Abolishing The Factory Tax

How to Boost Investment and Level Up Britain

By Sam Dumitriu and Pedro Serodio

BRIEFING PAPER

EXECUTIVE SUMMARY

- The UK has had the lowest level of private investment in fixed capital as a share of GDP in the G7 for over two decades. This low level of investment has contributed to the rapid downfall of the UK's manufacturing sector, which has declined by more than any other G7 nation.

- Britain's corporate tax system is exceptionally hostile to capital investment. The UK is ranked 33rd in the OECD on the Tax Foundation's Capital Cost Recovery index.

- The UK's system of capital allowances fails to account for inflation and a real return on capital, as a result businesses cannot fully deduct the costs of investments in equipment as they can with other day-to-day expenditures such as wages.

- The capital stock per worker in manufacturing is more than twice as high as it is in other areas of the economy. The UK's corporate tax treatment of investment in fixed capital is in effect a Factory Tax, holding back growth in parts of the country that are relatively more dependent on manufacturing, such as the North and Midlands.

- The bias in the tax system against investment is a contributing factor to Britain's productivity crisis by discouraging investment. Output per hour worker has grown at its slowest rate since the industrial revolution over the last decade, at just 0.3% a year.

- Eliminating this Factory Tax, by allowing businesses to immediately write-off capital expenditures, would boost investment by 8.1% and labour productivity by 3.54% (£2,214 per worker) in the long-run.

- It would also improve the UK's Corporate Tax Rank on the Tax Foundation's International Tax Competitiveness Index from 15th to 6th and move us from 33rd to joint 1st best treatment of fixed capital investment in the OECD.

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The Royal Statistical Society recently gave its UK statistic of the decade award to "0.3%": the annual rate of growth in output per hour since the financial crisis. Over the last decade British labour productivity has grown at its slowest rate since the industrial revolution.

Discussions about 'productivity' can sound technical and disconnected from everyday life. But productivity has a very meaningful impact on our quality of life. Our emergence from abject squalor before the Industrial Revolution and into prosperous modern societies is because of our ability to make more with less. As Nobel Laureate Paul Krugman said: "Productivity isn't everything, but, in the long run, it is almost everything. A country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker."

While there are a variety of causes for the UK's recent productivity issues, a key underlying factor is a lack of investment, and in particular, investment in fixed capital. For every year since 1998, the UK had the lowest level of private investment in fixed capital as a share of GDP in the G7. This low level of investment has contributed to the rapid downfall of the UK's manufacturing sector, which has declined by more than any other G7 nation.

Distortions built into the corporate taxation system — namely, the limitations on capital cost recovery — are contributing to underinvestment in fixed capital. The UK is ranked 33 of 36 countries in the Tax Foundation's Capital Cost Recovery across the OECD index. **The inability to fully recover costs discourages investment in buildings and machinery, acting as an effective tax on factories.** This Factory Tax accelerates deindustrialisation and holds back growth in parts of the country that are relatively more dependent on manufacturing.

This report details how low levels of investment in fixed capital have contributed to Britain's slow productivity growth. It explains how the UK's corporate tax, despite cuts to the headline rate, has become increasingly unfriendly to fixed capital investment. This is then put in the international context, and in particular moves towards full capital cost recovery in the United States and Canada.

The report concludes that if the Government wants to boost investment and productivity, the tax penalty to fixed capital investment should be abolished by introducing a system of neutral cost recovery or 'full expensing'. In practice, this means making the Annual Investment Allowance, which currently allows a limited extent of cost recovery, unlimited and extending it to investments in buildings and structures.

This reform package would:

- improve the UK's Corporate Tax Rank on the Tax Foundation's International Tax Competitiveness Index from 15th to 6th and move us from 33rd to joint 1st best treatment of fixed capital investment in the OECD; and

- using estimates of investment elasticity with respect to the user cost of capital from a range of studies of US and UK tax policy changes, in the long run:
    - *increase investment by 8.1%*
    - *increase labour productivity by 3.54%* (£2,214 per worker)

THE UK'S PRODUCTIVITY PUZZLE

The UK's woeful productivity record in recent history is striking:

- The UK's post-crisis slowdown, or productivity puzzle, was the most severe in the G7. The difference in pre-slump and post-slump productivity performance was nearly twice as large in the UK (15.6%) compared to the G7 average (8.7%).[1]
- If the UK had kept up with its pre-crisis trend growth (2.3%), we would be 25 percent richer today — richer per capita than Germany.[2]
- While the recent slowdown in the rate of productivity growth is a global phenomenon with complex causes, the UK's national productivity gap with other major economies is long-standing.[3] Labour productivity (output per hour worked) in the UK is 16.3% below the G7 average.

This has a huge effect on our standard of living. While in both the UK and US there has been a slight decoupling in the relationship between labour productivity (GDP per hour worked) and median wages, research from Stansbury and Summers found in the US that "periods of higher productivity growth are associated with substantially higher growth in median and production or nonsupervisory worker compensation". They concluded "the potential effect of raising productivity growth on the average American's pay may be as great as the effect of policies to reverse trends in income inequality".[4]

There is a common misconception that improving productivity means working harder and for longer. But as the Australian Productivity Commission writes "productivity is not, as some would have it, about extracting more sweat from the brow of an already hard-working Australian." Rather, it is about doing more with the same inputs - that is, increasing the value of each hour we work. While private sector innovations are the key driver of productivity improvements, policymakers can help by removing barriers to business investment, being open to the research and trialling of new ideas, and not defending outmoded regulation that protects inefficient incumbents over consumers and startups.

The causes of the UK's persistently low levels of labour productivity are complex and multi-faceted. The following are likely causes that have been proposed by economists:

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1 https://www.ons.gov.uk/economy/grossdomesticproductgdp/articles/

2 https://revivingeconomicthinking.com/

3 International comparisons of UK productivity (ICP), final estimates: 2016

4 Stansbury, A. M., & Summers, L. H. (2017). Productivity and Pay: Is the link broken? (No. w24165). National Bureau of Economic Research.

- Falling business dynamism.[5]
- Under-investment in vocational education.[6]
- Insufficient agglomeration effects due to high housing costs.[7]
- Weak knowledge diffusion between leading and laggard firms.[8]
- Regional bias in infrastructure and R&D spending.[9]
- Persistently low levels of capital investment.[10]

This paper focuses on the last issue.

INVESTMENT IN THE UK

Britain has undergone a process of deindustrialisation over the past five decades. The trend, while painful in transition, was primarily driven by market forces as less productive manufacturers (often with strained industrial relations) left the market. The UK's comparative advantage has shifted towards knowledge-intensive sectors such as finance, pharmaceuticals, and information technology. In many ways, this economic transformation, like the transformation before it from subsistence farming to the industrial era, should be welcomed. Work in the knowledge-intensive sector is typically safer, higher paying and more interesting. However, the extent of the UK's deindustrialisation has been stark. It has disproportionately affected the North and Midlands, contributing to regional inequality. Manufacturing as a share of GDP fell by over 5 percentage points, more than any other G7 nation. While it would be a folly to target a high level of manufacturing as a share as GDP, the UK's outlier status hints that other factors, beyond comparative advantage, are at play.

