

# Who Pays Corporation Tax

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## EXECUTIVE SUMMARY

- 1** While most of the substantive details are hotly disputed, the best studies of corporation tax find that in an open economy workers bear a significant part of the burden of the tax, along with owners of capital. In a closed economy—like the world as a whole—the burden falls mainly on capital owners.
- 2** The average empirical result puts the burden on workers at 57.6%—though of course it is worth mentioning that these results have been questioned. Averaging theoretical studies is much more difficult, mainly because each study gives such a wide range of results over such varying sets of circumstances.
- 3** Nearly all economists agree that taxes on capital are particularly highly distortionary, and thus unattractive as means of raising revenue. Owners of capital do tend to be wealthier than non-owners, but capital taxes are far from the best way of redistributing wealth.
- 4** Transparency is a virtue of a tax system, and many workers are unaware that their wages are lowered by corporation tax.
- 5** In the presence of an extremely complex regulatory and legal regime like the UK's, the costs of corporation taxes become even higher by distorting key decisions like choices between debt and equity.
- 6** The interaction between corporate income taxes and corporate gains taxes may complicate the question, necessitating reforming both in order to properly reform one.
- 7** Overall, there is a strong case for reducing or abolishing the corporation tax, and either cutting spending, or increasing taxes on consumption, income, or wealth. In practical terms we urge the government to accelerate its corporation tax cuts.

## 1 INTRODUCTION

When economists ask “who pays corporation tax?” they are not asking which firms avoid or evade tax and which do not. They mean “what is the incidence of the tax”—who is made poorer by a tax on the profits of incorporated businesses. Since corporations and firms are merely legal constructs, it does not make sense to simply say that they bear the tax: some combination of capitalists, workers and consumers must pay.

In one sense, discerning exactly what share of the tax each group pays could be seen as pointless for public policy purposes. It is widely acknowledged that (at least expected) taxes on capital are “Bad Taxes”—that they are particularly economically costly ways of raising a given amount of revenue. So if it turns out capital pays the corporation tax, then we’d have particularly strong reasons to oppose it. While economists generally view income taxes a lot more favourably, it hardly makes sense to raise the income tax so stealthily through this channel, and ditto for consumption taxes. So even if it turns out workers pay the corporation tax by getting lower wages, or consumers pay it through higher prices, the roundabout nature of the tax may still support replacing it with a more transparent and efficient tax elsewhere.

In another sense, however, clarifying broadly how harmful corporation tax is could strengthen political will to reform or replace it. For example, we found out that capital was bearing most of the tax, we would have (in theory) more incentive to prioritise chipping away at what is, either way, a Bad Tax. In practice, of course, taxes on capital often prove politically popular, whereas if workers and consumers could be convinced the tax directly impacted upon them, a broader coalition against corporate profit taxation might be possible.

But the inspiration for doing the research comes more from surprise at finding out there was a question at all, and finding at each juncture that the actual picture is far more complicated than is usually believed.

In the paper I review roughly 45 of the most prominent and influential papers on the incidence of corporation tax and discover that, though there is nothing like a consensus in the literature, most economists agree that both capital and labour bear substantial fractions of the burden of the corporate tax, with capital, mainly due to complex law and regulation, likely to be bearing the larger share. Most economists also agree that consumers do not pay a significant share.

Whatever their conclusions about how the burden is apportioned, nearly all economists think that the corporate income tax is a bad idea; in the words of Fehr, Jokisch, Kambhampati and Kotlikoff (2013): “Eliminating the US corporate income tax has the potential to raise the

welfare of all US generations. Remarkably, this is true even if other regions follow America's lead and set their corporate tax rates to zero."

Though this paper is aimed at UK policymakers the evidence comes from around the world—I attempt to detail the sorts of differences between countries' institutions and rules that would shift the burden in different directions (e.g. the more open an economy the more of the burden borne by workers), as well as the factors that make the question difficult to answer (e.g. the way tax systems tend to favour debt over equity).

## 2 THE UK CORPORATION TAX SYSTEM

Firms with their headquarters or central management in the UK, or which are incorporated in the UK, pay UK corporation tax on the global profits they do not distribute to shareholders, unless they are a limited partnership or a limited liability partnership. Non-UK-resident firms, by contrast, are only charged corporation tax on the profits they earn in the UK.

