

Analyzing the Incidence of the Corporate Income Tax: Models and Statistical Estimates

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Who bears the burden of the corporate income tax (i.e., the incidence of the tax) is a perennial issue in debates about the corporate tax. This issue is crucial for determining the extent to which the corporate tax is progressive or regressive. If the tax falls on capital income, it is progressive because capital income is concentrated in higher incomes. To the extent it falls on wages, it can become a regressive tax, falling more heavily on lower incomes.

Corporate taxes can fall on labor if they discourage the inflow of capital from abroad or reduce savings, thus reducing the capital stock and production, and therefore wages. They can also fall on labor if workers share in the taxes on rents (i.e., profits in excess of the amount needed to attract investment).

Researchers have used two approaches to estimate the share of the corporate tax burden that falls on wages through capital flows: general equilibrium models and reduced form statistical estimates. General equilibrium models impose a structure on the findings and use estimates of how freely capital flows across borders, how easily capital can be substituted for labor, and how readily imports can be substituted for domestic products to determine labor's share of the corporate tax burden. Reduced form statistical estimates use regression analysis to estimate the effect on wages of a change in corporate taxes.

Rent shares are estimated by statistical methods, although the limits to the share of the burden that can fall on labor can be constructed based on estimates of the share of profits that is rent. Bargaining models indicate that while rents may be shared, the taxes on rent are not. A higher tax reduces the total after-tax rents available for sharing, potentially reducing wages, but also makes it cheaper to pay wages because the value of the tax deduction for wages increases.

General equilibrium models of capital flows generally find that, with the assumptions most favorable to the corporate tax burden falling on labor, about 70% can fall on wages. However, using central estimates of the substitutability of capital across countries and in production, and import substitution effects, the share of the burden borne by labor falls to around 20%. It would be smaller and lead to a benefit for wages if other factors were considered, most notably debt finance, where higher tax rates provide a benefit. By contrast, most of the empirical studies find larger shares falling on labor, in some cases many multiples of the tax. Similarly, while rents are estimated to be no more than 20% of profits, studies of rent sharing find much larger shares falling on wages, in some cases more than 100%.

The large effects found in some studies may be due to statistical and variable choices, including how to measure wages or not controlling for fixed effects (including variables that are constant across countries and time). Another reason for the limitations of statistical methods is that wages are affected by many factors, and the corporate tax is a small variable by comparison, so it may not be possible to identify the tax's effects. In addition, a body of statistical studies can suffer from publication bias, where only studies that find statistically significant effects in the expected direction are published; studies that do not find such effects might not be completed if researchers expect they will not be published. A recent examination of the studies on the effect of corporate taxes on wages found and corrected for publication bias; this analysis estimated a small effect that was not statistically significantly different from zero.

Compared to statistical studies, the models point to the burden largely falling on capital rather than labor.

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Introduction

The corporate income tax is imposed on taxable profits of corporations. Who bears the burden of the corporate income tax (i.e., the incidence of the tax) is a perennial issue in debates about the tax.¹ This issue is crucial for determining the extent to which the corporate tax is progressive or regressive. If the tax falls on capital income, it is progressive because capital income is concentrated in higher incomes. To the extent it falls on wages, it can become a regressive tax, falling more heavily on lower incomes.

For many years, economists relied on general equilibrium models of the corporate tax, beginning with the 1962 Harberger model.² This model generally found that the corporate tax burden fell on capital and not on wages. Harberger's model was subsequently modified to allow for international capital inflows and outflows, introducing some uncertainty into the incidence of the tax with wide variations in the share borne by labor and capital depending on model parameters.

Beginning around the time of a discussion about lowering the corporate tax in 2007, several reduced form statistical estimates of corporate tax incidence appeared. These studies estimated the wage rate as a function of the corporate tax rate, and used cross-country or cross-state variation in tax rates. At about the same time, a literature also began to develop examining the extent to which some of the burden of the tax on excess profits (i.e., profits larger than those required to pay a normal return to investors), also called *rents*, was shared with workers.

Both the general equilibrium papers and the reduced form statistical estimates showed a range of values, although the range was much greater for statistical studies. This report provides a review of this literature and what it implies for the share of the corporate tax falling on labor. It addresses the merits of using general equilibrium models compared to reduced form statistical estimates. Compared to statistical studies, the models point to the burden largely falling on capital rather than labor.

Theoretical Issues

A corporate tax could reduce the incomes of shareholders, of capital in general, of labor, or of consumers. Both models and empirical studies do not generally assign the tax to consumers, but rather assume that, with fixed aggregate price levels, the tax is passed backward to the owners of inputs, capital and labor. There are excise tax effects, in that prices of corporate products rise, but noncorporate prices fall. The quantity of corporate products decreases, while the quantity of noncorporate products increases. In the aggregate, these excise tax effects are offsetting, and there is no aggregate effect on the price of consumption. Therefore, both models and empirical studies aim to estimate the extent to which the burden falls on wages rather than income from capital.

This convention does not mean there are no effects on corporate prices, and a recent statistical study found evidence of such effects.³ Rather it means that there is only an effect on relative prices, not absolute prices. If the money supply keeps price levels fixed, then corporate prices

¹ This analysis uses incidence, burden, and share interchangeably to mean the percentage of the corporate tax borne by either labor or capital.

² Arnold Harberger, "The Incidence of the Corporate Tax," *The Journal of Political Economy*, vol. 70, no. 3 (June 1962), pp. 215-240, <https://www.journals.uchicago.edu/doi/abs/10.1086/258636>.

³ See Scott R. Baker et al., *Corporate Taxes and Retail Prices*, National Bureau of Economic Research, Working Paper 27058, April 2020, <https://www.nber.org/papers/w27058>.

cannot go up unless noncorporate prices fall. If price levels are allowed to rise, aggregate inflation means that the purchasing power of consumption remains unchanged.

Although reduced form statistical estimates are alternatives to using a general equilibrium model, they are not subject to limits that result from the constraints on these models. In general, even in the model that yields the largest effects on wages, no more than 100% of the burden can fall on wages (as long as the corporate sector is not more capital intensive than the economy as a whole). Similarly, in rent-sharing studies, the burden cannot exceed the rent. Thus, empirical results can be assessed in part on whether the estimates are within these constraints.

General Equilibrium Models

The initial general equilibrium models featured a closed economy with a fixed capital stock. When global trade and capital flows became more important in the latter part of the 20th century, researchers developed general equilibrium models of an economy with international capital flows.

Closed Economy Models

For many years, corporate taxes were believed to fall on capital income, based on the 1962 Harberger model.⁴ The Harberger model contained two sectors, a corporate sector and a noncorporate sector, each producing a different product. Aggregate capital and labor were fixed. Capital and labor could move freely between these sectors. This model indicated that the corporate tax reduced the return to capital in general, and the effects on wages were uncertain in direction, but small. They depended on how easily capital and labor could be substituted in production in each sector and how readily corporate and noncorporate products could be substituted, as well as the relative importance of capital versus labor in each sector.

Open Economy Models

Several researchers have published estimated shares of the tax falling on wages using open economy models since the mid-1980s, including (in order of appearance) Mutti and Grubert (MG, 1985), Gravelle and Smetters (GS, 2006), Randolph (2006), and Harberger (2008).⁵ All of these models are essentially the same or similar multiple sector models modified to consider an open economy with trade with and capital investment in the rest of the world. Harberger characterizes his model as an “illustrative example,” and it is not based on calibrating his results to the U.S. economy.

⁴ Arnold Harberger, “The Incidence of the Corporate Tax,” *The Journal of Political Economy*, vol. 70, no. 3 (June 1962), pp. 215-240, <https://www.journals.uchicago.edu/doi/abs/10.1086/258636>.

⁵ John Mutti and Harry Grubert, “The Taxation of Capital Income in an Open Economy: The Importance of Resident–Nonresident Tax Treatment,” *Journal of Public Economics*, vol. 27, no. 3 (August 1985), pp. 291-309; Jane G. Gravelle and Kent A. Smetters, “Does the Open Economy Assumption Really Mean That Labor Bears the Burden of a Capital Income Tax?” *Advances in Economic Analysis and Policy*, vol. 6, no. 1, article 3 (August 2006), pp. 1-44; William C. Randolph, *International Burdens of the Corporate Income Tax*, Congressional Budget Office, Working Paper 2006-09, 2006; and Arnold C. Harberger, “Corporate Tax Incidence: Reflections on What is Known, Unknown, and Unknowable,” in *Fundamental Tax Reform: Issues, Choices, and Implications*, John W. Diamond and George R. Zodrow, eds. (MIT Press, 2008). Harberger had an earlier model, but this model measured the nominal and not the real effect on wages; see Arnold C. Harberger, “The ABCs of Corporate Tax Incidence: Insights into the Open-Economy Case,” in *Tax Policy and Economic Growth* (American Council for Capital Formation, 1995).

Determinants of the Corporate Income Tax Burden on Labor

A Congressional Budget Office study identified five main factors that affect the shares of the corporate tax burden that fall on labor and capital in these models:⁶

- Whether the country is a large country: The larger the country's share of world output, the smaller the share of the burden that falls on labor. All four models are modeling the United States, a large country.
- Whether the model allows for imperfect capital mobility across countries: Imperfect capital mobility reduces the burden on labor. MG and GS allow imperfect capital substitution.
- Whether the model allows for imperfect substitution between imports and domestic production: Imperfect product substitution reduces the burden on labor. MG and GS have imperfect product substitution. MG has a fixed degree of substitution. GS allow for different degrees of imperfect product substitution.
- The factor substitution elasticity (how easily labor and capital can be substituted in production): GS allow for some variation in this parameter; the remaining models rely on specific, and significantly different, values.
- Whether the corporate sector is more or less labor intensive than the noncorporate sector: A more labor-intensive corporate sector causes less of the burden to fall on labor. Three of the four models have a more labor-intensive corporate sector or one that is about the same as the noncorporate sector, while Harberger has a significantly less labor-intensive corporate sector.