The UK is also an outlier on private sector investment in fixed capital. For every year since 1998, the UK had the lowest level of private investment in fixed capital as a share of GDP in the G7. Among the 36 members of the OECD the UK had the lowest percentage of private-sector investment as a percentage of GDP between 1995 and 2015. During that time period, the UK private sector was in the bottom 10th percentile for private sector investment for all but three years. In the years since 1991, private-sector fixed capital investment in Germany, France, and the US has been, on average, a third higher than in the UK.

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5 https://media.nesta.org.uk/documents/other_productivity_puzzle.pdf

6 Aghion, P, T, Besley, J, Browne, D, Caselli, R, Lambert, R, Lomax, C, Pissarides, N, Stern, J, Van Reenen (2017) 'Investing for Prosperity: skills, infrastructure and innovation', LSE Growth Commission Report.

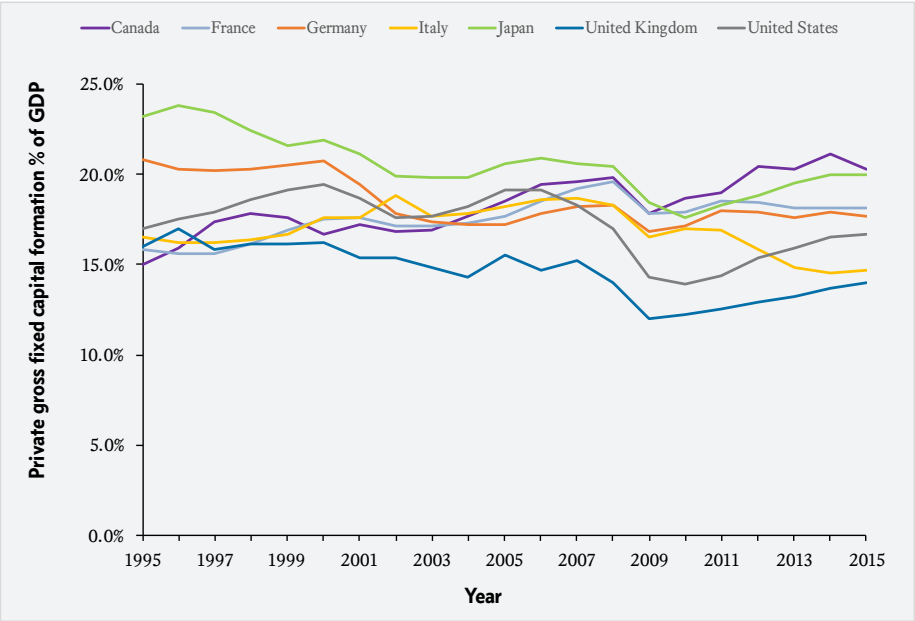
7 Hsieh, C. T., & Moretti, E. (2019). Housing constraints and spatial misallocation. American Economic Journal: Macroeconomics, 11(2), 1-39. For application to the UK see the Adam Smith Institute report "Yes In My Back Yard - How to end the housing crisis, boost the economy and win more votes by John Myers.

8 Haldane, A. G. (2018). The UK's Productivity Problem: Hub No Spokes. Academy of Social Sciences Annual Lecture, 28.

9 Jones, Richard. "Innovation, research and the UK's productivity crisis." SPERI paper 28 (2016).

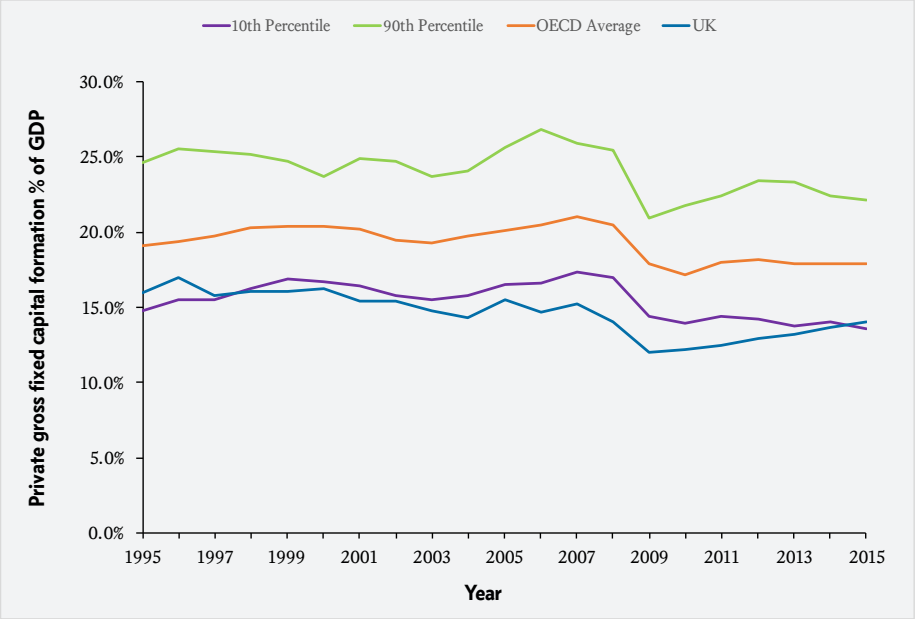
10 Silvana Tenreyro, Speech, The fall in productivity growth: causes and implications, 15 January 2018.

Figure 1: Private Sector Fixed Capital Investment in G7 nations



Source: OECD/ONS

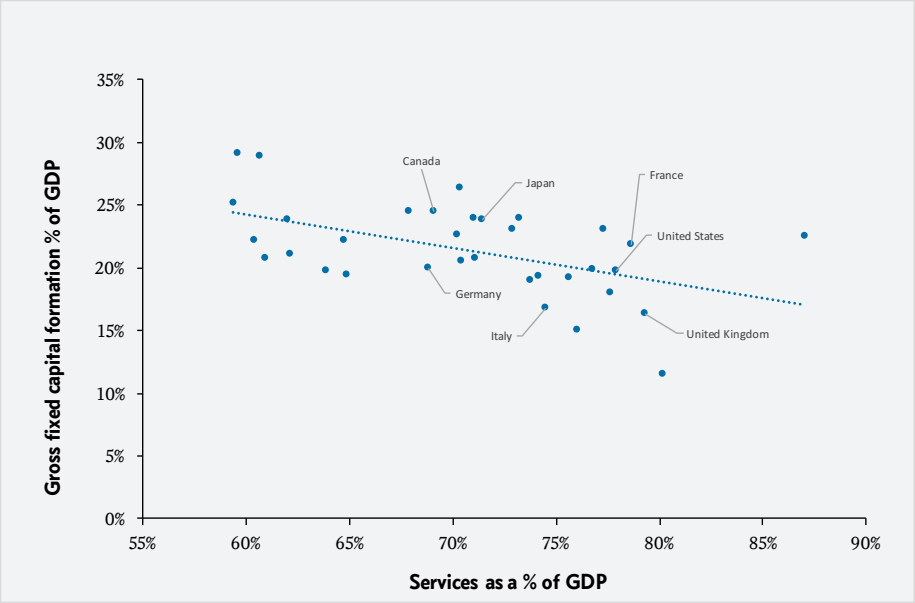
Figure 2: Private Sector Fixed Capital Investment in OECD



