TaxDev

TaxDev Manual

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An introduction to tax policy costing:
A manual and worked examples

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Preface

The manual has been prepared by the Centre for Tax Analysis in Developing Countries (TaxDev), a collaboration between the Institute for Fiscal Studies (IFS) and the Overseas Development Institute (ODI).

TaxDev aims to contribute to more effective tax policymaking in low- and middle-income countries through applied research and policy analysis, and a focus on improving the evidence base in collaboration with partner governments.

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Executive summary

The effect of proposed tax policy changes on revenue collections is one of the most important considerations for policymakers. This makes the approach taken in generating *ex ante* policy costings a crucial part of tax policy appraisal. However, tax policy costings can be both conceptually and practically challenging, with a range of assumptions required to reach any estimate.

In this context, this manual provides a simple methodology for consistently generating estimates of the revenue effects of potential tax policy reforms. The approach provides a framework involving three ways to estimate the impact on revenue: assuming no behavioural response; incorporating responses by directly affected groups of taxpayers; and accounting for wider economic impacts. An analyst undertaking a tax policy costing can follow the steps set out below to build up and present a complete costing (or set of costings).

The policy costing process

1   *Definition.* Clear statement of the features of the proposed policy change compared with the current situation (e.g. changes to the rate or base of a tax).

2   *Rationale.* Justification for the proposed policy change based on economic reasoning, in response to a policy 'problem'.

3   *Static costing.* A quantitative estimation of the revenue cost or yield from the proposed policy change, noting any assumptions and uncertainties, and assuming that taxpayer behaviour remains fixed at initial pre-reform levels.

4   *Behavioural costing.* A quantitative estimation of the cost or yield from the proposed policy change, allowing taxpayers directly affected by

the reform to change their behaviour in response, thus affecting the volume of income, expenditure, etc., subject to taxation.

5   *Consideration of wider economic effects.* If appropriate, consider the revenue implications of the likely effects of the proposed policy change on the macroeconomy.

6   *Statement of the final policy cost.* Set out the final estimated cost of the policy, making clear whether it incorporates wider economic costs and any assumptions and uncertainties. Some final costs will provide low, high and central estimates to reflect these uncertainties.

7   *Completion of the policy costing scorecard.* If costing multiple policies as part of the budgetary process, collate the (central) costing for each policy to present the cost or yield from the full package of measures being proposed or implemented.

1. An approach to tax policy costing

Policy costing refers to the process of estimating the revenue impact of a policy change. Herein, we refer to a negative revenue impact as a cost, and a positive revenue impact as a yield. Often, the cost of or yield from a policy change is of critical importance in policy decisions. In some cases, it may even be the main outcome of interest, especially if the purpose of the policy is revenue mobilisation. Thus, the costing of a proposed policy change contributes to a government's broader process of appraising different policy options, and is key to guiding the policy development process, updating revenue estimates in the budget, and informing parliaments and the public.

Given the centrality of the revenue effects of tax policy options and proposals to decision-making and scrutiny by governments and parliaments, the tax policy costing process is of crucial importance for evidence-based policymaking. However, the conceptual and practical details of policy costing are not trivial – the ways in which policy changes can affect government revenues are often numerous and complex, and this can make it difficult to generate reliable estimates. This is especially true in environments where resources and expertise are more limited, and when existing evidence on the likely impact of different tax policies is scarce. In response to this challenge, this manual has been written to provide a practical guide to tax policy costing. We do not attempt to provide exhaustive technical guidance here; instead we emphasise a consistent and transparent process, which is to be tailored to the specific policy, data, models and needs of a given context. The guidance draws heavily on the practices of the UK's HM Treasury and Office for Budget Responsibility (OBR): the former publishes final policy costings alongside tax and spending measures announced at fiscal events, and the latter scrutinises

these, and incorporates macroeconomic effects if necessary, updating its fiscal forecasts accordingly.[1]

The process of costing a tax policy change requires a number of steps. To promote transparency and reliability, it is recommended to follow a consistent procedure, setting out clearly the data and assumptions used, as well as the results obtained, and any uncertainties.

Each costing is likely to require a different method depending on the features of the policy, the nature of the change, and the data available. Costings are estimates and will not always be precise or made with high confidence. However, a useful costing is indicative of the likely effects in terms of both the direction and magnitude of the revenue cost or yield.

While the method may differ each time, there are some elements that will be common to most policy costings, as follows.

