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**CENTRE FOR
BUSINESS TAXATION**

G20 Corporate tax ranking 2011

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EXECUTIVE SUMMARY

The UK government has stated that it aims to 'create the most competitive corporate tax regime in the G20'. In support of this aim, it has announced that it intends to reduce the main UK corporation tax rate from 28 percent when it took office to 23 percent by 2014.

This report assesses the current competitiveness of the UK corporate tax system relative to other G20 countries. We measure competitiveness using two widely employed indicators: the effective average tax rate (EATR) and the effective marginal tax rate (EMTR). Theory and empirical evidence indicate that the EATR is relevant for the location of discrete investment projects, while the EMTR is relevant for the level of investment, given its location. Both the EATR and the EMTR depend on the statutory tax rate and the definition of the tax base; the EMTR depends more heavily on the tax base.

These measures are based on an analysis of the parameters of the corporation tax regimes in each of the G20 countries. Our key findings for 2011 are that:

- the UK has an EATR of just over 26 percent, which ranks the UK 9th out of the 19 independent G20 countries (excluding the European Union), and
- the UK has an EMTR of just under 23 percent, which ranks the UK 15th out of the 19 countries.

The weaker position of the EMTR is due to the fact that, although the UK tax rate is relatively low by international standards (in 7th position), the UK is the least generous G20 country with respect to allowances for capital investment. Recent tax reforms that have reduced allowances have tended to raise the EMTR, despite corresponding cuts in the tax rate.

The tax reforms proposed by the government to take place between 2011 and 2014 will improve the competitiveness of the UK tax system, if the other countries do not change their tax systems. In this case, the UK would rise to 5th in the EATR ranking, and 14th in the EMTR ranking.

But the trends of the last decade suggest that other countries will also change their tax system. Since 2002 the UK has lost competitiveness to other countries. The UK was 4th in the EATR ranking in 2002. It fell to 9th in 2011, despite a small reduction in its own EATR as the main rate was cut from 30 percent to 28 percent. However, most other G20 countries reduced their EATR more aggressively than the UK. For the first time in ten years, in 2011 the UK EATR exceeded the average of other G20 countries.

This trend is even more dramatic for the EMTR, where the UK was below the G20 average in 2002 and is far above this average today. The reduction in capital allowances contributed to raising the UK EMTR from 20 percent in 2002 to 22.8 percent in 2011, despite the reduction in the tax rate.

These results suggest strongly that reforms that cut the tax rate but also cut allowances are not enough to maintain, let alone improve, the competitiveness of the UK corporate tax system. Such reforms mainly redistribute the tax burden between companies, rather than making the tax system as a whole more competitive. The government has also emphasised its intention to make the UK more attractive as a location for manufacturing. For that objective, a policy of cutting capital allowances is misguided.

Overall, our results suggest that the UK corporate tax system has lost competitiveness during the last decade. Reversing this trend and making the UK corporate tax system the most competitive in the G20 is a very ambitious objective. To get anywhere near achieving it, UK corporate tax policy has a long way to go.

1. INTRODUCTION

The coalition agreement upon which the current UK government is based contains the following statement:

“Our aim is to create the most competitive corporate tax regime in the G20, while protecting manufacturing industries.”¹

Despite the need to reduce public sector borrowing and the actions taken to achieve this, the government followed up this statement by announcing in its first Budget a gradual reduction in the main rate of corporation tax from 28 percent to 24 percent over four financial years from April 2011. In its next Budget in March 2011 it reduced the main rate by a further 1 percent from April 2011, with the subsequent reduction eventually leading to a rate of 23 percent by 2014.

This report evaluates how close the government currently is to meeting its aim of creating the most competitive tax system in the G20. It also evaluates the potential impact of the announced tax rate reductions, combined with announced reductions in allowances, if all other members of the G20 held their corporate tax systems unchanged.

We assume that the government’s intention in aiming to create a competitive corporate tax regime is to stimulate business investment and economic growth. We do not set out here to evaluate the benefit of the UK having the most competitive regime in the G20. Instead we simply address how far the government is from meeting its aim, assessing the competitiveness of the system by the incentive to undertake investment.

With this in mind, we therefore use a methodology developed in the academic literature for evaluating corporate taxes which considers their effect on the incentive to invest. The approach taken has also been used extensively by national and international governments to evaluate corporation tax regimes.²

The approach considers two different forms of investment decision. The first is a discrete choice, for example a location choice such as whether a business should expand its activities in the UK or in another country. We assume that the business would choose the location that would generate the greater post-tax profit, in present value terms. The relevant measure of tax in this case is the proportion of the present value of pre-tax profit that would be taken in tax in either country. This is measured by an effective average tax rate (EATR). The second measure considers the size of investment, conditional on the location choice. To evaluate this we consider the cost of capital: the rate of return that an investment project

must earn if it is to break even in present value terms, taking into account all receipts and expenditures. Broadly, we would expect investment to be undertaken only up to the point that the marginal gain from an additional investment is at least equal to the cost of capital. Corporation taxes typically have the effect of increasing the cost of capital, and therefore reducing the quantity of investment that is undertaken. We measure the scale of this investment disincentive by the proportional increase in the cost of capital due to taxation: this is the effective marginal tax rate (EMTR).

There is a large academic empirical literature that investigates the impact of these two measures on investment. A meta-analysis of a large number of empirical studies was undertaken by De Mooij and Ederveen (2008). They found that, on average across estimates in the studies examined, a one percentage point reduction in the EATR led to a 5.6 percent increase in inward flows of foreign direct investment, and that a one percentage point reduction in the EMTR led to a 4.0 percent increase in inward flows of foreign direct investment. These results suggest evidence of a very high sensitivity of flows of foreign direct investment to the measures reported here.

While the approach of considering these two measures is quite general, there are of course practical limitations. In making a comparison across all the G20 countries, it is impossible to account for all aspects of a country’s tax system. In this report, we follow the approach used by the academic literature and the European Commission in measuring effective tax rates using broad measures of the tax rate and tax base in each country.

Specifically, we first identify a measure of the statutory corporation tax rate in each country. We analyse only the main corporation tax rate in each country; we do not take into account lower tax rates applied to small companies or companies with small profit. We do take into account local taxes where possible, using an average or typical local tax rate. Second, we take into account the rate of capital allowances permitted for investment in three broad asset categories: plant and machinery, buildings and intangible assets. We consider a specific investment in each of these assets, and calculate the present value of allowances that would be permitted for each investment in each country. We also follow the standard approach by including investment in inventories; in this case we model the valuation permitted by the tax system in each country and infer any tax charges due to changes in the value of the inventory over time.

¹ H.M. Government (2010), p. 10.

² The approach used here was initially developed by Devereux and Griffith (1998, 2003) and is an extension of the earlier approaches used by King and Fullerton (1984) and OECD (1991). The European Commission has used the Devereux-Griffith approach extensively to analyse differences in corporation tax regimes within the EU: see, for example Devereux et al (2010).

Our central measures consider the case of a business investment which includes investment in all four of these types of asset. We derive weights for the use of each asset using accounting data from a large number of European countries.³ This allows us to calculate the present value of allowances for a composite investment incorporating each of these assets. We combine that with the statutory rate to form the two effective tax rates. A more detailed description of the approach is presented in Appendix A.

