Rethinking the Corporate Income Tax:

The Role of Rent Sharing

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ABSTRACT

Standard analysis of the corporate income tax assumes shareholders bear the burden of taxes on excess returns. But evidence shows that firms share rents with workers, especially high-income workers, which implies that these workers bear some of the burden as well. Using the Tax Policy Center microsimulation model, we show that, relative to standard assumptions, allowing for rent sharing with high-income workers consistent with recent studies changes the incidence of the tax – labor bears more of the burden – but the tax remains highly progressive. We discuss several implications of the results and directions for future research.

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I. INTRODUCTION

Economists have devoted substantial attention to understanding the effects of the corporate income tax. The historic corporate tax changes in the Tax Cuts and Jobs Act of 2017 only heighten the importance of understanding these issues.

Understanding who bears the burden of the tax has proven to be an especially difficult issue. Corporate profits consist of two components: normal returns and super-normal returns. Normal returns can be thought of as the minimum risk-adjusted return necessary for a firm to make an investment. Super-normal returns – often called rents, excess returns, or excess profits, terms that are used interchangeably except where noted below – comprise any returns above the normal returns. Firms may earn super-normal returns through patents, special expertise or skills, luck, economies of scale, location-specific factors, monopoly power in product markets, monopsony power in labor markets, restrictive regulations, or other factors.

The distinction between normal and excess returns matters because taxes on each type of return are plausibly borne by different agents in the economy. A tax on the normal return is typically expected to be shifted to some combination of all capital owners or workers as capital moves from the corporate to the non-corporate sector, raising pre-tax returns in the former and decreasing pre-tax returns in the latter. Alternatively, capital may move overseas, depressing returns to relatively immobile factors such as workers or landowners. In contrast, a (less than 100 percent) tax on excess returns still leaves the firm with some super-normal returns and so may not affect investment or hiring. In that case, standard analysis assumes that the tax on excess returns is borne by shareholders.[1]

[1]The Department of the Treasury (Cronin 2013, Power and Frerick 2016) and Tax Policy Center (Nunns 2012) follow this approach. Auerbach (2006, 2010, 2018), Gentry (2007), and Gravelle (2021) describe the logic behind this type of conclusion while also clarifying that there are situations where the assumptions may not hold.

There is substantial empirical evidence, however, that firms share rents with their workers. Rent sharing can occur via any of several ways, including explicit bargaining between unions and firms; implicit bargaining, in which firms that earn rents choose to pay their workers more; contracts that link executives' compensation to measures of firm performance, which are in turn affected by taxes; and self dealing behavior on the part of executives. Rent sharing implies that both shareholders and workers bear some of the burden of taxes on excess returns.

In this paper, we integrate the literature on rent sharing into the type of quantitative microsimulation models that inform official government revenue estimates and the broader policy debate. We proceed in several steps.

Section II briefly summarizes previous theoretical analyses of corporate income tax incidence. Analyses that assume firms earn only normal returns examine how the tax affects wages and rates of return through general equilibrium ("indirect") effects on the level and allocation of investment, hiring, and output. Analyses of rent sharing add a "direct" effect that examines how the corporate tax affects wages, via a mechanism that is distinct from, and in addition to, the general equilibrium incidence. The key theoretical implication, perhaps counterintuitive, is that, under rent sharing, the *more* power workers have, the *higher* their wage (holding taxes and constant) and the *more* they bear the burden of taxes on excess returns.

Section III provides extensive documentation of five facts that provide context and motivation for this study. We show that: excess returns to capital have increased as a share of the economy; excess returns constitute a large share of the corporate tax base and have increased over time relative to the corporate base; firms share rents with workers, with the best estimates suggesting that between 30% and 80% of rents are shared; rents are shared disproportionately with high-income workers, managers, and executives; and rent sharing among rank-and-file

workers has fallen over time. Together, these facts imply that assumptions about who bears the burden of taxes on excess returns may be quantitatively significant.

Section IV presents simulation results. We use the Tax Policy Center microsimulation model (Nunns 2012) to examine the effects of replacing the assumption that shareholders bear the full burden of taxes on corporate excess returns with assumptions that allow for workers and shareholders to share the burden.[2] We distinguish between the incidence of the tax – that is, the burden the tax places on labor, all capital owners, and shareholders – and the distributional effects – the impact of the tax on the post-tax income of tax filing units at different income levels.

The empirical literature exhibits fairly wide variation on the levels of key statistics about rent-sharing. Thus, we examine a range of possibilities, focusing on six alternative scenarios that mix (a) two alternative assumptions about the proportion of total rents shared with workers (20% or 50%) with (b) three alternative scenarios about the identity of the workers who share the rents. In one scenario, with heterogeneous rents based loosely on Dobridge et al. (2021), 50% of shared rents go to the top 1% of workers, 40% go to the next 19% and the remaining 10% to the bottom 80% of workers. In a second scenario, based loosely on Kline et al. (2019) and Carbonnier (2020), shared rents are allocated to the top 20% of workers in proportion to labor compensation. In a third scenario, representing the literature that did not distinguish among types of labor, rents are shared with all workers, in proportion to labor compensation.

To establish a baseline set of results, we show that the corporate tax is progressive under

[2] In its standard formulation, the TPC model (Nunns 2012) assumes that normal returns constitute 40 percent of the corporate tax base and are borne equally between workers and all capital owners, in proportion to labor income and capital income, respectively. Excess returns constitute the remaining 60 percent of the corporate tax base and are borne by tax filing units in proportion to the excess returns they receive. Cronin (2013) and Power and Frerick (2016) make similar assumptions.

the standard assumption that shareholders bear the entire burden of taxes on excess returns. For example, in the TPC model, the top 1 (20) percent of tax filing units in the income distribution receives 16 (53) percent of income and pays 35 (70) percent of the corporate income tax.[3]

In general, one might expect that reallocating burdens on rent from shareholders to workers would be regressive, because stock holdings are highly concentrated among the very wealthy (e.g., Batty et al. 2020). With that in mind, we obtain some surprising results and some which are more expected.

First, in the scenarios with heterogeneous rents (and either 20% or 50% of rents going to workers), the corporate tax remains approximately as progressive as it is in the base case, even though the allocation to labor has increased significantly. The top 1 (20) percent of the income distribution bears the burden of 34 (70) percent of the tax if 20% of rents are shared and 33 (71 percent) if 50% of rents are shared, about the same as in the baseline. This shows that to the extent that extremely high-income workers receive most of the rent that firms share with workers, the progressivity of the tax is approximately unchanged from standard predictions.

Second, when rent is shared with the top 20% of the labor income distribution, in proportion to their labor income, tax burdens are higher, relative to the standard assumption, in the 60^{th} – 99^{th} percentile of the income distribution but lower for the top 1 percent and for households in the bottom 60 percent. The top 1 (60^{th}-99^{th}) percent bears the burden of 32 (54) percent of the tax in the scenario with 20% of rents shared, compared to 35 (50) percent in the baseline. These changes are amplified when 50% of rents are shared, with top 1 (60^{th}-99^{th}) percent bearing 27 (61) percent of the burden. That is, although tax burdens fall for the top 1 percent, burdens are higher for the vast majority of high-income households when firms share

[3]As described in section IV, the TPC model uses a broad measure of income called Expanded Cash Income.

rents with the top 20 percent of workers than when firms capture all rents. This result occurs because tax filing units in the 60th to 99th percentile of the income distribution own a greater share of the top 20 percent of labor income than of excess returns.

