

# Corporation Tax.

## Summary.

- Corporation tax is a tax on investment. Current plans to increase the rate in the UK and the US will, if implemented, severely damage their economies.
- That such self-destructive folly is not being opposed and 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, whose absence from the consensus model 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 US, if similar credits are introduced.

## 1. 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 consume or invest. Corporation tax can only fall on consumption if it reduces the income of shareholders, company creditors 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. It does not fall on receipts from corporate interest payments. 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 maximization" – the aim of maximizing 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 maximization. An alternative view is that the behaviour and functions of shareholders and managers are sufficiently different to make it essential that economic models separate the private sector between households and companies. "We start from the proposition that corporate directors may subject corporate policy decisions to utility functions of their own."<sup>1</sup> If companies pursued profit maximization 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 maximized" investment would rise and fall with fluctuations in the stock market, which does not happen,<sup>2</sup> and the mean

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<sup>1</sup> *The Economic Theory of "Managerial Capitalism"* by Robin Marris (1964) Macmillan.

<sup>2</sup> *Productivity and the Bonus Culture* by Andrew Smithers Oxford University Press (2019) Chapter 8 illustrated in Figure 28.

reversion of the ratios between corporate net worth and stock market value (“equity  $q$ ”)<sup>3</sup> and corporate capital and market value (“Tobin’s  $Q$ ”)<sup>4</sup> would result from the changes in business investment<sup>5</sup> 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 or on whom its cost falls. A workable model of the economy must separate the 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 a wish 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 paper on the work I have done on this aspect of financial macroeconomics.<sup>6</sup>

## 2. Corporation Tax and Returns to Shareholders.

The real returns that shareholders receive in aggregate are mean reverting around an average of approximately 6.4%. 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,<sup>7</sup> 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.<sup>8</sup>

The stock market can be valued;<sup>9</sup> 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

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<sup>3</sup> *Valuing Wall Street* by Andrew Smithers & Stephen Wright McGraw Hill (2000).

<sup>4</sup> *A General Equilibrium Approach to Monetary Theory* by James Tobin (1969) *Journal of Money, Credit and Banking* Volume 1 No. 1.

<sup>5</sup> *Tobin’s marginal  $q$  and average  $q$ : A neoclassical interpretation* by Fumio Hayashi (1982) *Econometrica*, 50 (1).

<sup>6</sup> *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.

<sup>7</sup> 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)

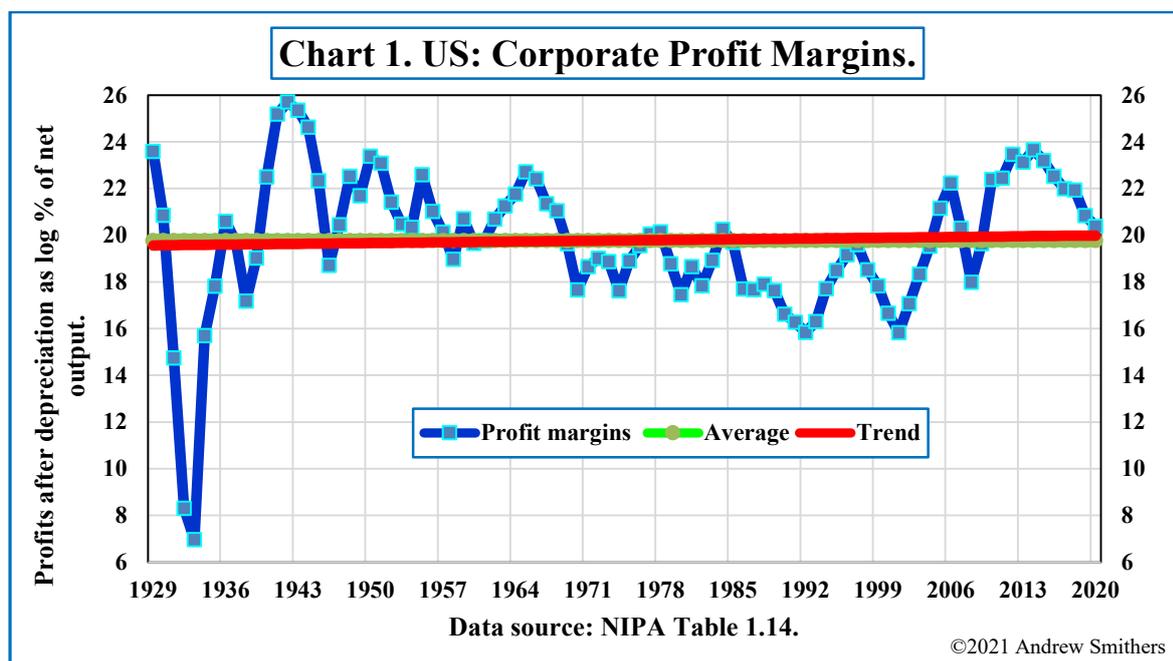
<sup>8</sup> The effective rate of corporation tax, which is tax revenue received as a per cent of pre-tax profits, varies not only with the statutory rates levied at Federal and State levels, but with allowances and credits, such as the R&D tax credit introduced in 1981, and through the impact of inflation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