To understand the basics of how an international model works, it is helpful to first imagine a small country that produces a single product with capital and a fixed amount of labor. Domestic products and imports are the same good and have the same worldwide price, and capital is completely mobile with a single after-tax return regardless of where it is invested. If a tax is imposed on capital income, the return to capital goes down and capital will be invested in other countries that still provide the original return. As capital leaves, the pretax return rises until the original after-tax return is restored. Because costs go up, the price of the domestic product would go up, but it cannot because the product can only be sold at the original price. The only way for the price to remain fixed is for the wage rate to fall. The full burden of the tax falls on labor.

However, as the assumptions that capital is perfectly mobile, products are perfectly substitutable, and the country is small are relaxed, more of the burden will fall on capital and less on labor. If capital is completely immobile, the burden will fall on capital income entirely, through a lower after-tax return. If capital is partially mobile, the tax will be shared between capital and labor. If the domestic product is not perfectly substitutable with imports, the relative price can rise as costs increase, so that the entire tax does not fall on wages. How much the share falls on labor now also depends on how easily capital can be substituted with labor. If the country is large, with perfect

⁶ Jennifer Gravelle in *Corporate Tax Incidence: Review of General Equilibrium and Analysis*, Congressional Budget Office Working Paper 2010-03, May 20, 2010, <https://www.cbo.gov/publication/21486>. A version of this paper was published in the *National Tax Journal*, vol. 66, no. 1 (March 2013), pp. 185-214. CBO referenced the 2010 study in their distributional analysis that assigned 25% of the burden to labor. See Congressional Budget Office, *The Distribution of Household Income and Federal Taxes, 2008 and 2009*, July 2012, <https://www.cbo.gov/sites/default/files/cbofiles/attachments/43373-06-11-HouseholdIncomeandFedTaxes.pdf>. This study, and the reasons for these factors driving the results, is also discussed in Paul Krugman, "The Gravelle Geardown," *The New York Times*, November 1, 2017. Referring to these papers, the five factors were identified as the drivers of incidence by Maxime Desmarais-Tremblay and Marianne Johnson, "On the 75th anniversary of Musgrave's Distribution of Tax Payments by Income Groups," *International Tax and Public Finance*, June 2026.

capital mobility and perfect product substitution, there is a worldwide after-tax return to capital at home and abroad, but the tax is large enough to affect worldwide returns, with the after-tax return falling. It can be shown that in this simple model with perfect substitution of capital and goods, capital will bear the share of the tax consistent with the share of worldwide capital in the large country. For example, if the large country has 30% of the capital, 30% of the tax will fall on capital and the remaining 70% on labor. If imperfect capital mobility and imperfect product substitution are allowed, the burden on labor will fall and the burden on capital will rise.

The purpose of the international model is to capture all these effects in a realistic model that matches the countries' capital stock, labor supply, and output, and includes multiple sectors, including sectors producing products that are nontradeable and noncorporate sectors that are not taxed. Thus, while this model is much more complex, it captures the effects of imperfect capital mobility, imperfect product substitution, and size in the world economy as described in this simpler model.

Comparison of Model Results

Table 1 compares the results of the various models with changes in assumptions for capital mobility, product substitution, and factor substitution. Having perfect (i.e., infinitely elastic) substitution of capital across countries and of products greatly simplifies this model, and the Randolph and Harberger models are not constructed to accommodate less-than-infinite elasticities. Thus, their estimates of the corporate tax incidence on labor tend to be large, although they differ significantly. Randolph finds labor bears 74% of the corporate tax burden, whereas Harberger finds that labor bears 130%.

Table 1. Share of Corporate Tax Falling on Labor in Four Models

Assump- tion	MG (1985) Factor Substitu- tion Elasticity 0.05 for Skilled and 0.6 for Unskilled	GS (2006): Factor Substitu- tion Elasticity 1.0	GS (2006): Factor Substitu- tion Elasticity 0.8	GS (2006): Factor Substitu- tion Elasticity 1.2	Randolph (2006) Factor Substitu- tion Elasticity 0.6	Harberger (2008) Factor Substitu- tion Elasticity 1.0
Perfect Capital Mobility and Product Substitution	NA	73	74	72	74	130
Perfect Capital Mobility, Product Substitution Elasticity 3.0	86	55	60	51	NA	NA
Capital Mobility Elasticity 3.0, Perfect Product Substitution	NA	28	33	23	NA	NA

Assumption	MG (1985) Factor Substitution Elasticity 0.05 for Skilled and 0.6 for Unskilled	GS (2006): Factor Substitution Elasticity 1.0	GS (2006): Factor Substitution Elasticity 0.8	GS (2006): Factor Substitution Elasticity 1.2	Randolph (2006) Factor Substitution Elasticity 0.6	Harberger (2008) Factor Substitution Elasticity 1.0
Capital Mobility Elasticity 3.0 Product Substitution Elasticity 3.0	74	21	27	16	NA	NA
Capital Mobility Elasticity 1.0 Product Substitution Elasticity 3.0	66	NA	NA	NA	NA	NA
Capital Mobility Elasticity 3.0, Product Substitution Elasticity 1.0	NA	3	13	0	NA	NA
Capital Mobility Elasticity 0.4 Product Substitution Elasticity 3.0	35	NA	NA	NA	NA	NA
Capital Mobility Elasticity 0.1, Product Substitution Elasticity 3.0	NA	3	3	0	NA	NA
Capital Mobility Elasticity 0.0, Product Substitution Elasticity 3.0	-0.3	NA	NA	NA	NA	NA

Source: See John Mutti and Harry Grubert, "The Taxation of Capital Income in an Open Economy: The Importance of Resident–Nonresident Tax Treatment," *Journal of Public Economics*, vol. 27, no. 3 (August 1985), pp. 291-309; Jane G. Gravelle and Kent A. Smetters, "Does the Open Economy Assumption Really Mean That Labor Bears the Burden of a Capital Income Tax?" *Advances in Economic Analysis and Policy*, vol. 6, no. 1, article 3 (August 2006), pp. 1-44; William C. Randolph, *International Burdens of the Corporate Income Tax*, Congressional Budget Office, Working Paper 2006-09, 2006; and Arnold C. Harberger, "Corporate Tax Incidence: Reflections on What is Known, Unknown, and Unknowable," in *Fundamental Tax Reform: Issues, Choices, and Implications*, John W. Diamond and George R. Zodrow, eds. (MIT Press, 2008). Harberger had an earlier model, but this model measured the nominal and not the real effect on wages; see Arnold C. Harberger, "The ABCs of Corporate Tax Incidence: Insights into the Open-Economy Case," in *Tax Policy and Economic Growth* (American Council for Capital Formation, 1995).

The first row shows the assumptions with respect to capital mobility and product substitution that produce the largest corporate tax burdens on labor. It reflects only the size of the United States, with about 70% of the burden falling on labor in the MG and GS models.

Harberger's example shows a burden on labor that is much larger than the other two models. This result is almost entirely due to his assuming that the manufacturing (corporate traded) sector is much more capital intensive than the economy as a whole, while the other models reflect observed ratios.⁷ It would appear, therefore, that Harberger's model is an illustration and does not estimate the burden on labor for the United States; the other two models are in agreement and the results are not very sensitive to the choice of factor substitution (1.0, 0.8, or 1.2 in the GS model and 0.6 in the Randolph). In these two models, under the assumptions that lead to the highest burden on labor, it is between 72% and 74%.

The second row of **Table 1** explores the effect of retaining perfect capital mobility but allowing a product substitution between imports and domestically produced goods of 3. (The product substitution elasticity is the percentage change in the ratio of domestic consumption to imports divided by the percentage change in price.) Making domestic products and imports imperfect substitutes has little effect on capital flows. Rather, it allows the price of the domestic corporate good to rise, which then does not require the tax to be completely absorbed by lowering wages. In the GS model, the share of the corporate tax burden falling on labor declines from about 74% to 60% with a 0.8 factor substitution elasticity, 55% with the unitary elasticity, and 51% with a 1.2 elasticity.

The MG model finds a significantly higher share of the corporate tax falling on labor, 86%. This difference is due to the low factor substitution elasticities, especially the extremely low elasticity with respect to skilled labor of 0.05. If capital falls as the result of a tax increase, then skilled labor must fall almost as much, so there is a significant reduction in demand for skilled labor, and thus a significant decline in wages. This effect both limits the outflow of capital and causes most of the burden to fall on labor. (MG assume an elasticity of 0.6 for unskilled labor and capital.⁸)

The third row explores the effect of retaining perfect product substitutability while allowing imperfect capital mobility. The capital substitution elasticity (the percentage change in the ratio of domestic to foreign capital invested in each country divided by the percentage change in the ratio

⁷ See the discussion of Harberger's article by Jane G. Gravelle, "Discussion," *Fundamental Tax Reform: Issues, Choices, and Implications*, John W. Diamond and George R. Zodrow, eds., (MIT Press, 2008). The current corporate sector is estimated to have about half of the work force, based on Table 1.13 of the National Income and Product Accounts (NIPA: <https://www.bea.gov/products/national-income-and-product-accounts>) for the share of private sector wages, with wages increased by 75% of noncorporate income (assuming that is the share of labor income of the owners' earnings). The share was also adjusted to exclude Subchapter S corporations that are not subject to the corporate tax based on the share of wages and earnings on Subchapter S returns in IRS data compared to C Corporations, Tables 2.3 and 2.4, <https://www.irs.gov/statistics/soi-tax-stats-corporation-income-tax-returns-complete-report-publication-16>. Corporations account for about a third of the capital stock, based on Table 1.6 of Fixed Assets, NIPA, after adjusting for Subchapter S Corporations.

⁸ Almost all estimates of the substitution elasticity are with respect to aggregate labor, in part because of the challenges of separately estimating the parameters for skilled and unskilled labor. A review of a broad range of studies (a meta-analysis) suggests an aggregate elasticity between 0.6 and 0.7 for the United States. See Michael Knoblach, et al., *The Elasticity of Factor Substitution Between Capital and Labor in the U.S. Economy: A Meta-Regression Analysis*, September 2016, https://www.econstor.eu/bitstream/10419/146770/1/CEPIE_WP_03_2016.pdf. One study suggests that there is a downward bias to estimates using common techniques due to simultaneity problems. It found that using an alternate estimate raised the elasticity from 0.6 to 1.5. See Thomas Von Brasch et al., *Identifying The Elasticity Of Substitution Between Capital and Labour: A Pooled GMM Panel Estimator*, ZBW, Discussion Paper 976, 2022. About half of workers earn hourly wages. See U.S. Bureau of Labor Statistics, "Characteristics of Minimum Wage Workers, 2023," <https://www.bls.gov/opub/reports/minimum-wage/2023/#:~:text=In%202023%2C%2080.5%20million%20workers,all%20wage%20and%20salary%20workers>.

of after-tax return) is 3. This imperfect capital mobility reduces capital outflows and limits the rise in pretax profits to offset the tax for capital. Imperfect capital mobility is a more important factor in reducing the burden on labor, leading to shares of 23% to 33%.

