

Why Has the UK Corporation Tax Raised So Much Revenue?

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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 reduced. We consider explanations based on changes in the tax law and in economic factors. Changes in the tax law, such as base-broadening measures through reductions in capital allowances, can explain only part of the puzzle. Among the economic explanations, an increase in the size of the corporate sector, mainly caused by expansion of the service sector and improvements in profitability of the financial sector, seems the most likely. 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.

I. INTRODUCTION

This paper investigates the trends in UK corporation tax (CT) collections 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.

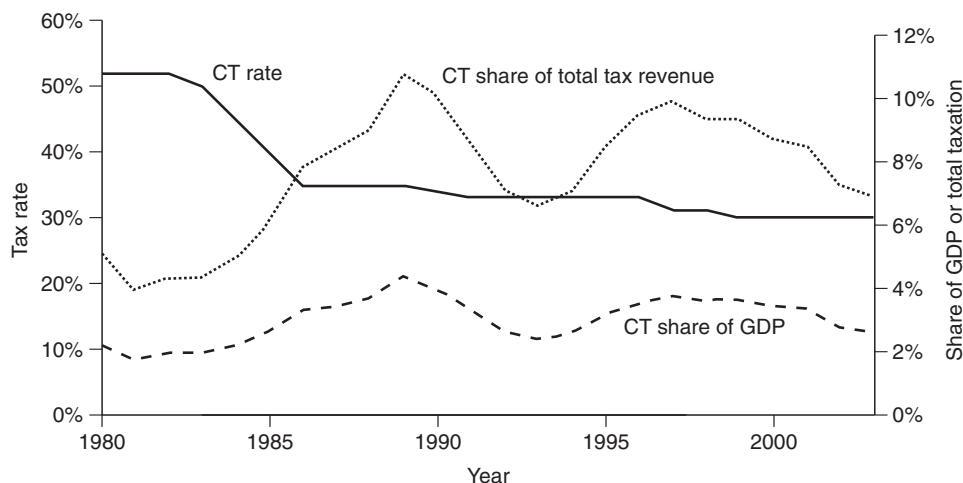
The history since 1980 is shown in Figure 1. The current statutory CT rate of 30 per cent is at an all-time low. Yet revenues — expressed both as a proportion

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FIGURE 1
Corporate Tax Rates and Revenues



Note: Corporation tax receipts include advance corporation tax in years where this was payable.
Sources: Tax data from *Financial Statistics*, May 2004; GDP data from *UK Economic Accounts*, March 2004.

of GDP and as a proportion of total tax revenues — have recently been high. While CT revenues are volatile, they have been buoyant since the late 1980s. Even during the recession in the early 1990s, when they temporarily dipped, and despite a recent decline, revenues have remained at much higher levels than during the early 1980s, when the tax rate stood at 52 per cent.

A comparison of the current UK position with the positions in 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 both as a proportion of GDP and as a proportion of total tax revenues — are above the G7 average. Only Japan had higher CT revenues than the UK. As a share of GDP, UK CT revenues are virtually the same as Japan's.

Resolving this puzzle is not only interesting in itself but is also important in order to understand the likely future developments of CT revenues. We will consider a range of different explanations, which we group into two categories:

1. legal reasons: 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;

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

TABLE 1
Corporate Income Tax Rates and Tax Revenues in G7 Countries

	<i>Tax rate,^a 2001 (1996, if different)</i>	<i>Tax revenue as a share of total tax revenue, average 1996–2001</i>	<i>Tax revenue as a 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% (50.0%)	14.0%	3.8%
UK	30.0% (33.0%)	10.5%	3.8%
USA	39.3%	8.5%	2.5%
Average	37.3% (43.5%)	8.8%	3.1%

^aIncluding local taxes. In countries where the rate depends on the sector, the manufacturing rate is shown.

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

2. economic reasons: changes in the economy, such as to the rate of profitability or to the size and sectoral composition of the corporate sector, can change the average tax rate faced by companies even if the tax system remains the same.

In this paper, we address these possibilities in turn. Section II deals with the legal explanations, first summarising the CT reforms since 1980. It then presents estimates of effective tax rates, which take into account some of the rules defining taxable profit, as well as the statutory tax rate. Using these effective tax rates, we assess the contribution of explanation 1. Section III deals with the economic changes that might explain strong revenues, by calculating different measures of average tax rates using actual data. It also includes an analysis of the size and composition of the corporate sector of the economy. Section IV concludes.

II. 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.

1. Corporation Tax Reforms

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

BOX 1

Significant Corporate Tax Reforms Since 1980

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

1983: Small companies' rate cut from 40 per cent to 38 per cent from 1982–83.

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

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

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

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

1991: CT rate cut from 35 per cent to 34 per cent in 1990–91 and to 33 per cent 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 per cent on plant and machinery and initial allowance of 20 per cent on industrial buildings.

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

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

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

1998: Main CT rate cut from 31 per cent to 30 per cent and small companies' rate cut from 21 per cent to 20 per cent from 1999–2000. ACT abolished from 1999–2000. System of quarterly instalment tax payments phased in from 1999–2000.

1999: New starting rate for small companies introduced at 10 per cent from 2000–01.

2002: Small companies' rate cut from 20 per cent to 19 per cent. Starting rate cut from 10 per cent to 0 per cent. Allowance for intangible assets introduced.