<sup>9</sup> The stock market can be valued either by the cyclically adjusted PE (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](http://www.smithers.co.uk). The methods are set out in *Irrational Exuberance* by Robert Shiller Princeton University Press (2000) and *Valuing Wall Street* by Andrew Smithers & Stephen Wright McGraw Hill (2000).

returns to shareholders fluctuates 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.<sup>10</sup> 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 with 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 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 leverage, the amount of investment will vary inversely with the rate of corporation tax.

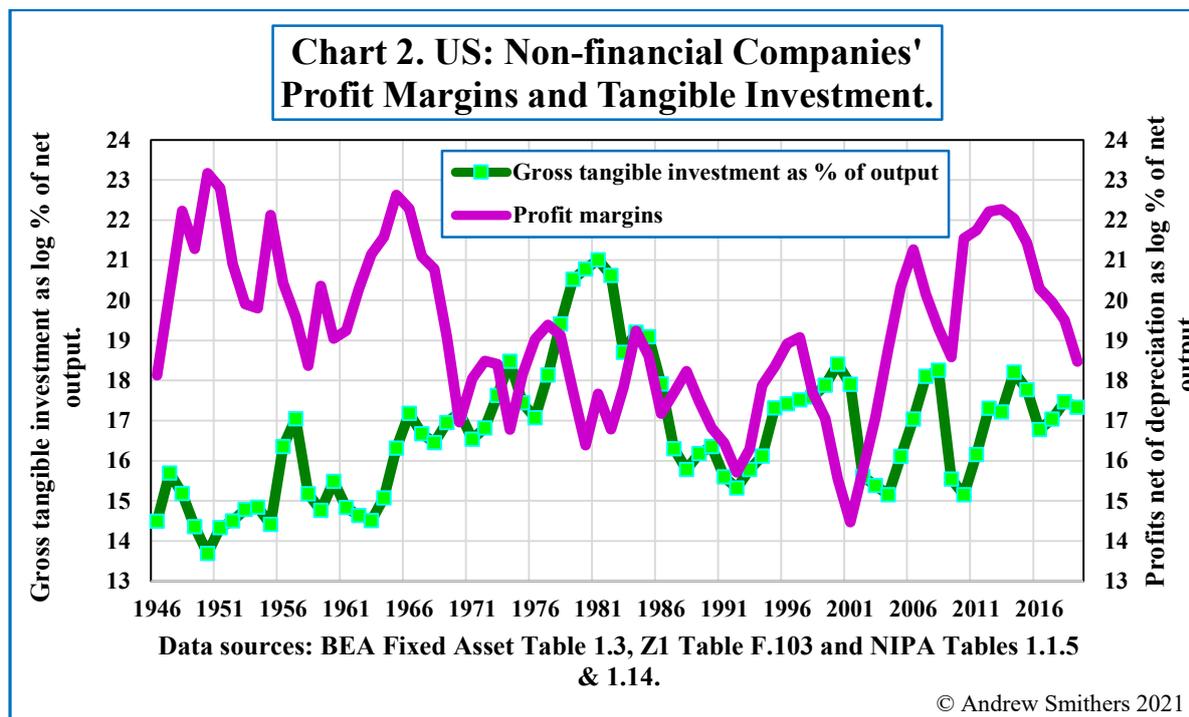
### 3. The Labour and Profit Shares of Output.



