Corporation Tax

Andrew Smithers

Key Points

- Corporation tax is a tax on investment. Current plans to increase the rate in the UK and the USA will, if implemented, severely damage their economies.

- That such self-destructive folly has met little opposition and is seldom even debated results from the weakness of current consensus economic theory—the neoclassical synthesis.

- The impact of corporation tax cannot be assessed without a command of financial economics. Except in the form of a few aprioristic and demonstrably false assumptions, finance is absent from the consensus model and this is widely accepted as its major fault.

- If implemented without offsetting policy measures, a rise in corporation tax will exacerbate two major economic problems. It will retard the already poor rate at which labour productivity and output grow and it will amplify the structural *ex ante* net investment deficit of the private sector.

- In the UK tax credits for tangible investment are planned for the next two years. The damage from a rise in corporation tax could be more than offset if these were made permanent and, in the USA, if similar credits were introduced.

Introduction

The tax receipts of government must reduce the income of the private sector and its consequent ability to consume or invest. Some of these revenues, including those attributed to corporation tax, VAT and some excise duties, are collected by companies but their burden must nonetheless reduce the private sector's capacity to spend on consumption or investment. It is not collected from corporate interest payments nor, as I show later, can companies pass its burden

on to them, so corporation tax can only fall on consumption if it reduces the income of shareholders, or employees. If it were to fall on shareholders, the return on equity would rise and fall with changes in corporation tax. If it fell on employees, their share of corporate output would respond to changes in the tax rate. As neither occurs, and corporation tax is not paid by company creditors, we know that the burden falls on investment.

Managements decide on how much investment the companies they run should undertake. The consensus model assumes that these decisions are based on "profit maximisation"—the aim of maximising the present value of companies' long-term net worth. Managements are assumed to behave as if companies were run directly by shareholders whose aim is assumed to be profit maximisation. An alternative view is that the behaviour and functions of shareholders and managers are sufficiently different to make it essential that economic models divide the private sector in two, separating households from companies. "We start from the proposition that corporate directors may subject corporate policy decisions to utility functions of their own."[1] If companies pursued profit maximisation they would invest more when capital is cheap and less when it is expensive. The main element in the cost of capital is the cost of equity because it is much more expensive than debt and because interest payments are an allowable expense for corporation tax. If companies "profit maximised" investment would rise and fall with fluctuations in the stock market, which does not happen,[2] and the mean reversion of the ratios between corporate net worth and stock market value ("equity q")[3] and corporate capital and market value ("Tobin's Q")[4] would result from the changes in business investment;[5] not, as they do, from changes in the level of the stock market.

This lack of connection between consensus theory and the observed behaviour of companies means that the consensus model cannot be used to understand the investment response of companies to changes in corporation tax nor on whom its cost falls. A workable model of the economy must separate the

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[1] Robin Marris, *The Economic Theory of "Managerial Capitalism"* (London: Macmillan, 1964).

[2] Andrew Smithers, *Productivity and the Bonus Culture* (Oxford University Press, 2019), Chapter 8 illustrated in Figure 28.

[3] Andrew Smithers and Stephen Wright, *Valuing Wall Street* (New York: McGraw-Hill, 2000).

[4] James Tobin, *A general equilibrium approach to monetary theory*. Journal of Money, Credit and Banking Volume 1 No. 1. (1969)

[5] Fumio Hayashi, *Tobin's marginal q and average q: A neoclassical interpretation*. Econometrica Volume 50 Number 1. (1982)

household from the corporate sector, explain how managers decide on the level of investment and show that the resulting model is robust when tested against the evidence.

The decisions of those who manage companies are swayed by many different factors but the two chief ones are wishes not to be sacked and to be highly paid while employed. If a company's shares are rated by the stock market below those of others it risks being taken over, which is a blow that neither the jobs nor the dignity of CEOs usually survive. Lowly rated companies are typically those with below average returns on equity, which are most often caused by losing market share through investing too little, and by poor returns on new investment through investing too much. The managers of quoted companies, who are responsible for about 80% of US corporate investment by domestically owned companies, determine the level of investment and thus a major part of demand and the major cause of growth. As their behaviour responds to the stock market, an understanding of its economics is an essential part of any economic model on which policy can be satisfactorily based. It is absent from the consensus model, which justifies the widely agreed view of its inadequacy as a guide to policy including decisions on corporation tax. I therefore rely in this article on the work I have done on this aspect of financial macroeconomics.[6]

Corporation Tax and Returns to Shareholders

The real returns that shareholders receive in aggregate are mean-reverting around an average of approximately 6.6%. The fluctuations around this average are completely unrelated to the rate of corporation tax. For example, they rotated around this level from 1801, when the US data series start,[7] to 1916, a period during which there was no Federal corporation tax, and since when it has been strongly positive and was persistently above 50% from 1941 to 1954.[8]

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[6] *The Economics of the Stock Market* by Andrew Smithers is due to be published by Oxford University Press and this is currently planned for January 2022.

[7] We owe the early statistics to the work of Jeremy Siegel, who kindly sent me his annual data, which he uses in his book *Stocks for the Long Run* Richard D. Irwin (1994).