Thus, in the first two sets of scenarios, we obtain the counterintuitive conclusion that, while allowing for rent sharing implies that labor bears more of the burden, in many ways the tax is still as or more progressive than in the baseline analysis.

In third case, when rents are shared with all workers in proportion to their labor income, burdens are substantially lower for the top 1 percent (31 percent when 20% of rents are shared, 25 percent when 50% of rents are shared, versus 35 percent in the baseline) and are higher for the bottom 95 percent of tax filing units. While this result is expected, its premises are the least supported by the empirical literature surveyed in Section III.

Section V provides concluding remarks. We suggest several ways that the analysis of rent sharing and the corporate tax could be extended, including examining the symmetry of the effects across tax increases and tax cuts and distinguishing between rents and quasi-rents. Our analysis points to, among other things, the need to examine different types of labor in analysis of the incidence of the corporate income tax, in particular distinguishing between rank-and-file workers on the one hand and professional, managerial, and executive workers on the other. Finally, our analysis has implications for understanding the incidence of other taxes (such as a value-added tax or a destination-based cash flow tax) that place burdens on rents.

II. CORPORATE TAX INCIDENCE

Theoretical models can help guide intuition and point to potentially important channels for the effects of policy. Modelling of corporate tax incidence has traditionally focused on the allocation of burdens on normal returns, only more recently turning to analysis of excess returns.

A. When Firms Earn Only Normal Returns

Harberger (1962) provided the first formal model of corporate tax incidence. His model had several key features: (a) a two-sector (corporate and non-corporate) general equilibrium framework where (b) each sector produces a unique, mutually exclusive good; (c) a closed economy with supply of capital and labor fixed in aggregate but flexible across sectors; (d) a corporate tax that was imposed on all capital in the corporate sector; (e) a focus on long-term, comparative static outcomes, and (f) an assumption that all corporate and non-corporate capital earns the normal return. We briefly discuss the first five assumptions in this subsection, and the sixth in the following subsection. Auerbach (2006, 2018), Gentry (2007), and Gravelle (2021) provide extensive reviews and interpretations of the literature.

Under Harberger's preferred assumptions, the tax was borne by all capital owners in the corporate and non-corporate sectors, and not by labor. The underlying logic was as follows: with no change in prices, an increase in the tax would reduce the after-tax return to capital in the corporate sector; this would drive capital to the non-corporate sector, reduce the return to capital in that sector, and raise the after-tax return to capital in the corporate sector until returns were equilibrated in the two sectors at a lower rate than prevailed before the tax was imposed; workers would move from the corporate to the non-corporate sector and thus wages would be maintained.

The Harberger model forms the basis of a large body of literature that extends the model in different ways to examine incidence issues. First, Shoven (1976) extended the model to cover multiple sectors and derived similar incidence results. Second, Gravelle and Kotlikoff (1989) removed the assumption that the corporate and non-corporate sectors produce mutually exclusive goods. In their model, the corporate tax shifts output from corporate to non-corporate firms within industries, in addition to shifting from industries dominated by corporate firms to

industries dominated by non-corporate firms. In this broader "mutual production model," the incidence of the tax continues to fall primarily on capital.

Third, relaxing the closed-economy assumption generally raises the extent to which domestic labor bears the burden of the corporate tax, as capital is thought to be more internationally mobile than labor (Bradford 1978, Kotlikoff and Summers 1987). Randolph (2006) develops a five-sector simulation model of two countries and concludes that domestic labor can bear up to about 70 percent of changes in corporate taxes when there is (a) perfect product substitution and (b) perfect investment substitution across countries. Gravelle and Smetters (2006), however, relax these two assumptions and show that the corporate tax does not necessarily fall on labor in an open economy and could fall instead on domestic capital or foreigners.[4] Gravelle (2013) argues that a careful reading of the literature indicates that capital bears most of the burden of the tax even in an open economy. Whether it is most appropriate to model the tax as occurring in an open or closed economy depends also on assumptions about how other countries would respond to changes in one country's corporate tax (Harberger 2008).

Fourth, numerous articles modify the assumption that the tax is imposed on all corporate capital. The tax-deductible treatment of debt can have a fundamental impact on the incidence of the corporate tax (see, e.g., Stiglitz 1976 and Grubert and Mutti 1994). Relatedly, there are no losses in the Harberger model. Auerbach and Altshuler (1990) discuss the implications of the asymmetric manner in which the tax system treats gains and losses.

Fifth, Auerbach (2006) summarizes a variety of dynamic considerations.

B. When Firms Earn Excess Returns

Rents are simply returns to labor or capital above the amount required to generate the

[4] Gentry (2007) notes that in the Gravelle-Smetters model, countries have market power, but firms do not.

observed supply of that factor. Rents generated by corporate activities can be shared with workers in any of a number of ways, including explicit bargaining, implicit bargaining, executive compensation contracts and executive self dealing.

The general equilibrium effects of corporate taxes on the normal return and wages, discussed in the prior section, can be considered the "indirect" effects of corporate taxes. Rent sharing examines the "direct" effects – the impact of the corporate tax on wages above and beyond the general equilibrium effects, *holding constant* output, investment, and interest rates.

Arulampalam, Devereux, and Maffini (ADM, 2012) provide a model of corporate taxes incorporating rent sharing.[5] In the ADM model, workers and capital owners can choose to supply their resources to competitive markets or they can formally bargain over the allocation of the total rent generated by their joint activities. The key finding is the equilibrium wage under bargaining is the sum of the wage in the competitive market plus a share (based on workers' bargaining power) of the rent the joint activity will generate. In this framework, taxes on rents reduce the total amount of rents to be distributed and thus reduce wages.[6] The greater workers' market power, the greater will be the wage (holding taxes constant), and the more a given tax will reduce wages. The Appendix summarizes their formal model and these results.

Although the ADM model lays out a formal bargaining process, nothing in the

[5]ADM incorporate taxes into a standard bargaining model – see MacDonald and Solow (1981), Blanchflower et al (1996), and Addison and Schnabel (2003). The original Harberger (1962, Appendix) analysis included a scenario where corporations earn monopoly profits, but there was no bargaining with workers, so that firm owners (shareholders) bore the burden of the tax imposed on monopoly rents. Auerbach and Hines (2001) examine optimal tax policy in markets with imperfect competition and rents.

[6] In this framework, lump sum taxes (defined as changes in tax liability that are not associated with marginal tax rates) affect wages by reducing the aggregate rent available to be allocated between workers and the firm. Higher marginal corporate tax rates likewise reduce the rent available to be allocated. Perhaps surprisingly, like the lump sum tax, the increase in marginal tax rates does not affect the relative cost of wages versus profits because wages are fully deductible (are "expensed") for the firm in determining taxable income (Felix and Hines 2009, Gravelle 2021). Thus, taxes affect wages by changing the total amount of rent available to be allocated, not by altering the relative price of wages.

framework requires that there be an employee union involved or even that there is an explicit bargaining process. Thus, the model would also apply to an implicit bargaining framework, where firms with higher profits pay their workers more.[7]

There is an extensive literature on how contracts link executive compensation to firm performance measures, which are in turn affected by taxes (see, for example, Hall and Liebman 1998, Bertrand and Mullanaithan 2001, Bebchuk and Fried 2003). Another extensive literature discusses executive self dealing – acting in the interests of the executive, by extracting rents, rather than in the interests of the corporation or the share holders (see, for example, Berle and Means 1934, Bebchuk, Fried, Walker 2002, Chetty and Saez 2005). Changes in corporate taxes affect the level of rents available, and thus affect executives' ability to extract rents.