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

<sup>10</sup> *Productivity and the Bonus Culture* op. cit. Figure 29.

eighty years ago has, to put it mildly, stood the test of time. As Hicks defined income it is “The maximum a man can spend and still be as well off at the end of the week as at the beginning.”<sup>11</sup> While this leaves the definition of ‘well off’ open to debate, it is clear that spending all profits before depreciation will leave the owner of capital worse off.<sup>12</sup>



As Chart 1 shows, the data series, which starts in 1929, shows that profit margins appear to be mean reverting.<sup>13</sup> As this fits the assumptions of the Cobb-Douglas production function,<sup>14</sup> 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%. Profit margins cannot therefore have risen and fallen with the level of corporation tax, which has not been borne either by profits or by the incomes of employees.

This is confirmed by comparing investment with profit margins as I illustrate in Chart 2. The two series have a mildly but insignificantly perverse relationship in that improving profit margins are mildly associated with lower investment ( $R^2$  correlation = 0.132) between non-financial corporate tangible investment and profit margins covering the period for which we have data and which I illustrate in Chart 2.

#### 4. 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 either a tax 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

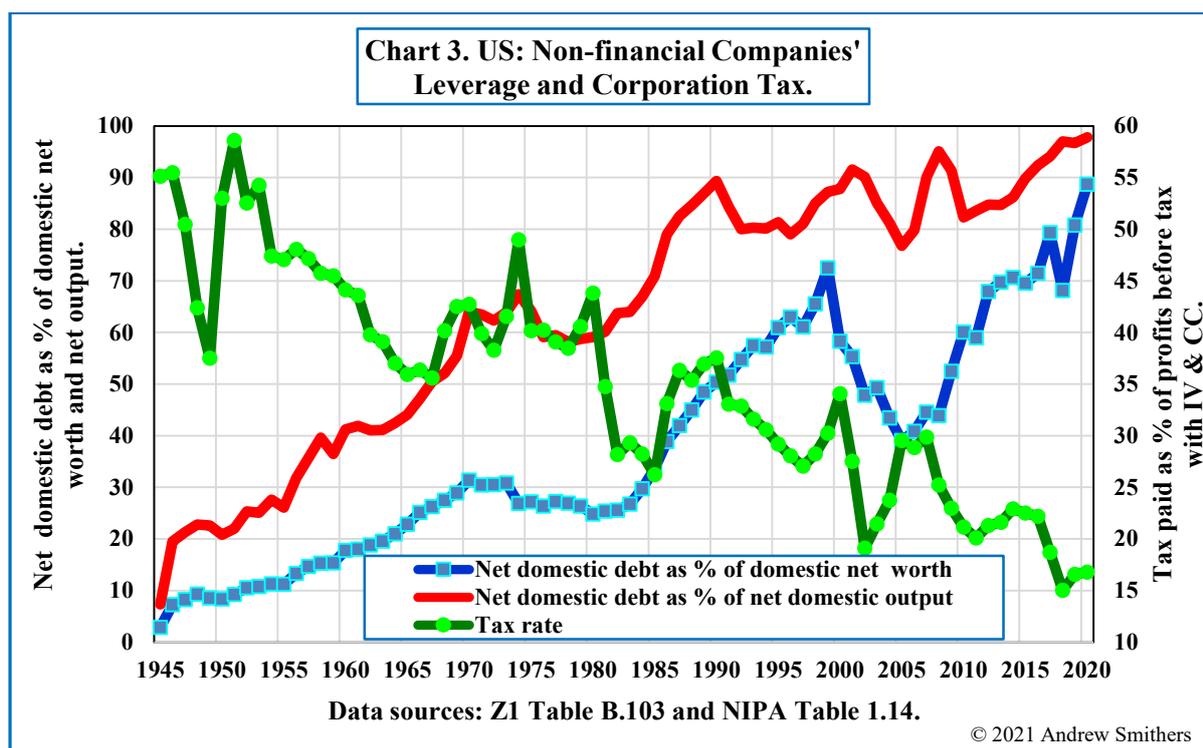
<sup>11</sup> *Value and Capital: An Enquiry into Some Fundamental Principles of Economic Theory* by J.R. Hicks, Oxford University Press (1939).