The fourth row shows the effects of both imperfect capital mobility and imperfect product substitution (with elasticities set at 3), with a labor share in the GS model of 16% to 27%. Again, the MG model shows a much higher burden on labor of 74% due to the low substitution elasticity between capital and skilled labor.

The remaining rows show how lowering the substitution elasticities further reduces the share of the tax falling on labor.

While the size of the economy and relative factor intensity can be observed, the results also depend on the three substitution elasticities: factor substitution, product substitution, and portfolio substitution. The following sections examine the empirical evidence for those values.

Factor Substitution Elasticities

Historically, the factor substitution elasticity was generally considered to be 1.0 based on the consistent shares of capital and labor income in the economy over time. However, empirical studies have found different values. A recent meta-analysis (one that combines numerous studies and estimates) indicates elasticities of around 0.6 and 0.7.⁹ However, one recent study indicates that the econometric techniques used tend to bias the results downward.¹⁰ That study suggests that the factor substitution elasticity may be above 1.0.

MG's assumptions of a 0.05 elasticity for skilled labor and a 0.6 elasticity for unskilled labor suggest an aggregate elasticity of around 0.3.¹¹ MG reference a review of the estimates of substitution elasticities by Hamermesh and Grant, but that study reports a wide range of substitution elasticities between skilled workers and capital, and the values used in the MG simulations appear to come from a relatively low estimate by Grant.¹² Recent studies, as well as other studies cited by Hamermesh and Grant, find much higher factor substitution elasticities. Krusell et al. estimate an elasticity of 0.67 for skilled labor and 1.67 for unskilled labor, which suggests an overall elasticity of 1.2, consistent with traditional aggregate elasticities.¹³

⁹ See Michael Knoblach, et al., *The Elasticity of Factor Substitution Between Capital and Labor in the U.S. Economy: A Meta-Regression Analysis*, September 2016, https://www.econstor.eu/bitstream/10419/146770/1/CEPIE_WP_03_2016.pdf.

¹⁰ Thomas Von Brasch et al., *Identifying The Elasticity Of Substitution Between Capital and Labour: A Pooled GMM Panel Estimator*, Discussion Paper 976, ZBW, 2022, <https://www.econstor.eu/bitstream/10419/268052/1/1796245917.pdf>. In an artificially constructed dataset where the substitution elasticity is set at 1.5, the standard estimator yielded an estimate of 0.6.

¹¹ About half of workers earn hourly wages, and these two values average to about 0.3. See U.S. Bureau of Labor Statistics, "Characteristics of Minimum Wage Workers, 2023," <https://www.bls.gov/opub/reports/minimum-wage/2023/#:~:text=In%202023%2C%2080.5%20million%20workers,all%20wage%20and%20salary%20workers>.

¹² Daniel S. Hamermesh and James Grant, "Econometric Studies of Labor-Labor Substitution and Their Implications for Policy," *The Journal of Human Resources*, vol. 14, no.4 (Autumn 1979), pp. 518-542. The assumptions appear to come from the Grant study in Table 3.

¹³ Per Krusell et al., "Capital Skill Complementary and Inequality: A Macroeconomic Analysis," *Econometrica*, vol. 68, no. 5 (September 2000), pp. 1029-1053, <http://piketty.pse.ens.fr/files/KrusellEtal00.pdf>.

Product Substitution Elasticities

A meta-analysis found a median elasticity of 3, but reduced this to 2 after correcting for publication bias.¹⁴ A subsequent version, which also addressed study quality, estimated a median of 3.8.¹⁵ Another review found elasticities from individual studies using different approaches ranging from 1 to 6.5, with more recent studies ranging from 2 to 4.¹⁶

Capital Mobility Elasticities

A meta-analysis of the elasticity of substitution of foreign direct investment found a median semi-elasticity (elasticity with respect to a percentage point rate change) of 3.2.¹⁷ Because elasticities are with respect to the after-tax return, this number should be multiplied by $(1-t)$, where t is the tax rate. Given a tax rate around 25%, the elasticity would be about 2.5 when expressed as a percentage change in the ratio of domestic to foreign assets divided by the percentage change in the ratio of the rate of return to domestic foreign investment. This provision operates through a reduction in capital flow. An elasticity of 3 reduces the outflow of capital by about two-thirds compared to perfect capital mobility, according to results in the GS model.

Implications for Model Estimates

What matters in the estimates of incidence from general equilibrium models is the measurement of elasticities. The measurements presented in this report on elasticities indicate product and portfolio elasticities of around 3 and factor substitution elasticities of around 1, suggesting that labor bears about 20% of the corporate tax burden.

Reasons Burdens on Labor May Be Lower Than Modelled

There are some additional reasons not incorporated in the models that the burden on labor is likely to be lower than the models predict. The first is debt finance. A corporate tax subsidizes debt because it allows the deduction of nominal interest. Thus, a corporate tax rate increase makes equity capital less attractive and debt more attractive. If debt is more mobile than equity, then a rate increase could attract more capital to the United States. In another study, Grubert and Mutti show that this result can occur.¹⁸ In this case, labor would gain from a corporate rate increase.

The second is that the tax rate on foreign source income is related to the tax rate on domestic income because the United States imposes a residual tax when foreign taxes are lower than the U.S. tax rate imposed on foreign source income. For a variety of reasons, these mechanisms do

¹⁴ Josef Bajzik et al. *The Elasticity of Substitution Between Domestic and Foreign Goods: A Quantitative Survey*, Czech National Bank, Research and Statistics, Department, Working Paper 2019/12, <https://ideas.repec.org/p/cnb/wpaper/2019-12.html>.

¹⁵ Josef Bajzik et al., "Estimating The Armington Elasticity: The Importance Of Study Design and Publication Bias," *Journal of International Economics*, vol. 127 (November 2020), <https://www.sciencedirect.com/science/article/abs/pii/S0022199620300982#:~:text=Highlights,Our%20main%20results%20are%20threefold>.

¹⁶ Saad Ahmad et al., *A Comparison Of Armington Elasticities In the Trade Literature*, U.S. International Trade Commission, Working Paper 2020-04-A, April 2020, https://www.usitc.gov/publications/332/working_papers/ahmad_schreiber_montgomery_4-21-2020.pdf.

¹⁷ Ruud de Mooij and Sjef Ederveen, "Taxation and Foreign Direct Investment: A Synthesis of Empirical Research," *International Tax and Public Finance*, vol. 10 (2003), pp. 673-693.

¹⁸ Harry Grubert and John Mutti, "International Aspects of Corporate Tax Integration: The Role of Debt and Equity Flows," *National Tax Journal*, vo. 47, no. 1 (March 1994), pp. 111-133.

not work perfectly, but they move in the direction of reducing the incentive for outbound investment, which would limit the reduction in the capital stock.

The third is that some portion of profit may be excess profits, and if the tax on those profits is not shared with workers, the burden will fall on stockholders and the burden on labor will decrease. Although some empirical studies discussed below find that workers share in rent, the studies are probably not as relevant to the United States, which has a small share of workers in labor unions, a point made in Azémar and Hubbard's cross-country rent-sharing study.¹⁹ In general, estimates suggest that rent is probably no more than 20% of corporate profits (also discussed below). If so, then any labor income share would be multiplied by 0.8, and based on labor bearing 20% of the corporate tax burden in the models, it would bear about 15% of the burden.

The models also assume that the only feature that changes is the domestic tax rate. If each country calculates incidence only with respect to its own tax rate, then the totals of the burden will not add up: as a closed economy, worldwide capital bears the full burden of the corporate tax. If the U.S. tax falls, the fall in U.S. labor income is matched by a rise in foreign labor income with a net effect of zero, and vice versa. Thus, while such a model may be used to estimate the incidence of a change in the corporate tax rate, the total burden of the corporate tax that falls on labor is smaller, as it should only apply to the excess of the U.S. tax rate over the weighted average of foreign taxes. Using Organisation for Economic Co-operation and Development (OECD) tax rates prior to the 2017 U.S. rate reduction, one study found that labor's share would fall by 75% if considering only the excess of the U.S. tax rate over average worldwide rates.²⁰

Reasons Burdens May Be Higher Than Suggested by The Evidence on Elasticities

One reason that the share of the burden falling on labor may be higher than the relatively small share suggested by the elasticities is that the estimates of underlying elasticities may be overstated due to relying on methods that estimate short-term effects, while long-term effects may be larger given adjustment time. In addition, the models have a high level of aggregation, so there may be adjustments within these aggregated levels that are not captured. Thirdly, they do not account for differences in quality that could lead to understatement of elasticities in the case of product substitution elasticities.²¹ As shown in **Table 1**, the share of the burden falling on labor can rise with higher portfolio and product substitution elasticities.

What The Models Generally Indicate

Beyond pointing to an estimate that the share of the tax falling on labor is small, the models' basic findings and the additional caveats suggest that the models can provide a constraint on reasonable values of the share of the burden falling on labor.

Agencies that assess corporate incidence for purposes of distributional analysis, including the Congressional Budget Office and the Joint Committee on Taxation, appear to concur with these

¹⁹ Céline Azémar and Glenn Hubbard, "Country Characteristics and the Incidence of Capital Income Taxes on Wages: An Empirical Assessment," *Canadian Journal of Economics*, vol. 48, no. 5 (December 2015), pp. 1762-1802.

²⁰ This point is made in Jennifer Gravelle, *Corporate Tax Incidence: Review of General Equilibrium and Analysis*. Note that this calculation applies only to pre-2018 corporate tax rates, as the U.S. rate was lowered from 35% to 21% in 2018.