III. EMPIRICAL EVIDENCE ON EXCESS PROFITS AND RENT SHARING

The theoretical channels described above highlight the potential importance of assumptions about the allocation of the burden of taxes on excess returns in analysis of corporate tax incidence. The magnitude of this effect, however, is an empirical question, which we address in this section by presenting and documenting five empirical regularities.

A. Excess Returns to Capital Have Grown Relative to the Economy

Over the past several decades, excess returns to capital have increased as a share of the economy. A number of studies document higher market valuations and increases in mark-ups (price-cost margins), profit rates, and market concentration.[8] Stansbury and Summers (2020)

[7] This could occur in an efficiency wage model, when employers face challenges finding new employees in 'tight' labor markets, in the conditions of bilateral monopoly established in Diamond-Mortensen-Pissarides models of search and matching (e.g., Mortensen and Pissarides 1999), or for a variety of other reasons.

[8] Besides the studies mentioned below, see Berry et al. 2019 and Karabarbounis and Neiman 2013. Autor et al. (2020) provide further evidence for an increase in aggregate markups along with one possible explanation based on "superstar firms." Syverson (2019) provides a critical survey of related issues.

note that these trends "suggest an increase in economic rents accruing to capital owners." There is debate about the extent to which the increase in excess returns to capital represents an increase in excess returns in the overall economy or a shift in rents away from labor (Stansbury and Summers 2020, Davis 2020). But the presence of increased rents accruing to capital appears to be well-established.

Barkai (2020) decomposes aggregate factor income into a labor share, capital share (earning the normal return) and a pure profit residual and finds that the pure profit residual rose by 13 percentage points of gross value added (GDP) from 1984 to 2014.

De Loecker et al. (2020) find that the median level of markups in the economy has remained almost constant, but that average markups have risen from 21 percent in 1980 to 61 percent in 2016, much faster than overhead costs, due to rising markups at the higher end of the distribution and reallocation of economic activity towards these larger, higher-markup firms. Likewise, the average profit rate rose from 1 percent to 8 percent.[9]

Grullon et. al (2019) find that market concentration has increased in more than 75 percent of U.S. industries over the last twenty years. They also find higher profit margins in more highly concentrated industries and no evidence for an increase in operational efficiency, implying the existence of higher excess profits in more concentrated industries.[10]

B. Excess Returns are a High (and Rising) Share of the Corporate Tax Base

While documenting that excess returns to capital have been rising helps to frame the

[9] Traina (2018), Basu (2019), and Edmond, Midrigan, and Xu (2021) argue that the effects found in De Loecker et al. (2020) are too large.

[10] The absolute magnitude of excess profits in the economy is a distinct issue from the fact that excess profits have been rising. Lamadon et al. (2022) estimate the share of rents in total profits after adjusting for risk at 11-15%. Using regressions of aggregate capital income against tangible and intangible capital, Gravelle (2015) estimates that excess profits account for less than 20 percent of returns after adjusting the normal return for risk.

issue, that trend is neither necessary nor sufficient for showing that the share of excess returns in the corporate tax base is large and increasing. The tax base is affected not only by economy-wide trends but also by the particular features of the tax code. For example, a corporate "income" tax that allowed for expensing of all new investment would not burden the normal return at all so that excess returns would account for the entire tax base regardless of their prevalence in the economy.

Before turning to the research on this issue, we note several general trends that suggest that excess returns have accounted for a large and rising share of the corporate tax base over time. First, changes in corporate tax law over time have encouraged expensing for equipment. The Tax Cut and Jobs Act of 2017 introduced 100 percent bonus depreciation (that is, it allowed expensing) of equipment investment (albeit on a temporary basis). In 12 of the 16 years preceding the Act, some sort of bonus depreciation rule was in effect (Fox 2020, Guenther 2018).

Second, intangible investments have increased significantly as a share of total corporate investment (Crouzet and Eberly 2019, Gravelle 2021, Orhangazi 2019, Power and Frerick 2016). CBO (2018) shows that as a share of the sum of equipment, structures, and investment in intellectual property products, intellectual property products have risen from 11-14 percent in 1966 to 1982 to 31-33 percent between 2009 and 2016. Most intangible investments are expensed and intangibles often generate excess returns. Thus, the rise of intangible investment relative to tangible investments implies a greater share of excess returns in overall returns and a greater share of investment being expensed.[11]

[11] As discussed below, Power and Frerick (2016) find that excess returns have increased as a share of the corporate tax base and suggest that a significant part of that increase is associated with rising investment in intangibles. Their analysis shows that "industries that hold [the most] intangible assets" (e.g., information technology/software, nondurable manufacturing, and pharmaceuticals) earned higher than average excess returns and are disproportionately represented in the increase in excess returns since 1992.

Of course, structures, land, and inventories are not expensed. But relative to investment in structures, investment in equipment is substantially larger and has increased over time (CBO 2018). Together, equipment (40 percent) and intellectual property products (primary R&D and software, 39 percent) accounted for 79 percent of gross private domestic investment in 2020 (Bureau of Economic Analysis 2021).

Third, the risk-free rate of return has declined dramatically over the past twenty-five years, but corporate profits have remained high. From 1995 to 2020, the nominal yield on 10-year Treasuries fell from 7.6% to 0.9%, and a measure of the real yield fell from 3.8% to -0.3% (Board of Governors of the Federal Reserve System 2022).[12] Nevertheless, pretax corporate profits as a share of GDP have continued to rise, increasing from 9.0% to 11.5% over the same time period (Bureau of Economic Analysis 2022).[13] This is further suggestive evidence of the rising importance of excess returns in the corporate tax base. It is not decisive, however, because the risk premium may have increased over the same period.[14]

Several studies have found that the share of the corporate tax base that is due to the normal returns has been falling over time. Although the studies differ in detail, the basic methodology shares several common steps. First, using either aggregated or individual corporate tax returns, the authors remove financial flows – interest paid and received, dividends, and net

[12] Real yields are calculated as the nominal 10-year Treasury yield (DGS10, https://fred.stlouisfed.org/series/DGS10) less year-over-year core CPI inflation. As an alternative measure of real returns, the market yield on 10-year inflation-indexed Treasury securities fell from 1.83% in 2004 to -0.91% in 2021.

[13] Calculated as nominal pretax corporate profits without inventory valuation adjustment or capital consumption adjustment (A053RC1Q027SBEA, https://fred.stlouisfed.org/series/A053RC1Q027SBEA) divided by nominal GDP.

[14] The best available estimates of the corporate risk premium in the United States, including those based on historical data, forward-looking implied estimates from futures markets, and even surveys of investors and fund managers, suggest that it falls somewhere between 3% and 6% and has not risen significantly above these values in the 21st century. See Damodaran (2020) for a review of the literature.

capital gains – from the tax base. That yields a tax base that would be a cash flow tax except for the treatment of depreciation and amortization of inventories and intangible capital. Second, the authors compare the revenue produced under that system to the revenues produced under a cash flow tax – that is, under the same rules except that it expenses investments and inventory changes. The resulting difference is taken as an estimate of the share of the corporate tax base that is due to taxation of risk-free returns (that is, not including the return to risk).

