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WHY HAS THE UK CORPORATION TAX RAISED SO MUCH REVENUE?

Michael P. Devereux
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February 2004

Abstract

We analyse a puzzle in the UK corporation tax: by both historic and international standards corporation tax revenues have been high while the statutory rate has been low. Possible explanations include the following: changes in tax law that may have increased effective tax rates; other factors such as higher profitability or different macro-economic conditions may have led to higher effective tax rates; and finally the size of the corporate sector may have increased. We find evidence for all three explanations, although none would be sufficient in itself. To the extent that higher profits, particularly financial sector profits may have led to high revenues, there are doubts as to whether revenues will continue to be so strong.

JEL classification: H25

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Executive Summary

This paper analyses a puzzle in the UK corporation tax: by both historic and international standards corporation tax revenues have been high while the statutory rate has been low.

Possible explanations include the following:

- other changes in tax law may have offset the cut in statutory rates
- economic conditions and other factors that affect effective tax rates, such as profitability, may have counteracted the fall in tax rates.
- the size of the corporate sector may have increased.

Evidence from the construction of effective tax rates suggests that reductions in the statutory tax rate have been partially, but not wholly offset by base-broadening measures. Evidence from implicit tax rates suggests indirectly that higher rates of profitability may at best be partially responsible, although this finding is not confirmed by direct evidence on profitability. An increase in financial sector profitability however cannot be ruled out. The primary reason for the strength of tax revenues seems then to be the rise in the share of corporate profits in GDP, which was particularly marked in financial services.

Future research could address the question of why the incorporated sector of the economy has increased, and whether this is a result of the lower tax rates. This could be either because of encouraging business activity or because of making it more attractive for multinationals to report profits in the UK. More research is also needed on the UK's financial sector and why it performed so well during the late nineties.

As long as there is only limited understanding about the reasons for the growth of the corporate sector, it is hard to make predictions for future revenue developments. We know however that revenues will depend too a much larger degree than previously on the performance of the financial sector. If the performance of that continues to suffer, or if financial services manage to avoid more tax, then the puzzle treated in this article might disappear rather quickly.

1. Introduction

This paper investigates the trends in UK corporation tax (CT) over the last 20 years. Our motivation is a puzzle: by both historic and international standards, recent CT revenues have been high while the statutory rate has been low.

The history since 1980 is shown in Figure 1. The current statutory CT rate of 30% is at an all time low. Yet revenues – expressed as proportion of both GDP and total tax revenues - have recently been high. Even allowing for the volatility of CT revenues, they have been buoyant since the late 1980s. Even during the recession in the early nineties when they temporarily dipped and despite recent falls, revenues have remained at much higher levels than during the early eighties, when the tax rate stood at 52%.

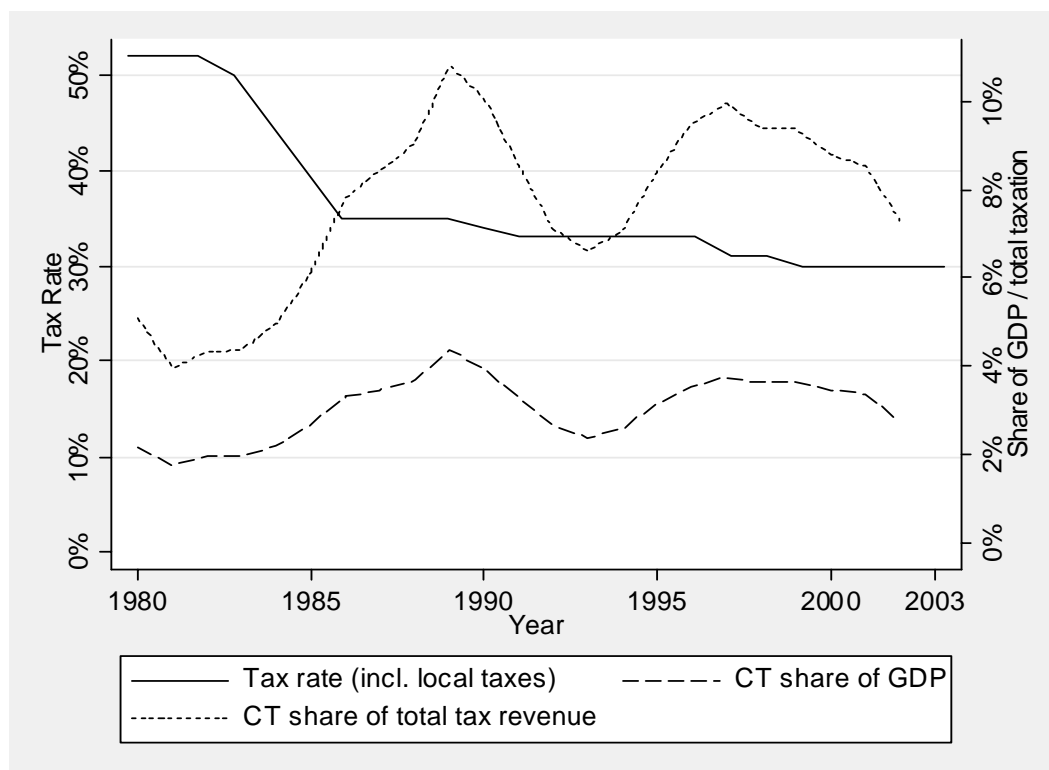


Figure 1: Corporate tax rates and revenues

Notes: Corporation tax receipts include ACT in years where this was payable. Sources: Tax data from Financial Statistics, March 2003, GDP data from UK National Accounts, September 2002.

A comparison of the current UK position with other G7 countries is given in Table 1. The UK's statutory rate is well below the G7 average – indeed the UK rate is currently the lowest amongst the G7.¹ By contrast, CT revenues – again as a proportion of both GDP and total tax revenues – are above the G7 average. Only Japan had higher CT revenues than the UK. As a share of GDP UK tax revenues are virtually the same as Japan's.

Table 1: Corporate income tax rates and tax revenues in G7 countries

<i>Country</i>	<i>Tax rate² 2001 (1996 if different)</i>	<i>Tax revenue (share of total tax revenue) Average 1996-2001</i>	<i>Tax revenue (share of GDP) Average 1996-2001</i>
Canada	35.6%	10.0%	3.6%
France	36.4% (36.7%)	6.3%	2.9%
Germany	38.3% (56.7%)	3.9%	1.5%
Italy	40.3% (53.1%)	8.2%	3.5%
Japan	40.9% (50%)	14.0%	3.8%
UK	30.0% (33%)	10.5%	3.8%
USA	39.3%	8.5%	2.5%
Average	37.3%	8.8%	3.1%

Notes: Tax rate data from Devereux, Griffith and Klemm (2002), revenue data from OECD Revenue Statistics (2003).

Resolving this puzzle is not only interesting in itself, but also important in order to understand the likely future developments of CT revenues. There are three possible groups of explanations.

- (A) Cuts in the statutory tax rate may have been offset by other changes in the tax system, particularly by a broadening of the tax base.
- (B) Apart from legal changes, other factors may have prevented effective tax rates from falling such as increased profitability or different macroeconomic conditions.
- (C) The corporate sector may have grown relative to the rest of the economy.

¹ There were however three EU countries with even lower rates: Ireland (10%), Sweden (28%) and Finland (29%).

² Including local taxes. In countries where the rate depends on the sector, the manufacturing rate is shown.

In this paper, we address these possibilities in turn. We begin in Section 2 by summarising CT reforms since 1980. We present estimates of effective tax rates, which take into account some of the rules defining taxable profit, as well as the statutory tax rate. These effective rates are used to analyse explanation (A). Section 3 presents alternative measures of the average tax rates faced by firms. These include measures based on the ratio of tax revenues to an approximate measure of profit. We use these to investigate explanation (B). Section 4 addresses explanation (C) by examining the share of corporate profits in UK national income, and the role played by particular sectors of the economy. Section 5 concludes.