Though the rules are very complicated in their specifics, in general firms deduct the cost of paying wages, buying inputs (such as raw materials) and paying interest from their revenues from sales, investment and capital gains and pay tax on the remainder. If they make a loss they can carry it back at most one year to offset losses then, or carry it forward indefinitely to offset future losses. Capital expenditure—investment—is not automatically deducted, but firms can claim a variation of different allowances to offset these costs.

The 2013 budget increased the annual investment allowance, which allows firms to write off plant and machinery spending against profits immediately, from covering the first £25,000 to covering the first £250,000, but only for two years. Remaining expenditure is written down (i.e. counted against taxable profits) at 18% per year. Spending on buildings and hotels enjoys no allowance, but may be written down at 8% per year. Spending on intangible assets, such as patents, copyrights, trademarks, quotas, telecoms rights and franchise payments, has no allowance and is written down either at 4% or the accounting depreciation rate.

Current spending on research and development can be completely balanced against incomes. For small and medium-sized firms there is an additional credit, called R&D tax relief, adding tax relief worth 125% of R&D spending (meaning that, in total, R&D spending reduces tax liability by 225%). Alternatively, loss-making firms can give up their tax offset worth 200% of R&D spending, in return for a cash payment of 12.5%. Large firms can claim cash credits worth 10% of R&D expenditure, or offset an extra 30% of profits.

After all the offsets and allowances, which are of course vastly more complex than the simple run-through above implies, firms pay one of two tax rates on their entire remaining profits. If they earn £300,000 or less, they pay the small profits rate (currently 20%). If they earn more than £300,000, firms pay tax at the main rate (set to fall from 24% in 2012–13 to 23% this year and 21% in the 2014–15 tax year). To stop the knife-edge discontinuity at the £300,000 boundary, there is a relief system for firms earning between £300,000 and £1.5m, such that they effectively pay a marginal rate higher than the main rate (in 2012–13 that was 25%, it was 23.75% in 2013–14, and from 2014–15 it will be 21.25%).

Small and medium-sized firms pay their bill nine months after the end of the tax year, while large firms pay theirs in four equal instalments based on their expected liability.

### 3 MODELS

The tax incidence debate is so complex that it can be next to impossible, even with the most sophisticated techniques, to tease out tax incidence in empirical results. Economists have tried, especially in recent decades when computing power has become more widely available, but their results have been challenged in many cases. Thus, from a very early point in corporate tax incidence research, economists have turned to models of the economy instead, using only the most important facts, to try and get an idea of where the cost might fall.

The first major contribution to the tax incidence debate came from Harberger (1962), a pioneering analysis that showed that in a closed economy, where both labour and capital are fully mobile between two sectors—the taxed corporate sector and the untaxed noncorporate sector—the entirety of the burden of the corporation tax fell on capital. Even this result was interesting and slightly counterintuitive, since all owners of capital—not just shareholders in the corporate sector—bore the burden of the tax. Since then, ever more complex models have churned out what seems like every conceivable result; indeed, later models from Harberger himself have judged that more than 100% of the burden of a corporation tax rate falls on workers while capital actually benefits. The reason for these widely diverging conclusions, as ever with theoretical modelling, comes from the assumptions used.

Later research questioned all of Harberger's assumptions, including:

- (a) capital and labour move freely between sectors in a given economy;
- (b) corporation tax came on top of a general income tax, and that these taxes were together the only relevant provisions of the tax code;
- (c) markets are competitive and returns to scale are constant;

- (d) there is no risk;
- (e) the economy is closed;
- (f) the direct burden falls upon shareholders (prior to adjustment towards a putative new equilibrium); and
- (g) the tax change will not affect the owners' relationship with managers.

