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Peter Spencer, Peter Smith, Paulo Santos Monteiro

Department of Economics and Related Studies
University of York
Heslington
York, YO10 5DD

How to better align the U.K.'s corporate tax structure with national objectives

Peter Spencer[1], Peter Smith[2] and Paulo Santos Monteiro[3]

Abstract

Successive Chancellors have been keen to lower corporation tax to help UK business and attract inward direct investment. Starting with Nigel Lawson in his budget of 1984, the mainstream corporation rate has been progressively lowered and tax breaks for investment and other expenditures progressively withdrawn.

However, it is now clear that these reforms have had untoward effects. They removed a bias towards investment but left a strong bias towards debt finance, which was accentuated by Gordon Brown's abolition of Advance Corporation Tax (ACT) in the 1997 Budget. They have favoured service industry at the expense of capital-intensive manufacturing industry and so added to the imbalances in the economy caused by globalisation.

Moreover, the latest literature on economic growth, reviewed in the Appendix, suggests that effect of industrial investment on productivity has been seriously underestimated. That is because the conventional analysis upon which these reforms have been based, focuses on the return on investment for the individual firm and neglects the benefits for the wider economy and in particular the gains from knowledge spillovers. These spillovers largely stem from the complementarities between R&D, innovation and investment and the way that new ideas and practices spread from organisations that invest and innovate to others.

This synergy means that supporting capital investment can have the same effect on long-run growth as subsidizing R&D. However, because capital is easier to monitor than the production of intangible knowledge, supporting investment is less vulnerable to agency problems and gaming. Although the fiscal system recognises the importance of innovation for economic growth by supporting R&D, this is an argument for subsidising investment as well as research. Moreover, support for investment would help ensure that UK innovations build factories and jobs here rather than overseas.

Moreover, by favouring debt over equity, the corporate tax system discourages knowledge creation. That is because intangible assets such as knowledge and expertise are difficult to finance with a corporate tax and capital structure that is tilted towards debt.

Proposals for the reform of corporate taxation have aimed at achieving tax neutrality by removing the bias towards debt finance. However, these proposals neglect important innovation externalities, which mean that we should also be tilting tax relief towards investment. We would do this by using savings from reducing debt interest relief to restore capital allowances on industrial plant and machinery, which the empirical evidence shows, plays a key role in the growth of a knowledge-based economy.

[1] University of York, Department of Economics and Related Studies, peter.spencer@york.ac.uk
[2] University of York, Department of Economics and Related Studies, peter.smith@york.ac.uk
[3] University of York, Department of Economics and Related Studies, paulo.santosmonteirio@york.ac.uk