Source: OECD/ONS

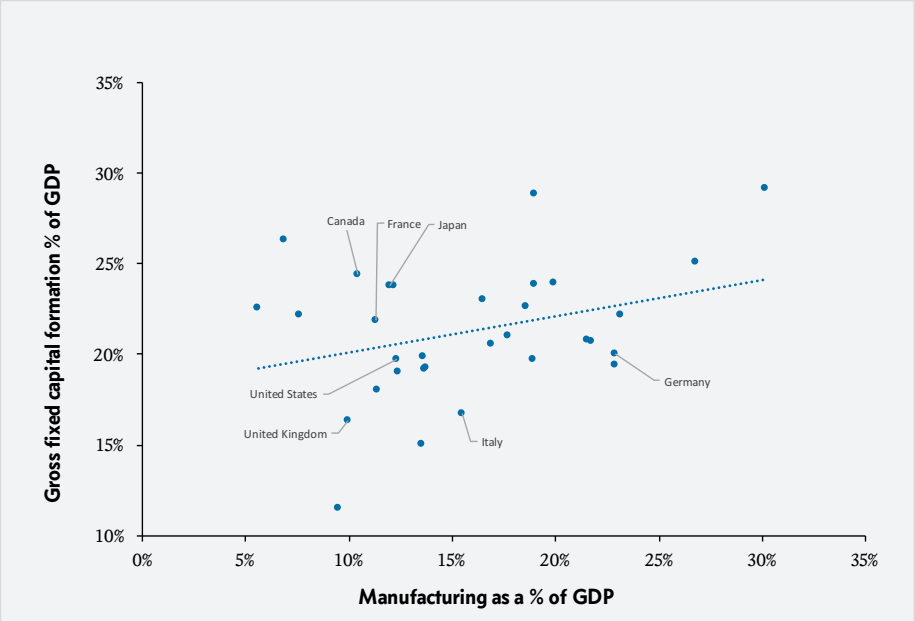
Furthermore, the UK's under-investment in fixed capital cannot be explained by the success of less-capital intensive industries. Even after adjusting for the relative size of the services and manufacturing sectors, the UK still under-invests relative to other countries.

Figure 3: Fixed capital and services sector



Source: World Bank/ONS

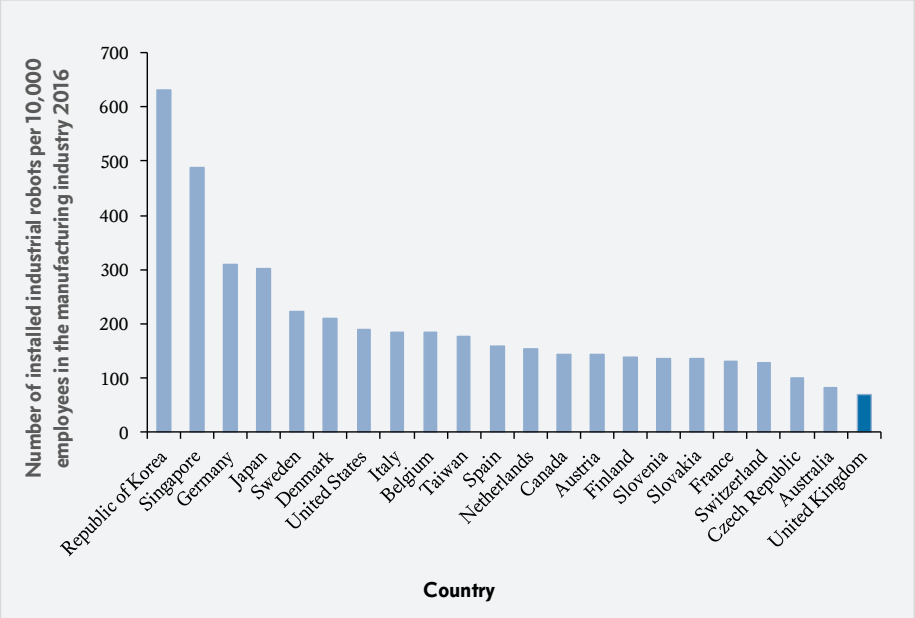
Figure 4: Fixed capital and manufacturing sector



Source: World Bank/ONS

The use of robotics allows for greater precision and automation in manufacturing. The proportion of robots used per manufacturing worker illustrates the UK's low levels of investment. Germany uses over four times as many robots per manufacturing worker as the UK, while South Korea uses nine times as many.

Figure 5: Robots per 10,000 manufacturing employees 2016



Source: International Federation of Robotics (IFR)

Anti-investment biases in the tax system may play an important role in explaining the UK's persistently low levels of investment. The next section explains how taxes affect a business's decision to invest or not.

THE IMPACT OF TAXES ON INVESTMENT

Businesses invest when the expected return exceeds the cost of investing. Imagine you owned a steel factory and were deciding whether or not to build a new blast furnace. You will need to consider multiple factors. To start, the costs of the raw materials, fuel, and labour required to build the blast furnace. Depending on how the investment is funded, you must also either factor in the interest payment on the loan or the cost of issuing equity.[11] Then, you would factor in depreciation, due to either wear-and-tear or obsolescence, such as the invention of better steel making machinery. If the projected revenue from the sale of additional goods produced by the new blast furnace exceeds these costs then you would make a profit and the investment will proceed.

In theory in a closed-economy, a pure tax on profits should not affect the decision as to whether or not a firm invests. If an investment is profitable, then you would make it regardless. After all, it is better to have 20% of something than 100% of nothing. In reality, when firms can move to a low-tax jurisdiction, high tax rates on profits encourage capital flight.[12] As a result, tax competition has pushed down the headline rate of corporate taxation across the world.[13] However, the way corporation tax functions in many countries, including the

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11 https://www.ifs.org.uk/docs/kay_king.pdf

12 Kotlikoff, Laurence J., and Lawrence H. Summers. Tax incidence. National Bureau of Economic Research, 1987.

13 https://taxfoundation.org/publications/corporate-tax-rates-around-the-world/

UK, introduces additional fiscal considerations into investment decisions.

A business's profits can be calculated by subtracting expenses (such as wages, equipment, and rental costs) from revenue. However, most corporate tax systems treat capital investments differently to other costs. The cost of investing in a new blast furnace cannot be written-off immediately as would be the case with wages or the purchase of raw materials. Instead, depreciation schedules specify an asset's lifespan and determine the number of years it would take for an asset to be written-off.