While this represents a relatively detailed examination of the tax rates and bases in the G20 countries, many aspects of the corporation tax systems are not accounted for. For example, we do not take account of any taxes relating to cross-border flows. We therefore neglect the effects of the taxation of foreign source income, withholding taxes on flows of dividends, interest and royalties, as well as CFC regimes and other anti-avoidance restrictions. It is simply not practical to allow for all of these factors; in effect, they are assumed to be negligible relative to the main corporation tax charge in each country in their effect on investment incentives. The effective tax rates presented here are therefore less reliable in identifying, for example, the incentives as to where to locate a holding company; rather they are focused on incentives to undertake investment in the four assets analysed. In addition, we do not allow for special regimes that apply only to specific industries, regions or other specific groups of companies, nor do we allow for differences between countries in the administration of taxes.

Our main sources of information on tax regimes in the G20 for this analysis are the country tax reports of the International Bureau of Fiscal Documentation. These have been supplemented from other sources, in particular from Devereux et al (2010) and various issues of the Ernst and Young Worldwide Corporate Tax Guide.⁴

The Group of Twenty Finance Ministers and Central Bank Governors (G20) is a group of finance ministers and central bank governors from 20 major economies: 19 countries⁵ plus the European Union, represented by the President of the European Council and the European Central Bank. Collectively, the G20 economies comprise 85 percent of global gross national product, 80 percent of world trade and two-thirds of the world population. The heads of the G20 nations have met twice yearly at G20 summits since 2008. Starting in 2011, G20 summits will be held annually. This report compares the UK to the other 18 independent countries of the G20.

³ These weights are taken from Devereux and Loretz (2008).

⁴ We are grateful to Chris Sanger and Ernst and Young for providing us with these reports.

⁵ Argentina, Australia, Brazil, Canada, China, France Germany, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkey, United Kingdom and United States.

The report is structured as follows. Section 2 presents our estimates of effective tax rates for 2011 for the G20 countries. Section 3 presents the two key elements underlying these estimates – measures of the statutory tax rate and tax base. Considering these separately can help in identifying the reasons why a country appears more or less competitive. Section 4 considers the impact of the proposed tax reforms in the UK. Section 5 identifies trends in effective tax rates over the last decade in the G20 countries. Section 6 considers the position of the UK relative to an alternative group of countries, the G7. Section 7 briefly concludes. Finally, there are two Appendices, which set out the methodology in more detail and provide some more detailed estimates.

2. EFFECTIVE TAX RATES

In this section we present estimates of effective tax rates for each G20 country in 2011. We begin with the effective average tax rate (EATR), which indicates the size of the disincentives created by corporation taxes to locate a discrete activity in a particular country. This is our central measure of comparison between countries: differences in this measure between countries may affect the location of investment.

We then show the effective marginal tax rate (EMTR), which is a measure of the disincentive to undertake a greater quantity of investment, conditional on a location decision having been made. In Section 3 we relate the measures here to the statutory tax systems in each country.

2.1 EFFECTIVE AVERAGE TAX RATE

Table 1 shows our estimated ranking of the G20 countries for their EATR at the beginning of 2011. These measures reflect an investment in four types of asset, financed by debt and equity. They should therefore best be regarded as an average across a number of different types of investment.

The UK is ranked 9th out of the 19 G20 countries, excluding the European Union, with an EATR of just over 26 percent. In the context of the UK government's aim to have the most competitive corporate tax regime in the G20, and measuring corporate tax competitiveness by 'having a lower EATR this then indicates that the UK is still far from achieving the government's ambition.

The range of EATRs across the G20 countries is large. Russia heads the ranking with an EATR of just 16.7 percent. At the other end is Japan with an EATR more than double that of Russia, at 36 percent.

There is a clear split of countries in this ranking. Of the G7 countries⁶, the UK has the second lowest EATR behind Canada. The larger industrialised countries, such as USA, Japan and Germany, tend to have higher EATRs. In this context, the UK's position appears to be more competitive. However, the key question here is with which countries the UK should aim to be competitive; the UK government has chosen the entire G20 as its benchmark.

⁶ UK, France, Germany, Italy, USA, Japan and Canada.

Table 1. Ranking of effective average tax rates, 2011

Ranking	Country	EATR (%)
1	Russia	16.7
2	Turkey	16.9
3	Saudi Arabia	18.1
4	South Korea	19.8
5	China	22.4
6	Indonesia	23.0
7	Canada	25.7
8	Mexico	26.1
9	United Kingdom	26.3
10	Australia	26.6
11	Italy	26.8
12	Germany	27.0
13	France	29.3
14	India	29.5
15	South Africa	29.8
16	Brazil	30.7
17	Argentina	32.3
18	United States	34.9
19	Japan	36.0

In the next section we investigate in more detail the factors in the different countries' tax regimes which are important in determining the EATR. First, however, we present an equivalent table for the EMTR.

2.2 EFFECTIVE MARGINAL TAX RATE

The effective marginal tax rate is the traditional measure used in the academic literature. It is intended to identify the proportionate rise in the cost of capital for an investment project as a result of taxation. As such, it is usually taken to be one factor in determining the quantity of investment undertaken: a higher cost of capital is typically associated with lower investment.

The EMTR depends on the statutory tax rate and tax base, just as the EATR. However, the tax base plays a more dominant role in the determination of the EMTR.⁷ This largely accounts for the differences in the rankings of the two measures. In principle, it is quite possible for a tax regime to have an EMTR of zero, or even a negative EMTR. A zero EMTR could be achieved in two ways. Either all capital expenditure is fully expensed, but no relief is given for the cost of finance. In this case, all real cash flows are in effect reduced by the tax rate, and the tax is proportional to the net present value of the investment. Alternatively, if allowances are given at a rate equivalent to the true economic depreciation rate, and full relief is also given for the cost of finance including equity finance, then the EMTR would again be zero. For debt-financed investment, where allowances exceed the true depreciation rate, the EMTR can be negative.

As can be seen in Table 2, on average for the composite investment considered here, the EMTR is always positive, ranging widely from just under 8 percent in Russia to 27 percent in Japan and Argentina.

The UK is rather low in the EMTR ranking – 15th out of 19 – with an EMTR of just under 23 percent. This indicates poor competitiveness relative to other members of the G20. This performance can be traced directly to successive reforms of the UK tax system which have progressively reduced the statutory rate, but also reduced allowances. We will investigate this further in the next section. For the EMTR, only 2 members of the G7 are lower in the rankings, USA and Japan, both of which have relatively high statutory rates.

Table 2. Ranking of effective marginal tax rates, 2011

Ranking	Country	EMTR (%)
1	Russia	7.9
2	South Korea	8.1
3	Turkey	8.7
4	Saudi Arabia	13.4
5	Italy	15.8
6	China	16.2
7	Canada	16.8
8	Mexico	17.1
9	France	17.5
10	Germany	18.2
11	Indonesia	18.5
12	Australia	19.1
13	South Africa	19.3
14	India	21.6
15	United Kingdom	22.8
16	United States	23.3
17	Brazil	23.9
18	Japan	27.0
19	Argentina	27.0

⁷ This is because the EMTR reflects the taxation of an investment that just breaks even, while the EATR reflects the taxation of an investment which is more profitable. Capital allowances become relatively less important as the rate of profit earned increases, and so are less important in affecting the EATR.

3. STATUTORY TAX REGIMES

Both effective average and marginal tax rates depend on the same key information: the rate and base of the tax. They differ from each other because these two elements of the tax systems play different roles. To investigate the position of the UK in more detail, we consider the two elements separately. We begin by presenting measures of the main rate of corporation tax in each country, including local taxes where appropriate. We then turn to a summary measure of the value of allowances.