1. Introduction

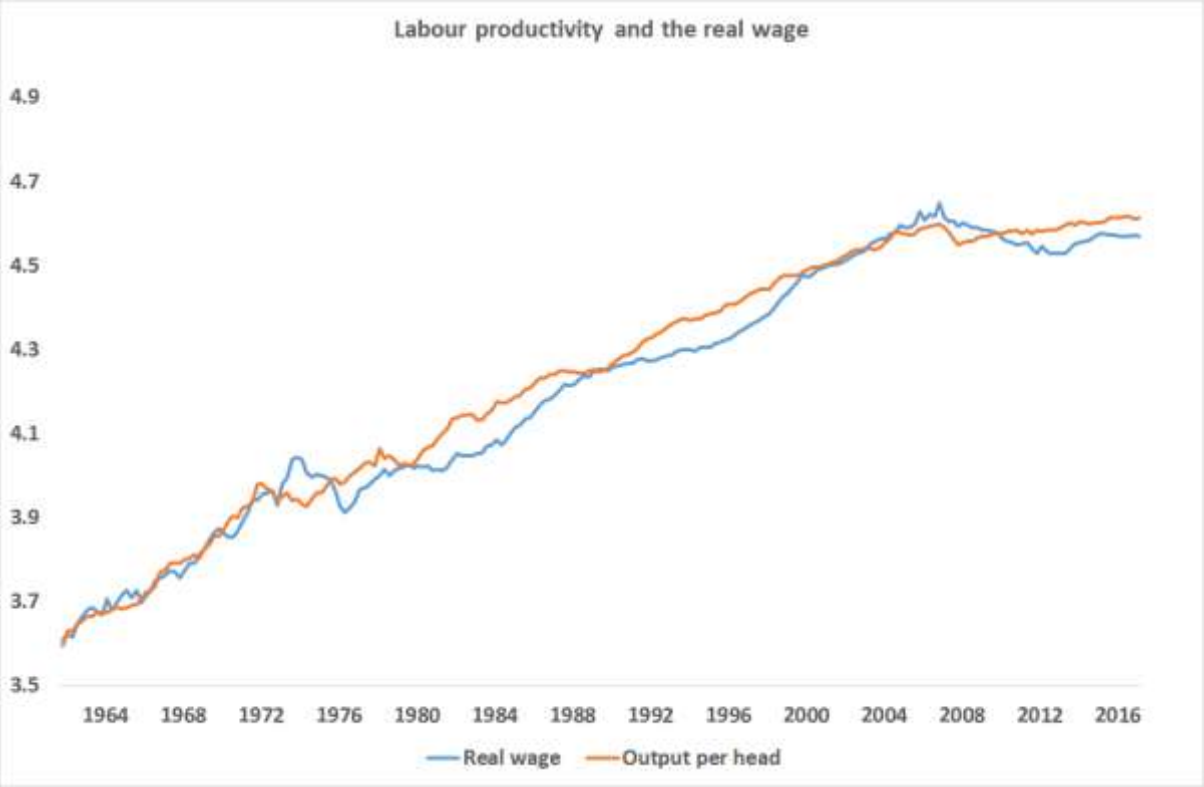
The British economy stands at a crossroads. Having experienced the force of globalisation and the financial crisis, it now faces the challenge of adjusting to Brexit and the longer-term opportunities that this promises. It is time to take stock.

We start with a review of the strengths and weaknesses of the economy and the way that the corporate tax structure may have affected these. We then look at this performance from the perspective of the latest literature on the economics of innovation. We argue that instead of encouraging investment in property and other forms of collateral, tax breaks should be used to incentivise investment in plant and machinery, to boost productivity and help mitigate the adverse effects of globalisation.

2. Britain's economic performance

Looking back at the list of economic problems faced by the UK in the 1970s (as discussed for example by Caves (1980)) it is remarkable how economic performance has improved. Top of the list then was the problem of inflation, closely followed by industrial unrest and unemployment. None of these feature on the worry list any longer.

However, other deep-seated problems remain, notably the weakness of business investment. Others faded into the background, only to return to haunt us in recent years. The balance of payments, which plagued the British economy in the 1960s and 70s, was relieved by the discovery of North Sea oil. Now, the decline of oil production and the more recent deterioration in the U.K.'s international balance sheet and rate of return on our overseas assets means that the balance of payments problem has re-emerged with a vengeance.



Source: ONS Labour market Statistics, log scales.

Other problems have loomed up since the 1970s, notably the economic imbalances. This period has seen a rapid increase in the share of business and financial services in GDP and a commensurate decline in the share of manufacturing industry. These trends have exacerbated the North- south divide as well as the divisions between the winners and losers from globalisation.

