	34.1%	86.9%
middle 40%	14.8%	16.5%	15.6%	50.4%	48.1%	10.2%
bottom 50%	3.7%	10.6%	6.9%	18.1%	17.9%	2.9%

Note: Table 1 shows the distribution of various definitions of capital, business and labor income derived from the pre-tax DINA tables from Piketty et al. (2018). Each column represents an income concept and each row is the share of the total going to a specific part of the household income distribution. Col. 1 is the distribution of corporate equity. Federal Reserve Table L.223 (Corporate Equities) shows that 14% of corporate equity is held be retirement funds and life insurance policies. I distribute 14% of corporate equity as pension income in the DINA tables (assuming that the 1.4% of corporate equity owned by life insurance companies is distributed like pension income) and the remaining 86% as equity income from the DINA tables. Col. 2 shows the distribution of pass-through owner income, inclusive of the capital and labor components (i.e. considering the owner as relevant unit for incidence), which is calculated as the weighted sum of the distributions of the capital and labor components of "mixed income" in the DINA tables. Col. 3 represents the distribution of income to business owners (the weighted sum of the distributions of corporate equity (col 1) and pass-through owner income (col 2)). Col. 4 is the distribution of labor income for workers (i.e. compensation to employees not including the labor of pass-through business owners). Cols 5 and 6 represent total capital and labor shares, including labor and capital separated for pass-through business owners.

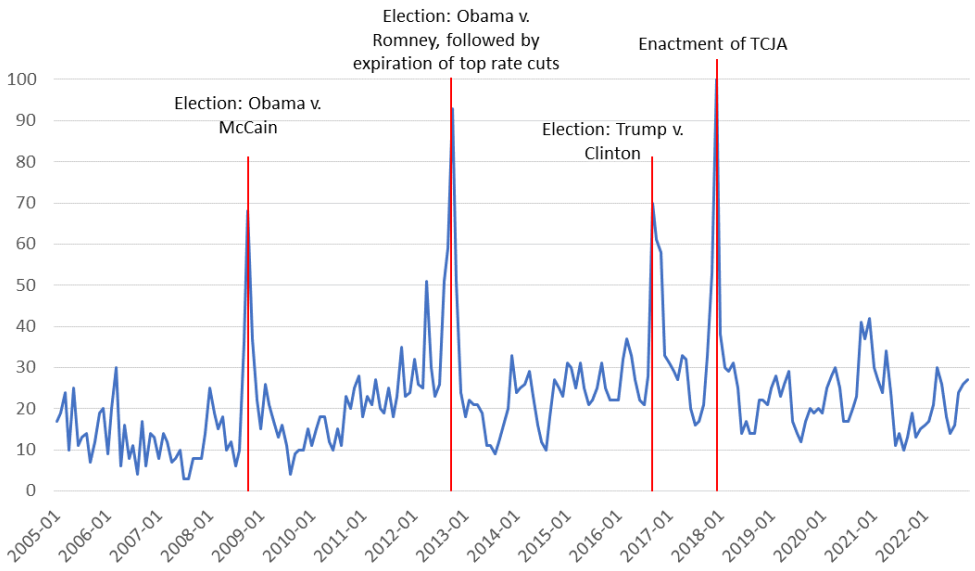

Figure 1: Trends in Search for Trickle Down

Note: This figures shows the Google Trends for "Trickle Down" in the U.S. from 2005-2022. The largest volume of searches was in December 2017, right at the enactment of TCJA which reduced corporate tax rates in the U.S. The next largest spike was following the election of President Obama in 2012, when American Taxpayer Relief Act (ATRA) was passed, increasing top marginal personal income tax rates. The other spikes were around presidential elections were tax policy was a salient issue.