<sup>12</sup> Sir John Hicks also remarked that many people found 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.

<sup>13</sup> For statistical testing of the stationarity of US profit margins see Smithers & Co. - ADF statistics from James Mitchell [www.smithers.co.uk/page.php?id=59](http://www.smithers.co.uk/page.php?id=59).

<sup>14</sup> For a detailed explanation see *Productivity and the Bonus Culture* op. cit. Appendix 8.

the important proviso that this substitution of debt for equity increases tax revenue from the household sector.

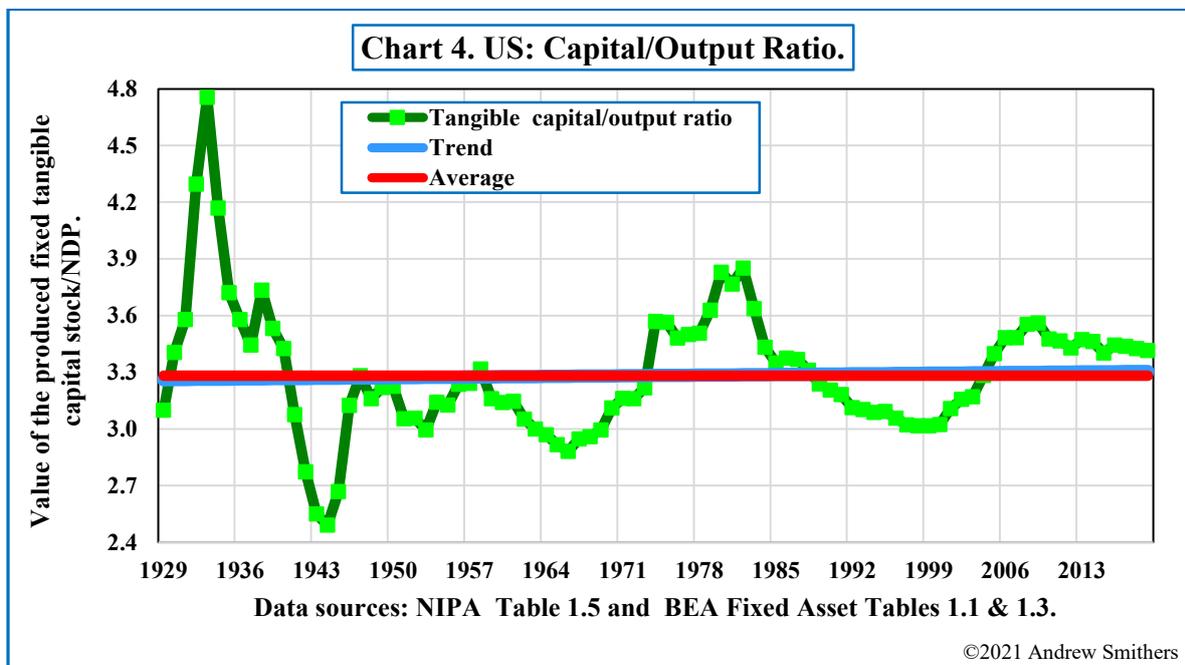


This might be possible, but to occur it would also have to be the result of a rise in the rate of corporation tax – it would in economic terms have to be endogenous. Companies would have to respond to a rise in the rate of corporation tax by increased leverage rather than to other changes such as lower interest rates. If interest rates are unchanged and leverage rises, then the household sector will, in a closed economy, 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 Chart 3 shows, the opposite has happened - leverage has risen since the data series start in 1945, whether debt is measured relative to net worth or to output, while the rate of corporation tax has fallen.

## 5. Lower Investment Means Slower Growth.

Output fluctuates with demand around its equilibrium level and, as Chart 4 illustrates, the ratio of the value of the tangible fixed produced capital to output is mean reverting.<sup>15</sup>

<sup>15</sup> I give in the appendix the theoretical explanation of why this ratio is mean reverting.



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 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<sup>16</sup> and, since the labour and profit shares of output are mean reverting (Chart 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.

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.