2. The impact of tax reforms on effective rates of tax

In this section, we document the main CT reforms over the last two decades, and describe the impact of these reforms on effective rates of CT. The aim is to determine whether the relatively buoyant tax revenues can be attributed to changes in the tax code, offsetting the reduction in the tax rate.

2.1. Corporation tax reforms

Over the last twenty years, reforms to CT have been the rule rather than the exception. The main reforms are summarised in Box 1.

The most significant reform was in 1984. This lowered the CT rate from 52% to 35% over four years. It also substantially reduced the generosity of capital allowances.³ Although further rate cuts occurred during the nineties, they were comparatively modest, and were not accompanied by reductions in allowances. Indeed, the only other significant change to allowances for large companies occurred in 1992, when a temporary allowance of 40% on investment in plant and machinery was introduced.

³ Such rate-cutting base-broadening reforms have subsequently been undertaken in numerous industrialised countries: see Devereux, Griffith and Klemm (2002) for further details.

There have also been more structural reforms. The most important was the abolition of Advance Corporation Tax (ACT) in 1999. Prior to 1999 a company paid ACT on its dividend payments. As ACT was deductible in calculating mainstream CT, for most firms ACT affected only the timing of tax payments. However, ACT was not fully deductible for firms whose grossed-up dividends exceeded their UK taxable profit - firms with large foreign earnings could easily be in this position.⁴ The abolition of ACT largely resolved this problem of surplus ACT.⁵ ACT payments were replaced by payment of CT in quarterly instalments.⁶

⁴ Between July 1994 and the end of fiscal year 1998/99 such firms could declare “Foreign Income Dividends” to avoid ACT.

⁵ Although ACT which was not set off against CT at the time of the abolition could be carried forward indefinitely, in a system of “shadow ACT”.

⁶ A related reform was the abolition of the repayment of tax credits to tax-exempt shareholders from 1997. However, this change is outside the scope of this paper, with its focus on taxes paid by the corporation.

Box 1: Significant corporate tax reforms since 1980

In 1980 the CT rate stood at 52% and the small companies' rate at 40%. There was a first year allowance of 100% for plant and machinery and an initial allowance of 50% for industrial buildings⁷. The yearly writing down allowances were 25% for plant and machinery (reducing balance) and 4% for industrial buildings (straight line).

1983: Small companies' rate cut from 40% to 38% from 1982/83.

1984: Announcement of stepwise reduction in CT rates, from 52% in 1982/83 to 35% in 1986/87. First year and initial allowances phased out by 1986/87. Small companies rate cut in one step to 30% from 1983/84. Stock relief abolished.

1986: Small companies' rate cut from 30% to 29%.

1987: Small companies' rate cut from 29% to 27%.

1988: Small companies' rate cut from 27% to 25%.

1991: CT rate cut from 35% to 34% in 1990/91 and to 33% from 1991/92. Loss carry back extended from one to three years.

1992: Temporary enhanced capital allowances between November 1992 and October 1993: first-year allowance of 40% on plant and machinery and initial allowance of 20% on industrial buildings.

1995: Small companies' rate cut from 25% to 24%.

1996: Small companies' rate cut from 24% to 23%. Writing down allowances for long life assets cut from 25% to 6%.

1997: Main CT cut from 33% to 31%. Small companies' rate cut from 23% to 21%. Windfall tax imposed on privatised utilities. Loss carry back reduced from three years to one year.

1998: Main CT rate cut from 31% to 30%, small companies' rate cut from 21% to 20% from 1999/00. ACT abolished from 1999/00. System of quarterly instalment tax payments phased in from 1999/00.

1999: New starting rate for small companies introduced at 10% from 2000/01.

2002: Small companies' rate cut from 20% to 19%. Starting rate cut from 10% to 0%.

In general then, cuts in statutory tax rates were only one aspect of UK tax reforms over the last two decades. An important empirical issue is identifying the quantitative impact of other reforms.

⁷ The difference between a first year allowance and an initial allowance is that the first year allowance is applied in place of the writing down allowance, while an initial allowance is applied on top of the writing down allowance.

2.2. *Effective tax rates*

The complexity of the CT system means that there is no single effective tax rate which can capture the whole tax regime. Instead, effective tax rates vary between firms and between investment projects. We do not present a comprehensive analysis of effective tax rates here;⁸ rather we aim only to illustrate the impact of reforms described above.

Investment allowances

As a first step we show in Figure 2 a measure of the present discounted value of investment allowances over the life of a capital asset. This measure is useful in that it incorporates all allowances over time for a specific investment. A value of 100% implies that the total cost of an asset can be deducted from taxable profit in the year in which it is incurred, while a value of zero would imply that no allowances are given in any period. A fall in this measure therefore implies an increase in the tax base. Figure 2 presents this measure for investment in plant and machinery and in industrial buildings.⁹ It documents the substantial fall in the value of allowances following the 1984 reform. The small rise in 1993 is due to the temporary investment allowance that applied in that year. Apart from that, however, these allowances have been unchanged since 1986.

⁸ For a comprehensive analysis of recent effective tax rates in the EU, see Devereux, Lammersen and Spengel (2000) and European Commission (2002).

⁹ The calculations use a discount rate in all years of 10%. We have also calculated this measure with a time-varying interest rate; while the annual variability increases, the overall pattern is unaffected.

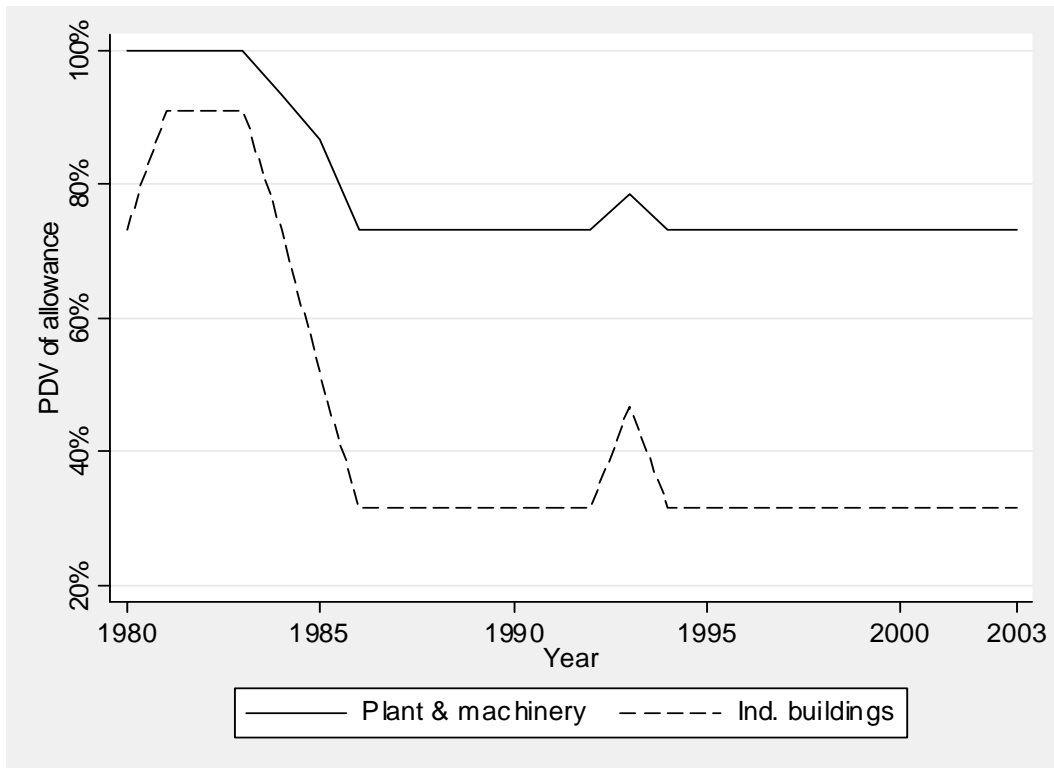


Figure 2: Investment allowances for different assets

Measuring effective tax rates

Effective tax rates depend on both the statutory tax rate and the definition of taxable profit. There are two forms of such tax rates.