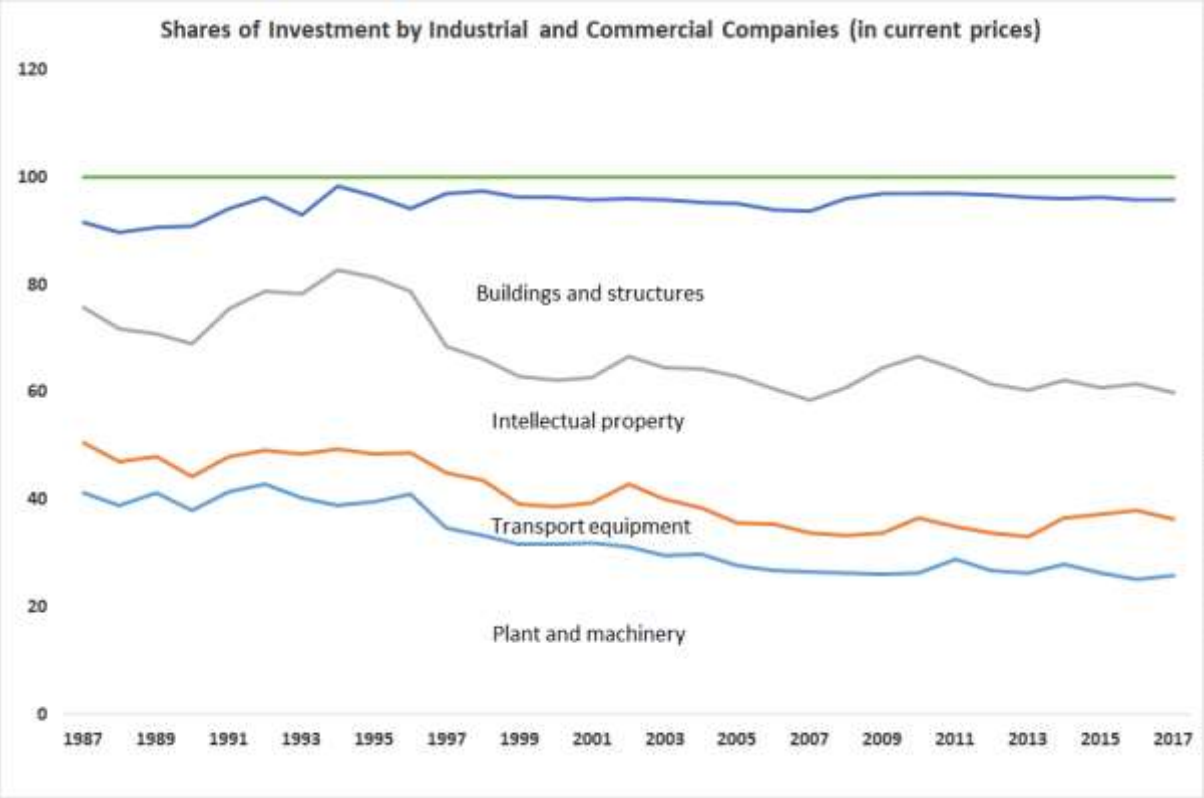
These trends are related. The rapid growth of any sector in the economy naturally puts pressure on the other sectors, while the decline of a sector eases it. For example, the growth of an exporting sector like oil extraction or indeed financial services pushes up the real exchange rate and makes it more difficult for other export intensive industries like manufacturing to compete. Also, crowding out occurs through labour and other factor markets. Seen from this perspective, business and financial services is the cuckoo in the nest that displaces its other occupants.

The growth of financial services has undoubtedly been a boon to the UK, one that other European countries envy. Moreover, the associated tax revenues have allowed the benefits to be shared right across the economy. The UK has a natural advantage in international financial services, stemming from its legal system, language and other attributes. This was apparent from the growth of the euro-dollar market in the post-war years, which allowed the City of London to avoid the usual consequences of imperial decline.

This expansion was greatly accelerated by the Big Bang reforms of 1986, which opened UK domestic markets to overseas competition. Dynamic advantages, such as improvements in market infrastructure and support services as well as deepening pools of specialised labour, built up over time, reinforcing the U.K.'s position as a world leader in financial services.

These developments can be seen as part of a global move towards trade and open markets, which leads countries to specialise in the industries in which they have a natural advantage. However, the downside effects need to be managed and mitigated carefully. Globalisation has exposed British companies and their employees to competition from Asia and elsewhere. Innovation in companies like Dyson, that would previously have generated new factories and jobs at home, have generated them elsewhere. British workers have found themselves competing directly with highly motivated and skilled immigrants in the labour market.

The UK labour market has handled these developments remarkably well. The increase in unemployment during the recession was mercifully small and short-lived and the recovery has seen a rapid growth in employment. However, real wages, which were under pressure before the financial crisis, then experienced the biggest decline since records began in the middle of the 19th century. This helps to explain why firms reacted to the upturn in demand by increasing the workforce and hours worked rather than investing to save labour and expand capacity, as they would normally do.



Source: ONS Quarterly Economic Accounts

UK business investment has been generally weak over the last two decades and investment in intellectual property and plant and machinery has been particularly weak. Dechezleprêtre, et al (2016) show that having been level-pegging with the US, France and Germany in 1980, the UK has fallen well behind these countries in terms of R&D spending as a share of GDP. As this chart shows, investment in buildings and structure, which are easy to use as collateral, has been relatively strong since the abolition of Advanced Corporation Tax (ACT) in 1997.