Using this approach, Power and Frerick (2016) find that the portion of the corporate tax base attributable to the risk-free return fell steadily from more than 40 percent in 1992 to less than 20 percent by 2013. They also find that between 2003 and 2013, only about 15 percent of multinational corporations' profits are attributable to the risk-free return, compared to about 40 percent for domestic corporations. Their study updates the methodology and data in Cronin et. al. (2013), which found that about 37 percent of the corporate tax base represented risk-free returns in five selected years between 1999 and 2007. That study, in turn, built off Toder and Rueben (2007) who used aggregate data and estimated that 32 percent of the 2004 corporate tax base represented risk-free returns. Gentry and Hubbard (1997) use a different methodology to estimate nominal returns to corporate capital were about 22 percent per annum in the 1980s, compared to a risk-free rate of about 10 percent. This implies that risk-free returns comprised only about 40 percent of total corporate returns during that period.

A related literature compares revenues from the corporate tax to the revenues that would arise under an "R-base" – that is, a cash flow tax. This comparison is relevant because a cash flow tax would completely exempt the normal return and tax only excess returns. Results in Slemrod (2007) imply that about 15 percent of the corporate tax base constituted risk-free returns in 2002-3. Results in Gordon, Kalambokidis, and Slemrod (1998) imply that in 1995 about 16

percent of the corporate tax base consisted of risk-free returns. Gordon and Slemrod (1988) found that in 1983 a cash flow tax would have raised more revenue than the corporate tax in place at that time.

All this research cited above suggests that the risk-free return accounts for a relatively small and declining share of the corporate tax base. The studies do not account for the return to risk (Gravelle 2015), but if that return has been moderate in size and either falling, roughly constant, or even rising slowly, the studies imply that the share of the corporate tax base that represents excess returns has been high and rising over time.[15] Slemrod (2007), Gravelle (2015), and Power and Frerick (2016) note that the R-base approach requires steady state assumptions, and in particular is only strictly valid if the corporate capital stock is growing at the rate of interest. If capital grows more slowly (rapidly), the method will understate (overstate) the portion of the tax raised by the normal return, as investment is expensed under an R-base and thus deductions are timed earlier than under an income tax. Power and Frerick (2016) undertake a variety of sensitivity tests to address the steady state assumptions and find that the results are robust.

Moreover, and perhaps most importantly, in simple direct calculations that are not subject to any of the critiques above, Patel and McClelland (2017) estimate that a corporate cash flow tax (that did not include border adjustments) would have closely mimicked the level of, and changes in, revenues from the corporate income tax over the past several decades. Fox (2020) provides similar results. These papers provide strong evidence that the corporate "income" tax is de facto close to a cash flow tax, in which excess returns constitute the entire tax base.

C. Firms Share Rents with Workers

[15] See again Damodaran (2020), which reviews the literature and suggests that the return to risk has been both moderate and relatively constant outside of recessions.

Since at least Slichter (1950) and Lester (1952) and continuing through Dickens and Katz (1987), Krueger and Summers (1988), and Katz and Summers (1989), the economic literature has documented the presence of significant and sustained inter-industry wage differentials.[16] High wages tend to be paid in industries that are concentrated, have high profits, and have relatively small labor shares. These patterns are economically significant and exist across different countries and time periods, and many authors have concluded that they most likely reflect "firms' sharing of rents with workers" (Krueger and Summers 1988).

Several papers have directly estimated the connection between profitability and pay. Blanchflower et al. (1996) find that increases in profits feed through into permanently higher levels of pay in the US, estimating the profit elasticity of wages at 0.08 (implying that a doubling of profitability in a sector is associated with an 8 percent increase in pay.) Christofides and Oswald (1992), Hildreth and Oswald (1997), and Dobbelaere and Mairesse (2018) estimate similar elasticities in Canada, the U.K., and France, respectively. Meanwhile, Budd, Konings, and Slaughter (2005) find that profits are even shared across borders by multinational firms. Likewise, the literature on how unions reduce firm value (Clark 1984, Lee and Mas 2009) and how deregulation reduced wages in airline and trucking industries (Card 1996, Rose 1987) are consistent with rent sharing.

Card et al. (2018) review 22 studies of rent sharing and find a "surprisingly consistent" range of wage elasticities with respect to value-added per worker of 0.05-0.15 after adjusting for worker quality. The authors suggest that firm-specific wage premiums explain roughly 20 percent of overall wage variation, and thus that rent sharing plays a statistically and economically significant role in the determination of wages.

[16] Sociologists have also focused extensively on the dynamics of worker power and workers' ability to extract higher earnings through rent sharing. See, for example, Kalleberg et al. (1981) and the citations therein.

Gravelle (2021, footnote 98), citing several studies from the last 30 years, concludes that "most studies have found that, even in those circumstances where bargaining is to be expected, labor tends to capture a relatively small share, typically less than 10% [of excess profits] and rarely more than 20% or 30%." However, most of these studies largely focus on rank-and-file workers and are confined to a particular industry such as manufacturing. Moreover, most do not feature plausibly exogenous sources of variation in rents, and those that use an instrumental variables approach find higher estimates.

In contrast, several more recent studies, using plausibly exogenous sources of variation in firm-level excess profits, suggest that workers obtain substantially higher shares of firm rent, with estimates ranging from 30 percent to 80 percent. Especially compelling evidence comes from recent analyses of tax changes in the U.S. (Dobridge et al. (2021) and Ohrn (2022)) and France (Carbonnier et al. (2020)) as well as analysis of other sources of increases in rents (Kline et al. (2020).

Ohrn (2022) uses data from the Execucomp data base to examine the impact of two changes in the corporate income tax (bonus depreciation and the Domestic Production Activities Deduction (DPAD)) on worker compensation. He finds that the combined compensation of *just the top five* executives at publicly traded firms increased by about 17-25 cents for each dollar in a firm's tax reduction. Presumably, workers as a whole obtain a significantly larger share of rents than that obtained by just the top five executives.

Dobridge et al. (2021) create a matched data set that links the universe of workers' W-2 forms with the tax returns of public and private corporations. In their preferred specification, workers captured 80 percent of the rents generated by the DPAD. (In other specifications, the worker share was even higher.)

Carbonnier et al. (2020) using a matched employer-employee data set covering the universe of workers and firms in France, exploit variation created by a corporate tax credit to estimate that firms share 50% of rents with workers.

Kline et al. (2019) examine the impact of rents generated by successful approval of an economically valuable patent in U.S. firms. They find that workers capture roughly 30 cents of every dollar of patent-induced rent.

Lamadon et al. (2022) create a matched employer-employee data combining all U.S. businesses and workers with tax records for the period between 2001 and 2015. Using several different specifications and measures, they estimate that 49% of firm-level rents are shared with workers.

Finally, several studies aim to estimate the direct effects of corporate taxes, holding constant the general equilibrium effects. ADM (2012) estimate the long run direct effect of an $1 increase in the corporate income tax across nine European countries as a $0.49 reduction in the real wage bill. Fuest et al. (2018), using a 20-year panel of German municipalities, obtain a similar estimate of the direct effects in Germany. Dwenger et al. (2019), also using German data, produce similar results while holding employment constant, but note that when changes in employment are considered, the wage bill only falls by 19-28 percent of the tax increase.