The first, standard in the economics literature, is an effective marginal tax rate (EMTR). In the absence of tax, an investment project must generate a high enough return after all costs to compensate the investor for having his funds tied up in the investment. The minimum acceptable financial rate of return is known as the cost of capital. Any investment which earns at least the cost of capital is worth undertaking. Taxes typically raise the cost of capital – the return on the project must be sufficient to pay the tax as well as to compensate the investor – and hence tend to reduce investment. The EMTR

measures the proportionate increase in the cost of capital due to taxation. It is calculated by applying the rules of the tax regime to a hypothetical investment project.¹⁰

However, although the EMTR is widely reported in the economics literature, and we also present estimates below, it is not closely related to tax revenues. The reason is that it applies only to investments which just break even. But it is more profitable investment projects which tend to pay significant amounts of tax. In assessing the impact of reforms on revenues, a second measure - the effective average tax rate (EATR) – is more relevant. The EATR is important in discrete investment decisions, in which a profit over and above the minimum rate of return is expected to be earned (the excess profit is known as economic rent). For example, suppose a multinational company is choosing between locating a plant in the UK or France (but not both). It will choose that location which generates the highest post-tax profit. The impact of tax on this decision is the proportion of pre-tax profit taken in tax. This is very similar to standard measures of tax ratios, for example, taken from company accounts.

However, like the EMTR, the EATR is calculated here for a hypothetical investment, taking into account cash flows arising through the life of the investment project, rather than being based on cash flows arising only in one particular period (which will be affected by the whole history of investment projects). Each form of effective tax rate varies with a large number of factors, including the type of asset invested in, the source of finance, and in the case of the EATR, the pre-tax rate of profit on the project. We present some stylised examples, while varying the assumptions about these factors.

Effective tax rates in the UK

Figure 3 presents the EATR for different levels of the pre-tax rate of profit. The investment is assumed to be in plant and machinery, financed by equity. The lowest line in the Figure is the EMTR – this is equal to the EATR for a marginal investment. At the other extreme is the statutory tax rate – equal to the EATR for an extremely profitable investment. The Figure shows that taxes on more profitable investments have fallen

¹⁰ The methodology used here is defined in Devereux and Griffith (2003).

relative to taxes on less profitable investments. The most important reform here was in 1984. The lower statutory rate reduced the EATR for highly profitable investments. However, the reduction in allowances offset this effect for more marginal investments, with the result that the EMTR rose (from zero, prior to the reforms). In the 1990s, the EATR fell slightly across the whole range of rates of profit, as the statutory rate was progressively reduced.

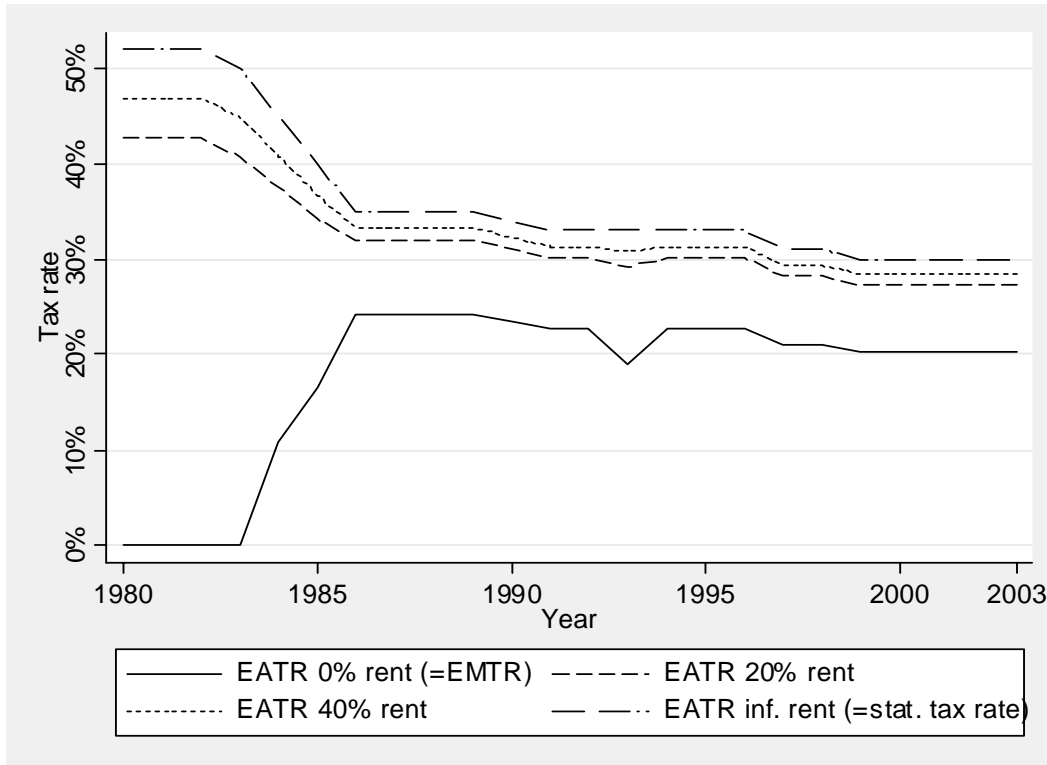


Figure 3: Effective average tax rates at different rates of profitability

Notes: EATR: Effective average tax rate. (Assets: plant & machinery, source of finance: equity / retained earnings, assumed real interest rate: 10%, assumed inflation rate: 3.5%).

Figure 4 investigates differences in effective tax rates across investments financed by equity in alternative types of asset: plant and machinery, industrial buildings and commercial property (which receives no allowances). It shows the EMTR and the EATR for an investment earning an economic rent of 20%. Given allowance rates (relative to assumed economic depreciation rates), the effective rates are consistently highest for investment in commercial property and lowest for investment in plant and machinery.

The Figure also indicates some convergence in the EMTRs for these assets. The reason is that investment in commercial property did not suffer from the reduction in allowances in 1984; the EMTR on such investment therefore fell with the reduction in the statutory rate. By contrast, the EMTR on the other two assets rose. The EATR on these alternative forms of investment moved more closely with each other – although again investment in commercial property benefited most from the 1984 reforms.