3.1 STATUTORY CORPORATION TAX RATE

Table 3 shows a ranking of the total statutory corporate tax rates for G20 countries at the beginning of 2011. The lowest rates are 20 percent in Saudi Arabia, Turkey and Russia. The highest is Japan with a rate just under 41 percent, with the USA just below this.

The UK, with a tax rate of 28 percent, is in the lower half of this range, with a ranking of 7th out of the 19 countries. This is the lowest of the G7 countries.

While clearly not the lowest of tax rates in the G20, the position for the statutory rate was therefore already relatively competitive even before the recent reforms had begun to take effect.

The fact that the UK's ranking in the effective rate tables is lower than in the statutory rate table must reflect a poor competitiveness with respect to the tax base; this is indeed the case, and is demonstrated below. Given that position, it could be argued that focusing on reforms reducing the main rate of corporation tax further, while also further worsening the UK's position on the tax base, may be misplaced.

However, there is at least one dimension in which the tax rate is important in its own right: profit shifting. Where companies are able to shift profits from high tax jurisdictions to low tax jurisdictions, they are motivated by the reduction in total tax at the margin. The relevant tax rate for this purpose is the statutory rate, since companies are in effect shifting taxable profit. So, to the extent that combating profit shifting is an important issue, then having a competitive statutory rate could be important, but the definition of the tax base is also important for flows of investment.

Table 3. Ranking of Statutory Rates of Corporation Tax, 2011

Ranking	Country	Statutory tax rate (%)
1	Saudi Arabia	20
2	Turkey	20
3	Russia	20
4	South Korea	24.2
5	China	25
6	Indonesia	25
7	United Kingdom	28
8	Canada	29.5
9	Mexico	30
10	Australia	30
11	Germany	31
12	Italy	31.4
13	India	33.1
14	Brazil	34
15	France	34.4
16	South Africa	34.6
17	Argentina	35
18	United States	40.5
19	Japan	40.8

3.2 CORPORATION TAX BASE

The poor performance of the UK in effective tax rate rankings, relative to its ranking for the statutory tax rate, can be traced to less than generous allowances. Table 4 ranks the G20 countries on the basis of a summary measure of allowances: the UK comes last.

The measure used reflects the net present value of allowances that would be permitted for an investment. Since expenditure on capital assets must typically be written off against tax over a number of years, the present value of the allowances is lower than the original cost. The measure shown in the table is the present value of those allowances expressed as a proportion of the initial cost.

In Table 4 we show the position for investment in a combination of three assets. The assets are plant and machinery, industrial buildings, and the purchase of a patent. We take a weighted average of the present value of allowances for these three assets, using the same proportions used in calculating the effective rates above: that is, approximately 44 percent for plant and machinery, 41 percent for industrial buildings and 15 percent for intangible assets. Inventories are also included in the calculation of effective tax rates: we discuss the position of inventories below.

The poor performance of the UK in this table reflects in particular the harsh treatment of industrial buildings. To see this, consider the measure as it applied to industrial buildings. At the beginning of 2011, industrial buildings in the UK were permitted a straight line allowance rate of 1 percent per year (since April 2011 this has been reduced to zero). If that rate had continued indefinitely, then it would take 100 years for the initial cost to be fully written off. At the nominal discount rate used in this report of around 7.5 percent, the present value of those allowances would be worth just over 14 percent of the initial cost.

This is shown in Appendix B, which sets out the rankings for the three individual assets. Table B.3 shows clearly that the UK has the least generous treatment of industrial buildings in the G20 – indeed the next countries, Argentina and Japan, have allowances which are approximately twice as generous as the UK. At the other end of the ranking, India permits allowances for industrial buildings with a present value of over 62 percent of the initial cost.

As would be expected, given that plant and machinery typically has a shorter life, allowances are more generous for this asset, ranging from 67 percent of the initial cost in Indonesia to over 96 percent in Canada. For plant and machinery, the UK is 10th in the ranking, permitting allowances worth around 78 percent of the initial cost. Note though, that this is based on the allowance rate of 20 percent which was in place at the beginning of 2011; from April 2012 this rate will be reduced to 18 percent.

Table 4. Ranking of statutory tax bases, 2011

Ranking	Country	PV of capital allowances (% of cost)
1	South Korea	73.8
2	France	73.0
3	South Africa	70.8
4	Russia	70.5
5	India	68.8
6	Turkey	67.5
7	Italy	66.5
8	China	65.6
9	Mexico	65.6
10	Australia	65.0
11	Canada	64.8
12	Brazil	62.8
13	United States	62.0
14	Indonesia	61.7
15	Germany	61.1
16	Saudi Arabia	60.7
17	Japan	56.7
18	Argentina	54.6
19	United Kingdom	52.3

The UK's ranking is higher still for investment in intangible assets, taken here to be the purchase of a patent, where the UK permits allowances worth over 82 percent of the initial cost. This puts the UK 4th in the ranking, behind only Italy, Germany and France.

As noted above, the overall position of the UK for generosity of capital allowances reduces its ranking for effective tax rates. This is particularly true for the EMTR, which depends more heavily on allowances. The reason that the UK is 15th in the ranking for the EMTR can be traced to its low allowance rates, particularly for industrial buildings.

A final aspect of the tax base is the treatment of inventories. We include inventories in the comparison of effective tax rates as accounting data shows that considerable amounts are invested in them. The tax treatment of inventories depends on their valuation. Typically, there is a tax charge when the valuation of inventories increases with prices, as is the case of FIFO valuation. Where LIFO valuation is used, there is no such increase in valuation and no tax is applied. Some countries allow an average of the LIFO and FIFO approaches. However, the UK is the only G20 country that requires FIFO valuations to be used. This further disadvantages investment in the UK, over and above the value of capital allowances, and this is also reflected in the effective tax rate rankings in Tables 1 and 2. The extent of the disadvantage depends on the rate at which prices increase within a year, which we assume in our analysis to be 2.5 percent. With higher inflation rates, this relative disadvantage to UK investment would be greater.

4. PROPOSED TAX REFORMS IN UK

The previous sections have compared corporation taxes in the G20 at the beginning of 2011. However, as noted in the Introduction, the UK has announced significant changes to both the corporation tax rate and base, to take effect gradually. Specifically, by April 2014, the UK will have a main corporation tax rate of 23 percent. It will also reduce the allowance rate for plant and machinery to 18 percent from April 2012, and has already reduced the allowance rate for industrial buildings to zero from April 2011. In addition, it intends to introduce a 10 percent rate of tax for income from patents.

In order to assess the implications of these changes for the corporate tax competitiveness of the UK, we examine how these changes will affect the EATR and EMTR by 2014, when they have all been introduced. We consider how the UK's ranking would change if no other G20 country undertook any reform of its corporation tax.

The reduction in the main rate of corporation tax to 23 percent would improve the UK's ranking on this measure to 4th place, behind the 3 countries with a 20 percent rate, as is clear from examination of Table 3. The effect of the reduction is therefore to overtake South Korea, China and Indonesia in the ranking of statutory rates. The practical implications of such a change in the ranking are of course difficult to identify, and we do not attempt to do so here. Of course, Table 4 reveals that the UK already has the least generous capital allowances in the G20. Further reducing the capital allowances for both industrial buildings reduces the overall measure for the UK to 38.6 percent, compared to the 52.3 percent shown in Table 4. This leaves the UK last in the rankings by a long way.