## 6. 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.<sup>17</sup> This utility function depends on the interaction of the two main concerns of managers, which are to keep their jobs and be highly paid, by shifting the short-term rewards of not investing.

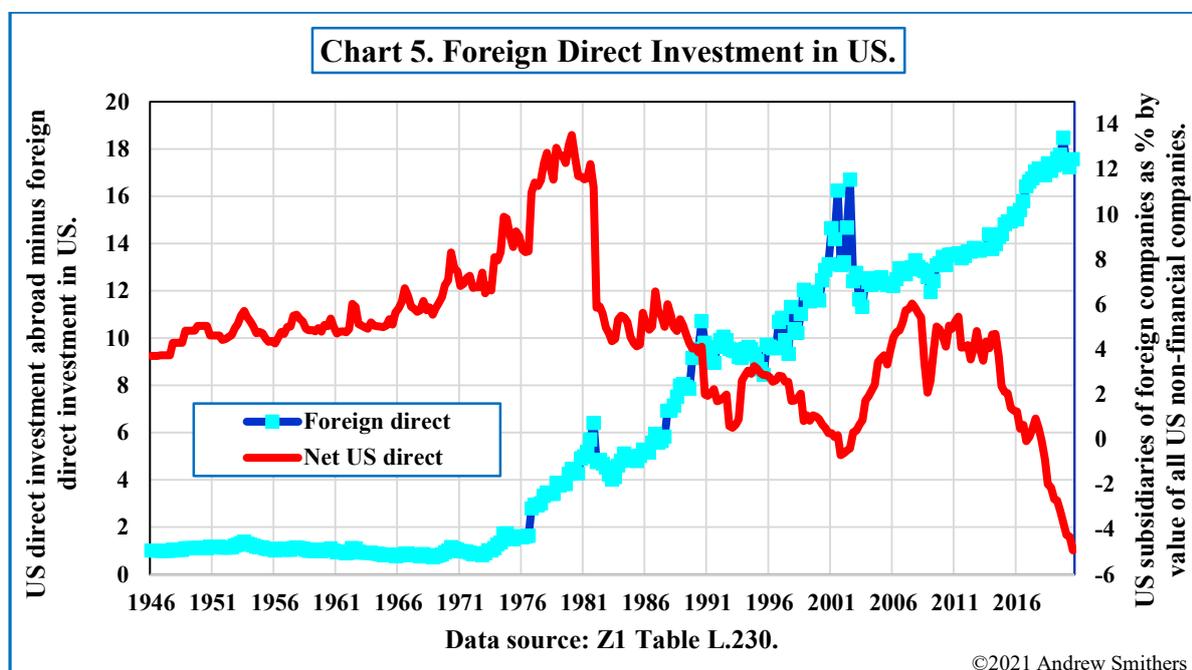
The year-to-year fluctuations in the proportion of output invested in an economy are relatively small but for individual companies, particularly smaller ones, they are much larger.

<sup>16</sup> *Neoclassical Growth with Fixed Factor Proportions* by R.M. Solow, J. Tobin, C.C. von Weizsacker and M. Yaari. *The Review of Economic Studies* Vol. 33 No. 2 (April 1966).

<sup>17</sup> *Productivity and the Bonus Culture* op. cit.

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. The efficiency of new equipment is greater 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.