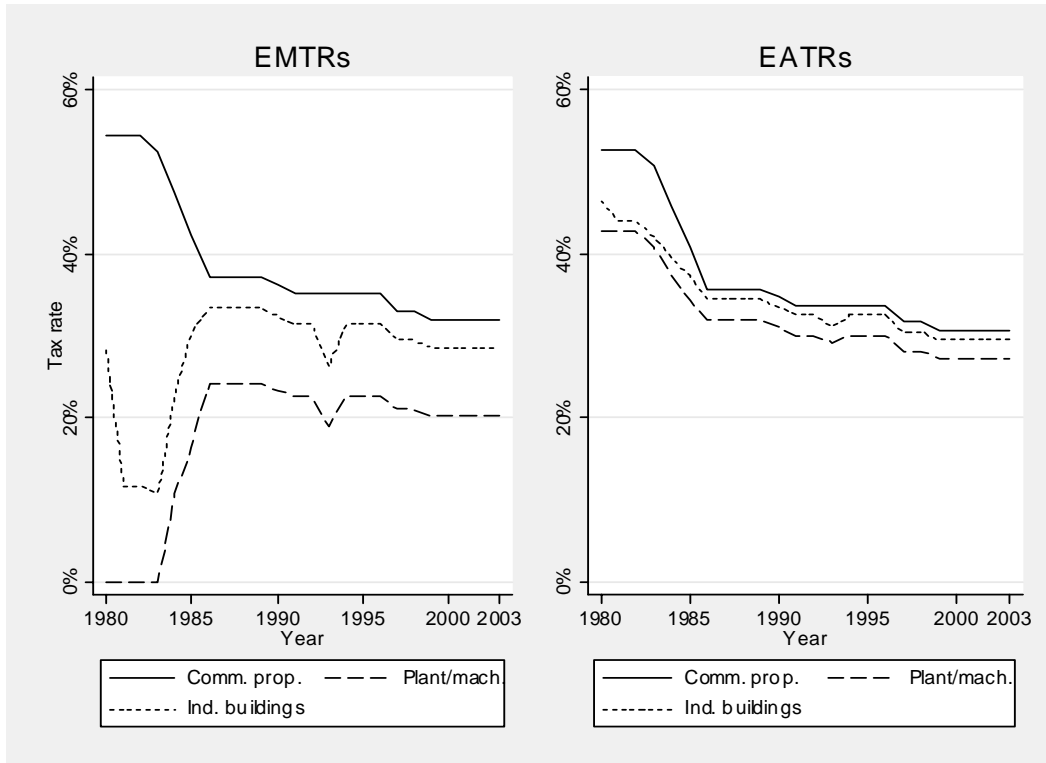


Figure 4: Effective tax rates for investments in different assets

Notes: Rate of economic rent: 0% (EMTR) and 20% (EATR), assets: as stated, source of finance: equity / retained earnings, assumed real interest rate: 10%, assumed inflation rate: 3.5%.

Figure 5 investigates the same measures, comparing differences across the source of finance of investment projects: specifically comparing investment in plant and machinery financed by equity¹¹ and by debt. The left panel of the chart indicates that the EMTR for

¹¹ In many analyses the effective tax rate in the case of equity depends on whether the source is new equity or retained earnings. In this case we assume that the shareholder pays no personal tax, and is not eligible to receive a tax credit associated with a dividend payment. In this case, the two sources yield the same effective tax rates.

such investment financed by debt reached levels of below *minus* 200% prior to the 1984 reforms (compared to zero for investment financed by equity). This arose because of the combination of the immediate offset of such capital expenditure against tax, combined with deductibility of the interest payments arising from the borrowing.¹² After 1984, however, the EMTRs on these two forms of investment have become closer. The EATR on debt-financed investment is also lower; but both EATRs have fallen substantially since 1984.

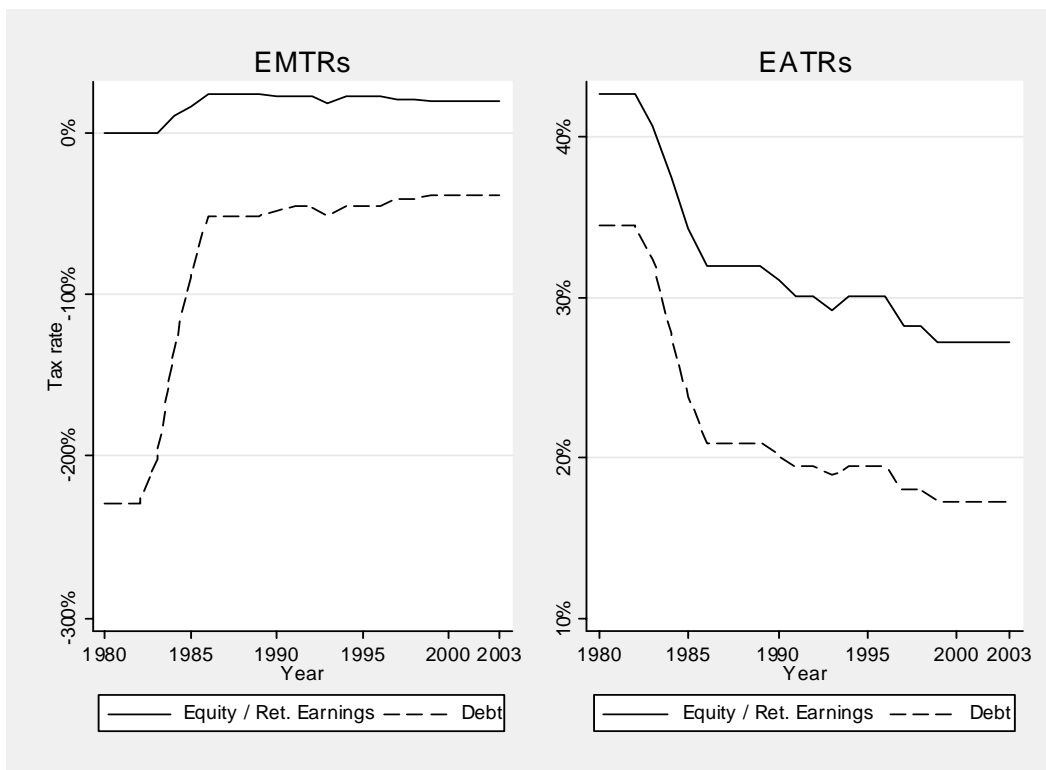


Figure 5: Effective tax rates for investments financed from different sources

Notes: Rate of economic rent: 0% (EMTR) and 20% (EATR), asset: plant & machinery, assumed real interest rate: 10%, assumed inflation rate: 3.5%.

¹² The rate is very high (and negative) since it is defined as $EMTR = (p - r) / p$, where p is the required pre-tax rate of return and r is the equivalent post-tax rate of return. If $p < r$ and p is close to zero, then very large and negative tax rates can result.

As noted above, in investigating the role of tax reform on tax revenues, the EATR is more relevant, since it is largely profitable investments which generate tax revenue. Overall, the Figures suggest that EATRs have fallen over the period considered. While the base-broadening in 1984 had some offsetting impact, it is not the case that base-broadening is a sufficient explanation for the strength of UK corporate tax revenues in the 1990s.

3. Other determinants of effective tax rates

We now turn to explanation (B): that other factors may have increased effective tax rates, even if the tax system remained unchanged. The most obvious possibility is that average profitability may have changed.¹³ As demonstrated in Figure 3, effective tax rates increase with the rate of profit. So an increase in profitability would mean that the average firm faced a higher EATR. This effect could counteract the fall in the statutory rate. Another possibility is a change in inflation and interest rates. For example, the rate of inflation affects the real value of investment allowances. As allowances are based on the nominal cost of an asset, allowances will be worth less in a high inflation environment. As inflation rates have fallen over the period considered here, this would have increased the value of allowances and hence led to lower tax rates. This is thus the opposite of what could potentially explain high tax revenues. Thirdly there may be compositional changes in the sources of finance used or assets invested in. In Figures 4 and 5 we have shown that the tax rate differs depending on the asset invested in and the sources of finance used.

Because of these and other issues,¹⁴ the effective tax rate faced by the average firm may change over time, even in case of a stable tax system. What is therefore needed is a measure of the tax rate that takes all of these factors into account. There are two main

¹³ This may or may not be in response to changes in the tax system.

¹⁴ There are many other possibilities, which we cannot provide an exhaustive consideration of here. Many are difficult to measure, for example changes in the mobility of capital and the opportunity to avoid UK taxes, the willingness of the tax authority to enforce the tax code or the development of innovations by tax advisers.

approaches to obtaining such a measure. One is to calculate the EATR as above, but to substitute assumed rates of inflation, profitability and shares of assets and sources of finance, by values estimated from data to capture the values that were applicable at the time. We call this measure the average EATR. Alternatively an “implicit” tax rate can be constructed by dividing total corporate income taxes by a measure of aggregate profits. We consider these approaches in the following two sections.