- Baseline or 'counterfactual' tax revenues: the expected revenues if the proposed policy change does not occur.
- The 'static' costing: the impact of the proposed policy change on revenues if taxpayer behaviour does not change as a result of the policy change. This means that underlying tax bases (e.g. the amount of income or expenditure that is subject to taxation) do not change unless the proposed policy change involves changing rules on what is subject to tax (e.g. the definition of what counts as taxable income). A static costing should also include the revenue impact of mechanistic changes in other tax bases as a result of the proposed change: for instance, a change in customs duty mechanically affects the tax base for value added tax (VAT) on imports, and therefore VAT revenues as well.
- The 'behavioural' costing: the impact of the proposed policy change on revenues, allowing for the biggest and most important changes in the behaviour of taxpayers directly affected by the proposed change. Such behavioural effects might include changes in the amount a taxpayer works if income or payroll taxes are changed, and in the quantity of a good purchased if VAT or excise duties are changed, affecting consumer prices.

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[1]   See, for example, the OBR website at http://obr.uk/forecasts-in-depth/policy-costings, Office for Budget Responsibility (2014) and example costing documents from HM Treasury (2017, 2020a).

- Sourcing credible estimates for the scale of potential behavioural responses is an important part of this step. As discussed further below, such estimates may come from previous policy evaluations in similar contexts or relevant academic literature.
- A costing accounting for broader economic effects: the revenue impact of the proposed policy change, accounting for the potential effects of the proposed change on the macroeconomy, specifically from
  - short-term demand-side effects, or
  - longer-term supply-side effects.
- Sensitivity testing: given the uncertainties around any of the aforementioned types of costings, it can be useful to provide a range of estimates, based on alternative assumptions, such as the elasticities, underlying growth in tax bases, or other factors that may affect results.

This manual outlines an overall approach to tax policy costing, and explains the necessary steps through worked examples for a number of hypothetical indirect and direct tax policy reforms. The calculations associated with the worked examples are contained in the *Costing Examples Spreadsheet*, which accompanies the manual. The annotations in the *Costing Examples Spreadsheet* provide information about each of the necessary steps, and explain the calculations made.

We also provide accompanying materials that may be used by analysts undertaking costings. Annex I provides a suggested policy costing template, which can be used by analysts to document their data, methods and assumptions in a structured and consistent way. Annex II provides a policy costing scorecard where completed costings can be compiled. Annex III provides a completed costing template, using the indirect tax example discussed throughout the manual. The policy calculations in Annex III are contained in the *Costing Examples Spreadsheet*.

This manual is part of a wider set of resources developed by TaxDev that have been designed to support tax policymakers during the policy appraisal process. Because costing a policy is only one part of this process, this manual and associated resources should be read alongside the policy appraisal manual (Granger, Phillips and Warwick, 2021), and – where relevant – used in conjunction with the associated policy appraisal template.

The approach and templates can be used both as part of the policy development process – when different policy options are being considered – and to communicate

the costings of chosen policies to key stakeholders (such as parliaments, civil society organisations, business organisations, etc.). They have been used in joint work with TaxDev's partners in Ethiopia, Ghana, Rwanda and Uganda as part of the appraisal of tax policy proposals (particularly in advance of budgets) and to update revenue forecasts following the decision to implement particular proposed reforms.

2. The policy costing process

This chapter of the manual outlines a suggested approach to costing, using two hypothetical examples to illustrate how each step can be undertaken in practice.

2.1 Define the policy change

To clearly and transparently cost a proposed policy, it is important to first define as precisely as possible the policy change being considered. This will clarify the nature of the change in rates, tax bands, and other tax system parameters that need to be modelled.

If the proposal relates to a change in existing policy, it is important to state both the current and proposed policy so that the nature and scale of the proposed change is as clear as possible. It is also relevant to note whether the existing and/or proposed policy departs from the standard (or benchmark) tax treatment, for example whether it relates to a change in the standard rate of tax, or a change to a special rate that applies only to certain groups or activities.

There are several aspects of the proposed policy change that need to be considered, for both the existing (pre-reform) system and the proposed (post-reform) system. These include the following.

- What is the base for the tax (i.e. the value or activity subject to taxation)?
- What is the rate of the tax?
- When and by whom is the tax paid?
- Are there any allowances, such as a threshold below which the activity is not taxable? Or are there any special groups or instances taxed at different rates?
- When would the tax policy change take place? Is the change linked to a public announcement or commitment by the government?
- Which law(s) governs the policy?

▪ Who administers the tax (e.g. national/federal revenue authority, regional state or local government, line ministry, etc.)?

It will not always be necessary to include all of this information – judgement will be required as to what is important in the context of each proposed policy.