Table 5 shows the effects of the announced reforms on the UK's EATR and EMTR, and the effects on the UK's ranking. Each of the rows presents a specific reform, or combination of reforms. We show only the position of the UK since the position of all other countries is unaffected and therefore the same as in Tables 1 and 2.

The first row of Table 5 reproduces the EATR, EMTR and rankings from Tables 1 and 2, for the beginning of 2011. The second row examines the effect on the EATR and EMTR of reducing the main rate of corporation tax to 23 percent, while leaving all other factors unchanged. This has a significant effect on both the EATR – a reduction from 26.3 percent to 21.6 percent – and on the EMTR – a reduction from 22.8 percent to 18.5 percent. This improves the UK's ranking to 5th for the EATR and 11th for the EMTR.

Of course, the government partly intends to pay for this reduction in the rate by expanding the tax base. The third row of Table 5 indicates that including the reductions in capital allowances has only a small impact on the EATR, raising it back up to 22.1 percent, while not affecting its lower ranking of 5th. As would be expected, the reduction in allowances has a more significant impact on the EMTR, raising it from 18.1 percent to 20.1 percent, and moving the UK's ranking almost back to where it was at the beginning of 2011, to 14th place.

Table 5. Effects of announced UK reforms

	EATR		EMTR	
	Ranking	Rate (%)	Ranking	Rate (%)
Beginning of 2011	9	26.3	15	22.8
Rate reduced to 23%	5	21.6	11	18.5
Rate reduced to 23% and capital allowances lowered	5	22.1	14	20.1
Patent box introduced, with no other reforms	7	25.1	15	22.5
All changes	5	21.2	14	19.8

In general, in this report we have modelled only the main corporation tax regime in each country. Many countries have special regimes of various kinds which we have not modelled, on the grounds that we aim to make the comparison across countries as straightforward as possible to implement and to interpret.

However, for the purposes of analysing the UK proposals, we can also allow the part of the return due to the purchase of the patent to be taxed at 10 percent. Relative to the other main rates of corporation tax, this is clearly very low – indeed it is half the 20 percent rate in the three countries at the top of the more general ranking. In modelling the patent box, we assume that the expenditure incurred in purchasing the patent receives relief at only 10 percent, which is consistent with the intentions set out by the government.

The fourth row of Table 5 presents the results of this analysis: here the only change considered is the reduction in the tax rate on patent income in the UK; other aspects of the tax system are held at the rates at the beginning of 2011. Table 5 shows the effect of this on the average EATR and EMTR, which clearly depends on the relative importance

of patent income to other income. Using the weights set out in Appendix A, we find that the introduction of the patent box would, on its own, reduce the EATR by just over one percentage point, to 25.1 percent. Since we assume that expenditure receives relief at only 10 percent, the impact on the EMTR is small, with a reduction only from 22.8 percent to 22.5 percent. The effects of investment solely in patents is larger than the average effect shown in the table.

The last row of Table 5 shows the effects of taking all of these reforms into consideration simultaneously, again assuming that no other countries introduce any corporate tax reforms. The effect on the EATR is clearly dominated by reduction in the main rate of corporation tax. Overall, the EATR falls from 26.3 percent to 21.2 percent, leaving the UK again 5th in the ranking, behind Russia, Turkey, Saudi Arabia and South Korea. By contrast, the reduction in the EMTR is smaller, offset more by the reduction in allowances and also the lower value of allowances since the tax rate is lower. The EMTR falls from 22.8 percent to 19.8 percent, an improvement in the ranking of only one position, from 15th to 14th.

5. DEVELOPMENTS OVER THE LAST DECADE

Section 4 analysed the implications for the UK's tax competitiveness if the announced UK reforms go ahead, and no other G20 countries reform their corporation tax regimes. This procedure was followed in order to provide some indication of the scale of the UK reforms. It is not intended as a prediction of what other G20 countries will do over the next few years. Indeed, it seems very likely that there will also be reforms in other countries. Although we do not make predictions about future reforms, we can analyse trends that have taken place over the last decade. To do so, we first present evidence of the rankings of effective tax rates in 2002. We then show the development over time of the UK effective rates compared with the average of effective rates in the rest of the G20.

5.1 RANKING OF EATR AND EMTR IN 2002

We begin in Table 6 by ranking G20 countries by their EATR in 2002. The procedure for analysing 2002 is exactly the same as that used for analysing 2011, and so Table 6 is directly comparable to Table 1. Table 6 reveals that Russia also had the lowest EATR in 2002. South Korea and Turkey also did well in the rankings in 2002 as well as 2011, although Saudi Arabia, 3rd in 2011, has risen from only 8th in 2002.

The UK was 4th in the ranking of EATRs in 2002, compared to 9th in 2011. So there has been a significant fall in the UK's ranking over the last ten years. This is despite a reduction in the main UK tax rate from 30 percent in 2002 to 28 percent in 2011. The decline in the UK's ranking also partly reflects a substantial reduction in capital allowances. In 2002, our measure of capital allowances for the UK was 68.1 percent, compared to the 52.3 percent for 2011, shown in Table 4. In 2002, the UK was ranked 7th by the value of capital allowances. This expansion of the tax base has offset the reduction in the tax rate, with the result that the UK's EATR fell only from 26.9 percent in 2002 to 26.3 percent in 2011. But there was a reduction – and despite that, the UK's ranking fell.

This reflects falls in the EATR between 2002 and 2011 in 15 out of the 19 countries listed. Only four countries – those ranked 16th to 19th in 2011 – did not reduce their EATR between 2002 and 2011 and all four countries simply stayed at the same rate.

Most countries reduced their EATR by more than the UK, which is why the UK has been overtaken. For example, Canada had an EATR of 36 percent in 2002, but reduced this to 25.7 percent in 2011. Saudi Arabia reduced its EATR from 28.8 percent to 18.1 percent. It is clear that the general trend in EATRs in the G20 over the last decade has been a reduction, and the UK has not kept pace with the reductions taking place elsewhere. Even allowing for the announced reforms analysed in the previous section, and assuming no other countries respond, the UK would still end up lower in the EATR rankings than it was in 2002.

Table 6. Ranking of effective average tax rates, 2002

Ranking	Country	EATR (%)
1	Russia	20.3
2	South Korea	24.4
3	Turkey	26.9
4	United Kingdom	26.9
5	Australia	27.1
6	Indonesia	27.6
7	China	28.7
8	Saudi Arabia	28.8
9	France	30.2
10	Mexico	30.5
11	India	30.7
12	Brazil	30.7
13	Argentina	32.3
14	Italy	33.0
15	South Africa	33.1
16	United States	34.9
17	Germany	34.9
18	Canada	36.0
19	Japan	36.0

The pattern for the EATR is also reflected in that for the EMTR, as shown in Table 7. Indeed, given the drop in capital allowances, and the importance of the tax base in the EMTR measure, the pattern is even more pronounced.

In 2002, the UK was ranked 8th by the EMTR – compared to 15th in 2011. In this case the fall in the main rate of corporation tax was outweighed by the reduction in allowances, so that the EMTR rose from 22.0 percent in 2002 to 22.8 percent in 2011. In fact, the UK was one of only two G20 countries (the other was India) that raised its EMTR between 2002 and 2011. Five countries maintained the same EMTR between the two years, and the remaining twelve countries reduced their EMTR. Some of these reductions have been substantial. For example, Canada reduced its EMTR from 29.5 percent in 2002 (when it was ranked last in the G20) to 16.8 percent in 2011 (a ranking of 7th).