For instance, a new blast furnace cost would be deducted at a rate of 18% per year (or 6% per year if it considered a long-lived asset). It takes five and a half (or sixteen) years to deduct the initial cost of the blast furnace. However, over the five and a half years, the real value of the deduction will have been eroded by inflation. Furthermore, if the deduction was taken upfront then the business could have earned interest on the money or used it for other investments.[14] According to the Tax Foundation's Cost of Capital Recovery index, the discounted value of the deduction for plants and machinery in the UK is just 75.6% of its total cost.[15] This is one of the lowest in the OECD (30th out of 36).

As the costs of capital investment, unlike other costs, cannot be fully recovered capital-intensive businesses are penalised. Conservative MP Neil O'Brien notes that "the UK's tax system is currently uniquely hostile to manufacturing".[16] To put that statement into context, the capital stock per worker in manufacturing is more than twice as high as it is in other areas of the economy.[17] **The UK's tax treatment of capital investment is in effect a Factory Tax.**

Taxes not only affect whether investments are made, but also how they are financed. In theory, the cost of capital should be independent of the method of finance chosen (e.g. via borrowing, equity, or retained earnings), however taxes complicate matters. The Mirrlees Review explains that "the standard corporate tax base favours debt rather than equity finance, and tends to discourage corporate investment to the extent that companies rely on equity finance."[18] While interest payments to the holders of debt can be deducted from taxable profits, the opportunity cost required to compensate shareholders for equity investments is not. This is problematic for two reasons.

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14 For a numerical example, see the following from The Tax Foundation's Cost of Capital Recovery Index: "For instance, assume a machine costs $1,000 and is subject to a life span of five years. Under straight-line depreciation, a business could deduct $200 every year for five years. However, due to the time value of money, a deduction of $200 in later years is not as valuable in real terms. If inflation is 2.5 percent and a required real return is 5 percent, then at the end of the five-year period, the value of that deduction will be just $149.76 in today's terms. In total, the business will only be able to deduct $869.87 instead of the full $1,000, just 87 percent of the total. This understates true business costs and inflates taxable profits, which, in turn, increases the cost of capital investment. The effect becomes exaggerated with longer depreciation schedules and higher inflation."

15 https://taxfoundation.org/capital-cost-recovery-across-the-oecd-2019/

16 https://www.ukonward.com/firingonallcylinders/

17 Ibid

18 https://www.ifs.org.uk/uploads/mirrleesreview/design/ch17.pdf

First, equity may be preferable to debt for financing more entrepreneurial or innovative businesses. Any advantage to debt will shift resources away from those businesses.[19] Second, a bias towards debt may lead to excessive leverage creating problems for financial stability. Research from the European Central Bank finds reforms in Belgium to reduce the relative tax advantage of debt over equity increased the capital ratio of Belgian banks by 0.94 percentage points relative to other similar European banks.[20]

To recap, the status quo discourages capital investment and penalises capital-intensive sectors, such as manufacturing. It also favours debt over equity financing promoting excessive levels of leverage. In the next section, we discuss an alternative 'ideal' corporate tax base, the cash-flow tax.

THE DESIGN OF AN OPTIMAL TAXATION SYSTEM

The tax system should not discriminate between day-to-day spending and long-term investment, it should not favour one form of financing (debt) over another (equity), and it should be sector-neutral.[21] The status quo falls short on all three counts.

There is a strong theoretical case against taxing the normal return to capital income. Under standard assumptions, taxes on capital discourage saving, shrink the long-run capital stock, and reduce long-run output.

By investing in capital goods, individuals are forgoing consumption today in order to consume more tomorrow. Taxing capital is in effect taxing consumption tomorrow at a higher rate than consumption today. The return on capital investment is the price we demand for deferring consumption. Depending on interest rates, modest taxes on investment can translate to very high tax rates on future consumption.[22] In famous papers Judd (1985) and Chamley (1986) found that workers are better off under a zero tax rate on capital income even if the revenue raised from capital taxes was redistributed to them.[23][24] This is because wages are a function of labour productivity which is in turn a function of the capital stock.

However, it is important to distinguish between marginal and average rates. While the Chamley-Judd models recommend that the marginal effective tax rate on new capital is set at zero, it is still possible for taxes on capital income, such as corpora-

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19 https://www.econstor.eu/bitstream/10419/148156/1/87216389X.pdf

20 https://www.ecb.europa.eu/pub/economic-research/resbull/2016/html/rb160927.en.html

21 For a discussion of the properties of an optimal tax on business income, see https://www.ifs.org.uk/uploads/mirrleesreview/dimensions/ch9.pdf

22 For a numerical example see: https://www.adamsmith.org/blog/capitaltaxesarebad

23 Judd, K. L. (1985). Redistributive taxation in a simple perfect foresight model. Journal of public Economics, 28(1), 59-83.Judd, K. L. (1985). Redistributive taxation in a simple perfect foresight model. Journal of public Economics, 28(1), 59-83.

24 Chamley, C. (1986). Optimal taxation of capital income in general equilibrium with infinite lives. Econometrica: Journal of the Econometric Society, 607-622.

tion tax, to raise substantial revenues.[25] For instance, some businesses have access to investment opportunities that generate profits in excess of the cost of capital. To use an extreme example, investors who spot a sure-fire opportunity to treble their money in a day will still invest even if their market-beating returns are taxed heavily.

The challenge for policymakers is to tax those excess returns, while exempting the rate of return necessary for the investment to be made. This can be done in two ways. The first option would be to abolish deductions for depreciation and interest payments, and instead allow businesses to immediately write-off the full cost of capital investments. Under this system, businesses would not distinguish between day-to-day spending and investments for tax purposes. As well as stimulating investment, it would radically simplify taxes for business.

It would convert Corporation Tax into what is known as a Business Cash-flow Tax (BCT). This approach was advocated by the Institute for Fiscal Studies' Meade Committee in 1978 and as the 'Growth and Investment Plan' by the President's Committee on Federal Tax Reform in 2005. Estonia, which ranks top on the Tax Foundation's International Tax Competitiveness Index, uses a version of the BCT that only levies taxes when profits are distributed to shareholders.

Alternatively, you could introduce an additional allowance to cover the cost of equity finance. Under this system firms would continue to deduct investment costs according to depreciation schedules, but the value of the equity base would increase in line with inflation and a real return on equity. It would effectively mirror the tax system's treatment of debt. The Mirrlees Review of Tax Reform recommended introducing an Allowance for Corporate Equity (ACE). In 2008, Belgium granted firms an ACE set at the return to 10-year government bonds.

Both systems represent clear improvements over the status quo in the UK. In terms of effect on investment, both approaches reduce the marginal effective tax rate on new investment to zero and therefore should have the same effect. Similarly, in the long-run the fiscal impact of moving to a BCT or ACE are identical.[26]

In practice, each system has its own advantages and drawbacks. Allowing investments to be written-off in full is likely to create large tax losses that must be carried forward into future tax years. Without provisions to rebate or index losses to the normal rate of return, businesses may still be penalised when they invest. This is less of an issue with the ACE.[27]

Cautious policymakers may prefer the ACE on the grounds that it doesn't require any other change to Corporation Tax. By contrast, moving to a BCT would be a

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25 Abel, A. B. (2007). Optimal capital income taxation (No. w13354). National Bureau of Economic Research.