It is this mass modelling and remodelling that drives the apparent wide divergence in the results economists have reached. We can roughly model the effect of these factors on the overall conclusion in the following table, although of course many of the individual factors are further complicated and the arrows are only illustrative, as it can be almost impossible to sum up their affects on the tax's incidence with such a simple taxonomy. *Parentheses imply that the result is less clear or disputed, but a generally fair summary of the overall set of results.*

|     | SHARE OF BURDEN   |                       |                |                 |
|-----|-------------------|-----------------------|----------------|-----------------|
|     | corporate capital | non-corporate capital | native workers | foreign workers |
| (a) | ↑                 | ↓                     | =              | =               |
| (b) | ↑                 | ↓                     | =              | =               |
| (c) | ↑                 | ↑                     | ↓              | ↓               |
| (d) | ↓                 | ~                     | =              | =               |
| (e) | (↓)               | (↓)                   | (↑)            | (↓)             |
| (f) | ↓                 | ↓                     | ↑              | =               |
| (g) | ↑                 | ↓                     | ↓              | =               |

### 3a Capital transference

Auerbach (2005) points out that most capital cannot quickly or easily be transferred to new uses; it is largely heterogeneous. For example, while one can move a computer from one office to another, one cannot easily turn the components of a nuclear power plant into a tractor. So while Harberger's end equilibrium will be the final result, in the meantime corporate capital will depreciate due to the tax. The slower the transition, the more of the burden the corporate shareholders will absorb due to their holdings of assets that cannot be easily transferred away from their now less-profitable uses. After the adjustment, the situation reverts to Harberger's equilibrium, with capital invested in all sectors paying the tax.

### 3b Tax treatment

The complexity of the British tax system is legendary. Therefore it is unsurprising how much more difficult it becomes to place tax incidence in a tax system nothing like Harberger's simple model. Auerbach shows that the tax treatment of depreciation—almost inevitably out of sync with economic depreciation—could affect the relative corporation tax rates, not just when laws are changed over time, but also with “accelerated” depreciation regimes, such as those that exist in many actual economies, which treat asset values as initially falling much faster than their economic value. To the extent to which the tax system acts in this way, corporate shareholders pay an extra chunk of the burden, and other capitalists pay less.

It's not just the tax treatment of depreciation that alters Harberger's basic story—the tax deductibility of interest on debt finance means firm incomes are not simply handed out as dividends, as the narrative would imply. In fact, Stiglitz (1973) and Miller (1977) build models that suggest firms can completely avoid double taxation by borrowing to fund all investment and converting only pre-existing assets into equity.

In Stiglitz's model, an increase in corporate income tax that stayed below the individual income tax rate would fall entirely on the corporate shareholders. This is because the individual is paying only the corporate tax and only on the extra assets embedded in the equity. However, Auerbach notes that the vast majority of investment is in fact funded by equity, suggesting that—at least broadly—Stiglitz's model isn't sufficiently general.

The model was further developed by Miller, with a model in which individual investors hold debt and equity in regard to their preferences. A higher marginal income tax rate will drive a preference for equity and a lower rate will drive a preference for debt; in the aggregate, corporations will offer sufficient of each class to satisfy investors. This all implies that corporate shareholders will bear more of the brunt of corporation tax, since some are still paying less tax than they would otherwise be, if they continue holding equity.

### 3c Industrial organisation and returns to scale

In certain forms of imperfectly competitive markets, correctly designed taxes could hit economic rents without affecting any decisions on the margin and causing distortions. But in general, imperfect competition is typified by restricted output leading to supernormal profits through higher prices. Adding to the cost of one input (capital) by imposing a corporate income tax could lead firms to over-respond and shift more capital out of the corporate sector than in the competitive situation, i.e. worse distortion.

Gravelle and Kotlikoff (1989) build a model in which both the corporate and non-corporate sectors produce the same goods, and people can decide to fill one of three different roles: manager or worker in the corporate sector, or entrepreneur in the non-corporate sector. Incorporation allows exploitation of scale economies, but loses the entrepreneurial vigour of unincorporated small firms. The authors find that the distortions and burdens on capital are much higher than in Harberger's original model, but they may still be low in absolute terms if substitution elasticities (the ease of switching between job roles) are low, as may be the case empirically.

### 3d Risk

But this picture is still too simple, according to Auerbach and King (1983), because investors make their decisions not just on the tax differences between debt and equity, but also risk. Risk-averse investors will want to hold safer debt: even if they face higher income tax rates. This implies that less of the tax burden—at least compared to the Miller and Stiglitz models—will fall upon the higher-income shareholders, and even that non-corporate capital owners would bear more of the burden.