Given this pattern, it is not surprising that the UK has slipped down the EMTR ranking.

Table 7. Ranking of effective marginal tax rates, 2002

Ranking	Country	EMTR (%)
1	South Korea	10.6
2	Russia	10.7
3	Turkey	11.2
4	Italy	15.8
5	France	18.2
6	China	19.2
7	India	19.4
8	United Kingdom	20.0
9	Mexico	20.6
10	Australia	20.8
11	Germany	22.1
12	Indonesia	22.7
13	United States	23.3
14	South Africa	23.4
15	Brazil	23.9
16	Saudi Arabia	26.6
17	Japan	27.0
18	Argentina	27.0
19	Canada	29.5

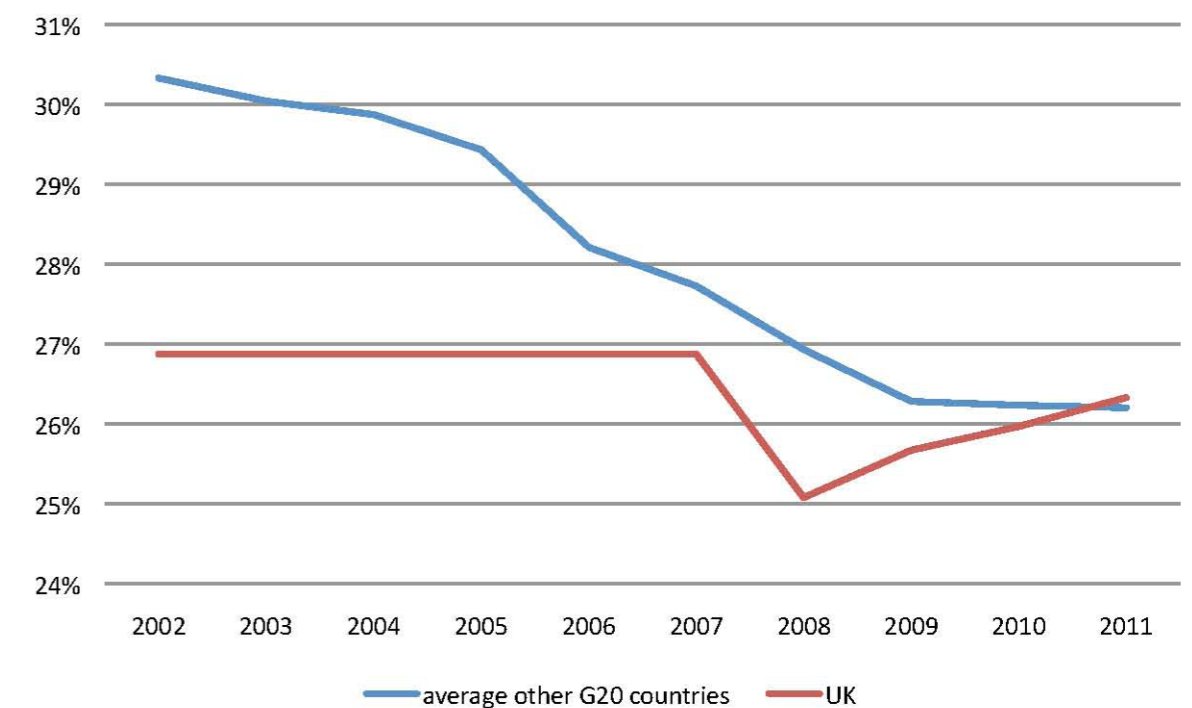
5.2 DEVELOPMENT OF EATR AND EMTR 2002-11

In Figures 1 and 2, we trace out how these changes happened over time, comparing the position of the UK with that of the average of the other G20 countries.

Figure 1 shows that the average EATR in other G20 countries has gradually declined since 2002, by about 4 percentage points from just over 30 percent to just over 26 percent. The pace of change appears to have slowed since 2009.

In 2002, the UK was well below the average of other G20 countries, though the difference was gradually reduced until 2007. The reduction in the UK main rate of tax in 2008 reduced the UK EATR so that the UK again appeared more favourable relative to other G20 countries. However, in 2009, the capital allowance rate for plant and machinery was reduced to 20 percent, and the rate of industrial buildings was reduced to 3 percent, leading to an increase in the UK EATR. The EATR further increased in 2010 and 2011 as the capital allowance rate for industrial buildings continued to fall, to 2 percent and then 1 percent. As a result, for the first time in ten years, in 2011 the UK EATR rose above the average of other G20 countries.

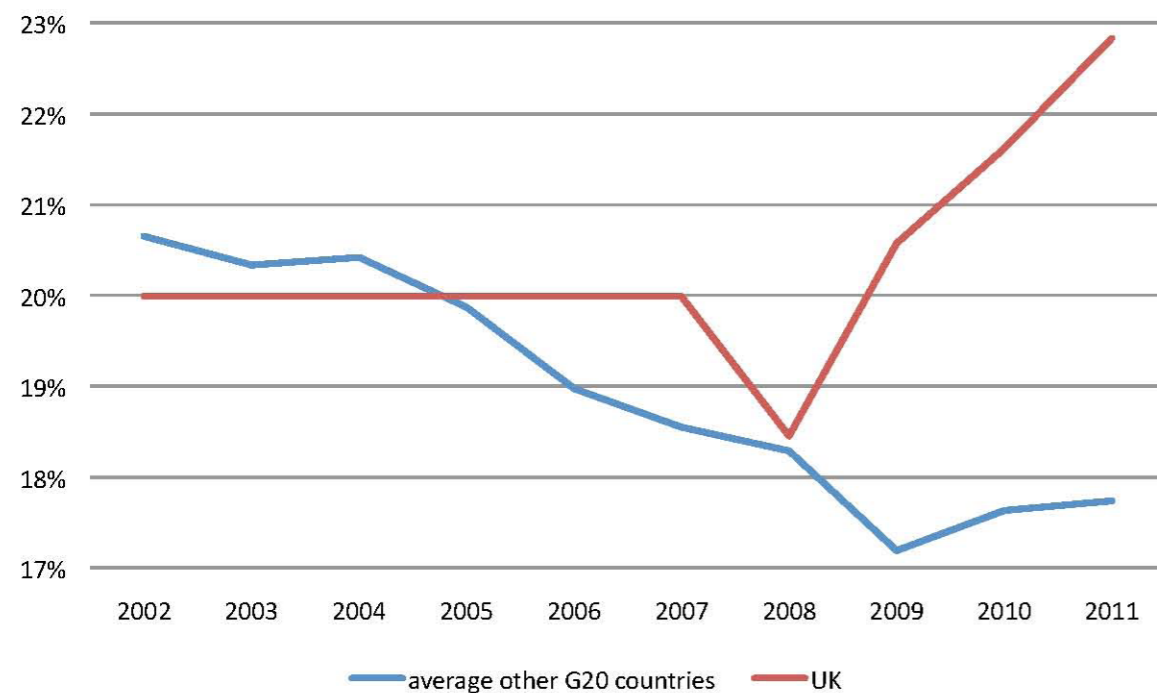
Figure 1. EATR: UK vs other G20 countries



A similar pattern arose for the EMTR, although the trend over the last ten years has been much less favourable to the UK. The position for the average EMTR in other G20 countries has been rather similar to that for the EATR. There was a gradual decline in the average EMTR of nearly 4 percentage points from 2002 to 2009. Since 2009, this average EMTR has risen slightly, as capital allowance rates have been reduced elsewhere, as well as in the UK.