[8] The effective rate of corporation tax, which is tax revenue received as a percentage of pre-tax profits, varies not only with the statutory rates levied at Federal and state levels, but with allowances and credits, such as the R&D tax credit introduced in 1981, and through the impact of inflation on allowances for depreciation.

The stock market can be valued;[9] it becomes expensive after a prolonged period of above-average returns and cheap after sustained periods of poor ones. Buyers of equity when markets are cheap thus receive above-average returns and vice versa. For companies, the cost of equity is the mirror image of the return to shareholders. Equity capital is cheap when the stock market is expensive and expensive when it's underpriced. Mathematically the way returns to shareholders fluctuate is termed negative serial correlation, which can be measured by showing the decline in the volatility of returns as the period for which equities are held lengthens.[10] Over time the return that shareholders receive must be the same as the return on corporate equity ("net worth"). Companies risk being taken over if their shares are poorly rated by the stock market. This is a relative judgement which is independent of the level of the stock market. Managements are therefore unconcerned about whether the stock market is cheap or expensive; they worry only about their standing relative to others. If companies invest too much, they receive a lower return than the average company, and are liable to be taken over; if they miss opportunities to invest when they can get this return, they will find their costs rising relative to those of their competitors. Companies therefore invest when they expect a return on the equity component of the finance which at least equals the long-term return on equity. This is their "hurdle rate".
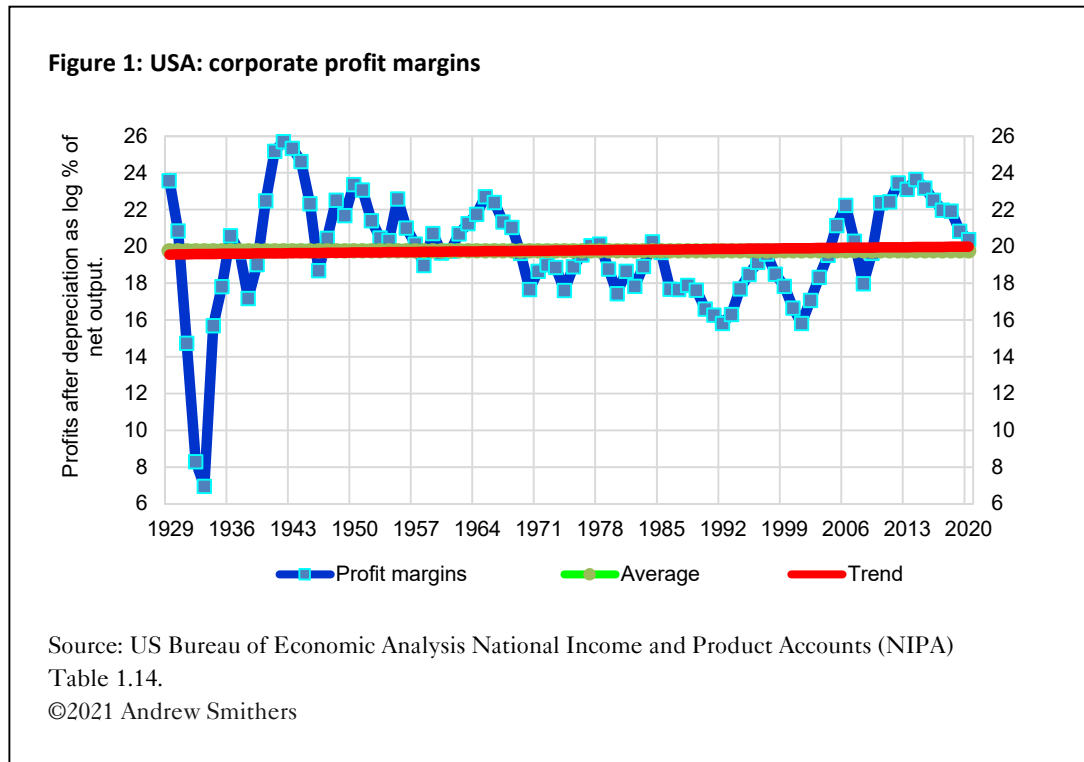
When the level of corporation tax is raised the hurdle rate is unchanged but the expected return on new investment will fall, unless the share of output taken by profits rises, interest rates fall, or less equity is needed for investment through a rise in leverage. Projects which would previously have been pursued will be cancelled and those that qualify will be fewer than before. The amount of new investment fluctuates with the opportunities provided by improvements in technology, which occur over time at varying speeds. The level of new investment does not therefore rise and fall solely with the level of corporation tax, but for any given rate of technological improvement, interest rates and

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[9] The stock market can be valued either by the cyclically adjusted price/earnings ratio (CAPE) or by the equity q ratio. The results from each method support each other. Regular updates are available on the website at www.smithers.co.uk. The methods are set out in *Irrational Exuberance* by Robert Shiller (Princeton University Press, 2000) and *Valuing Wall Street* by Smithers and Wright. op. cit.