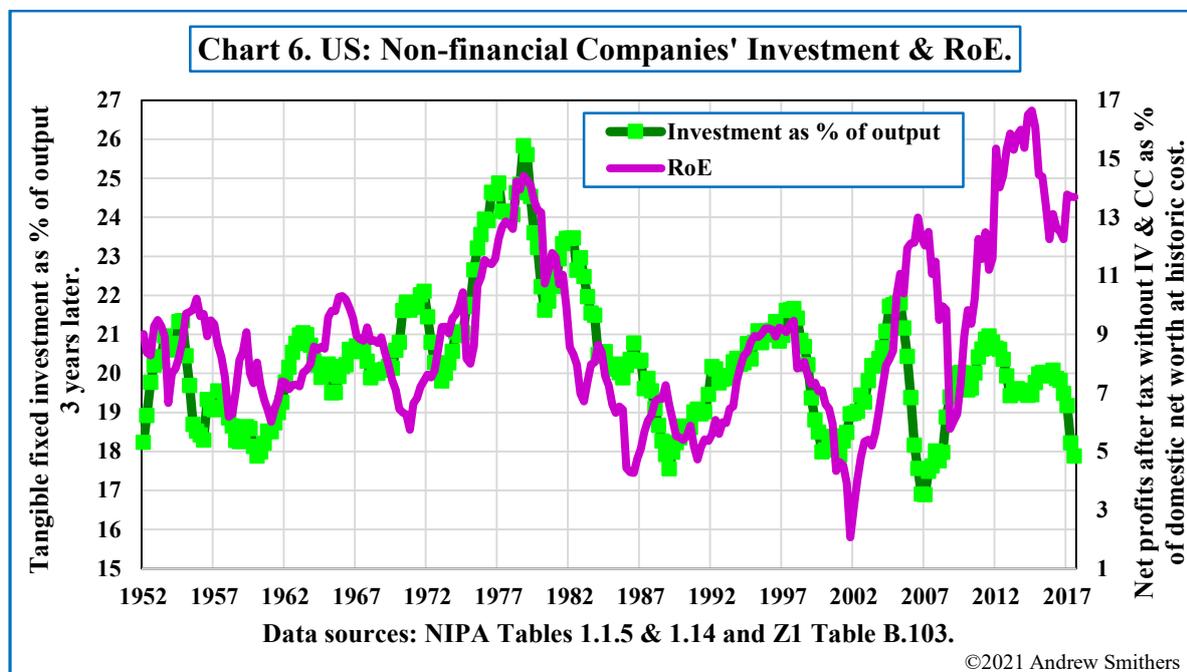
Profits and additional debt can be used to invest or to reduce equity and raise dividends. Investment is costly and risky in the short-term while the benefits are long-term, as lower production costs only emerge over time as output rises to meet the increased ability to produce. Buy-backs and higher 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 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 "...to determine almost one third of S&P 500 CEO total pay."<sup>18</sup> The impact seems to be largely confined to quoted companies in the UK and US 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 US. The disincentive to invest in the US is thus less for foreign owned companies than for the domestically owned and as Chart 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.

<sup>18</sup> *Pay for Destruction: The Executive Compensation arrangements that encourage value decreasing stock Buybacks* by Nitzan Shilon Columbia Law School's Blog on Corporations and Capital Markets (15<sup>th</sup> March 2012).

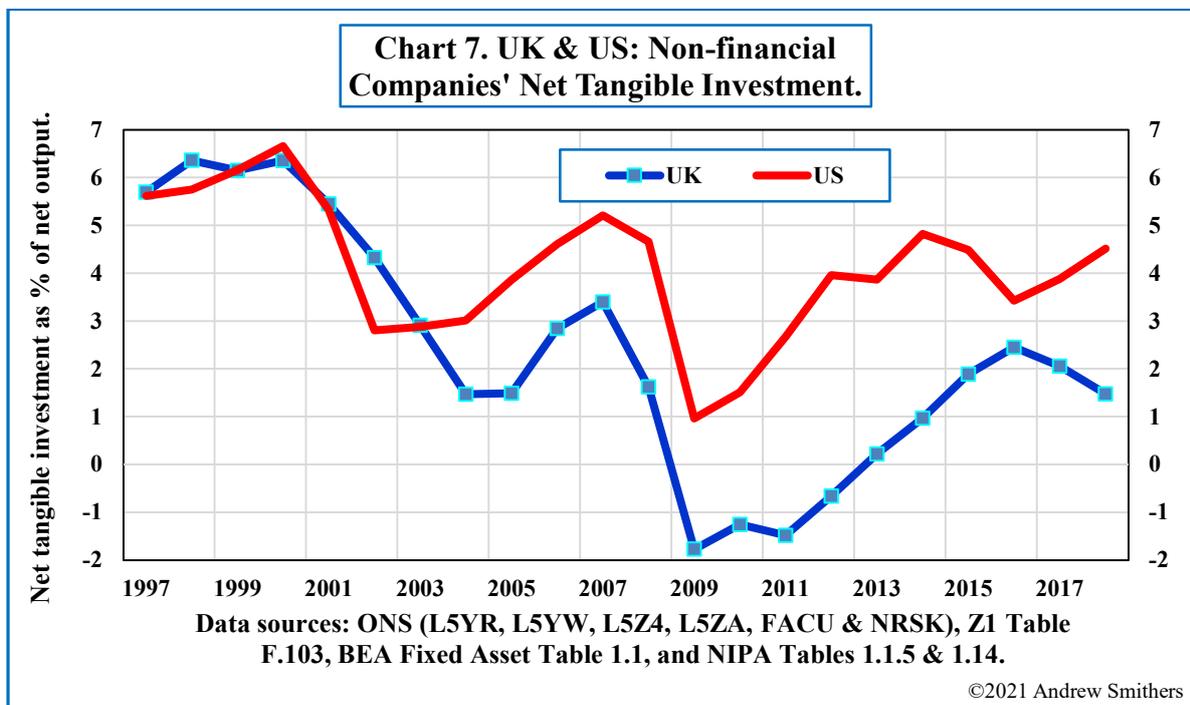
The bonus culture arrived in the 1990s, when the pay and the proportion of CEOs total remuneration rose dramatically,<sup>19</sup> and this changed business behaviour after 2000 as I illustrate in Chart 6. Previously tangible business fixed investment responded to changes in the return on equity (RoE) but it has not done since.<sup>20</sup> 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,