However, this change has been much more pronounced in the UK. The UK had an EMTR slightly below the average of other G20 countries in 2002, a position that was maintained until 2005. The UK EMTR fell with the reduction in the main rate of corporation tax in 2008, albeit not by enough to keep up with the fall in the average in the other G20 countries. But the cuts in capital allowances from 2009 onwards have had a dramatic impact in raising the UK EMTR, so that by 2011 it had become well in excess of – by around 5 percentage points – the average of the other G20 countries.

Figure 2. EMTR: UK vs other G20 countries

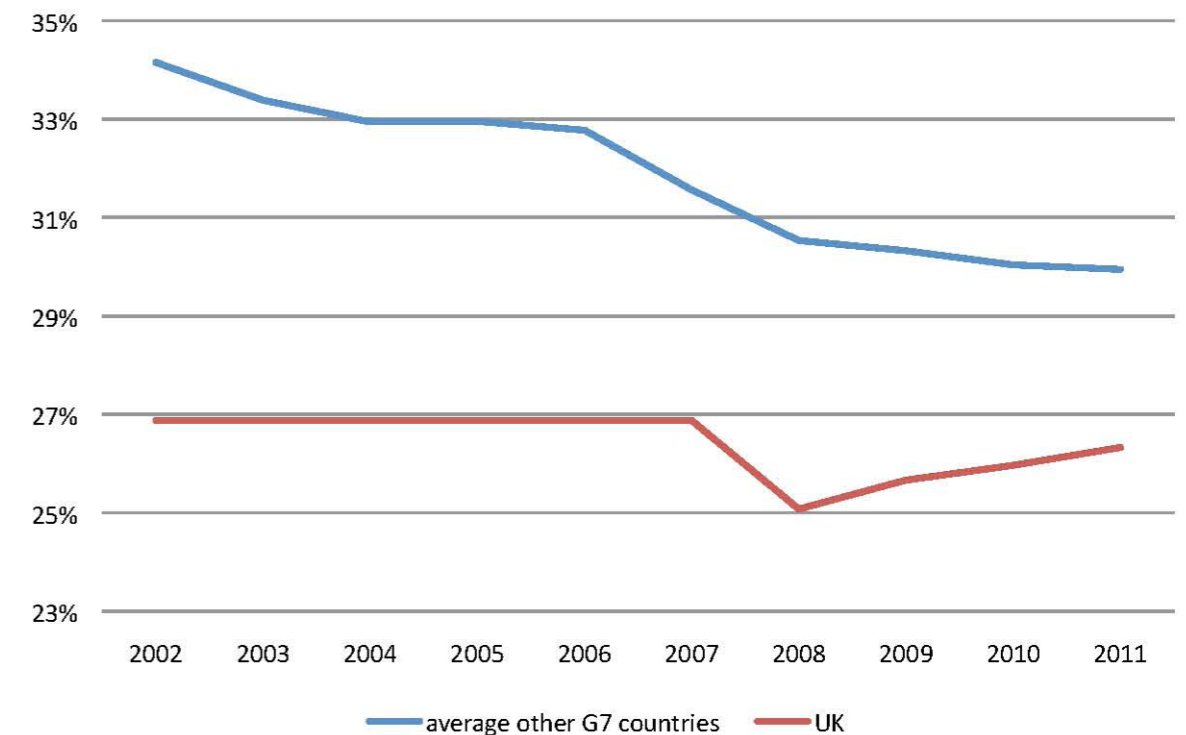


6. COMPARISON WITH OTHER G7 COUNTRIES

The focus of this report has been on a comparison of the UK with other G20 countries, since that is the group identified by the UK government. However, it is of course possible to make comparisons with other groups of countries. Here we briefly make a comparison with other G7 countries. In particular, Figures 3 and 4 reproduce the analysis of Figure 1 and 2, but compare the UK to other G7 countries, rather than to other G20 countries.

Figure 3 shows the position since 2002 for the UK relative to other G7 countries. The trend in the average EATR for the other G7 countries is similar to that for the other G20 countries. The average for other G7 countries falls by around 4 percentage points from approximately 34 percent to 30 percent. This is a similar reduction to that for the other G20 countries. However, the level of the average EATR for the other G7 countries is roughly 4 percentage points higher throughout the period.

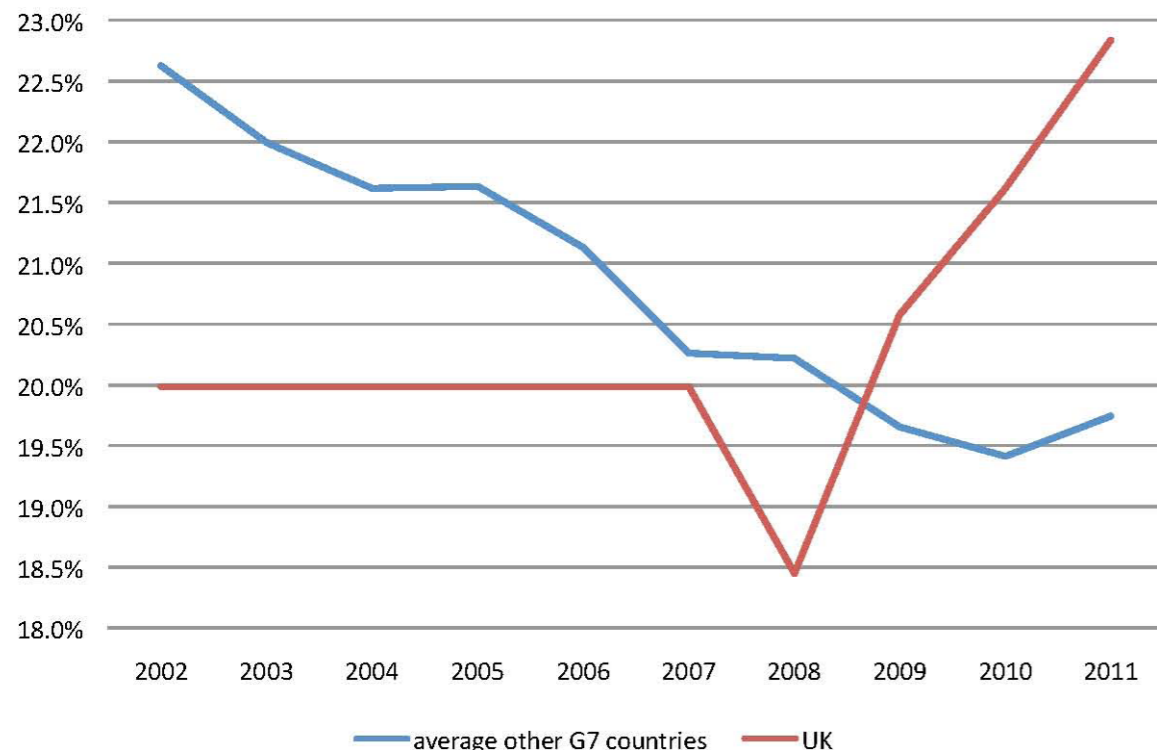
Figure 3. EATR: UK vs other G7 countries



As a result, the UK has consistently had a lower EATR than the average of the other G7 countries over the last 10 years, although the gap has narrowed from around 7 percentage points in 2002 to around 4 percentage points in 2011.