Box 2.1. Defining the policy change

Indirect tax example: removal of VAT on financial services

In this example, the current policy is to levy VAT at a rate of 17.5% on the fees charged by banks for a range of services (which we assume are defined clearly in the VAT law). The new proposal is to make such fee-based services exempt from VAT, so that VAT would no longer be charged on them. However, it is also important to note that under the existing (pre-reform) system, banks would be able to claim a credit (or potentially a refund) for any VAT incurred on the inputs required to produce the financial services. Under the proposed exemption, banks would no longer be able to claim back the VAT paid on their input purchases.

Direct tax example: reduction in the rate of corporate income tax

In this example, the standard rate of corporate income tax (CIT) is 25%. The proposed policy change is a reduction in this standard rate from 25% to 20%. The tax base is the value of taxable income (e.g. determined by the gross income or turnover from sales and other sources of income, minus deductions for allowable expenses) that is subject to the standard rate. The tax base and allowances are unaffected by the change, but the rate is reduced.

2.2 Explain the rationale

If a full policy appraisal is not also being conducted alongside the policy costing, the second stage is to set out the purpose of the proposed policy change. In particular, two critical questions should be addressed.

1. What is the problem that this change seeks to address, either with the current policy framework and/or with wider socio-economic conditions?
2. By what mechanism(s) will the policy change address this problem?[2]

The potential justifications for a policy change are numerous and it is necessary to set these out clearly in order to provide transparency and to inform decisions. From a costing perspective, it can also aid in thinking about the potential behavioural and broader economic impacts that may need to be accounted for in the policy costing.

Some examples of potential policy rationales include:

- mobilising additional revenue to finance public spending or reduce deficits;
- altering aggregate levels of demand in the economy to smooth economic 'cycles' (e.g. a temporary reduction in rates of taxation, such as a temporary cut in VAT, to provide a stimulus during an adverse economic shock or downturn);
- redistribution of wealth or income through, for instance, progressive income taxation or targeted indirect tax changes;
- addressing market failures such as 'externalities', which occur when 'consuming or producing a good or service produces benefits or costs for others that are not directly involved in the consumption or production' (HM Treasury, 2020b);
- adjusting relative prices to change taxpayer behaviour – in general (externalities aside), taxes tend to distort behaviour in undesirable ways, so a new tax policy change might be motivated on the grounds of removing or reducing such existing distortions;
- removing an existing feature of the tax system that favours a particular type of economic activity or group; or
- streamlining tax collection and improving the efficiency of tax administration, or reducing tax avoidance and evasion.

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[2] The evidence to support these mechanisms is provided in step 3 (see Section 2.3.).

Box 2.2. Explaining the rationale for the policy change

Indirect tax example: removal of VAT on financial services

The main rationale for this policy is to reduce the cost of banking services to households and businesses that are not registered for VAT (and who are therefore unable to claim back the VAT charged on their input purchases of fee-based financial services).

It may be expected that the reduced cost of financial services could increase the use of formal banking services by households and informal and small businesses, increasing the money that flows through the financial system and is available for investment, and contributing to wider formalisation. The policy also aims to remove an economic distortion that was created by the current VAT policy, in which banks had an incentive to use other ways of charging for services to households and informal and small businesses (such as interest rate differentials), which were already exempt from VAT, even if a fee-based approach would otherwise be preferred (note the incentive goes in the other direction for services for larger VAT-registered businesses, who can reclaim any VAT charged).

However, the removal of this distortion would create new distortions, with the tax system encouraging households and informal and small businesses to make more use of fee-based financial services relative to those goods and services that are still subject to VAT.

Direct tax example: reduction in the rate of CIT

The government is likely to have several objectives when introducing a major change to CIT policy. For this example, however, let us assume that it is intended to boost foreign direct investment (FDI), which may also boost employment and earnings. A reduced rate of CIT can incentivise investment by enabling businesses to retain a greater share of the income generated from the investment, which they can either pay out as dividends to shareholders or invest back into the business. In other words, a lower CIT rate increases the marginal and average returns on investment, encouraging firms to invest more. The return on FDI will depend on other factors as well, such as market size or costs for locally purchased inputs (including skilled labour and electricity supply) and institutional factors, but at the margin the CIT rate will be a factor. This must be weighed up against any loss of government revenue by policymakers (which is likely to partially determine these other drivers of FDI as well).

2.3 Produce a static costing

The first type of costing that should be produced is a static costing. This is an estimate of the cost/yield from a policy change, holding taxpayer behaviour fixed. This means that underlying tax bases (e.g. the amount of income or expenditure that is subject to taxation) do not change unless the proposed policy change involves changing rules on what is subject to tax (e.g. the definition of what counts as taxable income). A static costing should also include the revenue impact of mechanistic changes in other tax bases as a result of the proposed change; for instance, a change in customs duty mechanically affects the tax base for VAT on imports and therefore VAT revenues as well.