2004: Minimum rate of 19 per cent for distributed profits introduced.

^aThe 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.

^bThe reducing-balance method specifies the yearly allowance as a fixed percentage of the tax-written-down value (i.e. the original cost less any capital allowances already granted), so that the nominal value of the allowance declines over time. The straight-line method specifies the allowance as a fixed percentage of the original cost, so that the nominal allowance remains constant.

The most significant reform was in 1984. This lowered the CT rate from 52 per cent to 35 per cent over four years. It also substantially reduced the generosity of capital allowances.² Although further rate cuts occurred during the 1990s, 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 per cent on investment in plant and machinery was introduced.

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.³ The abolition of ACT largely resolved this problem of surplus ACT.⁴ ACT payments were replaced by payment of CT in quarterly instalments.⁵

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 to identify the quantitative impact of other reforms. We do that in the rest of this section by looking at measures of the ‘effective’ tax rate firms face. These reflect both the statutory tax rate and other tax rules. They cannot, however, include every aspect of the tax system. One of the reforms that raised significant amounts of revenue was the introduction of CT payments by quarterly instalments. While this did not affect effective tax rates, it boosted revenues during a four-year transitional period from 1999–2000 to 2002–03, when it was phased in. This is because it brought tax payments forward compared with the previous system with ACT due at the time of distributions and the remaining (‘mainstream’) CT due nine months after the end of the accounting year. During the transitional period, more than one year’s worth of tax was thus paid by affected companies. The abolition of ACT, on the other hand, cost revenues. The net effect of both changes raised, on average, £2.2 billion per year during the transitional period (Inland Revenue, 1998). Without these changes, the average ratio of CT revenue to GDP would have been around 3.1 per cent instead of 3.3 per cent and the ratio of CT revenue to total tax revenue would have been 7.9 per cent instead of 8.5 per cent. While

²Such rate-cutting base-broadening reforms have subsequently been undertaken in numerous industrialised countries: see Devereux, Griffith and Klemm (2002) for further details.

³Between July 1994 and the end of fiscal year 1998–99, such firms could declare ‘foreign income dividends’ to avoid ACT.

⁴Although ACT that was not set off against CT at the time of the abolition could be carried forward indefinitely, in a system of ‘shadow ACT’.

⁵A related reform was the abolition of the repayment of tax credits to tax-exempt shareholders from 1997. This raised revenues of around £5 billion per year (Inland Revenue, 1997). However, these show up in personal income tax receipts and are thus outside the scope of this paper, with its focus on taxes paid by the corporation.

these are important differences, the figures with the effect of the transition and the abolition of ACT taken out would still have been much higher than in the early 1980s.

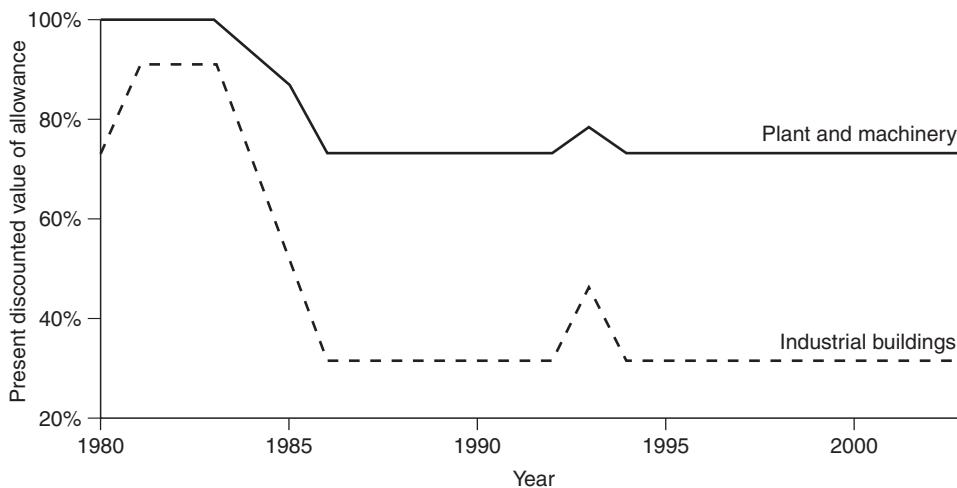
2. Effective Tax Rates

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;⁶ rather, we use them to illustrate the impact of the reforms described above. We focus on the tax system that applies to large firms, as large firms account for most of the corporation tax revenues.

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 incorporates all allowances over time for a specific investment. A value of 100 per cent 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 implies 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

FIGURE 2
Investment Allowances for Different Assets



⁶For a comprehensive analysis of recent effective tax rates in the EU, see Devereux, Lammersen and Spengel (2000) and European Commission (2002).

and in industrial buildings.⁷ 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

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 that earns at least the cost of capital is worth undertaking. Taxes typically increase the cost of capital — the return on the project must be sufficient to pay the tax as well as 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.⁹

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. One reason is that it applies only to investments that just break even. But it is more profitable investment projects that tend to account for significant amounts of tax revenue. 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 in France (but not both). It will choose the location that generates the higher 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. It is thus a forward-looking measure. By contrast, tax revenues depend on past investments and on the timing of income streams. Using effective tax rates to predict tax revenues should therefore be done with caution,

⁷The calculations use a discount rate in all years of 10 per cent. We have also calculated this measure with a time-varying discount rate (interest rate plus a 4 percentage point risk premium); while the annual variability increases, the overall pattern is unaffected.