²¹ For a discussion of some of these issues relating to product substitution elasticities, see Thomas Hertel et al., "How Confident Can We Be in CGE-Based Assessments of Free Trade Agreements," Purdue University, 2007, <https://docs.lib.purdue.edu/gtapwp/26/>.

general findings in their analyses. The basic method in their calculations is to use general equilibrium models and assign a relatively smaller share of the tax burden to labor income.²²

Reduced Form Empirical Studies of Corporate Incidence

Reduced form statistical estimates (regressing wages on tax rates) fall into two categories: those that derive estimates from investment flows and those that derive estimates from rent sharing.

In general, studies that estimate the effects of capital flows tend to use cross-section panel data, following effects in different countries or subnational jurisdictions as tax rates change. Studies that follow changes over time across firms in a single jurisdiction are generally aimed at rent sharing.

A number of these studies have drawn considerable policy attention due to their apparently robust results, at least under the form and statistical test parameters in their original publication, indicating that corporate tax burdens fall largely on labor. However, certain aspects of the design of these studies and the magnitude of the results (being large enough to suggest that they are not generally applicable given real-world economic measurements) could raise questions about the precise statistical accuracy of the estimates, as discussed in more detail below. Nevertheless, the consistency of the direction of findings (though the magnitude varies) has made the studies influential, as they seem to indicate that labor bears a large share of the burden of corporate taxes.

Studies Estimating Effects From Investment Flows

The Hassett and Mathur Study

The first study of the incidence from capital flows was by Hassett and Mathur (originally released as a working paper in 2006, subsequently updated in 2010 and published in 2015). This study was referenced in both the 2007 and 2017 corporate tax debates and remains among the most cited studies of this topic.²³ Since its release and throughout its development, the study has been influential and referenced by Administration officials, in the popular press, and by other researchers, and is seen as the seminal paper on cross-country studies of corporate tax incidence.²⁴ Its results at each stage and how those results changed between subsequent

²² See Congressional Budget Office, *The Distribution of Household Income and Federal Taxes, 2008 and 2009*, July 2012, <https://www.cbo.gov/sites/default/files/cbofiles/attachments/43373-06-11-HouseholdIncomeandFedTaxes.pdf>, and Joint Committee on Taxation, *Modeling The Distribution Of Taxes On Business Income*, JCX-14-13, October 16, 2013. Both agencies assign 25% of the tax to labor and 75% to capital. The Treasury Department's methodology is also based on general equilibrium models, although it allocates a significant share to excess returns; overall 18% falls on labor. See Julie-Anne Cronin et al., "Distributing the Corporate Income Tax: Revised U.S. Treasury Methodology," *National Tax Journal*, March 2013, vol. 66, no. 1, pp. 239-262. CBO also did an assessment of the statistical studies at that time: Jennifer Gravelle, *Corporate Tax Incidence: A Review of Empirical Estimates and Analysis*, CBO, Working Paper 2011-01, June 14, 2011, <https://www.cbo.gov/publication/41511>. This paper also raised issues with these studies and was not referenced by CBO in its explanation of corporate incidence assumptions.

²³ Kevin A. Hassett and Aparna Mathur, *Taxes and Wages*, American Enterprise Institute, working paper, March 6, 2006, presented at a conference of the American Enterprise Institute on May 2, 2006.

²⁴ For example, this paper was referenced by R. Glenn Hubbard, former chairman of the Council of Economic Advisers, in "The Corporate Tax Myth," *The Wall Street Journal*, July 26, 2007 (also on the American Enterprise Institute's website at <https://www.aei.org/commentary/the-corporate-tax-myth-2/>). The paper continues to be referenced. It was extensively discussed in Benjamin H. Harris, "Corporate Tax Incidence and Its Implications for (continued...)"

adjustments inform the evaluation of the study and provide context on the evolution of the literature in this area since its original publication.

The study used data from 72 developed and developing countries for the 1981-2003 period. For the analysis, the dependent variable was the logarithm of the five-year average of the average manufacturing wage. They converted the wage rates for all countries to U.S. dollars using annual exchange rates. The main explanatory variable of interest was the logarithm of the top corporate tax rate, and the average effective and marginal effective corporate tax rates (in logarithms) were also used as explanatory variables in some specifications.

The study found a statistically significant result that indicates a 1% increase in the corporate tax rate causes manufacturing wages to fall by 0.8% to 1%. However, corporate taxes are about 2.5% of GDP at most, whereas labor income is about two-thirds. These results imply that a dollar increase in the corporate tax would decrease wages by \$22 to \$26, an effect larger than those estimated by general equilibrium models, which tend to top out at around \$1.²⁵ Researchers noted that these initial results may be explained by certain statistical issues.²⁶

Hassett and Mathur subsequently produced a revision of their initial paper that incorporated changes related to issues that had been raised.²⁷ One potential source of difficulty with cross-country wage studies is that a proper specification should take into account not only the tax rate in the country being studied, but the rates of other countries. Hassett and Mathur addressed this issue, in part, by adding tax characteristics of neighboring or economically similar countries. In some cases, this addition reduced the coefficient on taxes and made it statistically significant at a lower level. The study also included some local price indices, but did not fully address the issue

Progressivity,” Urban-Brookings Tax Policy, Center, November 2009, <https://taxpolicycenter.org/sites/default/files/alfresco/publication-pdfs/1001349-Corporate-Tax-Incidence-and-Its-Implications-for-Progressivity.PDF>; listed in Tax Foundation, “Studies on Business Taxes,” May 15, 2012, <https://taxfoundation.org/blog/studies-business-taxes/>; and discussed in Chye-Ching Huang and Brandon DeBot, “Corporate Tax Cuts Skew to Shareholders and CEOs, Not Workers as Administration Claims,” Center on Budget and Policy Priorities, August 16, 2017, <https://www.cbpp.org/research/federal-tax/corporate-tax-cuts-skew-to-shareholders-and-ceos-not-workers-as-administration>. The post on Repec of the paper reports 37 citations in the literature, see <https://ideas.repec.org/p/aei/rpaper/49824.html>.

²⁵ To convert an elasticity into an incidence measure, the coefficient should be multiplied by the ratio of labor income to the corporate tax. Two other studies using cross-country data have examined the incidence of the tax on labor income. Rachel Alison Felix, *Passing the Burden: Corporate Tax Incidence in Open Economies*, November 2006, finds smaller effects than Hassett and Mathur, but ones that are still too large to be predicted by a theoretical model. This study does not control for country fixed effects and thus may capture the cross-country wage differences that are not associated with corporate tax.

²⁶ For example, a 2007 CRS report reanalyzed the results to address concerns that some had raised regarding whether (1) the dependent variable, the wage, reflected exchange rates rather than purchasing power; (2) by using price indexes, the study measured nominal rather than real wages; and (3) some of the averages did not cover the full five years. When these changes were made, the estimated effect on wages was smaller and not statistically significantly different from zero. For the most recent version of this report, see CRS Report RL34229, *Corporate Tax Reform: Issues for Congress*, by Jane G. Gravelle. Data were provided by Kevin Hassett and Aparna Mathur. The reanalysis also addressed the computation of five-year averages of wage rates—some averages were based on six years of data and others were based on less than five years of data—so that each five-year period for each country contains five years of data. The difference was due to missing values in the wage series; most of the missing values were in the 2001 to 2005 period.

²⁷ Kevin A. Hassett and Aparna Mathur, *Spatial Tax Competition and Domestic Wages*, December 2010, <http://www.aei.org/docLib/SpatialTaxCompetitionandDomesticWages.pdf>. A version of this paper was published as Kevin A. Hassett and Aparna Mathur, “A Spatial Model of Corporate Tax Incidence,” *Applied Economics*, vol. 47, no. 3 (2015), pp. 1350-1365.

of comparing wages using purchasing power. The revised paper continued to produce large estimates, indicating a decrease of \$13 in wages for each dollar of increase in corporate taxes.²⁸

Other Cross-Country Studies of General Corporate Income Tax Burden

Four other notable studies have relied on cross-country data. In a study that controls for education, Felix (2006) finds much smaller effects than the Hassett-Mathur study, but they are still large relative to model estimates (about \$4 for each dollar of corporate tax revenue).²⁹ This study similarly has methodological issues related to specification and direction of causation, and does not control for country fixed effects. The lack of fixed effects (for country and time period) may render the finding statistically biased (the estimate differs from the true measure) and inconsistent (increasing the number of observations will not improve the estimate). The sample is a factor to examine as well, with 19 countries covered for varying years. Out of the total of 65 observations (countries and years), about a quarter of the sample is drawn from Italy and Mexico, and 7 of the 19 countries had one or two years of data.

Desai et al. (2007) use observations on foreign-owned affiliates of U.S. firms across countries and in different time periods.³⁰ This study uses data on multinational subsidiaries of U.S. firms to estimate the allocation of the tax burden between labor and capital using a seemingly unrelated regression for capital income (which they measure by the interest rate) and labor income. In their model, labor and capital burdens are restricted to the total of taxes, and they impose a cross-equation restriction on the estimated burdens. They find the share of the burden on labor income to fall between about 45% and 75% of the total.

This approach, however, has a fundamental theoretical issue in that wages at an individual firm should not reflect tax burdens at an individual firm in general equilibrium. In deriving a model that assumes this is true, the study assumes that the price level of its goods is fixed and bases its results only on its sample of multinational corporate sector firms. This approach creates econometric problems in the study's analysis and means that the results cannot be construed as reflecting actual burdens in any of its economies, as discussed, along with an indication that without the cross-equation restriction, the results are not statistically significant.³¹

A cross-country study by Clausing (2012) used a dataset covering the OECD countries.³² This study examined different specifications, econometric approaches, and alternative data measurements. It differed from the Hassett-Mathur study by comparing wages using purchasing power parity and excluding value-added variables, which Clausing suggests captures the effect of corporate taxes (whose burden on labor operates by reducing labor productivity). She expected this latter change would make results for the corporate tax variable larger. Clausing tried many specifications and approaches, and she characterized the overall results as indicating no robust evidence that corporate tax burdens have large depressing effects on wages. She noted, however,

²⁸ The authors indicate that the fall in wages is \$4. However, they calculate this incidence with the ratio of wages to taxes in the manufacturing sector, which is much smaller. Effects of the corporate tax on wages are, however, economy-wide effects that should lower wages in the other sectors, including noncorporate sectors.