3.1. EATRs based on average rates of profit in each year

To address the impact on the EATR of changing the rate of profit over time, we examine a hypothetical investment based on a weighted average of the assets considered above, and debt and equity finance. We also allow the firm’s discount rate, and the inflation rate, to vary over time. This approach allows us to move away from simply identifying the impact of tax reforms holding all other things constant, as analysed in the previous section, to analysing estimates of the actual EATR in each period. This is presented in Figure 6.

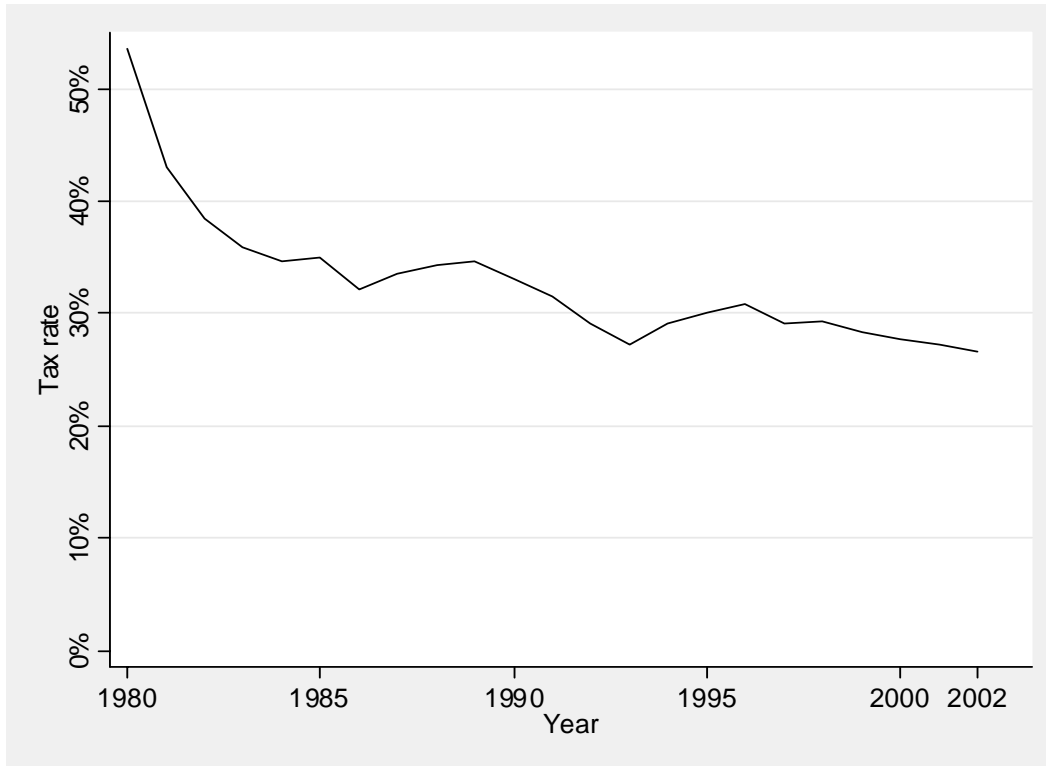


Figure 6: Average effective average tax rate

Notes: Rate of economic rent: average rate of profitability calculated with Thomson Financial Datastream data, sources of finance: weighted average of debt and equity, asset: weighted average of plant & machinery and industrial buildings, interest and inflation rates: actual values from National Statistics.¹⁵

This Figure makes it clear that movements in the average level of profitability, the inflation rate and compositional changes between assets and sources of finance cannot account for the strength of tax revenues in the 1990s. There is a sharp drop in the average EATR in the early 1980s, but since then it has been fairly flat, with a small decline similar to that in the statutory rate. As would be expected, this series is more volatile than

¹⁵ Definitions and sources in detail: profitability is defined as Pre-tax profit (154) divided by the capital stock, where the number in parentheses refers to the Datastream account item. The capital stock is calculated using the perpetual inventory method, starting off with the capital stock (339) in the first period, which is assumed to be on average three years old, assuming a depreciation rate of 8% and adding investment (1026 + 479, or, where this is not available, 431 - 423 + 479). The share of buildings in total assets is estimated as the sum over all firms of total land and buildings (327) divided by total land and buildings and plant and machinery (327 + 328) in each year. The share of loan finance is calculated accordingly by dividing total loan capital (321) by total assets (392). Inflation is the GDP deflator calculated from nominal GDP in current (YBHA) and constant (ABMI) prices. Interest rates are 20-year government bond rates (AJLX) with an added assumed risk premium of 4%.

the one in the previous figures, because factors that are independent of the tax system are allowed to vary over time. Based on this approach, then, strong tax revenues do not appear to be driven by changed firm characteristics or macroeconomic changes.

Two caveats should be noted though. First, effective tax rates are forward-looking measures based on tax payments over the lifetime of an investment. By contrast, tax revenues depend on past investments and on the timing of income streams. Second, we calculate a single average EATR, while in practice, tax revenues depend on the distribution of EATRs across investment projects. Even if the average EATR fell, it is possible that tax revenues might rise if the distribution became more skewed towards high EATR projects. We therefore turn to an approach that directly calculates an average tax rate based on the whole corporate sector.

3.2. Implicit tax rates

The second possibility, an implicit tax rate for the corporate sector¹⁶ is presented in Figure 7. This is defined as corporate tax revenues divided by a measure of corporate profit (the sum of the operating surplus of the corporate sector and taxable property income, less capital consumption).¹⁷ Data limitations mean that this particular measure cannot be calculated for years before 1987. Therefore, Figure 7 also contains an approximate version of the measure that can be calculated further back in time.¹⁸ Note that, unlike the ratios of tax revenues to GDP, this measure is not affected by growth of the corporate sector. Higher profits will not affect this measure, as long as the tax rates on

¹⁶ A frequently used revenue based tax rate is the implicit tax rate on capital as first suggested by Mendoza et al. (1994) and then used and further developed by many institutions and individuals (e.g. Eurostat (1998), OECD (2001)). We do not present this tax rate here as it is rather confusing measure if the aim is to understand corporate taxation. The range of “taxes on capital” (sometimes referred to as “taxes on factors other than employed labour”) is extremely wide, and includes for example property taxes, capital gains taxes and numerous other taxes that have very little to do with taxes faced by companies. Most estimates of this rate (e.g. Mendoza et al. (1994), Eurostat (1998)) indeed fell dramatically, but this is mostly due to changes in property taxation (the move from domestic rates to council tax) and lower revenues from petroleum revenue tax. More details can be found in Devereux and Klemm (2004).

¹⁷ See Devereux and Klemm (2004).

¹⁸ The approximate measure does not take into account taxable property income (such as net interest payments and rent). Neither is it adjusted for that part of the operating surplus that is due to quasi-corporations, most of which are not liable to corporation tax.

the additional profits remain the same. Only if the rate of profitability increases would this measure also increase.