26 The economic and fiscal impacts depend on the Allowance for Corporate Equity being set at a sufficiently high enough rate. See Entin: https://taxfoundation.org/neutral-cost-recovery-system-pro-growth-solution-capital-cost-recovery/

27 But still an issue.

significantly more radical reform, requiring an end to the deductibility of corporate interest expenses.

The ACE also may present a short-term fiscal advantage, because moving to full expensing creates large, one-off transitional revenue losses. The issue arises because under the new system, businesses will continue to deduct past investments using the old depreciation schedules. The annual revenue loss falls substantially as old investments are written off. Although both systems are identical to the Exchequer from a long-run perspective, the government's objective of delivering a balanced budget by 2022 may cause problems.

The key disadvantage of the ACE is credibility. The economic equivalence of the ACE and BCT depends on investors believing that future allowances will be deductible in full. However, the record of tinkering within the tax system suggests this cannot be guaranteed. As discussed in the next section, governments have reduced the value of capital allowances on multiple occasions. As a result, the impact of an ACE on investment may be muted due to uncertainty.

A BRIEF HISTORY OF CORPORATION TAX IN THE UK

The evolution of the UK's tax system over the last forty years has a mixed record compared to an ideal corporate system set out in the previous section.

Prior to 1984, the headline corporate tax rate was set at 54% and businesses were able to immediately deduct the full value of investments in plants and machinery. As interest payments were tax deductible, debt-financed investments faced a negative effective marginal tax rate (up to -61.1%). Investments in less favoured assets (i.e. industrial buildings) still paid high marginal tax rates.

In Lawson's 1984 budget, the headline rate was cut to 35% and 100% first-year allowances were replaced by depreciation schedules that reflected true economic depreciation. While this approach enabled the elimination of the effective subsidy to debt-financed investments and lowered the headline rate to be more internationally competitive, it led to an increase in the overall tax rate on new investments. The average marginal tax rate on corporate investment increased from zero to over 45%.

Corporate tax reform has typically followed Lawson's 'broaden the base, lower the rate' approach. In the 90s, successive governments (Major then Blair) further reduced the rate of corporate from 35% to 30%.

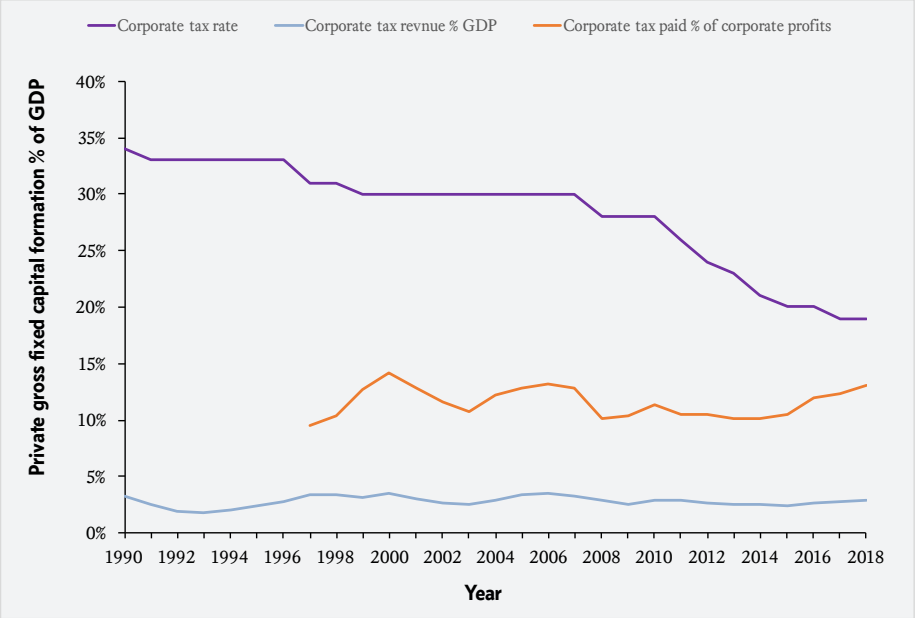
In 2008, the rate was cut again from 30% to 28%. At the same time, the rate at which investments in plants and machinery were written-off fell from 25% to 20%.[28] The industrial buildings allowance, which allowed for investments in structures to be expensed at a rate of 4% per year was abolished altogether. This may have been due

28 The special rate pool rate for long-lived plants and machinery was cut from 10% to 8%.

to EU state aid rules. The UK became the only OECD member without such an allowance.

In response to international tax competition, the headline rate of corporation tax was reduced from 28% to 19% from 2010 to 2017. Over this period, the total revenue raised from corporation tax increased. This was largely not due to a Laffer curve effect, where lower rates stimulated economic activity and led to the government taking a smaller share of a larger pie. In fact, an analysis by Dan Neidle of law firm Clifford Chance found the share of corporate profits paid in corporation tax increased as the headline rate was cut. Similarly, OECD data indicates corporate tax revenues as a proportion of GDP have been stable.

Figure 6. Corporate tax rate and corporate tax revenues



Source: OECD, Dan Neidle

The headline rate cut was financed by further reductions in the value of capital allowances. In 2012, the rate at which investments in plants and machinery were written-off was cut again from 20% to 18% and the special rate was cut from 10% to 8%.

The changes in 2008 and 2012 lead to a dramatic fall in the value of investment deduction. Although the headline rate of corporation tax fell by 11 percentage points over the time period (2008-2017), the marginal effective tax rate on new investment only fell by 3 percentage points. As firms base their investment decisions on the marginal effective tax rate, it explains why recent corporation tax cuts have not led to an investment boom.