[10] Smithers, *Productivity and the Bonus Culture*, Figure 29. op. cit.

leverage, the amount of investment will vary inversely with the rate of corporation tax.

The Labour and Profit Shares of Output

Figure 1: USA: corporate profit margins

Profits after depreciation as log % of net output.

Source: US Bureau of Economic Analysis National Income and Product Accounts (NIPA) Table 1.14.
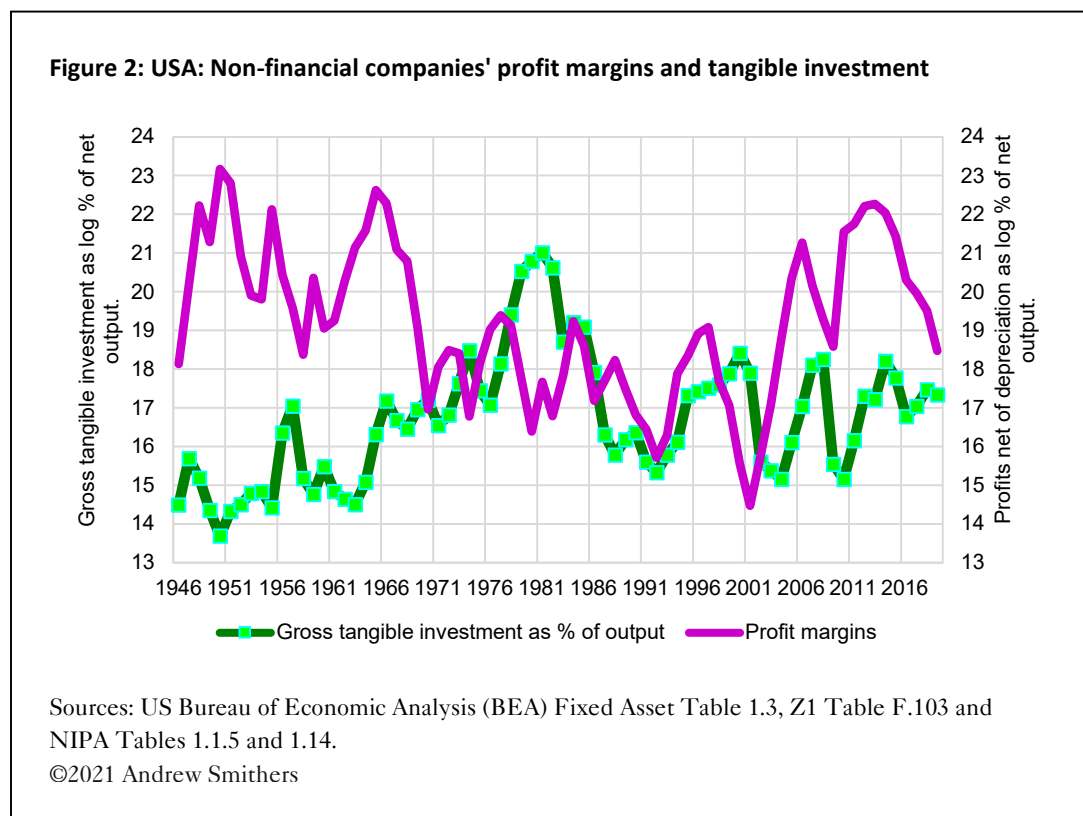©2021 Andrew Smithers

As a matter of statistical identity, although income and output are measured by different means they must be equal and, subject to small statistical discrepancies, they are. The output of companies is shared between the part taken by profits and the part paid to employees; together profits and labour incomes add up to 100% of corporate output. The definitions of labour and profit incomes must be consistent with each other. That proposed by Sir John Hicks eighty years ago has, to put it mildly, stood the test of time. As Hicks defined incomes it is "the maximum a man can spend and still be as well off at the end of the week as at the beginning".[11] While this leaves the definition of 'well off'

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[11] J.R. Hicks, *Value and Capital: An Enquiry into Some Fundamental Principles of Economic Theory* (Oxford University Press, 1939).

open to debate, it is clear that spending all profits before depreciation will leave the owner of capital worse off.[12]

As Figure 1 shows, the data series, which starts in 1929, shows that profit margins appear to be mean-reverting.[13] As this fits the assumptions of the Cobb-Douglas production function,[14] it is reasonable to assume that they have been mean-reverting over the long-term. They will therefore have been on average at the same level when there was no Federal corporation tax as they have been since when it has been always significant and often above 50%. Thus profit margins cannot have risen and fallen with the level of corporation tax, which has therefore not been borne either by profits or by the incomes of employees. This is confirmed by the absence of any correlation (R^2 correlation = 0.000) between