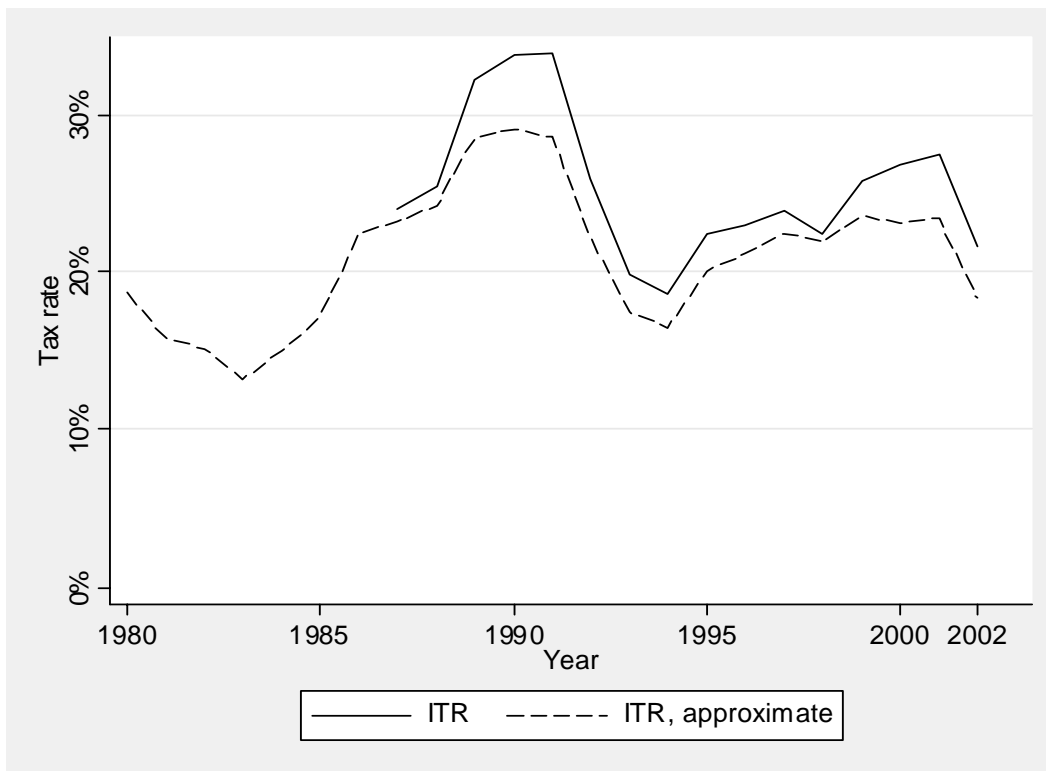


Figure 7: Implicit tax rates

Notes: Data from National Statistics (Inland Revenue Statistics, UK National Accounts and Financial Statistics)¹⁹

Figure 7 shows that the implicit tax rate rose strongly in the late eighties before starting a steep decline, after which it recovered slightly from the mid-1990s before starting to decline again. Over the longer period, however, the approximate measure moves broadly in line with the two series in Figure 1 for the share of CT revenue in total tax revenue and CT revenue as a proportion of GDP. They each show a large rise towards the end of the 1980s, before dropping back sharply in the first half of the 1990s before a recovery

¹⁹ Details of definitions: The approximate measure is defined as: corporate income tax revenue (ACCD) divided by gross operating surplus (NQBE+NQNV-NSRV-EAXB) less depreciation (DBGF+NHCE). The exact measure add net taxable property income (EABC+NHCK+FAOG+NHDH-EABG-NHCM-FBXO-NHDK) to the denominator and deducts any operating surplus due to quasi-corporations, which is

followed by a renewed drop. However, there are also some differences. The highest implicit tax rate came about two or three years after the highest CT to GDP ratio. And the implicit tax rate rose continually in the second half of the 1990s, whereas the CT to GDP ratio levelled out. Since the year 2000 though both have started declining. Further, by the end of the 1990s, the (approximate) implicit tax rate was well within its range of the previous thirty years, whereas the CT to GDP ratio was close to the top end of its range.

Interpreting Figure 7 to identify whether strong tax revenues can be attributed to strong profitability is complicated by the fact that rate of profit is cyclical. Due to lags in tax payments, and because the tax system is not symmetric – losses do not receive immediate rebates – tax payments do not move closely in line with profit. Hence – as can be seen from Figure 7 – there is considerable variation in the implicit tax rate over time.

3.3. The role of profitability

As discussed above, there are many reasons why the average EATR and the implicit corporate tax rate can be different. One of these is that the rate of profitability. Measures of profitability are typically defined as profits as a share of the capital stock. The capital stock however is difficult to measure. The accounts data - underlying the average EATR in Figure 6 - are usually based on the historic cost method (though with possible revaluations). An alternative method, usually used in national accounts, is to value capital at its replacement value. Whatever approach is taken though, the capital stock can be more or less informative for different industries. Particularly for the financial sector, the concept of a capital stock is not very useful. UK National Statistics therefore only publish profitability figures for the non-financial sector of the economy. These are presented in Figure 8 along with an estimate of profitability made using firm-level accounting data (from Datastream).

estimated the share of quasi-corporations' profits in total non-financial operating surplus $(EAXB/(NQBE+EABC+FAOG-EABG-FBXO)*DBGF)$.

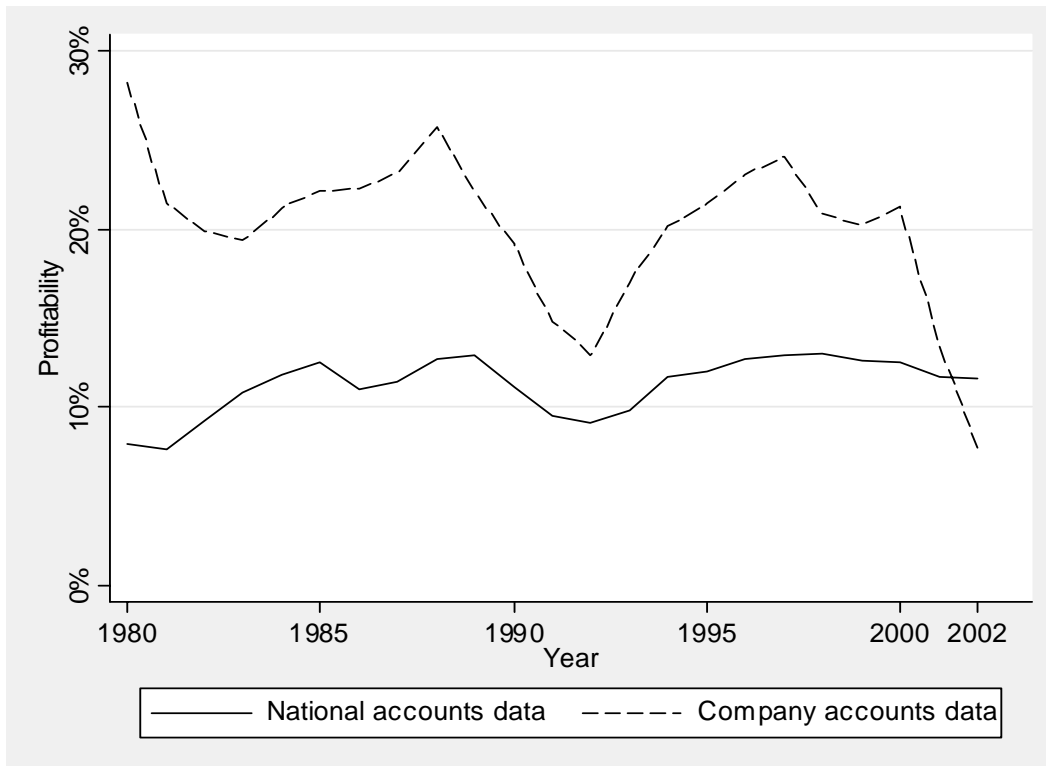


Figure 8: Profitability of non-financial companies.

Notes: National accounts data from National Statistics (Net profitability of UK companies, series LRWW, defined as net operating surplus divided by net capital employed). Company accounts data from datastream (defined as pre-tax profit excl. associates (item 154) divided by net total fixed assets (item 339)).