Figure 7. Effective Marginal Tax Rate on New Investment

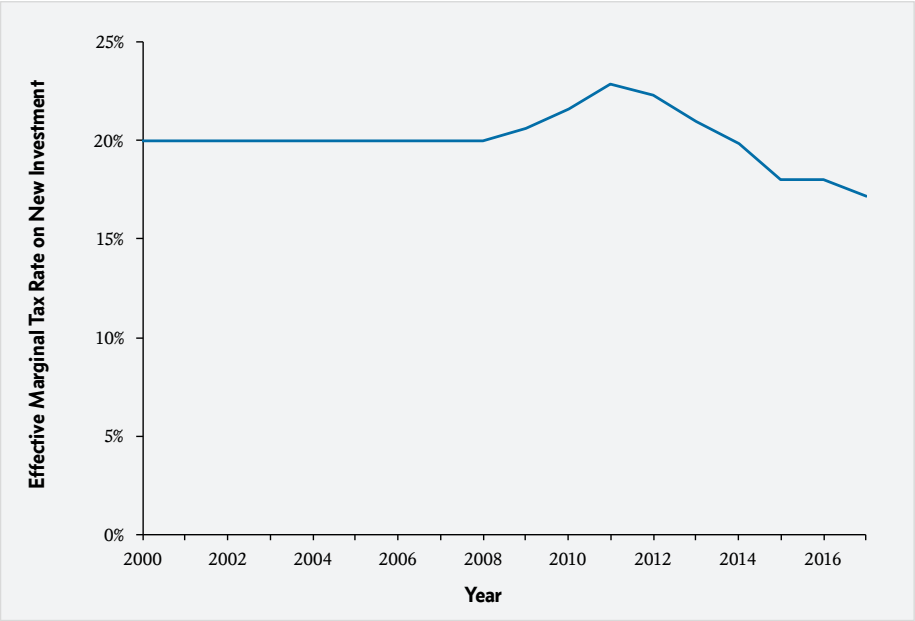
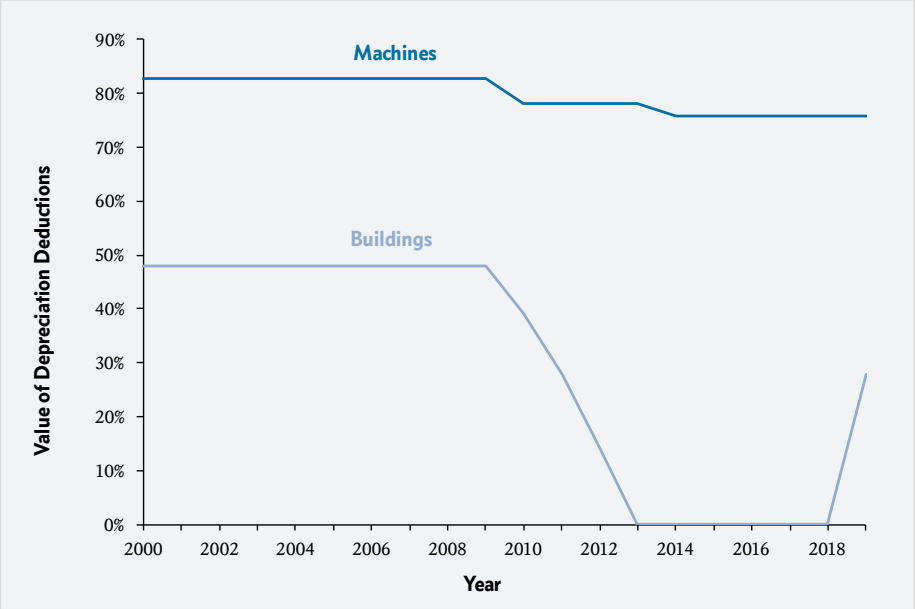


Figure 8. Value of Depreciation Deductions, Industrial Buildings and Machines



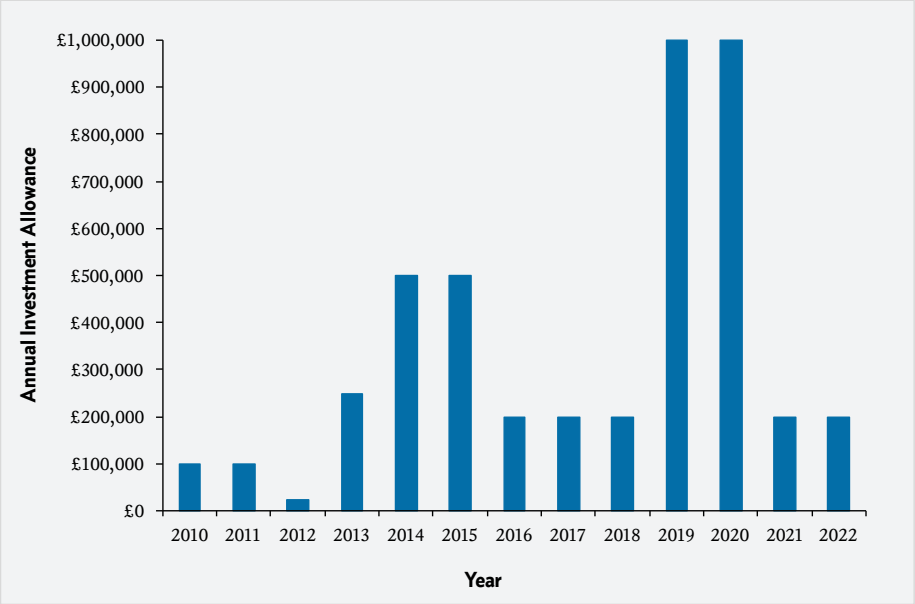
Over this period the UK effectively shifted the tax burden away from the financial sector, predominantly located in London and the South East, and onto the manufacturing sector, predominantly in the North.[29]

The 2018 Budget raised the Annual Investment Allowance (AIA) to £1m. The Annual Investment Allowance (AIA) enables business to immediately write-off the costs of new plants and machinery up to the AIA limit. The chart below shows changes to the Annual Investment Allowance over time. The see-saw nature of

29 https://taxfoundation.org/remarks-scott-hodge-tax-fairness-conference/

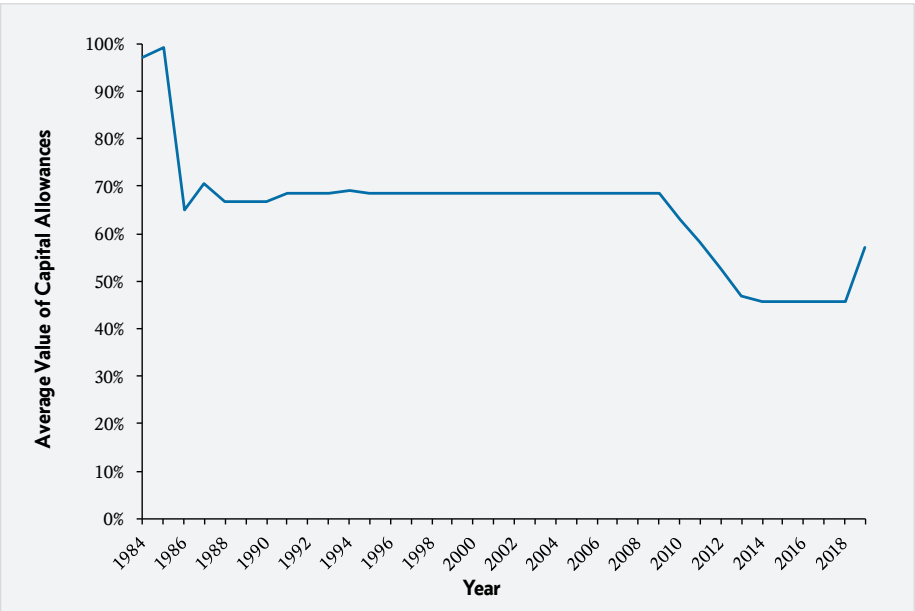
the AIA highlights how capital allowances have been afterthought to the Treasury until recently.