Azemar and Hubbard (2015) study incidence in 13 OECD countries and find that 60 percent of the overall (direct and indirect) corporate tax burden is shifted to labor on average, but that this result is sensitive to country characteristics in ways that indicate rent sharing playing a role. Gravelle (2021) shows that under U.S. unionization rates, their effect falls to 10 percent.

Felix and Hines (2009) provide evidence of rent-sharing by showing that union wage premiums are lower in states with higher state corporate tax rates, suggesting that workers are

less able to bargain for favorable wage outcomes when taxes are high. Taxes reduces union wage premiums even more in states without right-to-work laws, consistent with the view that these laws diminish the ability of unions to demand a share of rents.

Each of these studies of the direct effects suggest that the incidence of the corporate income tax on labor will be higher in contexts where workers have greater bargaining power over firm rents.[17]

D. Firms Share Rents Disproportionately with High-Income Workers

Auerbach (2018) notes that most analysis has treated wage earners as a homogenous group, neglecting to distinguish among different types of labor. In analysis of rent sharing, distinguishing among workers at different skill or income levels matters because the U.S. evidence strongly suggests that firms share rents predominantly with high-income earners.

For example, Hall and Liebman (1998) find that corporate executive compensation packages typically include an explicit rent sharing component – namely stocks and stock options. As a result, they find a substantial relationship between firm performance and CEO compensation. This implies that managerial compensation is tied to corporate profits, which in turn are affected by taxes.

As mentioned above, Ohrn (2022) finds that 17-25 cents of the rents from tax cuts go to

[17] Numerous additional empirical studies of corporate tax incidence have been undertaken. An early generation of empirical studies aims to estimate the relationship between corporate taxes and wages by focusing on cross-country comparisons (Hassett and Mathur (2006), Felix (2007), Desai, Foley, and Hines (2007)). These papers generally generated very large negative impacts of corporate taxes on wages, but in some cases the results seemed an order of magnitude larger than could be plausible, often suggesting labor burdens of more than 200% of the tax. Liu and Altshuler (2013) use an imperfectly competitive framework with industry concentration included as an explanatory variable to estimate that labor bears between 42 percent and 80 percent of the corporate income tax. Suárez Serrato and Zidar (2016) extend the literature in both theoretical and empirical directions. They estimate the incidence of state-level corporate taxes and apportionment rules in a spatial equilibrium model with location specific-rents that accrue to business owners. In that framework, state corporate taxes impose significant burdens (about 40 percent of the overall burden) on firm owners. Gravelle (2021) provides a recent survey and extensive criticism of the literature. Clausing (2011, 2013) provides further critiques.

just the top five executives at publicly traded firms. The effects of the tax breaks are concentrated among firms with weaker governance structures, which supports an explanation in terms of executives claiming a greater share of rents.

Dobridge et al. (2021) find that, of the 80 percent of rents that are shared with workers, about half (just over 41 percent of all rents) go to the top 1 percent of workers ranked by within-firm compensation. Another 25 percent of rents that workers share (20 percent of all rents) go to the next 9 percent of workers. Workers in the bottom 75 percent of the within-firm earnings distribution shared just 12 percent of the rents. These estimates capture both the idea that rent is heavily shared at the top, yet there is rent sharing throughout the income. As Ohrn (2022) notes, however, Dobridge et al. (2021) probably understate the share of benefits going to the top 1 percent because the estimates use information from W2 forms, which do not include forms of compensation that are common for executives, such as restricted stock, options, and long-term incentive payments.[18]

Carbonnier et al. (2020) find that the French tax credit they analyze increased the wages of high-skill workers almost exclusively. A 1 percent increase in the tax credit rate translates into a 0.6 percent increase in wages for high-skill workers, but a change in lower-skill wages statistically indistinguishable from zero.

Several papers find that corporate tax cuts widen the income distribution among workers, consistent with the notion that rent sharing occurs predominantly with high-income workers. In response to the tax cuts they examine, Dobridge et al. (2021) report semi-elasticities of wages

[18] Evidence from the taxation of pass-throughs (S Corporations) is consistent with the view that business taxes are borne largely by high-income households. Risch (2021) exploits the change in top marginal income tax rate in the 2012 to show that business owners bore as much as 80-90 percent of the increased tax burden, passing about 10-20 percent to moderate- and low-income workers. It is unclear how this result maps into the burden that is placed on high-income workers versus owners (i.e., shareholders in a corporate context), but the evidence suggests that these groups bore the vast majority of the burden of the tax increase.

that rise monotonically with within-firm wage percentile, ranging from 0 at the bottom of the distribution to about 0.5% at the median, to 0.9% at the 90th percentile, 1.3% at the 95th percentile, and 2.7% at the 95th percentile. Likewise, Nallareddy et al. (2018) obtain a similar pattern of findings for state-level corporate tax cuts. The cuts tend to increase inequality, raising the adjusted gross income of high-wage workers (defined as those making over $200,000 a year, or roughly the top 5% of earners) by 4.2 percent on average after a tax cut, while the income of all other workers increases by just 1.2%.

Kline et al. (2019) demonstrate that the rent sharing they document after the approval of an economically valuable patent is highly concentrated among earners in the top quartile and among officers in particular. Wage changes for nonmanagerial employees and employees in the bottom three earnings quintiles are statistically indistinguishable from zero, while managers and employees in the top earnings quartile see statistically significant salary increases estimated at over $4,000 on average.[19]

A variety of other research presents results consistent with these findings. Song et al. (2019) use Social Security Administration data covering 100% of workers and firms in the U.S. and find that more than 2/3 of the increase in wage dispersion since the 1980s is due to increasing between-firm inequality. The authors suggest that their findings make sense in a world where the distribution of firm rents has become increasingly skewed, with an increasing share going to high-wage workers. Barth et al. (2016) similarly find that much of the rise in earnings inequality is due to the increased dispersion of earnings between firms rather than within firms.

[19]Related evidence comes from Howell and Brown (2020), who examine the impact on wages in small firms who receive an R&D grant (with no restrictions on how the funds are used). They find that the distribution of within-firm wages becomes more unequal subsequent to grant receipt. The difference is driven by changes in the wages of longer tenured workers, which rise, relative to new hires, whose wages do not rise.

Furman and Orszag (2018) present evidence that an increasing number of companies are earning excess returns on capital and that workers at these firms (particularly high earners) are sharing in those returns, driving up wage inequality. Bivens and Mishel (2013) focus on the pay of corporate executives and highly compensated workers in the financial sector and find similar results.

Stansbury and Summers (2020) calculate various measures of wage premia associated with rents, using CPS data that is top coded at $2,885 per week for the 2000s and 2010s. They find that a significantly greater share of rents is shared with college-educated workers compared to non-college-educated workers, and that a greater share of compensation for college-educated workers is composed of rents.