²⁹ Rachael Alison Felix, *Passing the Burden: Corporate Tax Incidence in Open Economies*, November 2006. This paper was a dissertation essay at the University of Michigan.

³⁰ Mihir A. Desai et al., *Labor and Capital Shares of the Corporate Tax Burden: International Evidence*, prepared for the International Tax Policy Forum and Urban-Brookings Tax Policy Center conference on Who Pays the Corporate Tax in an Open Economy?, December 18, 2007.

³¹ See CRS Report RL34229, *Corporate Tax Reform: Issues for Congress*, by Jane G. Gravelle, for a mathematical explanation.

³² Kimberly A. Clausing, "In Search of Corporate Tax Incidence," *Tax Law Review*, vol. 65, no.3 (2012), pp. 433-472, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1974217.

that this outcome does not necessarily mean there is no incidence on labor, but that these effects cannot be detected with aggregate cross-country data.

A study by Exbrayat and Geys (2016) estimates a model that allows for countries to compensate for high labor costs by reducing the corporate tax. Their estimates, using 24 OECD countries, indicate that a 1% increase in the corporate tax rate reduces the average wage by \$0.51 to \$0.89, implying a \$6 to \$11 decrease in wages for a dollar increase in the corporate tax.³³

Cross-State Regressions

Seven studies have estimated tax incidence based on cross-state or other subnational government levels, as if each state were a separate country. Most of these studies found more than 100% incidence once elasticities were converted to measures of incidence.

Felix (2009) examined wages by residents of states depending, among other factors, on the state corporate tax rates.³⁴ This study found a smaller effect than her earlier one, suggesting that a \$1 increase in taxes reduces wages by between \$1.40 and \$3.60. Her dataset is not a panel, so there is no individual state-specific control, and it does not allow for the identification of place of work, but rather place of residence.

Felix and Hines (2009) use a similar cross-state dataset.³⁵ Although the stated objective of this study is to examine rent sharing by considering union and nonunion differentials, the paper also contains direct estimates of corporate tax rates' effects on wages. The relationships, however, are positive, not negative. Although the authors conclude that higher corporate tax rates reduce union wage differentials (a point associated with bargaining over surplus, discussed in the next section), this differential arises in their empirical estimates because union wages rise less with corporate taxes than nonunion wages.

Carroll (2009) also examines individual workers across states using a different dataset. This study estimates the effects of the statutory rate (combined federal and state) and an average state tax rate.³⁶ The first is only marginally statistically significant (and he does not highlight that result), but the second is highly significant. However, it measures average tax rate not as taxes divided by profits but as taxes divided by personal income. Because personal income is strongly correlated with wages, this measure of tax would likely produce a powerful negative relationship without any direct relationship with taxes. As with other studies, the incidence estimated in this study is large (he calculates \$2.50 for every dollar of tax).

A study of subnational taxes in Germany by Bauer et al. (2012) found a significant corporate tax effect on wages.³⁷ This study was similar to the cross-state studies done in the United States in that the explanatory variable was the tax rate. But it also addressed rent sharing by examining the differences between low-skilled workers with less bargaining power. Bauer et al. found that a 1% increase in tax rate decreased wages by between 0.28% and 0.46%. Although the incidence was

³³ Nelly Exbrayat and Benny Geys, "Economic Integration, Corporate Tax Incidence and Fiscal Compensation," *The World Economy*, vol. 39, no. 11 (November 2016), pp. 1792-1811. For a semi-elastic estimate, the coefficient should be multiplied by labor income and divided by the tax and the average wage.

³⁴ R. Alison Felix, "Do State Corporate Income Taxes Reduce Wages?," *Economic Review*, Federal Reserve Bank of Kansas City, vol. 94, no. 9 (2009).

³⁵ R. Alison Felix and James R. Hines, *Corporate Taxes and Union Wages in the United States*, National Bureau of Economic Research, Working Paper no. 15263, August 2009.

³⁶ Robert Carroll, *Corporate Taxes and Wages: Evidence from the 50 States*, Tax Foundation, Working Paper no. 8, August 2009, <https://files.taxfoundation.org/legacy/docs/wp8.pdf>.

³⁷ Thomas K. Bauer et al., *Business Taxation and Wages: Evidence from Individual Panel Data*, Institute for the Study of Labor, Discussion Paper 6717, July 2012, <http://ftp.iza.org/dp6717.pdf>.

not as large as other results, using the same ratio of wages to taxes as the aus dem Moore et al. (2000) study (discussed subsequently)³⁸ indicated a dollar of corporate tax reduced wages between \$3.36 and \$5.52.

States often allocate profits based on formulas, and these formulas change the dynamics of capital flows. For example, if a firm's taxes are based on the share of sales, changing the location of production would not be relevant to the state tax burden. A study by Suárez Serrato and Zidar (2016) explicitly addressed the apportionment issue by controlling for the share of the tax that was based on a sales factor (other factors are capital and labor) and thus should not affect location.³⁹ The study also used a spatial approach to address geographic location. It found 30% to 35% of the tax borne by labor, a finding more aligned with outcomes predicted by models.

Several other studies examined effects by comparing subnational governments. Ebrahimi and Vaillancourt (2016) used differences in Canadian federal tax rates across the provinces over time and found elasticities of the wage rate with respect to the tax rate of 0.15 and 0.24; they imply a wage reduction of \$4.20 to \$6.72 for every dollar of corporate tax.⁴⁰ A study by McKenzie and Ferede (2017) of the Canadian provinces did not control for the effect of formula apportionment (Canadian provincial taxes are levied 50% by sales and 50% by wages). This study found a wage reduction of \$0.96 to \$1.59 for every dollar of corporate tax, depending on the province.⁴¹ Ljungqvist and Smolyansky (2018) used a spatial approach and estimated a semi-elasticity of -0.3 using data across states, which indicates about 70% of the tax was borne by labor.⁴² Bauer et al. (2017) estimate the burden on labor, based on variation in taxes across German municipalities, at 65% to 93% of the tax.⁴³

One issue with cross-state studies is whether the results can provide guidance to the effects of the federal tax. Capital is likely significantly more mobile across states than across countries, and products across states are probably closer substitutes, both factors that make the incidence more likely to fall on labor. Labor, however, is also mobile, but its relative increase in mobility is

³⁸ Nils aus dem Moore et al., *Do Wages Rise When Corporate Tax Rates Fall? Evidence from the German Business Tax Reform 2000*, January 11, 2011. An updated version of this working paper for 2014 found a larger effect in the long run, see Ruhr Economic papers, no. 532, at <https://www.econstor.eu/bitstream/10419/107692/1/819623113.pdf>.

³⁹ Juan Carlos Suárez Serrato and Owen Zidar, "Who Benefits from State Corporate Tax Cuts? A Local Labor Markets Approach with Heterogeneous Firms," *American Economic Review*, vol. 109, no. 9 (September 2016), pp. 2582-2624. Subsequent developments of the model have yielded similar incidence results. See Clément Malgouyres et al., "Who Benefits from State Corporate Tax Cuts? A Local Labor Markets Approach with Heterogeneous Firms: Comment," *American Economic Review*, vol. 113, no. 8 (2023), pp. 2270-86; Juan Carlos Suárez Serrato and Owen Zidar, "Who Benefits from State Corporate Tax Cuts? A Local Labor Markets Approach with Heterogeneous Firms: Reply," *American Economic Review*, vol. 113, no. 12 (2023), pp. 3401-10; and Juan Carlos Suárez Serrato and Owen Zidar, "Who Benefits from State Corporate Tax Cuts? A Local Labor Market Approach with Heterogeneous Firms: Further Results," *American Economic Review*, vol. 114, no. 9 (May 2024), pp. 358-363.

⁴⁰ Pouya Ebrahimi and François Vaillancourt, *The Effect of Corporate Income and Payroll Taxes on the Wages of Canadian Workers*, The Fraser Institute, January 2016, <https://www.fraserinstitute.org/sites/default/files/effect-of-corporate-income-and-payroll-taxes-on-wages-of-canadian-workers.pdf>.

⁴¹ Kenneth J. McKenzie and Ergete Ferede, *The Incidence of the Corporate Income Tax on Wages: Evidence from Canadian Provinces*, April 2017, http://econ.ucalgary.ca/manageprofile/sites/econ.ucalgary.ca/manageprofile/files/unitis/publications/1-7833135/UCWP_04_2017.pdf.

⁴² Alexander Ljungqvist and Michael Smolyansky, *To Cut or Not to Cut? On the Impact of Corporate Taxes on Employment and Income*, National Bureau of Economic Research, Working Paper 20753, October 2018, https://www.nber.org/system/files/working_papers/w20753/w20753.pdf. The elasticity was a semi-elasticity with respect to the tax rate, which means the coefficient should be multiplied by the ratio of labor income to capital income, or about 0.7/0.3.

⁴³ Thomas K. Bauer et al., *Business Taxation and Wages: Redistribution and Symmetric Effects*, MAGKS Joint Discussion Paper Series in Economics, no. 32-2017, Philipps-University Marburg, School of Business and Economics, 2017.

probably less than that of capital. The states are also more like small economies on average. As in the case of cross-country studies, the tax rates of other states should be included in the regression. In addition, studies that use state corporate tax rates deal with much lower rates than the federal tax rate, and it would be more difficult to use this small explanatory variable to explain wages.

Rent Sharing Studies Through Bargaining

Rent sharing studies can be divided into two basic types. The first, called *bargaining models*, are primarily done in European countries or multiple countries and estimate sharing of corporate tax burdens on rents (or excess profits) with workers through bargaining, usually with labor unions. More recently, *rent extraction* studies have considered the shares of the corporate tax that might fall on executives and highly paid workers.

A number of studies discuss the potential burden of the corporate tax on wages via bargaining. Some in the press have conflated these with studies where effects on wages arise from investment flows.

Arulampalam et al., Azémar and Hubbard, and other studies of this nature do not estimate the general equilibrium effects of corporate taxes on economy-wide wages through capital flows, but rather the share of the tax on excess profits that falls on workers due to bargaining and rent sharing, as do the other studies reviewed in this section. These rent-sharing studies have relatively little relevance to the general issue of the corporate income tax for the United States (in part because the share of U.S. workers who belong to unions that bargain on wages is small). However, their results have been invoked as evidence of the general corporate tax burden falling on labor. The Arulampalam et al. study has apparently inspired several other studies of this nature, which are discussed in the following sections. These studies use individual firm or sector observations, which are not directly applicable to the general equilibrium incidence of the corporate tax, but are appropriate for the study of rent sharing.