⁸There have been other changes to allowances not taken into account here — for example, the introduction of an allowance for intangible assets in 2002 and the reduction of the rate of allowances for long-life assets in 1996.

⁹The methodology used here is defined in Devereux and Griffith (2003).

particularly in the short run. If there are many firms that are tax-exhausted or have a stock of losses carried forward, the link between forward-looking measures and the tax system will be weak. What effective tax rates, however, can tell us is whether the tax system, abstracting from changes in the timing of revenues, has become more or less generous.

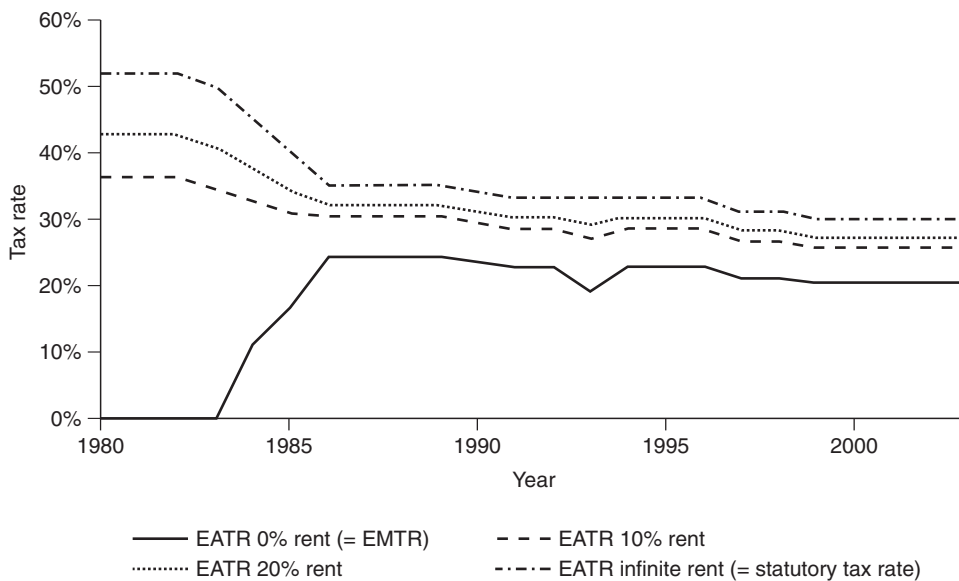
Each form of effective tax rate varies with a large number of factors, including the type of asset invested in, the source of finance and, in the case of the EATR, the pre-tax rate of profit on the project. We present some stylised examples while varying the assumptions about these factors.

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 graph is the EMTR; this is equal to the EATR for a marginal investment. At the other extreme is the statutory tax rate; this is equal to the EATR for an extremely profitable investment. The graph shows that taxes on more profitable investments have fallen relative to taxes on less profitable investments. The most important reform here was in 1984. The lower statutory

FIGURE 3

Effective Average Tax Rates at Different Rates of Profitability

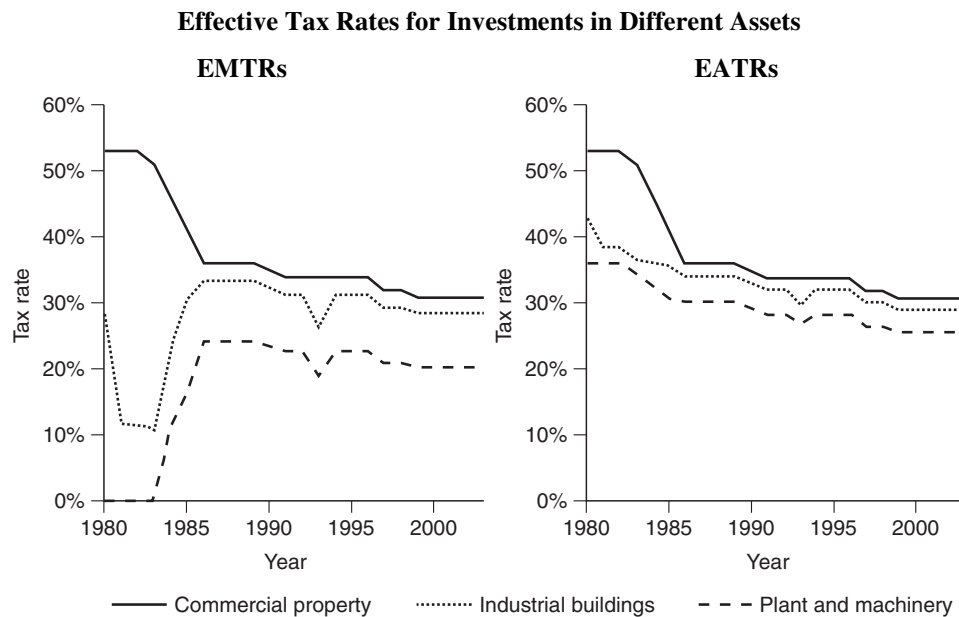


Notes: Assets — plant and machinery. Source of finance — new equity / retained earnings. Assumed real discount rate — 10 per cent. Assumed inflation rate — 3.5 per cent.