European labor market studies support this finding as well. Bloesch et al. (2021) use matched employer-employee data from Denmark with worker deaths as a causally convincing source of identification for marginal productivity and find that firms share rents especially with workers who have "hold-up power" over production and that workers with "hold-up power" tend to have higher wages. Gurtzgen (2009) investigates rents in the German economy using linked employer-employee data and finds that workers with a college degree win pay increases more than three times greater than workers without any higher education for a given increase in firm profits.[20]

In contrast to the all evidence presented above, Fuest et al. (2018) find that low- and middle-income German workers bear significant burdens from municipal corporate taxes and high-income workers do not. The extent to which these results should be viewed as applying to

[20] Saez, Schoefer, and Seim (2019) present evidence that, in response to a Swedish payroll tax cut that applied to some workers, firms shared rents with all workers.

the U.S. corporate tax, however, is unclear. As Fuest et al. (2018) note, their results "highlight the importance of labor market institutions and profit-shifting opportunities." Both factors differ markedly for the U.S. and Germany. In particular, in an earlier working paper version, Fuest et al. (2013) report that half of workers in West Germany and almost two-thirds in East Germany were covered by a collective bargaining agreement in 2009, substantially higher than the private sector unionization rate in the US, which was around 6 percent in 2020 (see Stansbury and Summers 2020). Moreover, Fuest et al. (2018) find that the presence of collective bargaining has a substantial impact on their results. In addition, the profit shifting opportunities associated with a municipal level tax would seem to be radically different from those associated with a federal tax in a national market as large as the United States.[21]

E. For Rank-And-File Workers, Rent Sharing has Declined Over Time

The extent of rent sharing between firms and the majority of workers has declined over time. Stansbury and Summers (2020) offer a comprehensive framework for documenting the decline over the past several decades in the power held by the vast majority of US workers (but not extremely high-income workers). They show that workers' ability to claim rents has declined markedly over time. They attribute the decline to a decline in unionization (see also Blanchflower and Bryson (2004) and Farber et al. (2021)), a decline in wage premia that workers receive in non-union settings. They estimate that labor rents have declined significantly (from about 12 percent of nonfinancial corporate value added in 1980s to 6 percent in 2010s) while

[21] There are several additional issues in applying the result to the U.S. First, Fuest et al. (2018) examine incidence using median wages rather than means, which makes it hard to "add up" the incidence of the tax across different groups. Fuest et. al (2013) examine the effects on the corporate tax on mean wages and find that high-income workers bear more of the burden. Second, 13 percent of the Fuest et al (2018) sample have top-coded wage data, which may cause the analysis to miss important effects. In Dobridge et a. (2021), for example, the top 10 percent alone received 75% of the rents shared with labor. Third, women, who may predominantly be secondary earners, may be less mobile and hence more likely to bear the burden of a local tax (from which men can move away) than a national tax (for which moving away is much more difficult).

profits to capital have increased by a similar amount, implying a sizable reduction in rent sharing. As noted above, they find that the decline has not been uniform: the decline in rent sharing was larger for middle- and low-income workers than higher-income workers, and for non-college-educated workers than for college-educated workers. Thorpe (forthcoming) complements these results by showing that rent-sharing between firms and top executives has increased since the 1990s, suggesting that the observed decline in rent-sharing with rank-and-file workers may in fact represent a redistribution of rents to top earners that is not captured in data where incomes are top coded at relatively low levels.

IV. NEW ESTIMATES OF DISTRIBUTIONAL BURDENS

In this section, we provide estimates of the distributional burdens of the corporate income tax using the Tax Policy Center (TPC) Microsimulation Model (Nunns 2012) calibrated to 2019 data and show the sensitivity of the results to different assumptions about rent sharing.

The TPC simulation model calculates federal income tax liability (and other tax measures) for households based on tax returns from the Internal Revenue Service Public Use Files, and imputations based on data merges with the Current Population Survey, the Survey of Consumer Finances, and other sources. The income classifier used is called "expanded cash income" (ECI), representing a broad measure of pre-tax income that includes adjusted gross income, imputed corporate income tax liability, and many additional forms of cash and near-cash income.[22]

The standard model specification is that 40 percent of the corporate tax base represents

[22] The additional forms of income include above-the-line adjustments (for example, IRA contributions, student loan interest, and self-employed health insurance deductions), employer-paid fringe benefits, employer and employee contributions to tax-deferred retirement saving plans, tax-exempt interest, non-taxable social security benefits, nontaxable pension and annuity income, accruals within defined benefit pension plans, inside buildup within defined contribution plans, cash and cash-like transfer programs (for example, SNAP). For further details, see https://www.taxpolicycenter.org/resources/brief-description-tax-model.

normal returns (and is split equally between all capital owners and all laborers in proportion to capital and labor income, respectively) and the other 60 percent represents excess returns (and is assigned to shareholders).[23] Our analysis focuses on the distribution of burdens on the excess return portion of the corporate tax base.

While distributional analysis using cross-sectional samples is common, the procedure has important limits. It omits the short-run and dynamic impacts of taxes and focuses instead on the long-run impact; and it does not undertake welfare analysis, it simply distributes the cash value of the tax burdens (Auerbach 1993, 2018).

Table 1 presents background information. Columns 1 and 2 show the distribution of ECI and of corporate tax burdens across ECI classes and show that the corporate tax is progressive, under the base case assumptions made in the TPC model. The top 1% (20%) of tax filing units ordered by ECI receive 16 (53) % of ECI and pay 35 (70) % of the corporate income tax. The table also shows the distributions of various measures of labor income and asset returns, which we return to below.

We consider six scenarios for rent sharing. In each of the first three scenarios, 20 percent of rents are shared with workers. The scenarios differ by how the shared rents are distributed across workers with different levels of labor income. [24] In the first case, we distribute 50 percent

[23] The Treasury Department (Power and Frerick (2016) and Cronin et al. (2013)) employs a similar breakdown, assuming that 36 percent of the corporate tax base represents normal returns, with the burden split equally between all laborers and all capital owners in proportion to the labor and capital income, respectively, and 63 percent of the base represents excess returns, which are borne by shareholders. (One percent of the base imposes no burdens.) The Congressional Budget Office (2018) allocates 75 percent of the burden of corporate income taxes to all capital owners in proportion to their capital income and 25 percent to workers in proportion to their labor income. The Joint Committee on Taxation (2013) distributes 75 percent of corporate income taxes to owners of capital (in the long term), including international capital holders. The remainder is distributed to labor.

[24] Labor income is constructed as the sum of wages, employee and employer contributions to defined contribution pensions, the contribution portion of DB accrual (accrual is divided into hypothetical contribution and return portions), employer Social Security and Medicare taxes, employer health care contributions, 80% of self-

of shared rents to the top 1 percent of individuals ranked by labor income, 40 percent to the next 19 percent of individuals, and the remaining 10 percent to individuals in the bottom 80 percent of the labor income distribution. This allocation is close to the results in Dobridge et al. (2021) and is not inconsistent with the results in Ohrn (2022). In the second case, we distribute rents to the top 20 percent of individual workers ordered by labor income, in proportion to labor income. This scenario is loosely based Carbonnier et al. (2020) and Kline et al. (2020). In the third scenario, rents are shared with all workers in proportion to their labor income. This is meant to reflect the many previous analyses that do not distinguish between different types of labor.

Note that in each of the three scenarios, the incidence as typically measured is constant: all capital owners bear 20 percent of the burden of the corporate tax, shareholders bear 48 percent, and labor bears 32 percent of the burden (50% of the tax on the normal return plus 20% of the tax on rents). Nevertheless, the distribution of the burden across tax units with different labor incomes varies.

In the second three scenarios, we use the same three allocation of rents among workers, but we assume that firms share 50 percent of rents rather than 20 percent. As a result, in the second three scenarios, all capital owners bear 20 percent of the corporate tax burden, shareholders bear 30 percent, and labor bears 50 percent.

Based on the survey presented in section II, we prefer the scenarios that share rent primarily with high-income workers. Nevertheless, we recognize that the literature has not evolved to the point where there is a definitive allocation of rents, so we present scenarios based on rent sharing with all workers as well.