Figure 2: USA: Non-financial companies' profit margins and tangible investment

Sources: US Bureau of Economic Analysis (BEA) Fixed Asset Table 1.3, Z1 Table F.103 and NIPA Tables 1.1.5 and 1.14.
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[12] Sir John Hicks also remarked that many people find it difficult to distinguish between capital and income, to which Sir Denis Robertson replied that the jails were full of those who failed to do so.
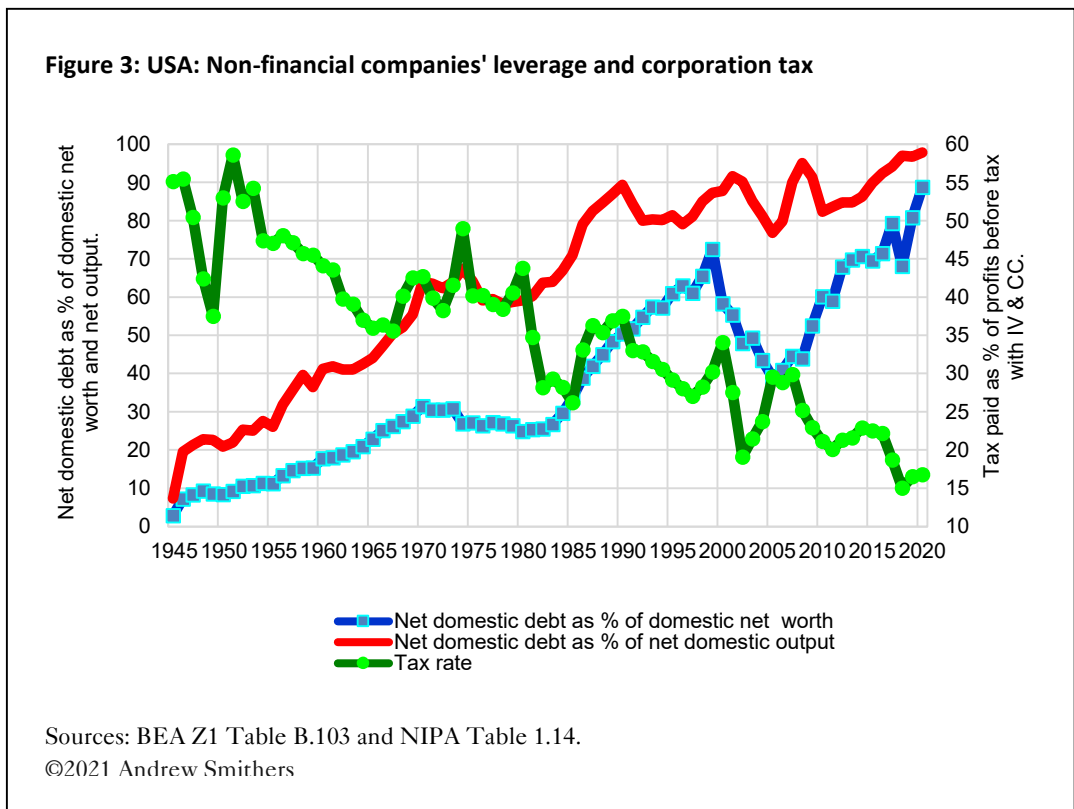
[13] For statistical testing of how stationary US profit margins are see Smithers & Co., ADF statistics from James Mitchell at www.smithers.co.uk/page.php?id=59.

[14] For a detailed explanation see Smithers, *Productivity and the Bonus Culture*, Appendix 8. op. cit.

business tangible investment and profit margins covering the period for which we have data and which I illustrate in Figure 2.

Interest Rates and Corporate Leverage

As corporation tax has no impact on the return on equity or the labour share of output, it must be a tax either on investment or on interest income from debt. It clearly does not increase the tax collected from income receipts, but it could raise the tax revenue from debt interest received if companies increased their leverage to offset the rise in corporation tax, subject to the important proviso that this substitution of debt for equity increases tax revenue from the household sector.

Figure 3: USA: Non-financial companies' leverage and corporation tax

Sources: BEA Z1 Table B.103 and NIPA Table 1.14.
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This might be possible, but to occur it would also have to be the result of a rise in the rate of corporation tax—it would in economic terms have to be

endogenous. Companies would have to respond, by increasing leverage, to a rise in the rate of corporation tax rather than to other changes such as lower interest rates. If interest rates are unchanged and leverage rises, then in a closed economy the household sector will own more debt and less equity. Receipts from an unchanged level of corporation tax will fall as leverage rises, and investment will rise, provided that debt remains cheaper than equity, as less equity will be needed to finance new investment. For this to occur, leverage must rise in line with the rate of corporation tax and, as Figure 3 shows, the opposite has happened—leverage has risen since the data series started in 1945, whether debt is measured relative to net worth or to output, while the rate of corporation tax has risen.

Lower Investment Means Slower Growth

Output fluctuates with demand around its equilibrium level and, as Figure 4 illustrates, the ratio of the value of the tangible fixed produced capital to output is mean-reverting.[15] Produced capital, which includes inventories, is the result of savings, and includes all capital other than natural endowments, such as land and unmined minerals. Its value rises with net additions to it, which equal gross investment less depreciation. Companies will not invest unless the expected return on new investment is positive and higher than the hurdle rate. The amount of investment thus declines if the expected return falls due to an increase in corporation tax, or to a rise in the hurdle rate. For any given growth rate of employment, labour productivity will improve as the value of the capital stock rises per person employed. Depreciation, however, also rises with the growth of real wages and,[16] since the labour and profit shares of output are mean-reverting (Figure 1), depreciation rises and falls with changes in labour productivity. The value of the produced capital stock per person employed will therefore rise with an increase in gross investment but will rise proportionately less as the value of the capital stock will be affected by an increase in depreciation.