Although many of these problems can be laid at the door of globalisation, we will argue that government policy and in particular, tax policy has played a questionable role. The consensus among OECD countries has favoured a reduction of investment allowances and other tax breaks designed to broaden the corporate tax base and lower the mainstream tax rate. This argument has been clearly reflected in reforms to the UK corporation tax system. The mainstream corporation tax rate has been progressively lowered and incentives for investment in plant and machinery progressively withdrawn. This switch naturally favoured

services at the expense of capital-intensive manufacturing industry. Other reforms such as the abolition of ACT have had similar effects.

Although the role of investment in explaining the weakness of productivity growth is clearly recognised, the new growth literature suggests that this effect has been seriously underestimated. That is because the conventional analysis, reflected for example in the Mirlees report of (2011), focuses on the return to the individual firm and neglects the benefits for the wider economy and in particular the gains from knowledge spillovers.

3. Corporate taxation, investment incentives and innovation-led growth

The tax system can have a decisive influence upon the incentives for innovation faced by entrepreneurs. The new literature on economic growth, reviewed in the Appendix, shows that by distorting the investment strategies of firms and the incentives for R&D a badly designed corporate tax structure, can damage economic performance. It also suggests that financial constraints have a negative impact, particularly if the tax system is tilted towards debt finance.

The evidence suggests that these effects are particularly strong in the case of industrial investment in plant and machinery. Indeed, an early paper by DeLong and Summers (1991) found that for a range of developed economies these externalities make the social return to this type of investment up to three times larger than the private return to the investor. In contrast, there is no reason to believe that the social returns to property, vehicles and other forms of tangible investment are higher than the private return.

Manufacturing investment exhibits other positive spillovers. First, it typically generates high productivity and high wage jobs, in strong contrast to non-financial services. Moreover, manufacturing is much more important in Northern Britain than in the South, and supporting it could help mitigate the effect of globalisation on the regional balance of the economy. The government clearly recognises the case for infrastructure investment, but we believe that this should be complemented by support for industrial investment.

Second, manufacturing output is typically traded and has the effect of boosting the balance of payments and our international terms of trade. Of course, the City also produces traded services and high wage jobs, but has arguably assumed a role in the economy that is now too

big for comfort, exposing the economy to financial risk and upsetting its sectoral and regional balance.

4. Capital allowances and industrial investment

UK policymakers are keenly aware of the need for a more positive regional and industrial policy and of the importance of R&D for innovation. The patent box is designed to offer a tax wrapper for R&D to help stimulate invention and innovation. However, the tax system does not take account of the synergies between research and investment. Nor does it take account of the effect of corporate taxation on the firm's optimal capital structure and thus the returns to investment in R&D and equipment.

Moreover, given the current state of play, initiatives such as the patent box, though helpful in supporting the UK research community, do not necessarily lead to the creation of new industries, factories and jobs in the UK. We need to think imaginatively of ways to foster industrial growth by taking advantage of these innovations ourselves.

Successive governments have been keen to lower corporation tax to help UK business and attract inward direct investment. Although low corporation tax rates also help to stimulate innovation, tax relief for specific types of business spending would allow this to be targeted more effectively. The patent box for R&D provides the prime example. Similarly, capital allowances, which allow the cost of capital expenditure to be deducted from profit before tax, offer a way of stimulating specific types of investment.

5. Debt interest relief and the choice of finance

First-year capital allowances were an important feature of the fiscal landscape until the 1984 Budget, which aimed at reducing the rate of corporation tax rate by reducing such allowances. The initial relief on plant, machinery and vehicles was then reduced to 25%, with relief at the same rate on the declining balance of unrelieved expenditure carried over to successive years. This 25% depreciation rate was further reduced to 18% in George Osborne's 2011 Budget. These reductions bring depreciation allowances into closer alignment with the depreciation rates used by company accountants. However, they fail to take into account the benefits to the rest of the economy.

In the meantime, in his 1997 Budget, Gordon Brown removed the ACT system that had until then provided investors with relief against double taxation of dividends (i.e. both at the level of the firm as profits and the level of the investor as dividend income). This reform was designed to encourage investment through retained profits. However, it left in place the relief on debt interest payments, which remained deductible from taxable profit.