From Figure 8 we can see that, depending on the data source, profitability has increased slightly or fallen.²⁰ We could thus conclude that improved profitability does not play a role in our explanation of strong revenues. However, we cannot rule out some effect from profitability, because the financial sector was excluded from these calculations. As the financial sector has become an increasingly important part of the economy (see section 4), an improvement in profitability in that sector could have contributed to higher tax revenues. This would explain the rise in the implicit tax rate in the late 1990s that is not

²⁰ The large difference between the measures may be surprising. This can be explained by the fact that Datastream data contain listed companies only, which may have higher profits. Furthermore, the historical cost approach will always lead to an underestimation of the capital stock, if inflation rates are positive. This tends to lead to a higher measured rate of profitability.

mirrored in the average EATR, although, as stressed before, these two measures can differ for other reasons as well.

Our conclusion from this section then is that improved profitability and other determinants of effective tax rates may have played some role in boosting tax revenues, but they are unlikely to have played a major one. The possibility of higher rates of profitability in the financial sector remains though and is addressed in more detail in the following section on the size and composition of the corporate sector in the UK.

4. Size and composition of the corporate sector

Finally we consider the explanation that at least part of the strength in CT revenues in the late 1990s may be due to (C) – growth of the corporate income due to compositional changes in the economy, rather than increased profitability. To examine this, Figure 9 presents two measures of the level of corporate profits as a share of GDP. The first is the sum the operating surplus and net property income of the corporate sector, using ONS data. Data limitations mean that this measure cannot be constructed for years before 1987. The second is net corporate income chargeable to tax, after capital allowances, using Inland Revenue data. A priori, the ONS measure is preferable for our purposes, because it is based on the flow of profits within a year. The IR measure is affected by past years profits due to carried forward losses, and does not include losses of firms that are not liable to taxation. It is, however, available for a longer time period than the ONS data; and given that the measures are in practice close during the period for which we have both (except at the very end), the approximation appears to be reasonably good.

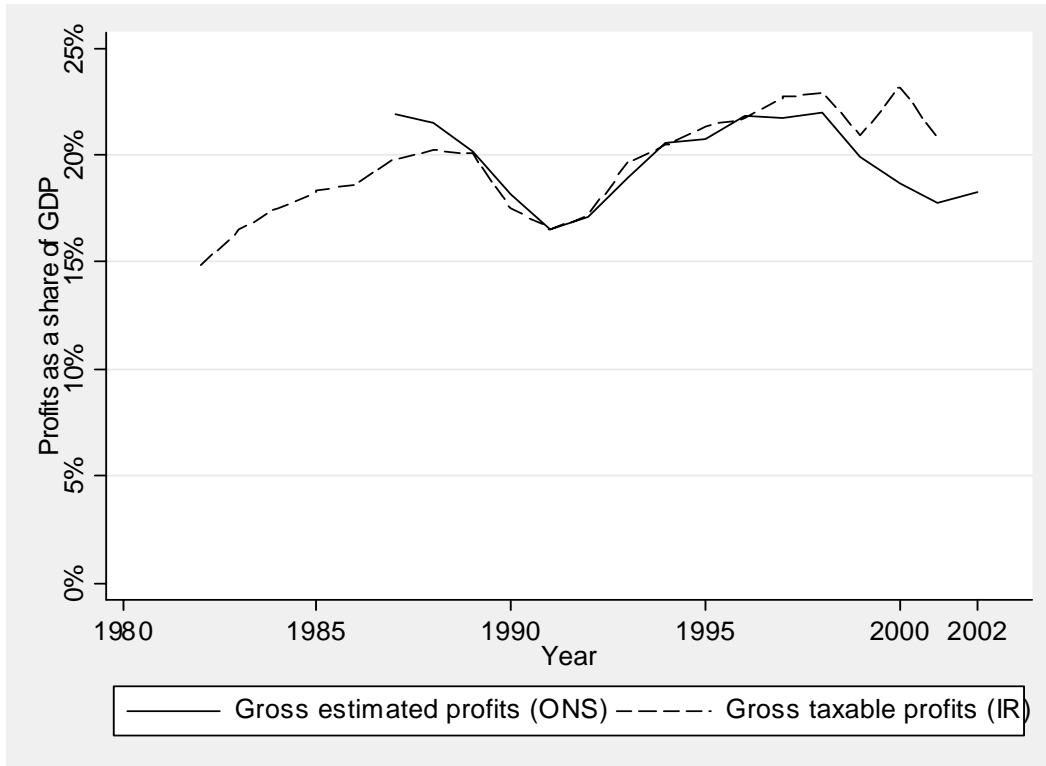


Figure 9: Two measures of aggregate profits

Notes: Data from National Statistics (Inland Revenue Statistics and UK National Accounts)²¹

Figure 9 shows that the measure based on IR data has risen substantially in the last twenty years: from around 15% of GDP in the early 1980s to well over 20% of GDP by the late 1990s. Of course, the measure is volatile, with the ratio dipping markedly in the early 1990s. The measure based on National Statistics data is very close to this for much of the overlapping period. However, because it begins above the IR measure, and ends below it, it gives a rather different impression – of a volatile ratio, but one without a clear trend.

To investigate the idea that increasing aggregate profits are a part of the explanation in Table 2 we show the share of total profits (based on the IR measure) attributable to

²¹ Gross estimated profits are defined as the sum of operating surplus and net taxable property income less profits from quasi-corporations (NRJT+NRJK+NQNV-NSRV+EABC+NHCK+FAOG+NHDH-EABG-NHCM-FBXO-NHDK-EAXB). Gross taxable profits are taken from Inland Revenue Statistics table 11.4 and are the sum of “Income chargeable to tax” and “capital allowances”.

different sectors of the economy for four 5-year periods²² and for the latest available year. In addition, the service sector is subdivided into banking, finance and insurance and other services.

Table 2: Share of total profits by sector

<i>Sector</i>	<i>1982-85</i>	<i>1986-90</i>	<i>1991-95</i>	<i>1996-00</i>	<i>2001</i>
Agriculture	0.7%	0.5%	0.5%	0.4%	0.4%
Manufacturing	46.8%	40.5%	40.0%	32.1%	31.1%
Construction	2.7%	4.1%	2.6%	2.5%	2.7%
Overseas / not classified	5.8%	3.3%	5.6%	5.0%	5.0%
Services	44.1%	51.5%	51.3%	60.0%	60.8%
<i>of which:</i>					
<i>Banking, finance and insurance</i>	<i>16.3%</i>	<i>16.8%</i>	<i>19.3%</i>	<i>27.7%</i>	<i>32.8%</i>
<i>Other services</i>	<i>27.8%</i>	<i>34.8%</i>	<i>32.0%</i>	<i>32.3%</i>	<i>28.0%</i>

Notes: Data from Inland Revenue Statistics (for details see footnote 21).

Table 2 shows that most of aggregate profits are attributable to five main sectors of the economy. It confirms the decline of manufacturing profits and the growth of the service sector. The subdivision of the service sector shows that while there has been growth in the profits of all services, there has been a particularly marked growth in banking, finance and insurance. To see more clearly which sectors have contributed most to aggregate growth, Table 3 shows for the same sectors the share of the total nominal growth in profits contributed by each sector. A negative figure means that the sector contracted.

As expected, growth was especially high in the service sector, which is responsible for more than 50% of the growth in profits for each period, and nearly 87% in the last five-year period. Within this category, the banking, finance and insurance sector alone contributes more than half of the profit growth during the last five-year interval. In 2001 however this drops to less than a quarter. By contrast, in earlier periods growth was more balanced across different sectors of the economy, and more in line with the share of profits each sector contributed to the total.

²² The first period is shorter due to data limitations.