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employment income (the assumed labor portion of the SECA tax base), plus distributions from pensions and defined contribution plans (excluding rollovers).

Table 2 presents the main results. The first column simply replicates the distribution of the corporate tax burden. Columns 2 and 5 show that if 20% of 50% of rents are shared with workers (based on Dobridge et al. (2021)), the corporate tax remains about as progressive as in the base case, even though "labor" bears much more of the burden. Specifically, the top quintile of households ranked by ECI bears 70.3% - 71.0% of the corporate tax under the rent-sharing scenarios compared to 69.8% in the base case. The 95th-99th percentile bears between 15.4% and 17.1% of the burden compared to 14.3% in the baseline. The top 1 percent bears 32.7% - 34.0% under the rent-sharing scenarios compared to 34.8% in the base case.

Columns 3 and 6 of Table 2 show that if 20% or 50% of rents are shared proportionally with workers in the top 20 percent of the labor income distribution, burdens are sharply lower for tax units in the top 1% of the ECI distribution but *higher* for households in the 60th-99th percentile of the ECI distribution than in the baseline. This occurs because – as shown in Table 1 – tax units in the 60th-99th percentiles of the ECI distribution account for a greater share of the top 20% of labor income (83.9%) than they do of excess returns (45.8%). As a result, shifting part of the burden from all shareholders to the top 20% of labor earners raises the burden of those households.

The fourth and seventh columns of Table 2 show that shifting a share of the burden of taxes on excess returns from shareholders to all labor income is regressive for the vast majority of tax units. It raises burdens in the bottom 95% of the ECI distribution and significantly reduces taxes borne by the top 1% of tax units in the ECI distribution. Tax units in the top 1% would bear significantly lower taxes – by 4 (10) percentage points of ECI if 20% (50%) of rents are shared.

V. CONCLUSION

Our goal in this paper is to incorporate insights from the literature on rent sharing between firms and workers into analysis of the incidence and distributional effects of the corporate income tax. The essence of our argument is simple: excess returns account for a significant and rising share of the corporate tax base and firms tend to share excess returns with workers–predominantly but not completely with their high-income workers. Together, these facts imply that standard public finance analyses that allocate all the burden of taxes on excess returns to shareholders are inconsistent with important features of the real world.

Instead, the facts imply that–in addition to any burden workers face from the "indirect" effect on wages that occur through changes in macroeconomic aggregates such as capital per worker and output, as described in Harberger (1962) and a vast subsequent literature–workers (again, predominantly high-income workers) also bear some of the burden of the corporate income tax through a "direct" mechanism, holding the macroeconomic variables constant. This effect may occur via explicit bargaining, implicit bargaining (such as when more profitable firms pay their workers more), contractual details in executive contracts that link compensation to firm performance, self-dealing by executives, or other mechanisms.

Our central results suggest both that more of the corporate income tax than previously understood falls on "labor," but because rent sharing is concentrated among high-income workers, the corporate tax remains quite progressive in the most plausible models of rent sharing.

Further analysis of rent sharing and the corporate tax could usefully address several questions. First, are the effects symmetric for increases and decreases in rents? Almost all the evidence above focused on rent increases (tax cuts). From a theoretical perspective, the effects may be asymmetric since wages may be downwardly rigid and because items like bonuses, stock

options, and long-term incentives are unlikely to take on negative values. Empirically, in contrast to the literature reviewed above showing that (national) corporate tax cuts that were shared with workers went predominantly to high-income workers, Fuest et al. (2018) show that (municipal) corporate tax increases in Germany hurt low- and moderate-income workers. For a number of reasons cited above, however, it is unclear how relevant those results are for the U.S. economy.[25] In any case, a finding that rent sharing is asymmetric with respect to increases and decreases in rents would have extremely important implications. At the very least, it would imply that raising taxes and then removing the change would not restore the original equilibrium. More generally, it would imply that the current incidence and distributional effects of the tax depend not only on current tax parameters but also on the entire history of the tax.

Second, are rents from all sources shared the same way? We speculate that firms might be less willing to share rents that are generated in private ways than rents generated in public ways (e.g., by tax cuts).

Third, is it appropriate to apply the benefits of rent sharing to all workers or just corporate workers? We believe that, in order to maintain long-term equilibrium in labor markets, the benefits of rent sharing from corporate tax cuts should apply to all workers, even those not working at corporations, but further investigation is warranted.

Fourth, how would dynamic effects modify the conclusions? The distributional effects examined above presumably represent long-term effects. Auerbach (2018) and others emphasize that short-term dynamics can lead to distributional in the short- and medium-term that are quite different from the long-term impact.

[25] The symmetric response would have been to reduce compensation for high-income workers, which is not inconsistent with the results in Risch (2021), where as much as 80-90% of an increase in the top marginal tax rate was borne S corporation owners rather than their employees.

Fifth, how does rent sharing work in pass-through organizations? Risch (2021) shows that in response to an increase in the top income tax rate, S-corporation owners bore as much as 80-90 percent of the tax burden. Pass-through owners, however, share some features with corporate shareholders and some with high-income corporate workers, so the implications as to who bears the burden of taxes on excess returns to pass-throughs remains unclear.

Sixth, how does incorporation of rent sharing affect the supply of and demand for highly educated and skilled workers?

Finally, to what extent are observed excess returns actually "rents" versus "quasi rents" and how would that affect the impact of rent sharing? So far, we have used terms like "rents," "excess returns," excess profits, and similar terms interchangeably. But not all excess returns represent true rents. Quasi-rents arise in situations such as patents, where many firms compete, some lose, and one or a few win. The winner(s) generate excess returns, but the presence of these excess returns was necessary to induce the initial investment in the first place.

Answers to these questions could usefully inform analysis of rent sharing and corporate taxes. More generally, our work points to the importance of several new directions for future work. Reinforcing points made by Fuest et al. (2013, 2018), Auerbach (2018), and Dobridge et al. (2021), distinguishing different types of labor–at the very least differentiating between rank-and-file workers and top executives–seems like a crucial next step for the analysis of corporate tax incidence. Likewise, analysis of the distribution of other taxes that place burdens on rents (such as a value-added tax or the destination-based cash-flow tax) should be reconsidered in light of the evidence on firms' rent sharing with high-income workers.

Appendix: Summary of the Arulampalam, Devereux, and Maffini (2012) Model

We focus on a single worker that can earn w in a bargaining agreement and w* in an alternative, competitive environment.[26] The worker's rent is w-w*.