A static costing is typically much simpler to undertake than a costing that incorporates behavioural or macroeconomic effects. Thus, it is a useful starting point that provides an initial indication of the magnitude of a change (and, in some cases, an initial static costing may be sufficient to rule out a proposal being taken forward). However, static costings clearly impose strong assumptions; for instance, an assumption of no behavioural response when there are changes to indirect tax rates implies perfectly inelastic demand and/or supply.

In this section, we discuss the steps required to produce a static costing. Briefly, these are the following.

- Define the tax(es) affected by the policy change.
- Identify the data that will be used for the costing. Analysts can compile data from various relevant sources, such as household and firm surveys, administrative data (e.g. tax returns and payments/revenue data), and industry reports.
- Estimate the size of the tax base(s) affected by the policy change using the most recently available data.
- Project forward this tax base for the forecast period using an approach consistent with the revenue forecasting method more generally adopted.
- Holding taxpayer behaviour fixed, apply the change in tax policy to the projected tax base, accounting for any changes in definitions and mechanical effects on the tax bases of other taxes. Mechanical effects occur when the tax being changed forms part of the tax base of another tax. As highlighted above, an example of this would be import duties, which may form part of the tax base for VAT and excise duties. In contrast, although a decrease in the rate of CIT

increases corporate profits, this does not mechanically change any other tax base – those corporate profits could be paid out as dividends, retained in the company or invested, for instance. The knock-on effects to other tax bases therefore depend on a behavioural response and are thus not part of a static costing.

The starting point is to identify and quantify the tax base to which the proposed policy change will apply. This could be expressed as a value (in the case of an *ad valorem* tax) or quantity of units (in the case of a specific tax). If the tax base is not directly known, but revenues and associated tax rates are, it can be possible to 'back out' the tax base.[3]

The analyst then needs to forecast or project forward the relevant tax base(s) for each of the years for which a policy costing is required. In the worked examples used in this manual, simple assumptions about GDP growth and the relationship between GDP and tax revenues will be used to project revenues forward. However, in many cases, baseline revenue forecasts will already be available – such forecasts are important for the management of the public finances (e.g. in planning bond issuance and interest and principle payments) and for tax policymaking (for instance, a forecast for ongoing revenue shortfalls may necessitate tax increases). When such forecasts are available, the analyst should use them to ensure consistency of their policy costings with the wider revenue forecasting process. However, it will still be important to consider the accuracy of the forecasts being used, as these will be fundamental to the final costing figures generated, and may be a key uncertainty in the final costing.

Once relevant tax bases have been forecasted or projected forward, existing and proposed tax policies (e.g. tax rates) can be applied to these tax bases to obtain revenue forecasts both *with* and *without* the proposed reform. The estimated revenue change will then be based on the difference between the forecast revenue with and without the proposed reform. In particular, the static costing for each tax mechanically affected by a proposed reform to tax rates and/or bases can be calculated as

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[3] This is true for simple linear tax rates such as VAT, but not for taxes with progressive structures, such as income tax.

$$Yield/Cost = \left(RATE_{reform} * BASE_{reform}\right) - \left(RATE_{no\text{-}reform} * BASE_{no\text{-}reform}\right).$$

Changes in tax rates are intuitive. Definitional or mechanical changes in tax bases take place when a proposed reform affects the definition of income or expenditure that is taxable, for example, by changing tax allowances, bands, exemptions and deductions. Changes in tax bases that result from changed behaviour (e.g. changes in income or expenditure as people change how much they work or consume in response to a tax reform) are not accounted for in a static costing though.

It is important to note that static costings, while holding behaviour fixed, still require implicit assumptions about the incidence of tax policy changes. In particular, for indirect taxes, fixed tax bases imply fixed pre-tax prices, and therefore tax changes are fully incident on the purchaser. For taxes on income, fixed tax bases imply that tax changes are fully incident on parties with a claim to that income (i.e. the individual for personal income tax, or the owners of the firm in the case of CIT). In reality, the incidence of tax policy changes will vary greatly according to the specific context and policy under consideration. However, the use of a clear and transparent approach like this to modelling incidence in policy costings is intuitive and simplifies the estimation considerably.

Once an estimate of the yield/cost is obtained, it is important to consider when that yield/cost will be accounted for. In particular, there is a difference between when a yield/cost will *accrue* and when it will affect *cash* tax receipts. Some countries record receipts on an accruals basis, while others do so on a cash basis. Box 2.3 discusses this issue in more detail.