One theory holds that corporation tax isn't actually burdensome, and thus the question of incidence has no answer, because it's actually a form of insurance. Gordon (1985) said the tax had little distortionary impact because firms could offset taxed gains with losses. But the fact that governments take large sums of money in through corporation tax is *prima facie* evidence that this approach is false. Auerbach (2005) rolls some of Gordon's analysis back; offsetting is far from complete and depreciation is not included in tax based on economic reality, both tending to boost the burden. But the existence of risk and offsetting does reduce the size of the burden by acting as a form of insurance.

### 3e Open Economy

Perhaps the biggest change comes when we compare one open economy to a closed economy like the world as a whole. Capital can shift easily between countries, whereas workers find it much more costly, especially with today's mainly closed borders. That is, a small open economy cannot affect the world rate of return. This means that capital per worker in the home country will fall in the taxed sector, driving productivity, labour demand, and hence wages (possibly including hours worked) down. Models such as Bradford (1978), Kotlikoff and Summers (1987) and Harberger (1995 and 2006) see the workers pay the entirety of the burden through reduced pay. As Diamond and Mirrlees (1971) showed, this means an income tax raising the

same amount dominates the corporation tax—at least under these simple conditions—since the corporate income tax distorts marginal investment decisions, as well as marginal working decisions.

But the model can change significantly if we bring in some of the insights used to alter the model in sections 1a to 1f, and open economies introduce complexities of their own. According to Gordon and Hines (2002), one of these is that firms will have the ability to channel earnings through foreign shell companies with difficult-to-excavate links. The costs of doing so mean that the option will only be attractive to those with lots of capital, effectively cutting the burden and shifting the remainder onto smaller investors, and adding to the distortion cost of the tax due to the efforts spent on avoidance/evasion. Gordon and Hines detail a litany of potential schemes that the government could entertain to claw in the taxes and reduce the distortions, any of which could bring the system closer to the basic open economy—full enforcement story.

Furthermore, the open economy model is susceptible to its own special modifications. To begin with, the simple result (that of 100% of the burden plus distortions falling on labour) comes from the assumptions that capital is perfectly mobile, there is only one good, labour is completely immobile, and the economy is so small that it makes no differences to international prices. Gravelle (2010) lists five main ways that changing the assumptions changes the results: the lower the capital mobility, the higher the share falling on capital, and the lower the share falling on labour. Similarly, the more products can be substituted with one another internationally, the more the tax falls on labour, and the less the tax falls on capital. By contrast, a larger country and a higher ability to substitute between factors means more of the burden falls on capital. Finally, the more capital intensive the taxed (corporate) sector is, the more it avoids the tax burden.

For example, Grubert and Mutti (1985) vary capital mobility elasticity from zero (where 100.3% of the burden falls on domestic capital) to 300 (where 13.9% falls on domestic capital). Varying product substitution elasticities, such as in the case of Gravelle and Smetters (2006), results in a burden on labour from –3% to 6% (with very low capital substitutability) and from 21% to 73% (with very high capital substitutability). Randolph (2006) finds burdens on labour ranging from 32.5% to 90.6% depending on intensities, product substitution elasticities and the share of the domestic country in output. Harberger (2006) finds that 130% of the burden falls on domestic labour with perfect product substitution, and 96% falls on domestic labour if there can be some differences between world and domestic prices. Capital on the other hand pays just 14% in the first scenario and 12% in the second.

The variation between these studies is largely due to different estimates of elasticities in the five areas noted above. Gravelle (2010) reviews the extensive literature on elasticities in those areas

and replaces the ones used in the four studies above. She says that in Gravelle and Smetters' model, using empirical elasticity measures generates the result that around 40 per cent of corporate tax falls on labour and around 60 per cent falls on capital. Appropriately adjusted versions of the other models point towards a similar result, according to Gravelle's analysis.

But additional complexities in the real world situation muddy the picture further. Gravelle suggests that it's possible for a corporation tax hike in one country to drive capital inflow, not capital outflow, if debt is more fluid than equity. This is because tax systems in most countries allow nominal interest payments to be deducted as a cost. A tax hike would drive up interest rates, as debt would be yet more attractive, bringing in foreign lending.

A second issue would be whether or not tax rates are in fact exogenous. If countries set tax rates to any extent reacting to one another, then to that extent we'd be back in the closed economy picture—there would be no change in the differentials between tax regimes. This would, of course, shift the burden away from labour and towards capital (and perhaps even shareholders in corporates). This ties in with the burden on foreign labour and capital. Under Grubert and Mutti's central case, 21% of the burden is borne by domestic labour, 72% by domestic capital, while foreign capital takes a 30% hit and foreign labour a 19% boost.