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 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 10 per cent. 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 graph also indicates some convergence in the EMTRs for these assets. The reason is that investment in commercial property did not experience 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 EATRs on these alternative forms of investment moved more closely with each other — although again investment in commercial property benefited most from the 1984 reforms.

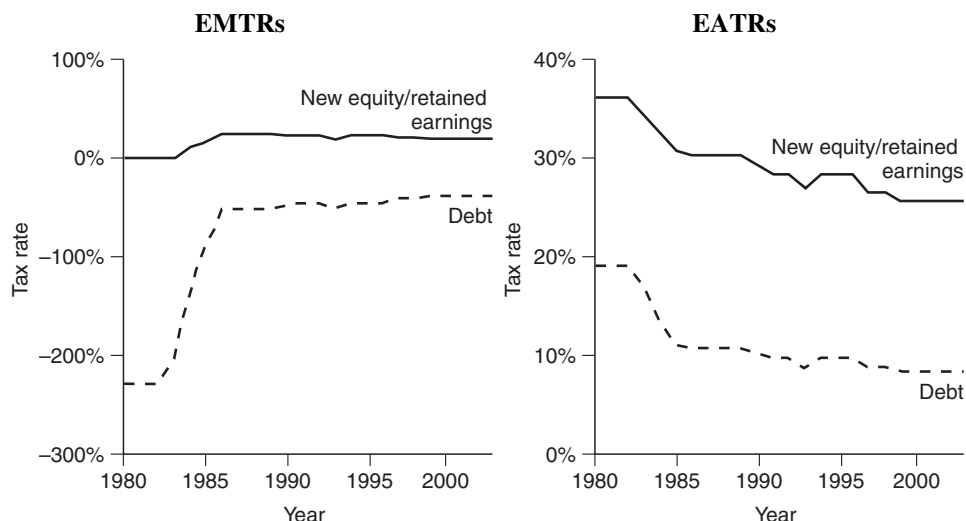
FIGURE 4



Notes: Rate of economic rent — 0 per cent (EMTR) and 10 per cent (EATR). Source of finance — new equity / retained earnings. Assumed real discount rate — 10 per cent. Assumed inflation rate — 3.5 per cent.

FIGURE 5

Effective Tax Rates for Investments Financed from Different Sources



Notes: Rate of economic rent — 0 per cent (EMTR) and 10 per cent (EATR). Asset — plant and machinery. Assumed real discount rate — 10 per cent. Assumed inflation rate — 3.5 per cent.

Figure 5 uses the same measures to compare differences across the source of finance of investment projects, specifically comparing investment in plant and machinery financed by equity¹⁰ and by debt. The left panel of the figure indicates that the EMTR for such investment financed by debt reached levels of below *minus* 200 per cent prior to the 1984 reforms (compared with zero for investment financed by equity). This arose because of the combination of the immediate offset of such capital expenditure against tax with the deductibility of the interest payments arising from the borrowing.¹¹ Since 1984, however, the EMTRs on these two forms of investment have become closer. The EATR on debt-financed investment is also lower than that on investment financed by equity; but both EATRs have fallen substantially since 1984.

¹⁰In many analyses, the effective tax rate in the case of equity depends on whether the source is new equity or retained earnings. We assume here 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.

¹¹The 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.

3. Conclusions from the Legal Explanations

So what can we conclude from this about the importance of tax reform in explaining the buoyancy of UK corporate tax revenues? As noted above, in investigating the effect of tax reform on tax revenues, the EATR is more relevant, since it is largely profitable investments which generate tax revenue.¹² Overall, the graphs 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. Neither can the changes in the payment system explain the trend, as they were only relevant for four years from 1999–2000 onwards and, even during these four years, they did not strongly affect the trend of the series.

III. ECONOMIC EXPLANATIONS

We now turn to explanation 2: that economic changes may have increased effective tax rates, even if the overall effects of changes to the tax system were small. The most obvious possibility is that average profitability may have changed. This is because, as demonstrated in Figure 3, effective tax rates increase with the rate of profit. Such a change in profitability might happen for a number of reasons. The sectoral composition of economic activity has changed significantly in the UK, and this might affect average profitability. The returns on certain types of investment might change — for example, in the UK and other countries during the second half of the 1990s, there has been rapid growth in stock market returns and thus in the profitability of the financial sector. In addition, the extent to which earnings are claimed as corporate profits may change in response to changes in the tax system. This effect could counteract the fall in the statutory rate.

Another possibility is that there may have been compositional changes in the assets invested in or the sources of finance used. In Figures 4 and 5, we have shown that the tax rate varies depending on the asset invested in and the sources of finance used.

A final possibility is that changes in inflation and interest rates, which affect the real value of investment allowances, could have affected tax rates. However, the fall in inflation rates since the early 1980s would have increased the value of allowances and thus led to lower tax rates, so would not be an explanation for high tax revenues.

For these reasons, the effective tax rate faced by the average firm may change over time, even if the tax system remains stable. We can put these factors

¹²There are, of course, also loss-making firms in the economy. The asymmetry of the tax system, however, means that they cannot always receive tax deductions for the losses. The non-linearity of the tax system also implies that tax liabilities rise more than proportionally with profits.

together in a measure of the tax rate that takes all of them into account. There are two main 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 subsections.