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[15] I give in the Appendix the theoretical explanation of why this ratio is mean-reverting.

[16] R.M. Solow, J. Tobin, C.C. von Weizsäcker and M. Yaari, *Neoclassical growth with fixed factor proportions*. The Review of Economic Studies Vol. 33 No. 2 (April 1966).

The relationship between depreciation and labour productivity explains why a rise in the rate of corporation tax does not cause a fall in the return on equity. An increase causes investment to fall below the level that it would otherwise be. This slows the growth of productivity, which reduces the growth of real wages and thus the rate of depreciation.

Figure 4: USA: Capital/output ratio
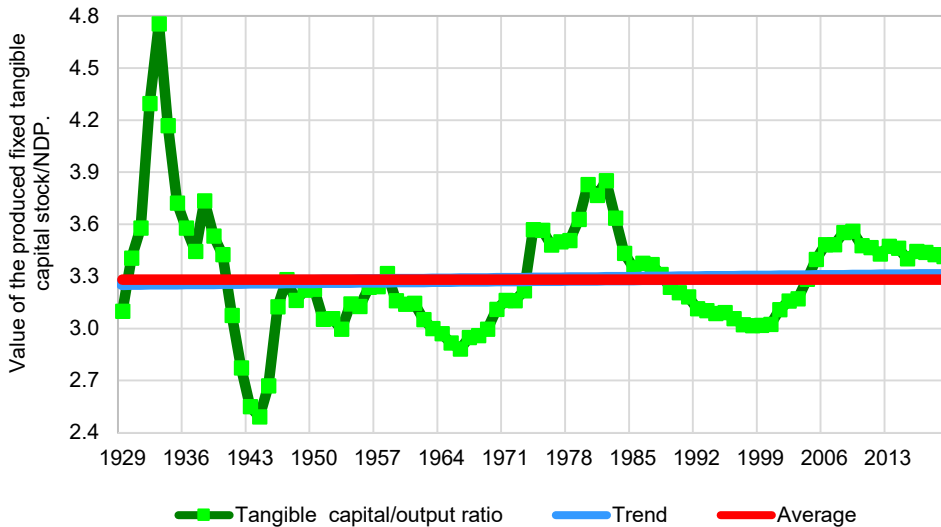
Sources: NIPA Table 1.5 and BEA Fixed Asset Tables 1.1 and 1.3.
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The Hurdle Rate

The hurdle rate must be stable over the long-term and equal to the average, mean-reverting, real return on equity. It can, however, fluctuate and has risen since 2000 due to the arrival of the bonus culture, which has changed management behaviour by shifting the utility function of those who decide on corporate investment.[17] This utility function depends on the interaction of the

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[17] Smithers, *Productivity and the Bonus Culture*. op. cit.

two main concerns of managers, which are to keep their jobs and be highly paid, by shifting the short-term rewards of not investing.

The year-to-year fluctuations in the proportion of output invested in an economy are relatively small but for individual companies, particularly smaller ones, they are much larger. Investing in new equipment is usually in response to expectations of increased demand, but the extra capacity, being lumpy, is unlikely to be absorbed immediately by higher sales. The returns on new investment tend therefore to rise over time as the cost of new capacity moves from exceeding the initial benefit to falling well below it. Over-optimism and over-investment are therefore dangerous, but so also is excessive caution. New equipment is more efficient than that currently in use and, as real wages rise, returns on equity will fall for those companies which underinvest and thus fail to keep pace with their competitors' improvements in productivity.

Profits and additional debt can be used to invest or to reduce equity and raise dividends. Investment is costly and risky in the short-term while the benefits are long-term, as lower production costs only emerge over time as output rises to meet the increased ability to produce. Buybacks and higher dividends are almost riskless in the shorter term and usually raise share prices, improve earnings per share ("EPS") and lift total shareholder returns ("TSRs") to which