Gravelle thus suggests an alternative way of approaching the issue: treating the average world corporation tax as falling entirely on capital (as in Harberger's original closed economy model) and deviations potentially being spread between both labour and capital. Under this model, around 100% of the tax will fall on capital in almost every tax regime.

Clausing (2011) goes further, stressing the imperfectly competitive elements of markets in major countries by pointing out that 0.04% of all firms pay 62% of corporation tax receipts in the US. If the tax is a tax on rents it may, as Auerbach suggested for the closed economy case above, fall not just on domestic capital, but on domestic shareholders. On the other hand, Clausing also points out that many models assume the world capital stock is fixed, while a corporation tax could reduce the long-term rate of capital accumulation. Naturally, any discussion of very long-term considerations is difficult given the extreme uncertainty over the future.

### **3f Direct impact**

Though an empirical paper, the assumptions in Arumpalam, Devereux and Maffini (2009) effectively amount to a new model of how the very direct initial impact might play out. In their model, which they support with a trove of 55,000 companies' records over seven years

(see section four below for further details), workers can pay for a chunk of a tax rise (or gain from a chunk of a tax cut) even before capital has adjusted, by reducing the cash owners and workers have to bargain over. This money—known as quasi-rent—is the difference between the opportunity cost of the current capital-labour configuration before and after the sunk costs of the firms' past investments. They find that in practice lower post-tax profits—lower quasi-rents—means less to share out in wage bargains, not just less for capitalists.

This analysis would imply that both capital and labour would adjust, flowing out of the taxed sector into the untaxed sector or abroad. This would seem to imply that in long-term analysis, labour would bear a significant fraction of the burden even if capital is unable to shift (quickly), if the economy was closed, or under any of the conditions raised above that tend to shift the burden from labour to capital. Of course, this would be spread across both corporate and non-corporate labour due to the adjustment.

### **3g The impact on principal-agent**

An extra burden on shareholders might come from the effect on corporate managers. Managers are hired by owners to run their businesses, and are often paid, or kept, based on their performance in their role. But a corporation tax reduces the (after-tax) cost of poor management, potentially reducing the incentive to oversee management and thereby reducing the efficiency of management. However, Auerbach (2005) also raises the possibility that tax-evading managers tend to hide their activity from both government enforcement and owners, possibly meaning that the burden of given taxes actually being enforced falls on management, and not on shareholders or average employees.

A different approach to all of these, questioning basically the entire literature, is Kotlikoff and Miao (2013) which models the scenario without capital to drill down to what exactly corporation taxes tax. In their model, entrepreneurs incorporate in order to diversify their risk. But—presuming the corporate tax is higher than the relevant income tax—corporation taxes discourage incorporation, keeping entrepreneurs independent and exposed to risk. They say that this means the burden falls mainly on high-skilled entrepreneurs, and this in turn implies that corporation tax taxes risk-sharing. This model is hugely interesting and plausible, but does not generate numerical estimates apportioning the burden, and looks to be only the beginning of a yet a further area of study for tax economists.

## 4 EMPIRICAL STUDIES

### Share of burden falling on workers

|                                          |           |
|------------------------------------------|-----------|
| Krzyzaniak and Musgrave (1963)           | Over 100% |
| Hassett and Mathur (2010)                | 2,200%    |
| Felix (2007)                             | 400%      |
| Desai, Foley and Hines (2007)            | 45%–75%   |
| Arumpalam, Devereux and Maffini (2009)   | 75%       |
| Fuest, Peichl and Siegloch (2013)        | 77%       |
| Dwenger, Rattenhuber and Steiner (2011)  | 47%       |
| Aus dem Moore, Kasten and Schmidt (2009) | ~         |
| Liu and Altshuler (2011)                 | 40–80%    |
| Aus dem Moore (2008)                     | 92%       |
| Felix and Hines (2009)                   | Over 50%  |
| Clausing (2012)                          | 0%        |

**Average excluding first three**

**57.6%**

Though there have been far fewer empirical and econometric studies of corporation tax incidence than theoretical approaches, there is still a wide literature. I haven't reviewed the entire literature, because some papers fail to give clear results, are hopelessly flawed, hard to interpret, or fail to give strong results. However, the papers I have included represent the most influential, respected or interesting contribution, and, I believe, give a fair summary of the state of the field such that the average of their results (excluding the outliers) is a reasonable proxy for the overall average. In general it points to a burden falling on workers, not capitalists, but nearly all of the results have been extensively challenged, and do not fit well with models.