The trend in the average EMTR for the other G7 countries is also similar to that for the other G20 countries, falling by roughly 3 percentage points over the period. Again, however, the level of the average EMTR for the other G7 countries is higher, by approximately 2 percentage points. As a result, the position of the UK relative to the other G7 countries has appeared more competitive for most of the period, until 2008. However, the reductions in capital allowances from 2009 onwards have resulted in the UK's EMTR rising above the average of other G7 countries. This gap has widened as capital allowances in the UK have continued to decline.

Figure 4. EMTR: UK vs other G7 countries



7. CONCLUSIONS

This report has compared average and marginal effective tax rates, statutory tax rates and capital allowances in G20 countries, in order to assess the UK government's objective of creating the most competitive corporate tax system within this group of countries. Our findings suggest that the UK is some distance from achieving that objective. During the last decade, the UK has lost competitiveness, mainly because other countries have reduced the tax burden on corporate investment significantly.

For many years, the UK has consistently moved towards lowering the corporate tax rate, and offsetting the revenue consequences of doing so by also reducing allowances. Current proposals continue to follow this direction. Such reforms have reduced the effective tax burden on highly profitable investments and have reduced the vulnerability of the UK to profit shifting. But the UK has become less attractive for firms which are less profitable and which rely more on capital allowances for plant and machinery and industrial buildings.

Alongside making the corporate tax system more competitive in general, the government would like to rebalance the UK economy towards more manufacturing. But manufacturing requires considerable investment in fixed assets. If the government wants to create more favourable conditions for this type of investment, a policy of cutting allowances is misguided.

Overall, our results suggest that the reforms that will take place over the next three years will not be enough to achieve the objective of making the UK tax system the most competitive in the G20. To get anywhere near that objective, more has to be done, but this would almost certainly have to come at the cost of lower corporate tax revenues. Cutting allowances to recover revenue losses caused by lowering the tax rate is a common strategy, but few countries have pursued this as aggressively as the UK. Improving both the general competitiveness of the tax system and the tax conditions for manufacturing will require a different tax policy paradigm. Whether this is feasible in the current fiscal climate remains to be seen.

APPENDIX A: METHODOLOGY

The methodology used in this report is that proposed by Devereux and Griffith (1998). It has been widely used in the academic literature as well as by the European Commission and the OECD.

The approach is to consider the implications for corporate taxation of an increase in the capital stock and inventories of a business financed by a proportionate increase in each source of finance. Thus, each asset is increased in proportion to its existing weight in the capital stock, and the increase is financed by debt in proportion to the existing use of debt.

In this report, we analyse two tangible fixed assets, plant and machinery and buildings, intangible assets and inventories. We use data from the annual reports of just under 300,000 European companies from the ORBIS database to identify appropriate weights for each asset. Details of this procedure are described in Devereux and Loretz (2008). The weights used are based on the average size of each asset in these companies, and the average use of debt. The resulting weights are as follows.

Plant and Machinery	25.6%
Buildings	24.0%
Intangible assets	8.7%
Inventories	41.7%
Proportion financed by debt	35.0%

To calculate the effective average tax rate (EATR), we identify the cash flows associated with a one-period investment in a composite of the four assets, financed by debt and equity⁸, where we assume a given rate of return on the composite investment. Applying the tax allowances and rates described below allows us to calculate the pre-tax and post-tax net present value of the investment in each country. Devereux and Griffith (1998) define a measure of the EATR to be the difference between the two scaled by the present value of the income stream. This measure has the property that it is equal to the EMTR (defined below) for an investment that just breaks even, but tends towards the statutory tax rate as the rate of profit increases.

⁸ We do not analyse personal taxes, and so the treatment of retained earnings and new equity issues is the same.

To calculate the effective marginal tax rate (EMTR) we analyse the same investment. However, instead of fixing a rate of profit and calculating the net present value, we instead identify the rate of profit that would be required for the investment to break even in the presence and absence of tax - that is the cost of capital. In the absence of taxation, the cost of capital is the sum of the required financial rate of return (or discount rate) and the depreciation rate of the composite asset. The cost of capital is typically raised by introducing tax. We define the EMTR to be the change in the cost of capital arising from introducing the tax, expressed as a proportion of the cost of capital in the absence of tax.

This procedure requires values of several parameters. We fix these to be the same across all countries, so that differences in effective tax rates depend only on differences in tax regimes. The values chosen here are similar to those used elsewhere in the literature, notably by the European Commission;⁹ this makes our estimates comparable with those used elsewhere. The values are as follows.

Economic depreciation rate (declining balance rate)	
Plant and Machinery	17.5%
Buildings	3.1%
Intangible assets	15.35%
Inflation rate	2.5%
Real discount rate	5%
Pre-tax rate of return (for EATR only)	20%

Information on statutory tax regimes was collected primarily from country tax reports of the International Bureau of Fiscal Documentation, supplemented from other sources, in particular Devereux et al (2010) and various issues of the Ernst and Young Worldwide Corporate Tax Guide. As far as possible we identify the tax regime in place on January 1 of each year.

We use data on the main rate of corporation tax at national and sub-national levels, including information on whether one is deductible in calculating the other. We use information on capital allowance rates for the different assets.

To make comparisons as fair as possible between countries, we attempt to identify the tax treatment in each country of three specific assets: an item of plant and machinery deemed to have a useful life of 7 years; an industrial building deemed to have a useful life of 25 years; and the purchase of a patent deemed to have a useful life of 10 years. This is again the same approach as used in studies for the European Commission.¹⁰ Definitions

⁹ See Devereux et al (2010).

¹⁰ See Devereux et al (2010).

of acceptable allowances vary considerably between countries. In some cases there is a clear acceptable rate – on January 2011, for example, the UK permitted a 20% declining balance rate of plant and machinery, a 1 percent straight line rate of industrial buildings and a 25 percent declining balance rate for the purchase of a patent. However, many countries offer more elaborate schedules, and some rely on the notion of the useful life of the asset for tax purposes: hence the need to define this for the assets we model.

Finally, we also record the acceptable valuation of inventories in each country. The UK tax system, for example, uses the FIFO method which implies that increases in the price of inventories between periods are subject to tax.

In all cases where there is some choice within the tax regime, we assume that the company would use the most tax advantageous approach.

We do not record the entire dataset of tax rates and allowances here. These data are available on the CBT website at www.sbs.ox.ac.uk/centres/tax/Pages/Reports.aspx.