Figure 5: Foreign direct investment in USA

Source: BEA Z1 Table L.230.
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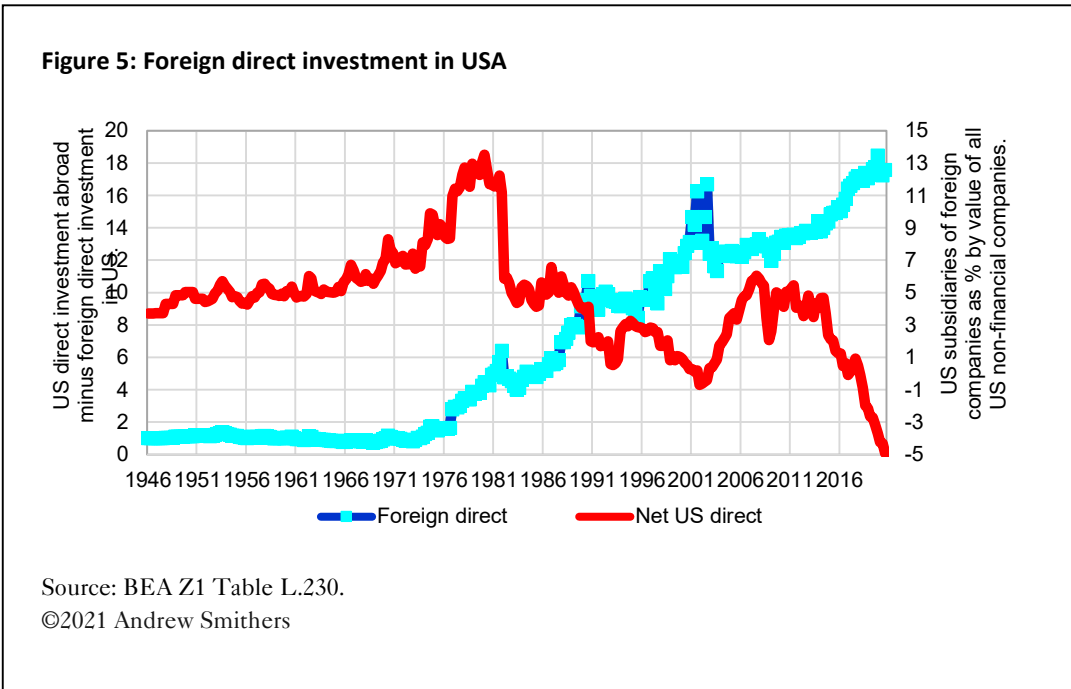
bonuses are usually linked. The bonus culture has thus shifted the utility function of managers so that they put more emphasis on the short-term rewards of higher pay and less on the long-term risk of losing market share by underinvesting.

The bonus culture does not affect all companies but the incentives to manipulate EPS and TSRs are estimated "… to determine almost one-third of S&P 500 CEO total pay".[18] The impact seems to be largely confined to quoted companies in the UK and USA and have had relatively little impact on other major economies, such as Germany and Japan, where listed companies account for a much lower proportion of corporate output than in the USA. The disincentive to invest in the USA is thus less for foreign-owned companies than for the domestically owned and, as Figure 5 illustrates, the former account for a rapidly increasing proportion of US corporate value and, it must therefore be assumed, of output. While the impact of the bonus culture should therefore weaken over time it has lowered the level of US business investment below that which would otherwise have occurred, given the decline in the rate of corporation tax.

The bonus culture arrived in the 1990s, when the pay and the proportion of CEOs' total remuneration rose dramatically,[19] and this changed business behaviour after 2000 as I illustrate in Figure 6. Previously tangible business fixed investment responded to changes in the return on equity (RoE) but it has not done since.[20] The effective rate of corporation tax has halved since 2000 and prospective returns on new investment will have risen with the cut. Since interest rates have fallen, leverage has risen and the rate of technological advance cannot have gone into sharp reverse, even if the pace of improvement has slowed; the only change that can explain the relatively weak response of investment is a rise in the hurdle rate.

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[18] Nitzan Shilon, *Pay for destruction: the executive compensation arrangements that encourage value decreasing stock buybacks*. Columbia Law School's Blog on Corporations and Capital Markets (15 March 2012).

[19] Smithers, *Productivity and the Bonus Culture*, Figure 41. op. cit.

[20] I have used the NIPA data on profits without the inventory ("IV") and capital consumption ("CC") adjustments for inflation as these resemble more closely than those with the adjustments to profits that companies publish and thus to the data to which they respond. The R^2 correlation for Q4 1951 to Q4 1999 = 0.42 and for Q4 1999 to Q3 2020 = 0.01.

Figure 6: USA: Non-financial companies' investment and RoE
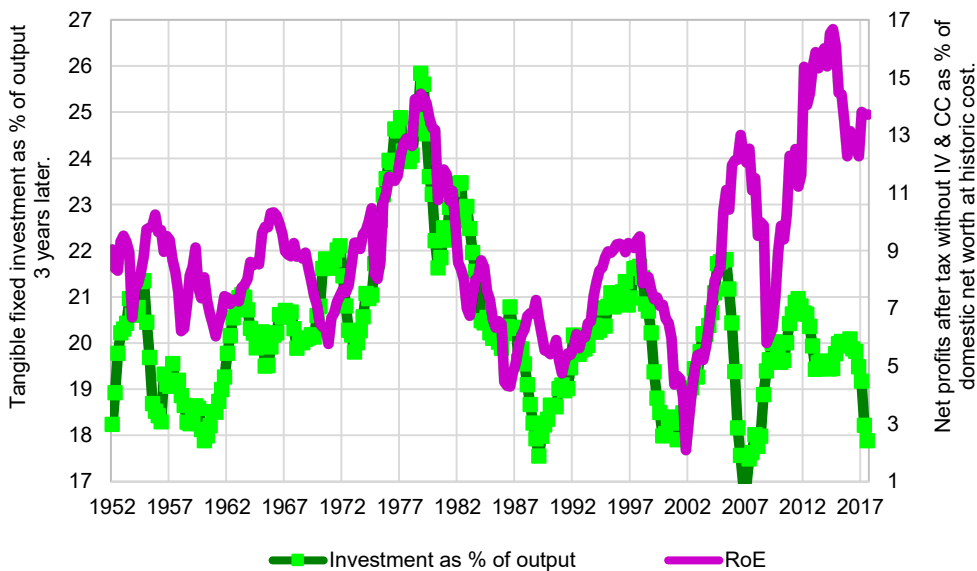
Sources: NIPA Tables 1.1.5 and 1.14 and BEA Z1 Table B.103.
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Since 2000 business investment has fallen even more in the UK than it has in the USA, as Figure 7 shows. In marked contrast to the USA, the effective rate of corporation tax has risen sharply in the UK since 2000 due to the abolition of Advanced Corporation Tax ("ACT") in 1999. Before the change, tax was only levied on retained profits, not on dividends or buybacks conducted "off-market". For companies which paid out 50% of their profits the effective tax rate was thus 50% of the standard rate. With a standard rate of 32% the effective rate was therefore 16%, which was thus approximately doubled by the abolition of ACT. This is likely to have been a major cause of the dramatic fall in investment that immediately followed.