Since 2000 business investment has fallen even more in the UK than it has in the US as Chart 7 shows. In marked contrast to the US, 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 buy-backs 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.

<sup>19</sup> *Productivity and the Bonus Culture* op. cit. Figure 41

<sup>20</sup> 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 the 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.



## 7. 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 earnings per share ("EPS") for companies which invest heavily and reverse the current negative 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 should therefore 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 P&L a/cs 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.<sup>21</sup>

The damage to the economies of the UK and US 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 US for tangible investment,

<sup>21</sup> I am grateful to Nick Antill for stressing this important point in email discussion with me.

where one for intangible investment already exists, should produce similar improvements in investment, labour productivity and growth.

## 8. Intangible Investment.

Output rises, as Chart 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 US 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<sup>22</sup>. 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%.<sup>23</sup> 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 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.

## 9. 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. Both the UK and the US have this century 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 proscribed cures of fiscal and monetary ease while 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.<sup>24</sup> The use of quantitative easing (“QE”) 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.

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<sup>22</sup> *Investment-less Growth: An Empirical Investigation* by Germán Gutiérrez & Thomas Philippon NBER Working Paper 22897 and *The Great Reversal: How America gave up on free markets* by Thomas Philippon Harvard University Press (2019).

<sup>23</sup> *The Debate Over the Depreciation of Intangible Capital* by Andrew Smithers World Economics Vol. 21. No. 1. (January–March 2020).

<sup>24</sup> *Savings Glut or Investment Dearth: Rethinking Monetary Policy* by Andrew Smithers American Affairs (Winter 2020).

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 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 US 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 US 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 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.

## Appendix.

### The Mean Reversion of the Ratio of Capital/Output Ratio.

The evidence for this shown in Chart 4 is consistent with the NTV model<sup>25</sup> of growth 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 ( $\Pi$ ) at some multiple ( $\theta$ ) of the non-technology variables (“NTVs”), thus  $V = \Pi \times \theta \text{NTV}$ . 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 ( $\epsilon$ ) of NTV, so  $\Pi = Y / (\epsilon \text{NTV})$ . Thus  $V = (Y / (\epsilon \text{NTV})) \times (\theta \text{NTV}) = (\theta / \epsilon) \times (Y)$ .

The profit share of corporate output is around 22% (log 20%) as shown in Chart 1, and the capital/output ratio shown in Chart 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 6.4% shown for companies.

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London  
April, 2021

NB. This paper has been revised as I made a mistake, for which I apologise, in assembling the data used in Chart 2 of the previous version. This correction has had no effect on the argument or conclusion presented.

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<sup>25</sup> For an account of the NTV model see *Productivity and the Bonus Culture* op. cit and *The NTV Model for Total Factor Productivity* by Andrew Smithers World Economics. Vol. 20. No. 2. (April–June 2019).