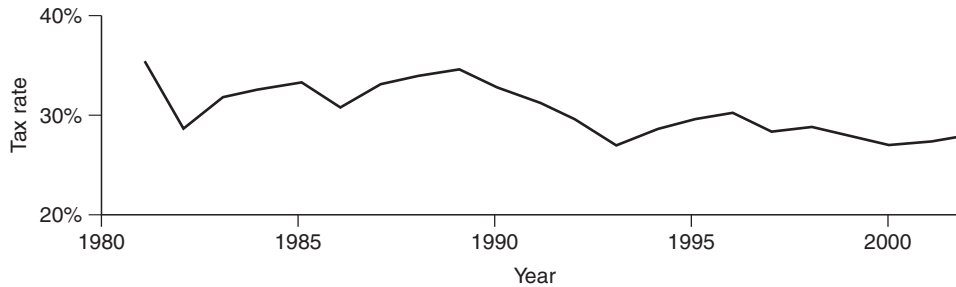
1. EATRs based on Average Rates of Profit in Each Year

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 of 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. These are presented in Figure 6. Note that this is representative only of the non-financial sector of the economy, as the common measure of profitability (profits/capital) is not very informative in the financial sector (see also Section III.3).

As would be expected, the EATR series shown in Figure 6 is more volatile than the one in the previous graphs, because factors that are independent of the tax system are allowed to vary over time. But it is still clearly showing a downward trend. This suggests that the overall effect of changes in the average level of profitability, changes in the inflation rate and those compositional changes between assets and sources of finance that we have taken into account cannot account for the strength of tax revenues in the 1990s. Based on this approach alone, we would conclude that strong tax revenues are unlikely to have been driven by changes in average profitability, changes in assets and finance mixes or macroeconomic changes.

Three caveats should be noted though. First, as pointed out above, 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. Third, this measure excludes the financial sector, which plays an important role in the UK economy. We therefore turn to an approach that directly calculates an average tax rate based on the whole corporate sector.

FIGURE 6
Average EATR, Non-Financial Sector



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 and machinery and industrial buildings. Interest and inflation rates — actual values from National Statistics, *Statbase*, www.nationalstatistics.gov.uk/statbase/tsdintro.asp.

Definitions and sources in detail: (Numbers in parentheses refer to the Datastream account items.) Profitability is defined as pre-tax operating profit (137) divided by the capital stock. 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 per cent 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 percentage points. (The four-letter codes in parentheses refer to National Statistics time series.)

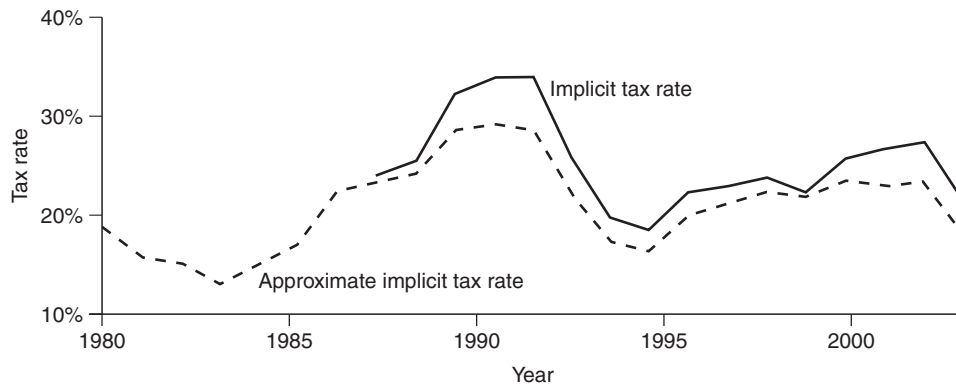
2. *Implicit Tax Rates*

An implicit tax rate for the corporate sector is presented in Figure 7.¹³ 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).¹⁴ Data limitations mean that this particular measure cannot be calculated for years before 1987. Therefore Figure 7 also contains an

¹³A frequently used revenue-based tax rate is the implicit tax rate on capital, as first suggested by Mendoza, Razin and Tesar (1994) and then used and further developed by many institutions and individuals (for example, Eurostat (1998) and OECD (2001)). We do not present this tax rate here as it is a 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 (for example, Mendoza, Razin and Tesar (1994) and Eurostat (1998)) have indeed fallen dramatically since the early 1980s, but this was 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).

¹⁴See Devereux and Klemm (2004).

FIGURE 7
Implicit Tax Rates



Sources: *Inland Revenue Statistics*; *UK National Accounts*; *Financial Statistics*.

Details of definitions: The approximate measure is defined as: corporate income tax revenue (ACCD) divided by gross operating surplus (NQBE + NQNV) less depreciation (DBGF + NHCE). The exact measure adds net taxable property income (EABC + NHCK + FAOG + NHDH - EABG - NHCM - FBXO - NHDK - NSRV) to, and deducts profits of quasi-corporations (EAXB) from, the denominator. It also reduces depreciation by the share of quasi-corporations' profits in total non-financial profits.

approximate version of the measure that can be calculated further back in time.¹⁵ Note that, unlike the ratios of tax revenues to GDP, this measure is not affected by an expansion of the corporate sector, as long as the tax rates on the additional profits remain the same. Only if the rate of profitability increases would this measure also increase.

Figure 7 shows that the implicit tax rate rose strongly in the late 1980s 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 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 continued to rise in the second half of the 1990s, whereas the CT to GDP ratio levelled out. Since 2000, though, both have declined. Further, by the end of the 1990s, the (approximate) implicit tax rate was well within its

¹⁵The 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.

range for the previous 20 years, whereas the CT to GDP ratio was close to the top end of its range.