Figure 7: UK and USA: Non-financial companies' net tangible investment
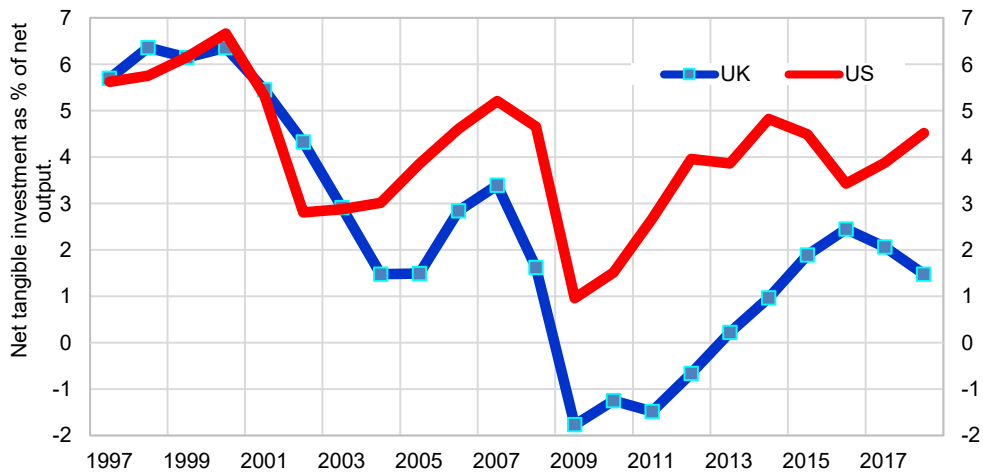
Sources: Office for National Statistics (ONS) series L5YR, L5YW, L5Z4, L5ZA, FACU and NRSK, BEA Z1 Table F.103, BEA Fixed Asset Table 1.1, and NIPA Tables 1.1.5 and 1.14.
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Tax Credits and Investment

The UK's Chancellor of the Exchequer is proposing that companies should receive tax credits for their tangible investments for the next two years. This would increase published EPS for companies which invest heavily and reverse the current incentive against investment. This will raise investment, growth and labour productivity as the level of investment depends on the utility preference of company managements; a rise in the ratio of tangible investment to output will increase the growth rate of the capital stock and a rise in the growth of the capital stock will increase labour productivity.

A tax credit for tangible investment, which exactly matched a rise in corporation tax if there were no change in investment, would leave profits after tax unchanged. A rise in net profits and EPS will, however, occur if investment rises. As bonuses usually rise with profits this will change the incentive of the bonus culture away from discouraging to encouraging investment. The hurdle rate, therefore, should then fall.

There will also be a reduction in the revenue from corporation tax in response to the rise in investment. If the rate of corporation tax is raised so that revenue is unchanged there will still be a rise in investment as the change in incentives will lower the hurdle rate. The stimulus to investment will, however, be smaller than it would be if the revenue from corporation tax falls. It is important to note that the hurdle rate may not fall if accelerated depreciation is introduced rather than a tax credit, because the former is offset in profit and loss accounts by a rise in future tax liability. While the economic effect is very similar, the appearance is very different, and bonuses vary with appearances rather than reality.[21]

The damage to the economies of the UK and USA could therefore be more than offset by tax credits for tangible investment. In the UK this requires the credits to be permanent rather than just for two years—particularly as companies require time to make major additions to their investment plans. The introduction of a similar tax credit in the USA for tangible investment, where one for intangible investment already exists, should produce similar improvements in investment, labour productivity and growth.