An early paper, Krzyzaniak and Musgrave (1963), found that over 100 per cent of the tax fell on consumers, but the results were both challenged theoretically (they violate the ground-level assumptions we have about profit maximisation in competitive markets) and empirically. Gravelle (2010) suggests that limited success with early empirical studies drove economists into looking at the problem in a largely theoretically manner.

But later on, economists rose to the task, especially in recent years. Hassett and Mathur (2010), with a sample of 65 countries between 1981 and 2005, and controlling for the value-added of workers (the main transmission mechanism to wages assumed in the open economy incidence literature), found that a dollar extra in corporation tax revenue would cut wages by at least

\$22. Gravelle and Hungerford (2010) criticise this study as depending heavily on specific methodological choices and generating an implausibly high estimate of the hit to wages.

Felix (2007) instead looks at household survey data across 30 countries between 1979 and 2002. Felix finds that in closed economies, greater payments in corporation tax cut wages, but in open economies they don't, the offered explanation being that open economies contain more multinational firms that can avoid the tax entirely. But this paper's results were also challenged on methodological grounds, including their reliance for a quarter of their data on Italy and Mexico.

Desai, Foley and Hines (2007) look for the fraction of the burden borne by labour by lagging US multinationals' affiliates in other OECD countries for four years after each of 1989, 1994, 1999 and 2004. This results in a burden on labour ranging from 45% to 75% of the total. But Clausing also questions this paper's methodology, asking whether the sample (of wage and interest payments by these affiliate firms) accurately represented the whole economy. She also notes methodological quirks that make the findings statistically significant only under tight conditions.

Arumpalam, Devereux and Maffini (2009) study the bargain over quasi-rents, looking at the direct impact of the tax, unlike most of the other work, and find that a substantial share of the burden of the tax is passed onto workers even before capital has a chance to flee. Picking through the unconsolidated records of 55,082 European companies between 1996 and 2003, they find that the effective incidence of an exogenous \$1 rise in the tax burden leads to wage payments \$0.75 lower, or \$0.59 lower after the reduction in the tax burden from the higher wages is taken into account. To back this up, they find a symmetrical \$0.57 gain to labour from a \$1 rise in pre-tax value added. They also try to control for managerial ability to erase that possible reason for lower tax burdens. But Clausing is sceptical about this paper as well, suggesting that its results are reliant on methodological choices like the precise econometric specification and choice of lags.

Fuest, Peichl and Siegloch (2013) backs up the Arumpalam et al. story about the tax's direct incidence through the wage bargain. According to their study of 11,441 German municipalities (8% of whose tax rates change every year) and employer-employee data, a €1 increase in taxes corresponds to a €0.77 decrease in wages. Though they don't control for value added, they say the indirect effect, due to capital shifting, doesn't come about due to regional labour mobility. Dwenger, Rattenhuber and Steiner (2011) also supports the Arumpalam story, finding a €1 increase in liabilities cut wages by €0.47 between 1998 and 2006 according to German panel data, though they control for the indirect effects of the corporate tax.

Aus Dem Moore, Kasten and Schmidt (2009) also look at data for firms in Europe. Considering French, German and UK firms before and after corporate tax cuts in Germany, the authors conclude that tax cuts boost wages. But Clausing points out that this comparison is only statistically significant when comparing the UK and Germany, and doesn't work for the France/Germany comparison.

Liu and Altshuler (2011) like Arumpalam et al. looks at rent-sharing, but focuses on the US, looking at inter-industry variations in effective tax rates during 1982, 1992 and 1997. The different tax treatments are mainly down to different industries holding different assets and therefore enjoying different depreciation allowances (as well as variations in interest rates, inflation, and investment tax credits). They also find that labour bears a large share of the corporate income tax burden—something like 40% to 80%—but their analysis is limited to the short run. It doesn't account for long-run worker switching between low- and high-wage industries.