Before proceeding to examine both the Arulampalam et al. study and other studies specifically, it is important to make some general points about these types of studies as measures of the share of the corporate tax borne by labor.

The Limits to Shares Falling on Labor From Rent Sharing

Unlike the studies of investment flows, the general applicability of these studies cannot be examined using a general equilibrium model. Rather, the share cannot be interpreted as the share of total tax falling on wages because the analysis relates only to excess profits, which are in turn only a part (and perhaps a small one) of total profits. The share of rents also suggests an upper boundary to the share of the tax that falls on labor, which should be detected through these studies. A widely cited study by Gentry and Hubbard estimated that 60% of corporate profits represented earnings in excess of a risk-free return.⁴⁴ This measure is assumed to reflect rent or excess profits by the Treasury Department and the Urban-Brookings Tax Policy Center, who in turn assign the incidence to shareholders. However, because some (perhaps most) of the profit above a risk-free return is a risk premium and is part of the opportunity cost of capital (not excess profit), the excess profit share should be lower. Some evidence suggests that it is in the neighborhood of 10% to 20%.⁴⁵ Since workers can receive no more than 100% of rents, the limit

⁴⁴ William M. Gentry and R. Glenn Hubbard, "Distributional Implications of Introducing a Broad-Based Consumption Tax," *Tax Policy and the Economy*, vol. 11 (1997), pp. 1-47.

⁴⁵ Jennifer Gravelle, *Corporate Tax Incidence with Excess Profits*, presented at the Proceedings of the National Tax (continued...)

to the share of a tax change falling on workers is about 20%. Every empirical study discussed in this section exceeds that level, with the smallest finding about 35% and the largest many multiples of 100%. The burden relates only to those firms that both have some excess profits and engage in bargaining. Whereas bargaining may be common in some European countries, in the United States, where unions would be expected to do the bargaining, less than 7% of private wage and salary workers are covered by unions.⁴⁶

Second, an existing literature has attempted to estimate the labor share of excess profits (without focusing on tax issues). Most studies have found that, even in those circumstances where bargaining is to be expected, labor tends to capture a relatively small share, typically found to be less than 10% and rarely more than 20% or 30%.⁴⁷ This small share suggests the amount of labor income due to rent sharing is small, no more than 6% (20% times 30%). In the United States, where the share of workers in unions is 7%, the overall share in the economy is less than one-half of 1% (7% times 6%).

Association Conference, 2015, <https://www.ntanet.org/wp-content/uploads/proceedings/2015/160-gravelle-corporate-tax-incidence-effect.pdf>. A much earlier estimate of the excess profits on manufacturing seems consistent with a small magnitude, as the authors found a q value (stock market value relative to replacement value of capital) of 1.28, which implies a rent share of 22% ($0.28/1.28$). The authors suggest that this value is too high because the capital stock does not include intangible capital. See Lawrence F. Katz and Lawrence H. Summers, *Industry Rents: Evidence and Implications*, Brookings Papers: Microeconomics, 1989, pp. 209-290, at https://www.brookings.edu/wp-content/uploads/1989/01/1989_bpeamicro_katz.pdf. Two recent studies find similar magnitudes. Simcha Barkai estimates a share of 24%, which would be smaller if estimates were adjusted to include missing intangible assets. See Simcha Barkai, "Declining Labor and Capital Shares," *The Journal of Finance*, vol. 75, no. 5 (October 2020), pp. 2421-2462, <https://onlinelibrary.wiley.com/doi/10.1111/jofi.12909>. Lamadon et al. find a share of 11%. See Thibaut Lamadon et al., *Imperfect Competition, Compensating Differentials, and Rent Sharing in the U.S. Labor Market*, National Bureau of Economic Research, Working Paper 25954, June 2019, https://www.nber.org/system/files/working_papers/w25954/w25954.pdf. Their studies also measure benefits from workers; these do not reflect a share of profits but rather inframarginal benefits (wages higher than those required for the willingness to work) from an upward-sloping supply curve, reflecting preferences for amenities. In another calculation, Gravelle uses estimates of the risk premium by chief financial officers to calculate corporate profits in excess of the risk-free return and the risk premium from 2000 to 2017, finding a share of 19.5%. See Jane G. Gravelle, "When Estimated Economic Effects Fail the Sniff Test: Tax Examples," *National Tax Journal*, vol. 76, no. 3 (September 2023), pp. 621-645. Barkai's share at the midpoint of that period was 16%.

⁴⁶ See Megan Dunn and James Walker, *Union Membership in the United States*, Bureau of Labor Statistics, September 2016, <https://www.bls.gov/spotlight/2016/union-membership-in-the-united-states/pdf/union-membership-in-the-united-states.pdf>.

⁴⁷ Most studies found labor's share of excess profits to be less than 10%. See Andrew K. Hildreth and Andrew T. Oswald, "Rent-Sharing and Wages: Evidence from Country and Establishment Panels," *Journal of Labor Economics*, vol. 15 (April 1997), pp. 318-337. Based on the means of the sample, their study of the UK indicated that labor's share of excess profits was about 5%. Four other articles, and a book, were cited as having similar results: Kevin Denny and Steve Machin, "The Role of Profitability and Industrial Wages in Firm-Level Wage Determination," *Fiscal Studies*, May 1991, pp. 34-45; Louis Christofides and Andrew J. Oswald, "Real Wage Determination and Rent-sharing in Collective Bargaining Agreements," *The Quarterly Journal of Economics*, vol. 107 (August 1992), pp. 985-1002; David G. Blanchflower et al., "Wages, Profits, and Rent-Sharing," *The Quarterly Journal of Economics*, vol. 111 (February 1996), pp. 227-251; and Alan A. Carruth and Andrew J. Oswald, *Pay Determination and Industrial Prosperity* (Oxford University Press, 1989). These studies generally used U.K. data, although one used U.S. data and one used Canadian data. These studies were generally not economy-wide but confined to sectors such as manufacturing. Two studies found, in one case, larger effects and in the other, mixed effects. John A. Abowd and Thomas Lemieux, "The Effects of Product Market Competition on Collective Bargaining Agreements: The Case of Foreign Competition in Canada," *The Quarterly Journal of Economics*, vol. 108 (November 1993), pp. 983-1014, found a larger effect of 18% when they used instrumental variables to address endogeneity. John Van Reenen, "The Creation and Capture of Rents: Wages and Innovation in a Panel of U.K. Companies," *Quarterly Journal of Econometrics*, vol. 111 (February 1996), pp. 195-226, also using instruments, finds a share of about 5% when using quasi-rents (sales minus the alternative wage) but 35% when using profits. (Note: All of the shares presented in this note are derived by CRS and are calculated using the sample means.) These studies, of course, vary in quality and are subject to various critiques.

Thirdly, in the standard bargaining model (such as that employed by Arulampalam et al.), a corporate tax rate that applies to excess profits would not be expected to affect wages through the bargaining process. If taxes are treated in a standard way as a rate applied to a firm's revenue minus cost, the tax term does not appear.⁴⁸ The workers and firm would split pretax excess profits, with each paying tax (corporate or individual) on their share. The economic intuition behind this result is that a higher tax rate has two opposing effects on wages: it reduces the surplus or size of the pie to be divided, but at the same time it makes the "price" of giving a dollar to labor lower because wages are deductible. Economists might think of these as offsetting income and substitution effects, and in the standard bargaining model they offset exactly.⁴⁹ Thus, the theory implies there is no sharing of the tax on rents.

Summary of Studies

The Arulampalam et al. study used firm-level data (for about 55,000 firms) from several European countries (primarily France, Italy, Spain, and Germany) over a relatively short time frame of 1996-2003.⁵⁰ It controlled for firm-specific effects. About a quarter of the observations are for four years and about 45% for five years, so that the panel, like Felix's, shows changes over the short run. The same authors conducted an earlier version of this study with a smaller sample. Although the authors control for firm-level fixed effects, they do not control for country-specific effects. The authors have subsequently revised their study and reported, for the preferred specification, that labor bears 64% of the tax in the short run and 49% in the long run.⁵¹

The Arulampalam et al. study begins with a standard bargaining model. To address the conflict of their result with their model, the authors hypothesize an extra tax term that is not associated with profit that will affect wages directly (and thus have no price effect). It is not clear exactly what type of tax provision would fall into this category,⁵² but it appears not to be related to the actual estimate, which simply relies on tax changes. The tax variable is total taxes paid per worker (although it is instrumented with tax rates and other variables). The study also excludes other important variables that cannot be observed, such as the competitive wage (it uses a minimum wage that is far lower). The empirical implementation examines the change in wages as a function of the change in output and taxes (all taxes, not only lump sum taxes), which are closely linked as major elements of a contemporaneous identity and may explain the findings. Thus, it is possible that the statistically significant relationships obtained derive from some other linkage and do not represent a share of the tax burden.⁵³ There are also some important reservations about

⁴⁸ See CRS Report RL34229, *Corporate Tax Reform: Issues for Congress*, by Jane G. Gravelle, for a mathematical derivation.

⁴⁹ Nadine Riedel, "Taxing Multi-Nationals Under Union Wage Bargaining," *International Tax and Public Finance*, vol. 18 (August 2011), pp. 399-421, makes this point when she argues that increasing the domestic tax on a multinational with a surplus would actually, through this mechanism, cause domestic wages to rise and foreign wages to fall because the latter do not benefit from the higher value of deductibility.

⁵⁰ Wiji Arulampalam et al., *The Direct Incidence of Corporate Income Tax on Wages*, Oxford University Centre for Business Taxation, March 2011, published in the *European Economic Review*, vol. 56 (2012), pp. 1038-1054.

⁵¹ Prior versions of this study reported larger results. A 2008 version reported that labor bears 96% of an increase in tax in the short run, and 92% in the long run, and a 2007 version found that labor bore 54% in the short run and 176% in the long run, at least for the specification that the authors reported. These results initially appear to reflect an increase in the sample and subsequently appear to reflect measuring incidence based on the mean rather than the median. These results seemed implausible.