Table 3: Percentage of profit growth due to each sector

<i>Sector</i>	<i>1982-85</i>	<i>1986-90</i>	<i>1991-95</i>	<i>1996-00</i>	<i>2001</i>
Agriculture	0.1%	0.6%	0.4%	-0.2%	-0.2%
Manufacturing	41.7%	33.6%	34.4%	3.1%	8.9%
Construction	2.7%	5.7%	0.4%	4.5%	11.1%
Overseas / not classified	0.4%	3.4%	5.5%	5.9%	3.8%
Services	55.1%	56.7%	59.4%	86.7%	76.4%
<i>of which:</i>					
<i>Banking, finance and insurance</i>	<i>29.0%</i>	<i>11.1%</i>	<i>37.5%</i>	<i>51.1%</i>	<i>23.7%</i>
<i>Other services</i>	<i>26.1%</i>	<i>45.5%</i>	<i>21.9%</i>	<i>35.5%</i>	<i>52.7%</i>

Notes: Data from Inland Revenue Statistics (for details see footnote 21).

Having shown that profits of the service sector, and particularly the financial service sector, have grown faster than profits in other sectors, it would seem reasonable to assume that these sectors contribute an increasing share of corporation tax revenues. To analyse this more directly, we present in Figure 10 the share of total tax liabilities²³ due to each sector.

²³ Tax revenue data are not available by sector. The main difference between liabilities and revenues is timing. Liabilities are reported by the year they accrue to while revenues are reported by the year of receipt, which is often later, because of payments in arrears. The timing difference has decreased though since the introduction of payments by installments.

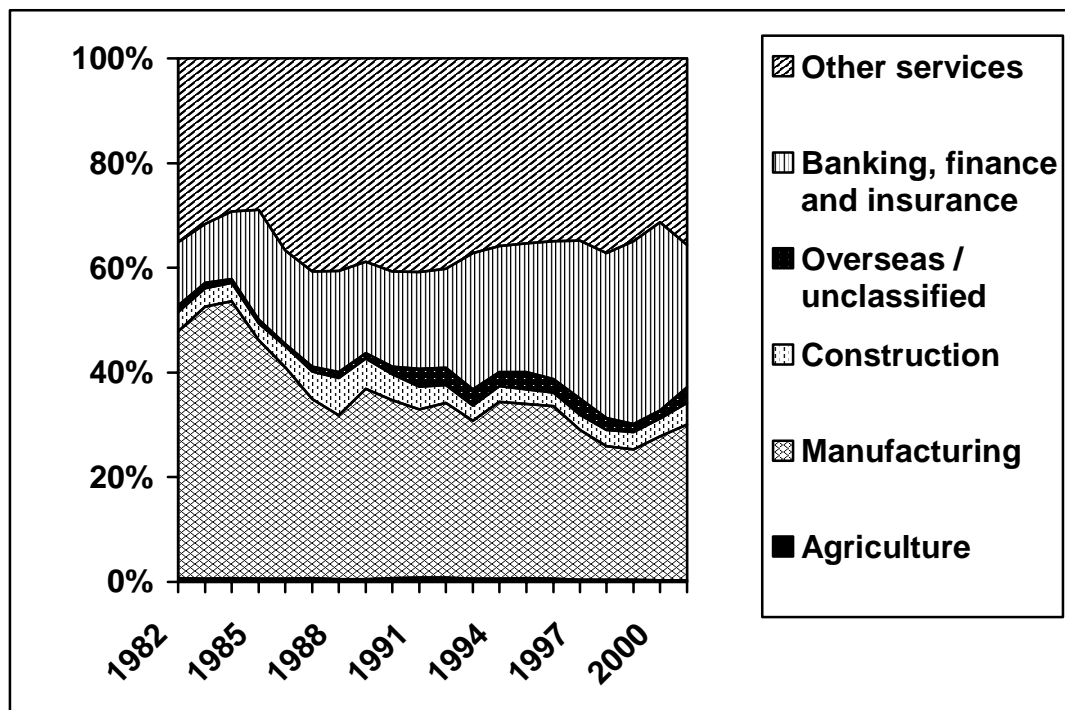


Figure 10: Share of each sector of total corporation tax revenues

Notes: Data from Inland Revenue Statistics (table.11.4), various years

As can be seen from Figure 10, the share of taxes received from the services has increased from less than half to two-thirds of all tax revenues. Within services, particularly the financial sector has grown, contributing 27% of total corporation tax in 2001 compared to only 12% in 1982. In the peak year, 2000, the financial sector contributed 36% of total tax revenues. The share of manufacturing has diminished accordingly.

The question remains as to why tax revenues from the financial sector have increased so much. Has the profitability of this sector improved or has the sector expanded at a constant rate of profitability? Because of the difficulty of measuring profitability, we cannot easily address this question directly. The timing of the revenue boom might however tell us something. Corporation tax liabilities of the financial sector peaked in 2000 at £11.3bn. By 2001 they had dropped to £7.9bn. This suggests a link with the stock market boom and subsequent crash, which will have had particularly strong effects on life assurance companies, as these firms are taxed on their unrealised capital gains. To the

extent that this might provide an explanation, the recent fall in corporate tax revenues is unlikely to be reversed unless there is another stock market boom.

5. Summary and conclusions

This paper has attempted to shed light on the puzzle expressed at the outset: why recent CT revenues have been so high while the statutory rate has been so low.

Evidence from the construction of effective tax rates suggests that reductions in the statutory tax rate have not been wholly offset by base-broadening measures. Evidence from implicit tax rates suggests indirectly that higher rates of profitability may have been partially – but not solely - responsible. Direct evidence on profitability cannot confirm that finding, although an increase in financial sector profitability cannot be ruled out. The primary reason for the strength of tax revenues seems then to be the rise in the share of corporate profits in GDP, which was particularly marked in financial services.

Future research could address the question of why the incorporated sector of the economy has increased, and whether this is a result of the lower tax rates. This could be either because of encouraging business activity or because of making it more attractive for multinationals to report profits in the UK. More research is also needed on the UK's financial sector and why it performed so well during the late nineties.

As long as there is only limited understanding about the reasons for the growth of the corporate sector, it is hard to make predictions for future revenue developments. We know however that revenues will depend too a much larger degree than previously on the performance of the financial sector. If the performance of that sector suffers, or if financial services manage to avoid more tax, then the puzzle treated in this article might disappear rather quickly.

References

Devereux, M.P. and R. Griffith (1998) "Taxes and the location of production: evidence from a panel of US multinationals", *Journal of Public Economics*, 68(3), 335-367

Devereux, M.P. and R. Griffith (2003) "Evaluating tax policy for location decisions" *International Tax and Public Finance*

Devereux, M.P., R. Griffith and A. Klemm (2002) "Corporate Income Tax Reforms and International Tax Competition" *Economic Policy* 35.

Devereux, M.P. and A. Klemm (2004) "Measuring Taxes from Income on Capital: Evidence from the UK", in P.B. Sorensen (ed.) Measuring the Tax Burden on Capital and Labour, MIT Press, Cambridge (MA).

Devereux, M.P., L. Lammersen, and C. Spengel (2000) "The effective levels of company taxation in the member states of the EU", report prepared for the European Commission.

European Commission (2002), Company Taxation in the Internal Market, COM(2001) 582 final, Brussels.

Eurostat (1998) "Structures of the Taxation Systems in the European Union" Luxembourg: Office for Official Publications of the European Communities.

Inland Revenue (various years) "Inland Revenue Statistics", London: The Stationary Office; also: <http://www.inlandrevenue.gov.uk/stats/index.htm>.

National Statistics (various years) "Statbase" at <http://www.nationalstatistics.gov.uk/statbase/tsdintro.asp>

Mendoza, E.G, Razin, A. and Tesar, L.L. (1994) "Effective tax rates in macroeconomics: cross country estimates of tax rates on factor incomes and consumption" *Journal of Monetary Economics*, 34, 297-323.

OECD (2001) "Tax Ratios: A Critical Survey" Tax Policy Studies 5, OECD, Paris

OECD (2003) "Revenue Statistics", OECD, Paris