As many financial economists and commentators have argued, this anomaly favours debt at the expense of equity finance, encouraging excessive leverage, risk taking and the risk of default. In addition, the evidence reviewed in the second half of the Appendix stresses the adverse consequences for innovation when the banking and debt markets favour assets like commercial property that are easy to collateralize. We have also noted that the abolition of ACT in 1997 was followed by a surge in investment in buildings.

To illustrate the effect of these various changes, suppose that a firm is considering an investment. First, suppose that it acquires commercial property. It would be able to finance most of this cheaply through a secured bank loan. This would not be possible if it invested in R&D or equipment. Thus, the effective cost of capital for equipment is significantly higher than for property, particularly for SMEs, distorting the investment decision. Mirlees (2011) provides useful illustrative examples.

Now consider how initial allowances change the situation. Suppose, for simplicity, that the first-year allowance for equipment is restored to 100%. This means that at the current CT rate of 19%, nearly a fifth of the cost can be financed by a lower tax bill in the first year. This increase can be thought of as a zero-interest loan from the government to the company, which reduces the cost of capital for equipment, offsetting the effect of debt interest relief and encouraging investment in equipment.

6. A proposal for the reform of UK corporate taxation

Proposals for the reform of UK corporate taxation (notably, Mirlees, (2011)) have aimed to achieve tax neutrality and in particular to reduce the bias towards debt finance. For example, the Allowance for Corporate Equity (Bond and Devereux (1995), Mirlees, (2011)), removes this bias by giving a similar relief to equity finance. This scheme would be expensive.

Instead, the OECD recommends that the cap on company debt interest relief should be progressively reduced from the current 30% of profit to 10%. We would implement this as part of our proposal.

However, seeking neutrality at the level of the individual firm neglects the externalities stemming from investment, which means that we should also be tilting tax relief towards investment. There is little suggestion of this in existing reform proposals. For example, there is no mention of innovation and only one mention of R&D (footnote 8) in the discussion of corporate taxation in Chapter 17 of Mirlees (2011).

We would support investment by increasing first-year capital allowances. This scheme would have to be carefully crafted, to avoid deadweight loss, gaming and possible problems with double taxation agreements. However, because equipment is difficult to reposition, gaming the system will not be as easy as it is with shifting debt interest from one tax jurisdiction to another.

Our costings are based on a gradual move, taking the depreciation rate back up to 25%, pre-announcing increases that take it to 40% after three years. These rates would apply to investment in plant and machinery, including computers, which play a vital role in the new economy. To facilitate the costings, we have included vehicles, but there is a clear-cut case for discrimination on environmental grounds. To avoid a deadweight loss, the 18% rate would remain for investments made before announcement.

The initial costs of this proposal can be estimated using the costings for George Osborne's changes in the 2011 Budget (reproduced from the Red Book in Seely (2016)). These showed that cutting the 25% rate to 18% would raise £1.7 billion for the Exchequer in the fourth year (2014-15). This cash-flow cost stabilizes in the following year despite the growth in capital expenditure. Our own financial modelling shows that it then falls back as the balance of unrelieved expenditure declines. Using this figure as a baseline, and inflating it by 25% to allow for the growth in investment since 2011, suggests that the peak cash flow cost of the initial increase to 25% would be £2.1 billion. The cost would peak at £6.0 billion if the rate moved up to 40% immediately, but phasing this in would spread the cost and lower the peak.

In the medium term, what matters is not this cash flow cost, but the cost of financing the effective zero interest loan to the company sector. Our modelling of the 40% allowance suggests that the national debt would increase by £52 billion (in 2018 prices) in the steady state, at an annual interest cost of £1.6 billion, assuming a 3% cost of government debt).

These costings are small relative to the cost of debt interest relief. Unlike capital allowances, these costs are not identified in the HMRC statistics. However, they are not difficult to calculate. Non-North Sea Industrial and Commercial Companies paid £16 billion in interest in 2017, (down from £31 billion in 2008). Relief at 19% thus cost the Exchequer about £3 billion in 2017. The cost of debt interest relief to financial companies is much harder to identify, but is almost certainly higher than this figure.