The owners of the firm have an amount of capital, K. They can invest it an alternative project and earn $\pi^* = rK$, where r is the competitive rate of return. Or they can bargain with the worker and generate profits equal to

$$(1)\ \pi = F(K) - w - T,$$

where F(K) is output, the assumed output price is 1, and T is total corporate tax payments. We consider a corporate tax system of the following form:

$$(2)\ T = t(F(K) - w - arK) + \varphi$$

In (2), t is the marginal corporate tax rate, which is applied to a base that equals output less wages and an allowance for capital, a. The variable φ measures any tax liability not related directly to employment compensation (w) or the level of the capital stock (K). This might include the firm's avoidance and evasion opportunities, such as the potential to shift profits abroad, use special tax credits, shift losses over time, or finance investment with debt. Or it could include special levies on the firm. (In (2), φ is added rather than subtracted but that does not affect the results, just the sign of the variable.) Equations (1) and (2) imply that

[26]Fuest et al. (2013) extend the model to incorporate several different worker types.

$$(3)\ \pi = (F(K) - w)(1 - t) + atrK - \varphi$$

The firm's rent is given by

$$(4)\ \pi - \pi* = (F(K) - w)(1 - t) - (1 - at)rK - \varphi$$

The total amount of rent is given by (w - w*) + ($\pi - \pi*$). Following ADM, the outcome of a Nash bargaining solution maximizes the value of the bargain, B, given by

$$(5)\ B = (w - w*)^{(1-\mu)}(\pi - \pi*)^{(\mu)}$$

where μ represents the bargaining power held by the firm and 1 - μ represents the bargaining power of the worker. Maximizing (5) with respect to w implies that the equilibrium wage is given by

$$(6)\ w = w* + (\pi - \pi*)[(1 - \mu)/(\mu(1 - t)]$$

That is, the wage determined through bargaining is the sum of the competitive wage and a share of the after-tax rent the firm can achieve. The share is determined by the relative bargaining power of the two groups and the tax imposed by the government.[27]

[27] If investment is expensed (i.e., a = 1) and there is no tax avoidance (φ = 0), then the tax term falls out of equation (6) and corporate taxes do not affect wages. Likewise, imposing individual income taxes on wage income, so that the worker maximizes (w-w*) (1-s), where s is the average marginal tax rate on income between w and w*, does not change the equilibrium outcome.

To show how marginal increases in output (or, given the assumptions, productivity) are allocated, use of (1), (2), and (6) implies that

$$(7)\ \frac{dw}{dF} = 1 - \mu;\ \frac{d\pi}{dF} = \mu(1 - t);\ \frac{dT}{dF} = \mu t$$

The effects sum to 1. An increase in output is divided among workers (in proportion to their bargaining power), firms (in proportion to their bargaining power adjusted for the corporate tax) and the government. Note that higher rents raise the wage but the *share* of the increase in overall rents that goes to workers is independent of the corporate tax rate. This reflects the fact that wages are fully deductible in determining the firms' taxable income, as noted above.

Looking at the effects of lump-sum taxes, total differentiation yields

$$(8)\ \frac{dw}{d\varphi} = -\frac{1-\mu}{1-t};\ \frac{d\pi}{d\varphi} = -\mu;\frac{dT}{d\varphi} = \frac{1-\mu t}{1-t}$$

The sum of these effects is zero. An increase in tax burdens, holding rates constant, reduces both wages and profits, with the government collecting revenues equal to the losses experienced by the private sector. Differentiating with respect to tax rates yields:

$$(9)\ \frac{dw}{dt} = -(1 - \mu)/(1 - \mu t),\frac{d\pi}{dt} = -\mu(1 - t)/(1 - \mu t).$$

Note that the derivatives with respect to t in (9) sum to -1 and the impacts are in the same proportion as the effect of an increase in productivity, given in (7).

The model also implies that the more bargaining power workers have (the lower μ is), the more wages fall by more in response to a tax increase. As equation (10) shows, the derivative of the wage response to taxes with respect to bargaining power

$$(10)\ \frac{d\frac{dw}{dt}}{d\mu} = \frac{d}{d\mu}\left(-\frac{1-\mu}{1-\mu t}\right) = \frac{1-t}{(1-\mu t)^2} > 0$$

where t and μ are between 0 and 1. That is, given that the wage response to taxes is negative (equation (9)), a lower μ reduces the wage response even further (raises it in absolute value).

Table 1: Percent Distribution of Income and Corporate Tax Burden, 2019 [1]

Expanded Cash Income Percentile [2, 3, 4]	Expanded Cash Income	Corporate Tax Burden	Labor Income	Labor Income in Top Quintile of Labor Inc. Distribution	Normal Returns	Supernormal Returns
Lowest Quintile	3.9	1.6	2.9	*	1.5	1.1
Second Quintile	8.2	4.3	8.0	*	3.5	3.3
Middle Quintile	14.2	8.7	15.6	0.4	6.9	7.0
Fourth Quintile	20.6	14.8	23.7	23.3	12.3	12.7
Top Quintile	**53.1**	**69.8**	**49.5**	**76.0**	**74.2**	**75.0**
Total	100	100	100	100	100	100
Addendum						
80th - 90th percentile	14.2	11.6	16.4	21.8	10.5	10.3
90th - 95th percentile	9.9	9.1	11.2	17.4	8.7	8.5
95th - 99th percentile	12.9	14.3	12.9	21.4	15.9	14.3
99th – 100th percentile	**16.1**	**34.8**	**8.9**	**15.0**	**39.2**	**41.9**
60th - 99th percentile	**57.6**	**49.8**	**64.3**	**84.3**	**47.3**	**45.8**

(*) Non-zero value rounded to zero.
(1) Calendar Year
(2) Includes both filing and non-filing units but excludes those that are dependents of other tax units.
Tax units with negative adjusted gross income are excluded from their respective income class but are included in the totals.
(3) The income percentile classes used in this table are based on the income distribution for the entire population and contain an equal number of people, not tax units. The breaks are (in 2020 dollars):
20% $ 25,525; 40% $50,630; 60% $90,455; 80% $163,826; 90% $241,542; 95% $343,382; 99% $826,902.
(4) Tax units with negative adjusted gross income are excluded from their respective income class but are included in the totals.

Table 2: Percent Distribution of Corporate Income Tax Under Alternate Assumptions, 2019 [1]

Expanded Cash Income Percentile [2, 3, 4]	Base	20% of Excess Returns Shared with Labor			50% of Excess Returns Shared with Labor		
		Heterogeneous Sharing by Labor Income Group (Dobridge et al.)	Excess Returns Shared with Top 20% of Labor	Excess Returns Shared with All Labor	Heterogeneous Sharing by Labor Income Group (Dobridge et al.)	Excess Returns Shared with Top 20% of Labor	Excess Returns Shared with All Labor
Lowest Quintile	1.6	1.5	1.4	1.8	1.4	1.2	2.1
Second Quintile	4.3	4.1	3.9	4.9	3.9	3.3	5.7
Middle Quintile	8.7	8.3	7.9	9.7	7.7	6.7	11.3
Fourth Quintile	14.8	15.0	16.1	16.1	15.2	18.0	18.1
Top Quintile	**69.8**	**70.3**	**69.9**	**66.7**	**71.0**	**70.1**	**62.1**
Total	100	100	100	100	100	100	100
Addendum							
80th - 90th percentile	11.6	11.8	13.0	12.3	12.0	15.0	13.4
90th - 95th percentile	9.1	9.1	10.2	9.4	9.2	11.8	9.9
95th - 99th percentile	14.3	15.4	15.2	14.2	17.1	16.5	13.9
99th - 100th percentile	**34.8**	**34.0**	**31.6**	**30.8**	**32.7**	**26.8**	**24.9**
60th – 99th percentile	**49.8**	**51.3**	**54.4**	**52.0**	**53.5**	**61.3**	**55.3**

(1) Calendar Year
(2) Includes both filing and non-filing units but excludes those that are dependents of other tax units.

Tax units with negative adjusted gross income are excluded from their respective income class but are included in the totals

(3) The income percentile classes used in this table are based on the income distribution for the entire population and contain an equal number of people, not tax units. The breaks are (in 2020 dollars):
20% $ 25,525; 40% $50,630; 60% $90,455; 80% $163,826; 90% $241,542; 95% $343,382; 99% $826,902.

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