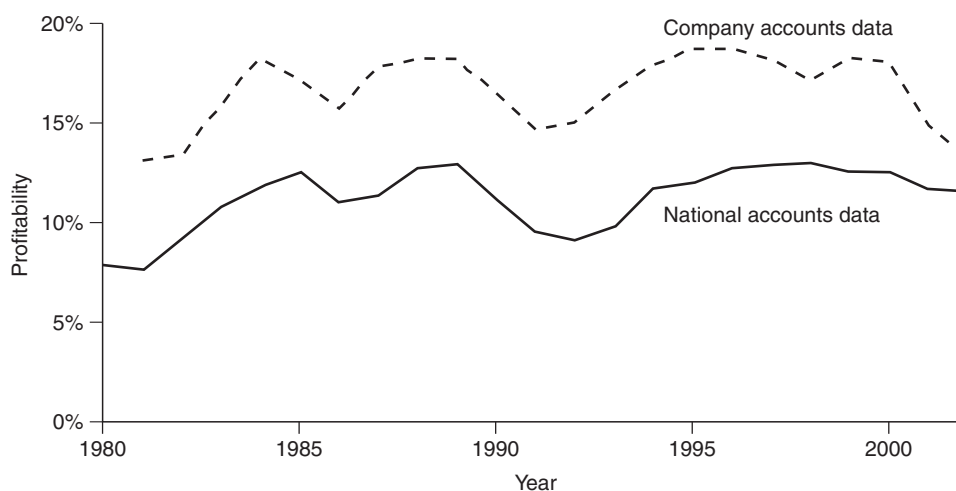
The increase in the implicit tax rate in Figure 7 can be rationalised by a number of explanations. One possibility is higher profitability, although how strong tax revenues can be attributed to strong profitability is complicated by the fact that the rate of profit is cyclical. Due to lags in tax payments, 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. The role of profitability is thus considered in more detail in the following subsection. Other explanations for the increase in the implicit tax rate include changes in the sectoral composition of the economy (see Section III.5) and the effect of any base-broadening measures not modelled in the analysis above.

3. The Role 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. Accounts data — which underlie the average EATR in Figure 6 — are usually based on the historic cost method (though with possible revaluations, and in our case adjusted using a perpetual inventory method). 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. For the financial sector particularly, the stock of physical capital is not very informative. UK National Statistics therefore only publishes 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).

From Figure 8, we can see that, depending on the data source, profitability has increased or slightly fallen since 1980. The large difference between the measures may be surprising but can be explained by the fact that Datastream data contain listed companies only, which may be more profitable than other companies. Furthermore, Datastream reports data on the worldwide activities of UK-listed firms, while National Statistics data are based on UK activities only. Which of the two is more informative for our purposes is debatable. On one hand, the UK operates a residence-based system of taxation in which firms are liable to UK taxes on their worldwide activities. On the other hand, double tax relief and delayed repatriation of profits mean that, in practice, foreign profits rarely face full taxation in the UK. On balance, the National Statistics measure might thus be more relevant, and one could conclude that there was indeed a (relatively small) increase in profitability.

FIGURE 8
Profitability of Non-Financial Companies



Sources: National accounts data from National Statistics, *Statbase* (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 operating profit (item 137) divided by capital stock obtained using the perpetual inventory method described in the definitions for Figure 6).

We could thus conclude that improved profitability may play a rather small role in our explanation of strong revenues. It should not be forgotten, though, that these measures of profitability were calculated for non-financial firms only. As the financial sector has become an increasingly important part of the economy, as will be discussed in Section III.5, an improvement in profitability in that sector could potentially explain an important share of the strong tax revenues. This would explain the rise in the implicit tax rate in the late 1990s that is not mirrored in the average EATR, although, as stressed before, these two measures can differ for other reasons as well.

4. Size of the Corporate Sector

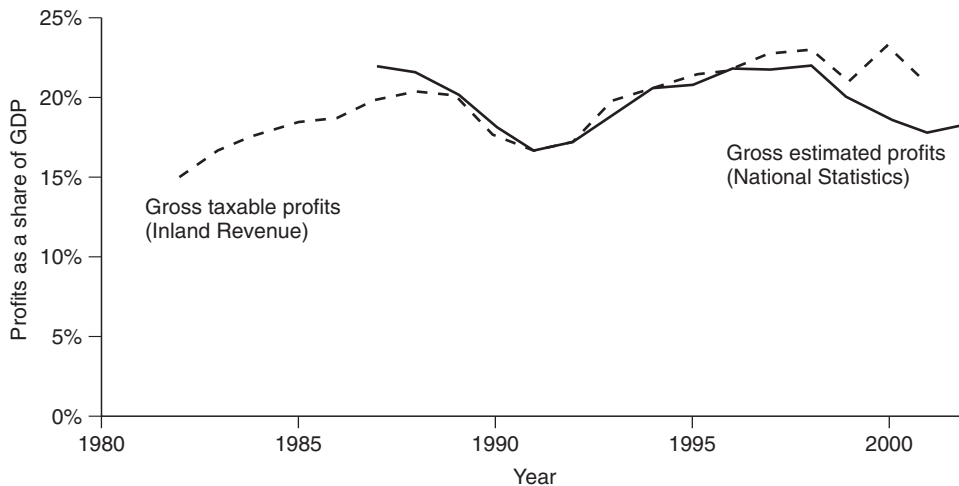
If increased profitability — at least in the non-financial sector of the economy — does not play a major role in explaining strong revenues, then it is still possible that the corporate sector expanded at a relatively stable rate of profitability. This could be due to an increase in entrepreneurship and/or an expansion of established businesses. The role of the major programme of privatisation undertaken in the UK will also be considered.