7. Conclusion

The UK tax system has progressively moved away from support for industrial investment in order to help reduce the average corporation tax rate. While laudable in many respects, we believe that from the new growth perspective, British economic performance would have been better had this move been financed through the withdrawal of debt interest rate relief rather than capital allowances. Support for industrial investment surely make more sense than debt interest relief at the current conjuncture. This is no panacea, but this proposal would bring better-balanced, quality growth and so help mitigate the adverse effects of globalisation on the UK.

Appendix: A review of the literature on innovation and economic growth

These are two main strands to this literature. The first concerns the generation of new ideas and the way that these diffuse through the economy. The second concerns the way that financial constraints can impede innovation and the way that the tax system can amplify this.

Corporate taxation and knowledge-led growth

The first strand of this literature starts with the simple observation that the objective of research is the production of "Ideas": *non-rival* but partially *excludable* goods which constitute the engine of long-run growth. A good is *non-rival* if one person's use of the good does not diminish another's ability to use the same good. Ideas should be thought of as recipe books, instructing organisations about the best ways to combine capital and labour in production. Mathematical theorems, musical symphonies and computer programming languages are all non-rival. They are also, to different degrees, partially *excludable*, in the sense that intellectual property and other barriers to information transmission make it possible for some people or organizations to prevent others from making use of these Ideas.

Partial excludability enables the market to provide incentives for innovation and knowledge creation. The power of these two characteristics combined – non-rivalry and partial excludability – is apparent in the economic successes of companies such as Google and Amazon, which are based on innovation and their ability to develop and maintain a market leadership position. There can be no doubt that the private success of these firms also leads to knowledge spill-overs that affect aggregate economic performance. Ideas shape long-run economic growth and form the basis for endogenous growth.

Our proposal builds on the important insights of endogenous growth theory, as developed by Romer (1990), Grossman and Helpman (1991), and Aghion and Howitt (1992), which recognizes the important roles played by economic organization, incentives and policies in shaping the way that incumbent firms and potential entrants allocate resources to innovation. Innovation requires entrepreneurial investment and leads to the replacement and transformation of existing processes through a fruitful process of creative destruction. This

process of creative destruction features both positive and negative externalities resulting from the non-rival and limited excludability of Ideas. Process innovation raises the economy's stock of knowledge and overall productivity. However, due to limited excludability, the entrepreneur only partially captures the gains from innovation as rents. There is, thus, a decisive knowledge spillover and a positive externality. There is also a destructive element to innovation, a negative externality, as the introduction of new production processes erodes the rents of incumbents. The private return and the social return to innovation will, therefore, be different and there is scope for public policy to achieve welfare improvements.

In their pioneering work, Aghion and Howitt (1998), emphasize the complementarities between investment and innovation. Innovation leads to higher productivity, more output and, thus, greater capital accumulation. At the same time, capital is an input in research and innovation. These authors show that if there are strong complementarities between capital and innovation, subsidizing capital investment can have the same qualitative effect on long-run growth as subsidizing R&D, but in a way which is less vulnerable to agency problems (and, we would argue, gaming and financial constraints). That is simply because capital is easier to monitor, measure and verify than the production of intangible knowledge. This is an important insight that we believe should transform the structure of corporate taxation in the UK in a way that promotes innovation and growth.

The corporate tax system can have a decisive influence upon the incentives for innovation faced by entrepreneurs. Jaimovich and Rebelo (2017) formulate an endogenous growth model based on innovation, in which a high marginal tax on entrepreneurial innovation leads to large reductions in long-run growth, even though the effects on average tax rates are muted. Their model helps to explain why, empirically, there is large cross-sectional dispersion in average tax rates with little discernible impact on long-run economic performance, while at the same time, countries that drastically reduce private incentives to innovate severely hurt their growth performance.

Akcigit et al. (2016) estimate a structural model of a dynamic R&D investment at the firm level with knowledge spill-overs. They use this to characterize the potential welfare gains from implementing the constrained efficient optimal tax, finding that these gains are large and

require a subsidy to R&D, to align the private benefits from innovation with its social benefit. These findings are also corroborated in more recent work by Jones (2018), who studies optimal taxation when Ideas are the engine of growth. In his model, the reward for creating a successful innovation is a top income, and innovation cannot be perfectly targeted by a separate research subsidy.