Felix and Hines (2009) use data comparing the 50 US states in 2000, and find that workers enjoy over half of the benefit of lower taxes, due to a higher premium than in high-tax states. But again, Clausing says that the short time horizon, combined some problems with the methodology, mean we should take the paper with a pinch of salt. Also problematic is that they, like Arumpalam et al. only look at the short-term direct impact, controlling for capital-labour ratios and therefore excluding the main medium- and long-term channel that the theory suggests wage changes will come through. Felix (2009) and Carroll (2007) take similar approaches but Clausing also judges their correlations between corporation tax and pay "spurious" based on methodological problems and lack of statistical significance.

Clausing's own analysis uses data from OECD countries from 1981 to 2005. She converts foreign currencies into dollars using purchasing power parity in order to filter out other reasons for exchange rate moves. She measures total compensation costs, as well as pay, in order to take into account benefits, labour-related taxes and firm-side social insurance expenditures like national insurance contributions, explaining that economists believe the supply side of the labour market tends to absorb all of these. On the tax side, she uses a variety of sources aimed at capturing the effective tax rate rather than the statutory rate. Within most of her five-year periods, there is no statistically significant effect on wages from a change in corporation tax. A vector auto-regression analysis also suggests that the impact tax has on wages was "ambiguous and very small", in Clausing's words, and this finding was robust to many changes in exact specification.

In fact, according to Clausing's work, even the theoretical channels that are supposed to link up higher corporation taxes and lower wages do not hold empirically. Lower corporation taxes

are not associated with higher investment in her sample, even over decent-sized periods, nor are they (in most of her measures) associated with higher capital-labour ratios. This means that even though higher capital stocks are closely related to wages, according to a wide literature, the channel does not work. Given the evidence that foreign direct investment responds reliably to corporation tax, Clausing suggests that perhaps it is the type—not the amount—of investment that is being influenced.

## 5 IMPLICATIONS

The disappointing fact about the corporate income tax literature is that it fails to generate a solid consensus. Most empirical papers suggest that the burden falls on labour, but many of these papers have errors that would lead us to question their accuracy. The good theoretical models are hopelessly divided and imprecise, with a wide range of estimates of the tax's impact. Clausing (2012), Gravelle (2010) and Auerbach (2005), the three best reviews we found, basically conclude that most of the tax falls on capital, not labour, so perhaps that should be the baseline assumption we work with in the absence of undeniable evidence in one direction.

As said above, most economists agree that capital taxes are Bad Taxes, whereas income taxes are generally seen as one of the less bad of an ugly bunch. Thus, the fact that corporation tax hits capital (or maybe top entrepreneurs, as tantalisingly interesting research from Kotlikoff and Miao (2013) suggested) actually makes it a worse tax, though potentially politically more palatable, depending on its framing. While owners of capital tend to have higher income and wealth than non-owners, this shouldn't make it attractive for the purposes of redistribution, because we have (better) methods for directly taxing wealth and/or income.

However, as is clear in the above analysis, in a tax system as complex as the UK's, considering one element in isolation is unlikely to yield anything concrete or immediately useful. It does seem obvious that capital shouldn't be taxed if the income that provided for the savings necessary to invest was also taxed, as this will favour current over future consumption, violating liberal neutrality as well as discouraging investment and lower allocative efficiency.

But introducing even a few extra details into the system (depreciation provisions, debt/equity differences etc., imperfect competition) might mean that we are taxing away economic rents, with no distortionary costs. It may be that those rents would disappear with better policy in other areas—and certainly my own view is that in something approaching a good tax system, capital taxes play no part—but we have bad policy in lots of areas and when nefariously hard-to-model tangles and intersections of policy are considered, it is often near-impossible to determine the costs and benefits of a specific isolated policy.

Complication notwithstanding, it is likely that workers' wages are being reduced substantially—empirical estimates average at 57.6%—and the remainder is falling on capital, reducing investment and long-term progress in living standards. In fact, the difficulty of deciding who exactly pays the tax is an extra reason to heavily reduce it or just scrap it, something a majority of economists would favour. Thus we call on George Osborne to continue, or ideally accelerate, his government's programme of cutting corporate income taxes. If the cuts do not pay for themselves with greater labour supply and higher investment, then revenues from much more efficient property, income or consumption taxes ought to be raised in its said.

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