To examine changes in the size of the corporate sector, we show in Figure 9 two measures of the level of corporate profits as a share of GDP. The first is the sum of the operating surplus and net property income of the corporate sector,

using National Statistics data. Data limitations mean that this measure cannot be constructed for years before 1987. The second measure is net corporate income chargeable to tax, after capital allowances, using Inland Revenue data. A priori, the National Statistics measure is preferable for our purposes, because it is based on the flow of profits within a year. The Inland Revenue 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 shows that the measure based on Inland Revenue data has risen substantially in the last 20 years, from around 15 per cent of GDP in the early 1980s to well over 20 per cent 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 Inland Revenue measure and ends below it, it gives a rather different impression — of a volatile ratio, but one without a clear trend.

FIGURE 9
Two Measures of Aggregate Profits



Sources: *Inland Revenue Statistics*; *UK National Accounts*.

Details of definitions: 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 table 11.4 of *Inland Revenue Statistics* and are the sum of 'Income chargeable to tax' and 'Capital allowances'.

This increase in profits could, of course, be driven by increases in the profitability of the corporate sector rather than increases in the extent to which activities are undertaken within the corporate sector. From Section III.3, we know that such an increase in profitability was at best small in the non-financial sector,¹⁶ although it might have been more important in the financial sector. Privatisation would be another candidate explanation. However, most privatisation was of public corporations, which would already have been liable to taxation and whose profits are included in our measures. Their privatisation would thus only increase the size of the corporate sector if it improved their profitability. Only the privatisation of certain services that were previously run directly by the government (for example, refuse collection in some councils) and are now run by private companies will have tended to increase the size of the corporate sector directly. This type of privatisation is of a relatively smaller scale, though, and could thus at best explain only a small part of the increase.

Overall, we can conclude from this subsection that there is some evidence of an expansion of corporate activity, as a result of either general expansion or improved financial sector profitability, or a combination. To analyse these issues further, the following subsection will investigate which sectors of the economy drove this increase.

5. Changes in Sectoral Composition of the Economy

An analysis of the changes in the sectoral composition of the economy may help us understand better the causes of an increase in size of the corporate sector as a whole. Such changes can affect tax revenues through a number of channels, including the asset mix of firms operating in different sectors, differences in the financial structure across sectors and different rates of profitability. Service sector firms invest substantially less in physical assets and thus will be eligible for less allowances. In addition, they tend to invest more in assets that do not attract capital allowances, such as commercial buildings.

To investigate the idea that changes in the sectoral composition of the economy are an important part of the explanation, in Table 2 we show the share of total profits (based on net corporate income chargeable to tax, after capital allowances, using Inland Revenue data) attributable to different sectors of the economy for four five-year periods¹⁷ and for the latest available year. In addition, the service sector is subdivided into banking, finance and insurance and other services.

Table 2 confirms the well-known 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

¹⁶The national accounts measure of profitability increased from 9.2 per cent in 1982 to 11.2 per cent in 2001. At the same time, the measure of taxable profits increased from 14.9 per cent to 20.7 per cent of GDP.

¹⁷The first period is shorter due to data limitations.

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particularly marked growth in profits in banking, finance and insurance. To see more clearly which sectors have contributed most to aggregate growth, Table 3 shows 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 per cent of the growth in profits for each period and around 84 per cent in the last five-year period. Within this category, the banking, finance and insurance sector alone contributes almost half of the profit growth during the last five-year interval. In 2001, however, financial sector profits drop, causing an almost equally large fall in aggregate profits. This again confirms the

TABLE 2
Share of Total Profits by Sector

	1982-85	1986-90	1991-95	1996-00	2001
Agriculture	0.7%	0.5%	0.5%	0.4%	0.4%
Manufacturing	46.8%	40.5%	40.0%	32.1%	31.2%
Construction	2.7%	4.1%	2.6%	2.5%	3.3%
Overseas / not classified	5.8%	3.3%	5.6%	5.0%	5.6%
Services	44.1%	51.5%	51.3%	60.0%	59.5%
<i>of which:</i>					
Banking, finance and insurance	16.3%	16.8%	19.3%	27.9%	25.5%
Other services	27.8%	34.8%	32.0%	32.1%	34.0%

Source: *Inland Revenue Statistics*. (For details, see definitions for Figure 9.)