Dechezleprêtre et al. (2016) use a clever regression discontinuity model of administrative tax data to exploit a UK policy reform that in August 2008 doubled the size thresholds under which firms could access the more generous small company capital allowances for R&D spending. This paper provides direct causal evidence for the impact on both R&D and quality-adjusted patenting. Importantly, the R&D tax responses are found to be large, consistent with our view that firms are likely to be subject to financial constraints. The authors also show that the R&D generated by the tax policy change led to positive spillover effects on the innovations of technologically-related firms, providing direct evidence for the knowledge transmission externalities upon which innovation-led growth is based.

Financial constraints, capital structure and the tax system

Our proposal builds on this literature. We also pick up on another important literature that shows how corporate taxation affects the firm's optimal capital structure and thus, because of financial constraints, the cost of investment in R&D and equipment.

This starts with the observation that a tax system that is tilted towards debt finance raises the relative cost of external finance for innovation-intensive firms. That is because R&D and other investments in innovation are hard to value and use as loan collateral. To take a prime example, consider the knowledge embodied in human capital. This is likely to be the factor of production that is the most complementary with innovation but is surely the least pledgable of all assets. Other examples include intangible assets and specialized silicon chips, machines and equipment. In contrast, general purpose equipment, vehicles, property and land are transparent, tangible assets that are easy to pledge and easy to value and liquidate in secondary markets.

We build on Kiyotaki and Moore's (1997) endogenous credit multiplier model, which establishes a tight relationship between a firm's ability to borrow and the plegability of its

assets. Strong empirical evidence for this link has been found by Almeida and Campello (2007), who show that the sensitivity of investment to cash flow in a financially-constrained firm depends critically upon the tangibility of its assets in a way consistent with the existence of an endogenous credit multiplier. Looking at firm level data, Bond et al. (2005) compare the UK to Germany and find that financial constraints are more significant in the UK and that cash flows are a strong predictor of whether UK firms perform R&D or not.

There is also some empirical evidence on the interaction between the R&D intensity of a firm and its choice of capital structure. Prominently, using UK firm level data, Aghion et al. (2004) find evidence that for firms investing in R&D, there is a negative relationship between a firm's investment in innovation and the importance of debt in its capital structure. Specifically, they look at a sample of firms with shares listed on the London Stock Exchange and find that firms investing in R&D are more likely to issue equity than firms that do not, and moreover, that the propensity to issue new equity increases with R&D intensity.

As these authors note, this finding stands in contrast to the traditional model of the choice of finance. This is based on agency costs stemming from informational asymmetries between the firm's managers and investors (Myers and Majluf (1984)). The future profits of firms that are big investors in innovation are less transparent than for other firms, and in this model, new equity issues by these firms may signal poor future profitability and thus raise their cost. Thus, the traditional approach would predict that such firms are likely to favour debt over new equity issues.

Instead, the evidence presented in Aghion et al. (2004) suggests that the intangibility of their assets is sufficient to overcome this effect and push innovating firms toward equity. This is consistent with theories that emphasize the importance of bankruptcy costs in determining the firm's financial structure. In particular, bankruptcy costs are likely to be lower for firms whose assets are tangible than for those with assets that are intangible and thus less easy to value and liquidate. Knowledge-based investment is, thus, associated with higher bankruptcy costs, leading the more innovation-driven firms to tilt away from debt financing.

Based on a large-sample evaluation programme of R&D grants to private US firms, Howell (2017) provides evidence to suggest that relieving financial constraints to early-stage start-ups

doing R&D has large, positive effects on citation-weighted patents, finance, revenue, survival and successful exit. Her findings strongly support the view that start-ups in high-tech and renewable energy sectors face financing constraints that impede innovation. Howell also notes that initial experimentation with new technologies may suffer from severe financial frictions due to the asset intangibility and uncertainty implied by experimentation. She argues that this phenomena is especially problematic for clean energy technology start-ups.

Clean energy investment is interesting in other ways. The dramatic fall in its cost, following on the heels of the long-established fall in the cost of computing, illustrates an earlier strand of the endogenous growth literature, due initially to Romer (1990). This emphasizes the role of learning by doing, production externalities and scale economies. In these models, investment leads to an accumulation of knowledge, expertise and skills that diffuse through the economy and register in the national statistics as labour-augmenting technical progress.

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