⁵² A few proposed types of provisions, such as interest deductions, losses, and pension contribution, would nevertheless be costs that are related to profits.

⁵³ This point is made by Jennifer C. Gravelle, *Corporate Tax Incidence: A Review of Empirical Estimates and Analysis*, CBO, Working Paper no. 2011-01, June 2011, <https://www.cbo.gov/sites/default/files/112th-congress-2011-> (continued...)

the econometric methods. Panel data with short time periods (where persistence effects can be serious) and the need to control for firm-specific effects face some significant econometric problems. The authors use different specifications, with widely varying results, which suggests that the results are not robust.⁵⁴ There are several other aspects of the econometrics that are not transparent.⁵⁵

Overall, it is not clear what relationship or phenomenon the study is measuring. Ideally, it would measure how an exogenous tax change affects wages. Yet, for some of the countries that constitute a large share of the data, there were no changes in tax rates. In others, tax rate changes were virtually all declines, with most of those declines occurring during the growth period of the late 1990s, when productivity and output were rising. It is possible that the results are capturing that phenomenon.

Another study using European data directed at capturing the bargaining share is aus dem Moore et al. (2011).⁵⁶ This study compared the changes in wages of German manufacturing compared with French manufacturing across a time period before and after 2000, when German taxes were reformed (including rate cuts) and French taxes were not. This analysis finds a very large effect: an increase in German wages of 6.4% due to the rate cuts. This finding seems large. According to the reported means of the data, the ratio of wages to taxes is 11.9; that is, wages are about 12 times the amount of taxes. If wages rose by 6.4%, that amount is 76% of the *total* corporate tax. It appears that the reduction in German taxes was around 20%, which implies, in dollar terms, that wages rose \$4 for each dollar reduction in tax. It seems likely that the empirical estimates are capturing some other type of influence, and the authors indicate their study is preliminary and uncertain. The authors never discuss the theoretical finding that this type of tax rate change is the type that would not be expected to show up as a part of rent sharing.

A study by Dwenger et al. (2011) also uses firm data to examine the German tax cut.⁵⁷ Like the aus dem Moore et al. study, this study does not address theoretical concerns and simply assumes that labor will bear some of the burden of the tax via bargaining. Its estimates of this initial wage effect indicate labor bears 156% of the tax. A subsequent updated study found this share to be 67%.⁵⁸ The authors also assume that higher or lower wages will lead to employment shifts (so that when wages rise, employment falls, and thus the wage bill does not fall as much), which results in a total wage bill effect of 47% of the tax. This line of reasoning regarding employment is unclear, as the wage does not change from the direct bargaining effect. Rather, it arises from the increase in the cost of capital via increased taxes, which, while decreasing the demand for capital (assuming there is a nontaxed noncorporate or foreign sector), has effects on employment in the corporate sector that are uncertain. In a general equilibrium model, employment is assumed to be fixed in the economy. In any case, these general equilibrium effects cannot be uncovered with

2012/workingpaper/06-14-2011-corporatetaxincidence_1.pdf. Note also that the regression is also run in logs, which does not allow for negative tax liability even though the model is in levels.

⁵⁴ The tests used by the authors to determine their preferred specification are not without problems. See David Roodman, *How to Do xtabond2: An Introduction to "Difference" and "System" GMM in Stata*, Center for Global Development, Working Paper no. 103, December 2006.

⁵⁵ For example, no reason is presented for using a dynamic specification or the specific number of lagged variables, and the number of instruments was not reported.

⁵⁶ Nils aus dem Moore et al., "Do Wages Rise When Corporate Tax Rates Fall? Evidence from the German Business Tax Reform 2000," January 11, 2011. An updated version of this working paper for 2014 found a larger effect in the long run; see Ruhr Economic papers, no. 532, at <https://www.econstor.eu/bitstream/10419/107692/1/819623113.pdf>.

⁵⁷ Nadja Dwenger et al., *Sharing the Burden: Empirical Evidence on Corporate Tax Incidence*, Max Planck Institute for Tax Law and Finance, 2011-14, October 2011 <http://piketty.pse.ens.fr/files/Dwengeretal2011.pdf>.

⁵⁸ Nadja Dwenger et al., "Sharing the Burden? Empirical Evidence on Corporate Tax Incidence," *German Economic Review*, vol 20, no. 4 (2019), pp. E107-E140, <https://www.degruyterbrill.com/document/doi/10.1111/geer.12157/html>.

firm-specific data within a country because the effect should not relate to the specific taxes on the firm. As with the aus dem Moore et al. study, it is not clear what the authors are measuring when they regress wage rates on tax rates, although the measurement could reflect differential wage growth across industries.

Fuest et al. (2016) report a corporate tax incidence on labor of 47% in a wage bargaining model, using data from German municipalities and a series of tax changes in the local business tax. This 47% includes an externally estimated excess burden (efficiency cost); without it, the incidence would be 36%.⁵⁹ In an updated paper, they report a slightly higher incidence of 51%.⁶⁰ This paper measures the incidence as a share of combined profit and after-tax wages, reflecting both the offset in a tax increase by the additional wage deduction and the additional personal taxes paid on the wage. It is smaller than the standard estimates of the share of the tax that falls on labor.⁶¹

A study by aus dem Moore (2014) comparing outcomes in France and the UK in a wage bargaining model follows the approach used by Arulampalam et al., and finds the shares falling on wages are 39% in France and 40% in the UK in the short run. In the long run, the results indicate a share of 66% in France and 73% in the UK.⁶²

Azémar and Hubbard estimated the incidence in a wage bargaining model using data on 13 OECD countries.⁶³ Using the values for 2004, their estimates indicate 60% of the burden falls on labor for a country with a high union density. Further estimates that include measures of union density indicate that this effect is highly driven by union density. With an average union density of 10% in the United States, this effect would probably be small.

Three studies have been based on data in the United States. As noted earlier, Felix and Hines found wages to rise with increases in state tax rates, but the union differential fell. They indicate that their findings show that workers in a unionized firm bear 54% of the tax burden. Several important points should be understood about their analysis. First, as they make clear, they are not trying to estimate the effect of direct taxes on rents, as this effect disappears from their model. They are rather examining the indirect effect that would arise due to the increase in the cost of capital and the subsequent general equilibrium effects that would arise. Although they have with sound explanation measured a statewide tax rate as their tax variable (rather than a firm-specific rate), the model they used to drive their theoretical expectations has an apparent inconsistency, and the expectation from a properly derived model is likely a close-to-zero effect, and if not zero then probably positive. Their estimate appears to be outside the range of theoretical prediction and possibly in the wrong direction. In addition, in calculating incidence they have applied the elasticity to the entire wage bill, not the share that is rent. If the rent share is about 15%, 8% of

⁵⁹ Clemens Fuest et al., *Do Higher Corporate Taxes Reduce Wages? Micro Evidence from Germany*, December 2016, <http://gabriel-zucman.eu/files/teaching/FuestEtal16.pdf>.

⁶⁰ Fuest et al., "Do Higher Corporate Taxes Reduce Wages? Micro Evidence from Germany," *American Economic Review*, vol. 103, no. 2 (February 2018), pp. 393-418. The second paper used a different function form, regressing wages on the net of tax rate rather than the percentage point change in the tax rate.

⁶¹ The authors measured the labor share as wages after personal income taxes divided by the total corporate tax after accounting for the benefit of deducting the additional wages at the corporate rate and the increase in personal taxes. They reported the average corporate tax as 16%, but did not provide a measure for personal taxes. If the personal tax were assumed to be 25%, the share would rise from 51% to 64%.

⁶² Nils aus dem Moore, *Shifting the Burden of Corporate Taxes: Heterogeneity in Direct Wage Incidence*, Ruhr Economic Papers, no. 531, 2014, at <https://www.econstor.eu/bitstream/10419/107694/1/819591319.pdf>.

⁶³ Céline Azémar and R. Glenn Hubbard, "Country Characteristics and the Incidence of Capital Income Taxation on Wages: An Empirical Assessment," *Canadian Journal of Economics*, vol. 48, no. 5 (December 2015), pp. 1601-2004. The authors investigated an estimate that would capture both wage bargaining and capital movement, but found the estimate unreliable because of endogeneity issues, although the upper limit is large: a \$2.65 decline in wages for each dollar of corporate revenue.

the tax, not 54%, falls on rents. For a nationwide incidence taking into account union membership and theoretical expectations, the share of the tax that falls on rents would be no more than 3% (keeping wages constant), and rents would more likely benefit.

Liu and Altshuler's study of U.S. firms does not explicitly indicate that it is a rent-sharing study. As discussed in this review, general equilibrium effects can shift the tax to wages, but within a closed economy with a fixed capital stock the central tendency is for the burden to be spread to all capital, but not to wages.⁶⁴ Only in an open economy—where capital can flow across countries (and which would require country observations)—could wage shares be estimated through this mechanism, and the wage would be an economy-wide (country-wide) wage. Thus, using a single country's data is implicitly measuring a burden that would fall on labor through the rent-sharing mechanism. In fact, at one point in their model, the wage rate becomes the numeraire (is fixed), which implies there are no industry wage differentials. Their regression estimates how relative wage rates in each industry changed over time based on the mix of assets and the change in marginal tax rates over that period. They conclude that labor bears 60% to 80% of the tax. The most likely reason for this large effect is that the marginal tax rate fell primarily for equipment, and those industries whose investments were more concentrated in equipment (manufacturing, transportation, and construction, but especially manufacturing) probably saw slower wage growth over the period due to the decline in unions and growth of international competition.

A recent study by Agarwal and Chakraborty (2019) uses the methodology of Desai et al., (and thus faces similar concerns) to measure the incidence of corporate taxes in India, based on the variation of effective tax rates across firms.⁶⁵ They find that labor bears 1% of the tax. Such a single-country study should reflect rent sharing.

A study by Misra (2019) using German subnational taxes finds no effect on wages across firms.⁶⁶

Rent Extraction By Executives And High-Income Employees

Several recent papers have focused on the effects of corporate taxation on wages of executives and highly compensated employees, examining recent U.S. corporate tax provisions: bonus depreciation (which allows investments in equipment to be deducted more quickly); the domestic production activities deduction (DPAD), which allowed a deduction of up to 9% of taxable income firms and industries; and the 2017 reduction in corporate tax rates. All of these studies used a difference in difference approach that compared employees at firms with different treatments over time.