Figure 9. Annual Investment Allowance



Budget 2018 also restored deductions for investment in non-residential buildings at a rate of 2%. This increase reversed just over half of the fall in the value of depreciation deductions since 2008. At the last General Election, the Conservatives pledged to raise the Structures and Buildings Allowance to 3%. The chart below shows the long-term fall in the value of capital allowances. In effect, it represents the growth of a stealth Factory Tax.

Figure 10. Average value of capital allowances



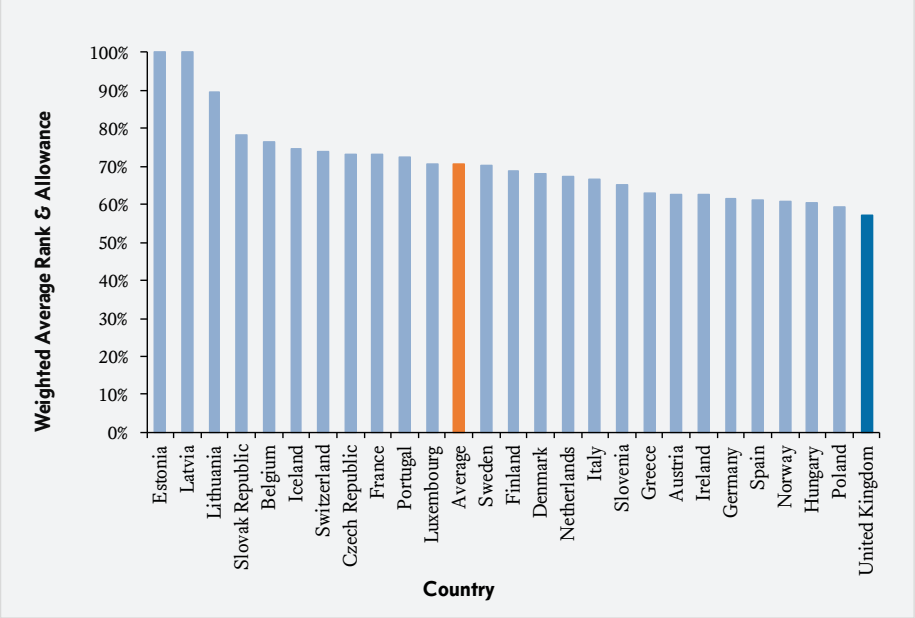
The UK ranks 33rd (out of 36) on the Tax Foundation's Cost of Capital Recovery Index. Prior to the creation of the Structures and Buildings Allowance, the UK ranked second from bottom on the index.

Table 1. Net Present Value of Capital Allowances, OECD, 2019

Country	Weighted Average Rank & Allowance		Machinery Rank & Allowance		Buildings Rank & Allowance		Intangibles Rank & Allowance	
Estonia	1	100%	1	100%	1	100%	1	100.0
Latvia	1	100%	1	100%	1	100%	1	100.0
Lithuania	3	89.5%	7	91.8%	3	83.8%	3	98.0%
Slovak Republic	4	78.2%	11	87.4%	4	65.3%	6	87.0%
Belgium	5	76.3%	9	88.2%	5	62.2%	17	80.3%
Iceland	6	74.7%	16	86.0%	6	60.2%	16	81.2%
Switzerland	7	74.1%	16	86.0%	7	55.5%	5	90.5%
South Korea	8	74.0%	6	92.2%	8	54.8%	20	73.8%
Czech Republic	9	73.3%	11	87.4%	12	54.3%	13	84.1%
France	10	73.2%	19	85.8%	8	54.8%	6	87.0%
Portugal	11	72.6%	8	88.8%	8	54.8%	20	73.8%
Luxembourg	12	70.7%	15	86.4%	14	47.9%	6	87.0%
Sweden	13	70.3%	16	86.0%	14	47.9%	12	86.0%
Canada	14	68.8%	1	100.0%	22	42.6%	35	49.0%
Finland	15	68.7%	21	82.7%	13	51.9%	20	73.8%
Denmark	16	68.2%	21	82.7%	14	47.9%	15	81.3%
United States	17	67.7%	1	100.0%	29	35.0%	31	63.3%
Turkey	18	67.6%	10	87.6%	14	47.9%	32	63.2%
Netherlands	19	67.3%	5	96.5%	30	33.8%	20	73.8%
Italy	20	66.8%	29	76.0%	21	46.3%	4	96.5%
Israel	21	66.1%	13	87.0%	23	39.1%	18	78.7%
Mexico	22	66.0%	32	73.8%	8	54.8%	20	73.8%
Slovenia	23	65.3%	13	87.0%	23	39.1%	20	73.8%
Australia	24	65.3%	20	85.1%	14	47.9%	33	54.8%
Greece	25	63.1%	32	73.8%	14	47.9%	20	73.8%
Austria	26	62.8%	24	81.3%	23	39.1%	20	73.8%
Ireland	27	62.5%	25	78.7%	14	47.9%	33	54.8%
Germany	28	61.5%	32	73.8%	23	39.1%	6	87.0%
Spain	29	61.3%	27	77.9%	23	39.1%	20	73.8%
Norway	30	60.7%	26	78.2%	28	37.4%	20	73.8%
Hungary	31	60.3%	23	81.6%	34	27.9%	6	87.0%
Poland	32	59.3%	32	73.8%	30	33.8%	6	87.0%
United Kingdom	**33**	**57.1%**	**30**	**75.9%**	**34**	**27.9%**	**14**	**82.7%**
Japan	34	57.0%	28	77.0%	34	27.9%	18	78.7%
New Zealand	35	56.6%	31	74.7%	33	31.0%	20	73.8%
Chile	36	41.7%	36	63.3%	30	33.8%	36	0.0%
OECD Average	68.6%		84.3%		48.9%		76.6%	

Source: Tax Foundation

Figure 11. Net Present Value of Capital Allowances, Europe, 2019



Source: Tax Foundation

The Tax Foundation's International Tax Competitiveness Index ranks the UK at 15th for Corporate Tax. Although the UK has the fourth lowest corporate tax rate in the OECD, treatment of investment drags us to the middle of the pack. If the UK abolished the Factory Tax, by either allowing investment expenditures to be written-off in full immediately or creating an ACE, it would move the UK's corporate tax from 15th to 6th on the International Tax Competitiveness Index.

The long-term decline in the value of capital allowances in the UK was part of a broad international trend. As corporate tax rates fell across the OECD so did the value of capital allowances. The average value of capital allowances across the OECD has fallen from 77% in 1983 to 72% in 2012. After going down even further, the average value of capital allowances is now 68.6%. As the CBI notes, the fall in the value of the UK's capital came at a time when "all other G7 countries have seen their present value of capital allowances increase."

In the US, the Tax Cuts and Jobs Act of 2017 temporarily enables businesses to immediately deduct the full cost of investments in plants and machinery from their taxable income. The provision lasts until 2021, where it will then be gradually phased out between 2022 and 2026.