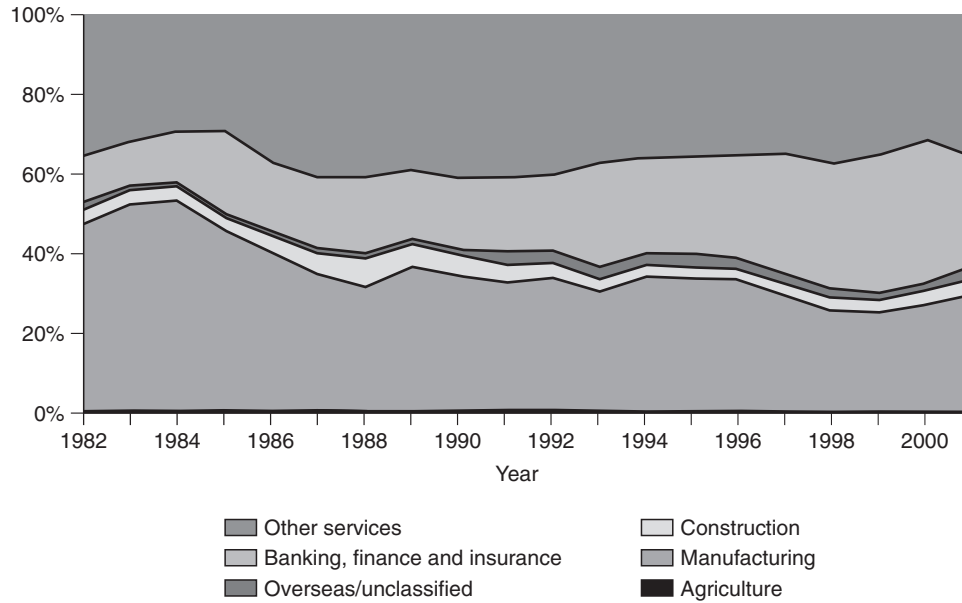
TABLE 3
Percentage of Profit Growth due to Each Sector

	1982-85	1985-90	1990-95	1995-00	2000-01
Agriculture	0.1%	0.6%	0.4%	-0.1%	0.5%
Manufacturing	41.7%	32.4%	35.3%	8.1%	-3.4%
Construction	2.7%	6.5%	-0.7%	3.5%	6.3%
Overseas / not classified	0.4%	-0.2%	7.8%	5.0%	3.6%
Services	55.1%	60.8%	57.3%	83.5%	-107.0%
<i>of which:</i>					
Banking, finance and insurance	29.0%	10.9%	36.6%	49.9%	-115.8%
Other services	26.1%	49.9%	20.7%	33.6%	8.9%

Note: Between 2000 and 2001, aggregate profits fell and the figures represent the share in the amount by which profits fell. For example, services contracted by 107 per cent of the total fall in profits.

Source: *Inland Revenue Statistics*. Gross taxable profits are taken from table 11.4 of *Inland Revenue Statistics* and are the sum of 'Income chargeable to tax' and 'Capital allowances'.

FIGURE 10
Share of Corporation Tax Revenues Contributed by Each Sector



Source: Table 11.4 of *Inland Revenue Statistics*.

increasingly important role of the performance of the financial sector for the entire economy.

By contrast to the recent years, growth in earlier periods was more balanced across different sectors of the economy, and more in line with the share of profits each sector contributed to the total.

Having shown that profits in the service sector, and particularly the financial service sector, have grown faster than profits in other sectors (except in the last year considered), it would seem reasonable to assume that these sectors contribute an increasing share of corporation tax revenues. To analyse this more directly, Figure 10 presents the share of total tax liabilities¹⁸ due to each sector.

As can be seen from Figure 10, the share of tax liabilities in the service sectors has increased from less than half to two-thirds of all tax liabilities. Within services, particularly the financial sector has grown, contributing 27 per cent of total corporation tax liabilities in 2001 compared with only 12 per cent in

¹⁸Tax revenue data are not available by sector. The main difference between liabilities and revenues is timing. Liabilities are reported by the year to which they accrue 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 instalments.

1982. In the peak year, 2000, the financial sector contributed 36 per cent of total tax liabilities. The share of manufacturing has diminished accordingly.

The question remains as to why the tax liabilities of 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 in the financial sector, we cannot easily address this question directly. However, we can see that employment in the financial sector has increased by just over a quarter (from 3.4 per cent to 4.3 per cent of the UK workforce) between 1980 and 2001, while the share of corporate profits has increased by more than twice that rate (56 per cent), as shown in Table 2. This suggests that profitability increased in addition to expansion of this sector. Furthermore, the timing of the revenue boom might also tell us something. Corporation tax liabilities of the financial sector peaked in 2000, at £11.3 billion. By 2001, they had dropped to £7.9 billion. 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.

6. Conclusions from the Economic Explanations

The evidence presented in this section points towards two main economic explanations for high tax revenues. The main one is growth in corporate sector profits as a share of GDP, which was mainly caused by a combination of expansion of and improved profitability in the financial sector. The other is a more general move from manufacturing to services, which tend to face higher effective tax rates because of lower allowances.

IV. SUMMARY AND CONCLUSIONS

This paper has attempted to shed light on the puzzle expressed at the outset: why recent corporation tax 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 expansion of the financial sector and, partially as a consequence, a rise in the share of corporate profits in GDP.

While this paper focuses on corporate taxes only, it should be borne in mind that the general state of the public finances depends on all taxes and their interdependencies. Some taxes are substitutes and some are complements to corporation tax. A higher rate of incorporation of small businesses, for example, would increase CT revenues but lead to lower personal income tax and National Insurance revenues. The aggregate effect on the public finances may well be negative. In the case of the main reasons for strong CT revenues identified in this paper, it seems less likely that there was an immediate trade-off.

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 to 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 paper might disappear rather quickly.

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