APPENDIX B: INVESTMENT IN INDIVIDUAL ASSETS

Table B1. Ranking of EATRs for investment in each asset separately, 2011

Ranking	Country	EATR Industrial buildings (%)	Ranking	Country	EATR Plant and machinery (%)	Ranking	Country	EATR Intangibles (%)	Ranking	Country	EATR Inventories (%)
1	Russia	16.3	1	Turkey	15.3	1	Russia	17.9	1	Turkey	17.4
2	Turkey	16.7	2	Russia	15.6	2	Turkey	20.0	2	Russia	17.4
3	Saudi Arabia	17.2	3	Saudi Arabia	17.1	3	Saudi Arabia	20.8	3	Saudi Arabia	18.9
4	South Korea	19.5	4	South Korea	17.5	4	Italy	21.2	4	South Korea	21.1
5	Indonesia	20.2	5	Canada	20.0	5	South Korea	21.6	5	Indonesia	23.7
6	China	20.2	6	China	23.0	6	China	22.3	6	China	23.7
7	Mexico	24.2	7	Australia	24.0	7	United Kingdom	22.6	7	Mexico	26.1
8	Australia	25.0	8	United Kingdom	24.5	8	Germany	23.6	8	Germany	26.9
9	India	25.9	9	Indonesia	24.9	9	Indonesia	24.0	9	Italy	27.3
10	Canada	26.0	10	South Africa	25.2	10	France	26.3	10	Canada	28.2
11	Italy	26.4	11	France	27.3	11	Mexico	26.8	11	Australia	28.6
12	Germany	26.9	12	Mexico	27.7	12	India	26.8	12	United Kingdom	29.0
13	United Kingdom	27.1	13	Italy	28.1	13	Brazil	30.4	13	India	31.8
14	France	27.8	14	Germany	28.6	14	Argentina	31.3	14	Brazil	32.6
15	South Africa	27.9	15	Brazil	31.4	15	Australia	32.6	15	France	33.1
16	Brazil	28.4	16	India	31.4	16	Canada	32.9	16	South Africa	33.2
17	Argentina	32.0	17	United States	31.5	17	Japan	34.5	17	Argentina	33.7
18	United States	35.9	18	Argentina	32.3	18	South Africa	37.5	18	United States	35.2
19	Japan	37.3	19	Japan	36.4	19	United States	40.5	19	Japan	35.5

Table B2. Ranking of EMTRs for investment in each asset separately, 2011

Ranking	Country	EMTR Industrial buildings (%)	Ranking	Country	EMTR Plant and machinery (%)	Ranking	Country	EMTR Intangibles (%)	Ranking	Country	EMTR inventories (%)
1	India	5.9	1	Canada	-13.5	1	Italy	-15.6	1	Russia	10.7
2	Russia	6.1	2	South Africa	-4.6	2	Germany	2.1	2	Turkey	10.7
3	South Korea	6.7	3	South Korea	-3.5	3	France	2.7	3	South Korea	13.3
4	China	7.0	4	Turkey	1.5	4	United Kingdom	8.2	4	Saudi Arabia	15.3
5	Indonesia	7.0	5	Russia	2.9	5	India	10.5	5	Mexico	17.0
6	Turkey	7.7	6	United States	6.9	6	Russia	12.5	6	Germany	17.7
7	Mexico	8.9	7	Australia	7.9	7	South Korea	15.5	7	Italy	18.0
8	Saudi Arabia	9.9	8	France	8.2	8	China	16.0	8	Indonesia	19.4
9	France	10.7	9	Saudi Arabia	9.6	9	Mexico	19.8	9	China	19.4
10	South Africa	10.7	10	United Kingdom	16.3	10	Turkey	20.0	10	Canada	23.2
11	Australia	12.6	11	China	18.6	11	Japan	20.9	11	Australia	23.7
12	Italy	14.2	12	Italy	21.1	12	Indonesia	22.0	12	United States	24.6
13	Brazil	14.8	13	Mexico	22.8	13	Saudi Arabia	22.5	13	Japan	24.8
14	Germany	17.6	14	Germany	23.6	14	Brazil	22.9	14	India	26.4
15	Canada	18.1	15	Indonesia	24.8	15	Argentina	23.7	15	Brazil	27.1
16	United Kingdom	25.3	16	Brazil	26.3	16	Australia	36.6	16	United Kingdom	27.3
17	Argentina	26.1	17	Argentina	27.2	17	Canada	38.0	17	France	27.5
18	United States	27.0	18	Japan	28.1	18	United States	40.6	18	South Africa	27.6
19	Japan	31.2	19	India	28.3	19	South Africa	41.6	19	Argentina	28.0

Table B3. Ranking of capital allowances for investment in each fixed asset separately, 2011

Ranking	Country	Capital allowances Industrial buildings (%)	Ranking	Country	Capital allowances Plant and machinery (%)	Ranking	Country	Capital allowances Intangibles (%)
1	India	61.1	1	Canada	96.5	1	Italy	96.5
2	Indonesia	54.3	2	South Korea	92.1	2	Germany	86.8
3	South Korea	54.3	3	South Africa	91.9	3	France	86.8
4	South Africa	54.3	4	Turkey	87.8	4	United Kingdom	82.5
5	Mexico	54.3	5	United States	87.3	5	India	82.5
6	France	54.3	6	Russia	86.2	6	Japan	78.4
7	China	54.3	7	France	85.8	7	Argentina	73.5
8	Russia	52.7	8	Australia	85.0	8	Mexico	73.5
9	Turkey	47.5	9	Saudi Arabia	79.6	9	China	73.5
10	Brazil	47.5	10	United Kingdom	77.9	10	South Korea	73.5
11	Australia	47.5	11	Japan	76.7	11	Russia	73.5
12	Italy	45.8	12	Italy	75.7	12	Brazil	73.5
13	Saudi Arabia	41.1	13	Germany	73.5	13	Indonesia	66.9
14	Germany	38.7	14	Argentina	73.5	14	United States	62.9
15	Canada	35.7	15	China	73.5	15	Turkey	62.8
16	United States	34.6	16	Mexico	73.5	16	Saudi Arabia	58.9
17	Japan	27.5	17	Brazil	73.5	17	South Africa	54.3
18	Argentina	27.5	18	India	71.4	18	Australia	54.3
19	United Kingdom	14.1	19	Indonesia	66.9	19	Canada	51.5

REFERENCES

De Mooij, Ruud and **Sjef Ederveen** (2008) “Corporate tax elasticities: a reader’s guide to empirical findings”, *Oxford Review of Economic Policy* 24.4, 680-697.

Devereux Michael P., Christina Elschner, Dieter Endres and **Christoph Spengel** (2010) “Effective Tax Levels Using The Devereux/Griffith Methodology: Project for the EU Commission TAXUD/2008/CC/099”, Brussels: European Commission. Available at: http://ec.europa.eu/taxation_customs/resources/documents/common/publications/studies/etr_company_tax.pdf.

Devereux Michael P. and **Rachel Griffith** (1998) “The taxation of discrete investment choices,” IFS Working Papers W98/16, Institute for Fiscal Studies.

Devereux, Michael P. and **Rachel Griffith** (2003) “Evaluating Tax Policy for Location Decisions”, *International Tax and Public Finance* 10.2, 107-26.

Devereux Michael P. and **Simon Loretz** (2008) “Increased efficiency through consolidation and formula apportionment in the European Union?”, Working Paper 08/12, Oxford University Centre for Business Taxation.

Ernst & Young Worldwide (various years) Corporate Tax Guide, London: Ernst & Young.

HM Government (2010) “The Coalition: our Programme for Government”, London: Cabinet Office.

International Bureau for Fiscal Documentation (various years) “Global corporate tax handbook” and “European tax handbook”, Amsterdam: IBFD.

King Mervyn A. and **Don Fullerton, eds.** (1984) “The Taxation of Income from Capital: a Comparative Study of the United States, the United Kingdom, Sweden, and Germany”, Chicago: University of Chicago Press.

OECD (1991) “Taxing Profits in a Global Economy – Domestic and International Issues”, Paris: OECD.



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