In response to the Trump administration's tax cuts, Canada's Liberal government adopted temporary full expensing for equipment and machinery used for manufacturing and clean energy. Canada also accelerated depreciation schedules for non-residential buildings used in manufacturing from 5% to 15% and from 3% to 9% for all other non-residential buildings. The Canadian reforms will be in place until 2023, then phased out over four years.

THE IMPACT OF CAPITAL ALLOWANCES ON GROWTH, INVESTMENT, AND WAGES

Multiple studies find large impacts on investment, output and wages when capital allowances are expanded.

To test the impact of capital allowances on investment in the UK, a paper from the Oxford Centre for Business Taxation exploited a change in the qualifying thresholds for first year allowances (FYA).[30] FYAs enable SMEs to deduct 40% of an investment's cost in the year it took place. Businesses that did not qualify for a FYA could only write-off 25% of an investment's cost in year one. SMEs that qualified for the FYA increased their investment by 11% (2.1-2.6 percentage points) on average (compared to similar non-qualifying firms). The paper implies a 1% decline in the post-tax cost of investment leads to an 8.7% increase in investment.

Another study looked at US states that temporarily implemented full expensing (or similar) policies between 2002 and 2008. Using a difference-in-difference approach to control for the risk that states with lower investment levels may have been more likely to adopt the reform, Economist Eric Ohrn found that full expensing increased investment by 18%.[31] Similar to the above paper, the results imply a 1% decline in the post-tax cost of investment leads to a 9.55% increase in investment.

A further study found that the local labour markets which were most exposed to the policy "experienced a large and stable increase in employment".[32] The study estimated that the fiscal cost per job created ($20,000) was lower than the cost per job created for government spending ($30,000) and equal to tax cuts targeted towards the low paid ($20,000).

A range of other studies find that similarly large impacts on investment from expanding capital allowances. Zwick and Mahon find a 1% fall in the post-tax cost of investment leads to a 7.2% increase in investment.[33]

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30 Maffini, G., Xing, J., & Devereux, M. P. (2019). The impact of investment incentives: evidence from UK corporation tax returns. American Economic Journal: Economic Policy, 11(3), 361-89.

31 Ohrn, Eric. "The effect of tax incentives on US manufacturing: Evidence from state accelerated depreciation policies." Journal of Public Economics 180 (2019): 104084.

32 Garrett, D. G., Ohrn, E. C., & Suárez Serrato, J. C. (2019). Tax Policy and Local Labor Market Behavior (No. w25546). National Bureau of Economic Research.

33 Zwick, Eric, and James Mahon. "Tax policy and heterogeneous investment behavior." American Economic Review 107.1 (2017): 217-48.

Table 2. Previous studies on investment and the cost of capital

Study	Estimate of elasticity of investment in response to the cost of capital
House and Shapiro (2008)[34]	6-14
Zwick and Mahon (2017)[35]	7.2
Maffini, Xing, and Devereux (2019)[36]	8.7
Ohrn (2019)[37]	9.55
Ohrn (2018)[38]	7.8
Average	**8.65**

By collating average empirical estimates of the responsiveness of investment to a decline in the post-tax cost of investment, we can model the impact of abolishing the Factory Tax on the UK economy, by allowing firms to immediately write-off all investment would raise investment by 8.1% over the long-run and permanently increase GDP by 3.54%.[39]

RECOMMENDATIONS

Recommendation 1: Allow businesses to immediately deduct capital expenditures on plants and machinery from their taxable income by making the Annual Investment Allowance (AIA) unlimited.

We estimate this measure would raise long-run investment in plants and machinery by 9.1%.

Under this reform, the UK's position on the corporate tax ranking of the Tax Foundation's International Tax Competitiveness Index would improve from 15th to 12th.

Recommendation 2: Allow businesses to immediately deduct expenditures on non-residential structures and buildings as well.

We estimate this measure would raise long-run investment in non-residential structures and buildings by 17.7%.

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34 House, C. L., & Shapiro, M. D. (2008). Temporary investment tax incentives: Theory with evidence from bonus depreciation. American Economic Review, 98(3), 737-68.

35 Ibid

36 Ibid

37 Ibid

38 Ohrn, E. (2018). The Effect of corporate taxation on investment and financial policy: evidence from the DPAD. American Economic Journal: Economic Policy, 10(2), 272-301.

39 Authors own calculations.

This further reform would improve the UK's position on the corporate tax ranking of the Tax Foundation's International Tax Competitiveness Index from 12th to 6th.

We estimate the above reforms would raise investment by 8.1% and labour productivity by 3.54% (£2,214 per worker in the long-run).

We estimate the above two reforms will reduce long-run annual Corporate Tax revenues by 0.47% of GDP (£9.4bn) on a static basis.[40] However, this does not factor in additional revenues resulting from increased investment, wages, and output.

In order to avoid subsidising debt-financed investments into plants and machinery, the tax deductibility of interest payments should be restricted.[41] This would lower the fiscal costs of the reform significantly.

Recommendation 3: Allow trading losses to be carried forward with an interest factor.

In theory, the above reforms should be sufficient to eliminate the Factory Tax and remove any bias against capital investment in the tax system. In practice, unless businesses are able to carry forward their losses with an interest factor that compensates them for the time value of money and inflation, then a bias will remain.

Additionally, the government should also abolish the cap on loss carryforwards. Under existing rules, losses may only be offset against at most 50% of taxable profit in a given year, subject to a £5 million allowance for each corporate group. The Institute for Fiscal described this as a policy "for which there is no good economic rationale". The current policy discriminates in favour of businesses with stable low positive profits over firms that make both large losses and large profits in different years".[42]

Combined with the two prior reforms, allowing losses to be carried forward with an interest factor and eliminating the 50% annual limit on loss carryforwards would improve the UK's overall position on the Tax Foundation's International Tax Competitiveness Index from 25th to 22nd.

CONCLUSION

If "levelling up" is to be more than a slogan, it is not sufficient to just tackle the biases in infrastructure and R&D spending that favour London and the South-East. With manufacturing making up a substantially greater share of the economy in the

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40 The costs would be higher in transition as businesses write-off capital costs incurred under the previous system of capital allowances. However, this does not affect the government's long-run fiscal position.

41 The would flip the existing treatment of interest. Interest costs would become nondeductible but interest receipts would not be taxed. It increases revenue by taxing returns on investments that might otherwise flow untaxed to tax-exempt or overseas entities.

42 Miller, H. (2017). What's been happening to corporation tax. IFS Briefing Note BN206.

North and Midlands, it will also require removing biases within the tax system that hit manufacturers the hardest.

The inability of businesses to fully recover the costs of capital expenditure (as they can with day-to-day expenses) acts as a Factory Tax. Removing this bias from the tax system by allowing firms to write-off the costs of new investments immediately would unlock 8.1% in additional investment and boost labour productivity by 3.54%, with most of the benefits going to places outside London and the South-East.