These studies do not have the same implications for progressivity of the corporate tax, since the benefits are received by highly or very highly compensated employees.

⁶⁴ Li Liu and Rosanne Altshuler, *Measuring the Burden of a Corporate Tax Under Imperfect Competition*, Oxford Working Paper no. 11/05, published in the *National Tax Journal*, vol. 66, no. 1 (March 2013), pp. 215-238. This outcome occurs with unitary production and utility functions; when these functions are changed, labor can bear a small amount of the burden, or labor can benefit from the tax with capital bearing slightly more than 100% of the burden. Labor can bear some nonnegligible share of the tax when factor substitution is much smaller in the corporate, as compared to the noncorporate, sector, but the reverse is likely to be the case because a large part of the noncorporate sector is housing services

⁶⁵ Samiksha Agarwal and Lekha Chakraborty, "Business Taxation in an Emerging Economy: Analysing Corporate Tax Incidence," *Review of European Studies*, vol. 11, No. 2 (2019), pp. 8-14, https://www.researchgate.net/publication/345475683_Business_Taxation_in_an_Emerging_Economy_Analysing_Corporate_Tax_Incidence.

⁶⁶ Sanjay Misra, *The Labor Market Effects of Corporate Taxation: Evidence from Germany*, 2019, <https://www.semanticscholar.org/paper/The-Labor-Market-Effects-of-Corporate-Taxation%3A-Misra/833e0d9cd3b47d69f30d7e121eac0e96aa6a17f2>.

Ohrn (2023) studied large publicly held corporations and found that their five top-paid executives received 25% of the tax cut from bonus depreciation and 17% of the tax cut from DPAD. He noted that these levels were reached only in firms with certain characteristics associated with comparatively weak governance (more-than-average protection of managers from shareholder discipline, concentration in ownership, and executive tenure).⁶⁷ For firms with none of those characteristics, he found no effect. These findings are consistent with rent extraction rather than labor market bargaining or tying compensation to stock values.

Dobridge et al. (2021) examined the effect of the DPAD on workers of varying incomes using tax data.⁶⁸ Their results indicate workers overall receive 80% of the tax reduction from DPAD. The percentage change in wages is heavily concentrated at high incomes. The bottom 25% of the wage distribution has no statistically significant change in wages. Compared to the median worker, the percentage change is 1.2 times greater for a worker at the 75th percentile, 1.8 times for the 90th percentile, 2.6 times at the 95th percentile, and 5.4 times at the top 1%. The average effects are greater for smaller firms and privately held firms. For publicly traded firms, there are no effects on workers, except for the top 1%, and these effects are smaller than for other firms. Some of these effects may reflect a blurring between labor and capital income by more highly compensated worker/owners.

Kennedy et al. (2024) study the investment and distribution effects of the 2017 rate cut by comparing smaller corporations that benefited from a larger tax cut with Subchapter S corporations that are taxed as pass-throughs and received a smaller tax cut.⁶⁹ They find that 49% of the tax cut increased wages of the chief officers and top 10% of workers, with no effect on the bottom 90%. There are two possible explanations of this large effect. The first is that the study included smaller corporations that are more likely to be closely held, thus blurring the line between owners and highly compensated workers as in the case of the Dobridge et al. study. Second, this type of difference-in-difference study is only valid if there are parallel trends, and while that was true of most workers, the 95th percentile and the top five earners in corporations showed a relative increase in trend in 2017, so the growth may not have been due to the tax change.⁷⁰ Their results for the rank-and-file workers did not face these issues, and those results indicate no rent sharing.

Gale and Thorpe (2024) explored the consequences of some of these studies, using the Tax Policy Center model.⁷¹ The most striking effects are based on the Dobridge result and indicate that the share of the tax borne by the top quintile increased from 52.1% to 78.8%. These results are, however, likely to be overstated because (1) the Dobridge results are largest for the long run, and (2) the Tax Policy Center assigns 60% of the corporate profit (the amount in excess of a risk-free

⁶⁷ Eric Ohrn, "Corporate Tax Breaks and Executive Compensation," *American Economic Journal: Economic Policy*, vol. 15, no. 3 (2023), pp. 215-255.

⁶⁸ Christine L. Dobridge et al., *Corporate Taxes and the Earnings Distribution: Effects of the Domestic Production Activities Deduction*, Federal Reserve Board, Finance and Economics Discussion Series 2021-081, December 2021, <https://www.federalreserve.gov/econres/feds/files/2021081pap.pdf>.

⁶⁹ Patrick J. Kennedy et al., *The Efficiency-Equity Tradeoff of the Corporate Income Tax: Evidence from the Tax Cuts and Jobs Act*, March 21, 2024, https://patrick-kennedy.github.io/files/TCJA_KDLM_2024.pdf.

⁷⁰ The authors suggest that the trend may reflect increased bonuses paid in 2017 to benefit from the higher corporate tax rate, but the reverse is more likely, that bonuses were paid early in 2018 when rules allowed them to be deducted at the higher corporate rate, but taxed at the lower individual rates that were also enacted. For a more detailed discussion of this study, see CRS Report R48485, *Economic Effects of the Tax Cuts and Jobs Act*, by Jane G. Gravelle and Donald J. Marples.

⁷¹ William G. Gale and Samuel I. Thorpe, *The Incidence and Distributional Effects Of The Corporate Income Tax: The Role of Rent Sharing*, Urban-Brookings Tax Policy Center, July 2024, https://www.brookings.edu/wp-content/uploads/2024/07/20240717_TPC_GaleThorpe_CorpRentSharing_FINAL.pdf.

return) to rents, whereas measures that also account for the risk premium would set that share at 20% or less.

Why Do Reduced Form Empirical Studies Yield Such Large and Variable Estimates of the Labor Share?

Most of the studies of the share of the corporate tax falling on labor are large compared to the effects predicted by general equilibrium models, and most studies of rent sharing find results that are larger than estimated rent shares. These studies also exhibit a wide range of results, suggesting that, as a group, they are not a robust source of evidence.

General Issues

These studies use a small variable, the corporate tax rate, to explain a large variable, wages, which are determined by a wide range of effects, and the relationship between these variables is small and difficult to detect. In addition, a change in the corporate tax rate may not be exogenous and can be affected by other variables that may be included in the regression.

The preceding discussion has also pointed to some specific methodological issues (such as lack of country and time fixed effects and simultaneity between the dependent and independent variable) in some studies. In addition, there are fundamental challenges to using reduced form estimates. For example, because the worldwide incidence of corporate taxes generally falls on capital, to the extent the burden falls on labor for an individual country's increase in tax rates, wages are also increased when the other countries' tax rates are increased. Thus, all corporate tax rates affect the individual wages in each country.

Studies also do not fully control for all the changes that affect corporate tax burdens, both the rate and the base, as well as how the base affects the given influence of a rate change. The measure of tax rates (statutory, average, marginal) can affect results. Also, the effects of investment flows take place over time, so studies that do not account for lags may not correctly capture the consequences of rate changes.

The variability of the findings also makes them less reliable, and the consequences of this variability for statistical inference can be examined through a meta-analysis that treats each study and its mean as a single observation. Knaisch and Pöschel (2023) provide such a meta-analysis for the studies of corporate tax incidence on labor.⁷² While they find a mean incidence of 500% of the tax falling on labor, the variation in means is so large that this finding is not statistically different from zero.⁷³

Publication Bias

One source of the effects is publication bias (also called the *file drawer problem*), which is the tendency for only expected and statistically significant results to be published. Among working papers, authors tend to abandon results that are statistically insignificant or deviate directionally from their expectations. The difficulty in getting null results published may also lead authors to try different specifications that could eventually lead to a statistically significant result, because there is still a distribution around the mean for results from different samples and different

⁷² Jonas Knaisch and Carla Pöschel, "Wage Response To Corporate Income Taxes: A Meta-Regression Analysis," *Journal of Economic Surveys*, May 2023, <https://onlinelibrary.wiley.com/doi/full/10.1111/joes.12557>.

⁷³ The t-statistic, the ratio of the mean to the variance, should be above 2 to be statistically significant at a typical 95% confidence interval. The t statistic was 0.8.

specifications. To address these concerns, researchers can conduct a meta-analysis, which examines the distribution of findings from a body of studies and can use statistical methods to detect and correct for publication bias.

Knaisch and Pöschel (2023) provide such a correction for the studies of corporate tax incidence on labor.⁷⁴ They examine studies aimed at effects derived from investment flows and studies aimed at rent sharing. They find that the mean for these studies is about 60%, but the large variance indicates that the estimate is not statistically different from zero.⁷⁵

Implications Of Evidence For Corporate Tax Incidence

Although corporate tax incidence based on investment flows is relevant to the degree to which the burden of the tax falls on labor, the rent sharing studies are generally not relevant given the limited presence of labor unions in the United States. This point was also indicated by Azémar and R. Glenn Hubbard, who found a 60% burden for countries with high union density, but no effect for the United States.⁷⁶ This finding is also consistent with the rent extraction studies, which found no effect on rank-and-file employees. Rent extraction by managers and highly compensated employees may be relevant, but not for the issue of whether the corporate tax is a progressive tax, and in any case appears to apply largely to closely held, smaller corporations where the line between wages and capital income is blurred.

Given the large and widely varying results of many of these studies, determining tax incidence may also be approached using a corporate tax model, with behavioral responses drawn from the empirical literature. These models also allow sensitivity analysis. The results, using the model approach based on this empirical evidence, point to a labor share of around 20%, a share that would be less if debt finance or other factors were considered.

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⁷⁴ Jonas Knaisch and Carla Pöschel, “Wage Response To Corporate Income Taxes: A Meta-Regression Analysis.”

⁷⁵ The t-statistic is 0.5.

⁷⁶ Céline Azémar and R. Glenn Hubbard, “Country Characteristics and the Incidence of Capital Income Taxation on Wages: An Empirical Assessment,” *Canadian Journal of Economics*, vol. 48, no. 5 (December 2015), pp. 1601-2004.

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