Intangible Investment

Output rises, as Figure 4 shows, with the increase in the value of the fixed tangible capital stock. Investment in intellectual products ("IP"), of which the major part is R&D, is included in GDP but depreciates rapidly so that its level makes little contribution to the growth of the capital stock and thus to the trend growth rate of the economy. In 2018 the depreciation rate for IP in the USA was 21.3% of its capital stock compared with 3.9% for tangible capital. It has been claimed that intangible capital should be depreciated less rapidly.[22] I have shown, however, that such claims conflict with the data on equity returns and that the rate of depreciation for IP should probably be raised to 100%.[23] In addition it is unlikely that gross IP investment is correctly measured as tax credits for R&D have probably been "gamed" by steadily increasing the

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[21] I am grateful to Nick Antill for stressing this important point in email discussion with me.

[22] Germán Gutiérrez and Thomas Philippon, *Investment-less growth: an empirical investigation*. NBER Working Paper 22897 (National Bureau of Economic Research, 2017) and Thomas Philippon, *The Great Reversal: How America gave up on free markets* (Harvard University Press, 2019).

23 Andrew Smithers, *The debate over the depreciation of intangible capital*. World Economics 21, 1 (January–March 2020).

proportion of managers' pay claimed as attributable to their time spent on research relative to their general management duties. While there is a risk that a tax credit for tangible investment could be similarly abused, the scope for this is much less and the risk thus small, because the cost of investment in equipment is mostly spent on purchases from external suppliers.

Undoing Past Damage to the UK and US Economies

By depressing investment, the bonus culture has damaged the UK and US economies in two ways. The most obvious adverse impact has been to reduce the trend growth rate of their economies, the other is the result of two related policy errors. This century both the UK and the USA have suffered from a structural and thus persistent net private sector, *ex ante*, savings surplus due to business investment being depressed by the perverse incentives of the bonus culture and in the UK by the sharp rise in the effective rate of corporation tax in 1999. This has been misdiagnosed as a cyclical problem. The prescribed cures of fiscal and monetary easing, while being satisfactory solutions to cyclical *ex ante* mismatches between private sector savings and investment, are unsuitable for a structural one, as they cause increases, which cannot be sustained indefinitely, in the debt ratios of the public and private sectors respectively. Of the two, that in the public sector presents the lesser immediate problem but attracts greater attention.

Had the problem been totally cyclical, as it was initially after the 2008 financial crisis, it would have responded more readily to fiscal stimulus and this led to the second error, which was to put excessive emphasis on monetary policy. This has produced a high risk of another financial crisis by raising debt levels and asset prices. Funding government debt is expensive but justified by reducing the volatility of inflationary expectations.[24] The use of quantitative easing, which is a form of negative funding, has thus had the added disadvantage of rendering the economy more than usually difficult to control and prospective errors in future monetary policy even more likely.

An *ex ante* mismatch between intended private sector investment can be the result of too much saving or too little investment. As it is usually presented in

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[24] Andrew Smithers, *Savings glut or investment dearth: rethinking monetary policy*. American Affairs (Winter 2020).

the financial press as a net savings surplus rather than a net investment deficit, it has been widely misinterpreted as a problem of too much saving rather than too little investment. This mistake has encouraged the extreme monetary policies which have driven up asset prices and thus discouraged savings. This in turn has created long-term problems for retirement incomes, as the level of private sector savings is too low rather than too high in both the UK and the USA, considered either by historic averages or by the level of savings needed to secure adequate pensions.

As a result of the COVID-19 crisis the national debt/GDP ratio of the UK is around 100% and that of the USA is even higher. While a further rise in this ratio need not be a matter of shorter-term concern, the level must in time be stabilised. If economies have a national/debt to GDP ratio of 100% then that ratio will rise indefinitely unless the growth rate and the structural, *ex ante*, net private sector savings' surpluses are higher than the rate of interest. Raising the level of private sector investment to improve the growth rate of the economy and thereby reducing the structural *ex ante* problem are thus essential for longer-term financial and economic stability.

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Appendix

The Mean Reversion of the Capital/Output Ratio

The evidence for this shown in Figure 4 is consistent with the non-technology variables (NTV) model of growth,[25] in which the value of the capital stock will have a constant ratio to output and, given cyclical fluctuations in the value shown by survey data, the ratio should be mean-reverting. Value (V) equals profits after tax (Π) at some multiple (θ) of the NTVs, thus $V = \Pi \times \theta NTV$. Profits are the share of output which can be financed at the current level of NTV and are thus the level of output divided by some multiple (ε) of NTV, so $\Pi = Y /(\varepsilon NTV)$. Thus $V = (Y(/\varepsilon NTV)) \times (\theta NTV) = (\theta/\varepsilon) \times (Y)$.

The profit share of corporate output is around *22%* (log 20%) as shown in Figure 1, and the capital/output ratio shown in Figure 4 is mean-reverting around 3.3 times. If the profit share of output were the same for the economy as a whole as it is for the business sector, then the equity return for the economy would be 20/3.3 = 6.7%, which is close to the approximate value of 6.6% shown for companies.

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[25] For an account of the NTV model see Smithers, *Productivity and the Bonus Culture* and Andrew Smithers, op. cit. *The NTV model for total factor productivity*, World Economics, Vol. 20. No. 2. (April–June 2019).