Box 2.3. Cash- and accruals-based revenue accounting

Under a cash-based system of accounting, revenue and expenditures are recorded when the cash actually enters and leaves government accounts. Instead, under accruals accounting, revenue is recorded when the economic activity underlying it occurs, and expenditure recorded when it is formally agreed to make that expenditure. A cash-based system of accounting is helpful in managing cash flow, while an accruals-based system is helpful in understanding the underlying position of an organisation's finances.

Presently, some countries' budgets record revenues and expenditures on a cash basis. This means any policy costings, at least when incorporated into the overall revenue forecasts, should be on a cash basis. However, an accruals-based costing often underlies a cash-based

costing, and can be useful in its own right, for understanding the overall effect of a policy on revenues from (rather than in) a year. A cash-based costing may differ significantly from an accruals-based costing if a large part of the yield/cost of a tax change in a given year (e.g. 2021) is not actually reflected in cash revenue figures until subsequent years (e.g. 2022).

As an example, consider a CIT system where companies are meant to pay their CIT on the last day of every quarter, based on one-quarter of their self-assessed or provisionally assessed profits for the accounting year in question. If a company's accounting year lines up with the calendar year, this means paying by the 31 March, 30 June, 30 September and 31 December. Assume that they would then have to file a tax return by 30 April (four months after the end of their accounting year). In this example, an accruals-based costing of a tax change coming into effect in a given year (e.g. 2021) may differ from the cash-based costing if: firms pay their taxes late (e.g. paying the final payment in January); their final return leads to a refund or additional payment of taxes; or their payments are adjusted due to subsequent audit activity. If a company's accounting year differs from the fiscal/calendar year, their due date for the final quarterly payment may also be in the following year (e.g. 31 January or 28/29 February).

Accurate policy costings would therefore require an understanding of the time profile of tax payments that relate to a given year. If, for instance, 80% of the revenue for a tax that relates to activity in 2021 is actually paid in 2021 and the other 20% is paid in 2022, a cash-terms policy costing should take this into account.

In addition to the actual static costing, the costing document should set out clearly the data and methodology used for the costing, and the key uncertainties in the costing. Although a static costing does not make assumptions about behavioural or economic effects, considerable uncertainties can still derive from a number of areas. For instance, underlying economic growth – and its implications for tax revenue forecasts – is likely to be subject to margins of error. Where assumptions are required to estimate the size of the affected tax base, these could be another key uncertainty.

Box 2.4. Producing a static costing of the policy

Indirect tax example: removal of VAT on financial services

The static estimate of the cost of this measure would be the forecast of net VAT collections on fee-based financial services (because the proposed exemption would mean the loss of these revenues). This estimate can be produced by first projecting forwards the current revenue collections from VAT on financial services over, say, the next three years, using either the growth rate implied by official forecasts or, where those are unavailable, an assumed growth rate (e.g. 1.1 times GDP growth).[4] Two further assumptions must then also be made. The first assumption concerns the share of bank fees paid by businesses that can reclaim any VAT paid. This is important because unlike for fees charged to households and small and informal businesses, no VAT is actually collected on these fees to VAT-registered businesses – any VAT initially charged is then claimed back. It is only on fees charged to households and small and informal businesses that VAT would actually be lost by an exemption. The second assumption is about the amount of input VAT that banks would no longer be able to reclaim once fee-based services are exempted from VAT. Banks' VAT returns may enable this to be estimated (rather than assumed) if existing input VAT reclaims all relate to fee-based services.

The proportions of sales to customers able to reclaim VAT is likely to be one of the key uncertainties when costing this policy. The other main uncertainty for the static costing will be the underlying growth of the tax base.

Direct tax example: reduction in the rate of CIT

In this case, the tax base would be taxable corporate profits, which as above could be projected forward using either official revenue forecasts or simple buoyancy assumptions.

It may not be possible to calculate the total tax base using overall CIT revenues, however. In some countries, businesses are subject to different tax rates based on their sector and/or their location. Some assumptions or estimates of the proportion of the tax base that is subject to the standard rate, and the proportion subject to reduced rates, would therefore be necessary

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[4]   In this example, 1.1 is the tax buoyancy factor, which measures how much faster or slower a tax base grows than GDP.

(and it may be possible to estimate this from administrative data on business sector, size, location, etc.).

The share of tax revenues that come from the standard rate of CIT is likely to be uncertain, and could change over time. The other main uncertainty for the static costing will be the underlying growth of the tax base.

2.4 Produce a behavioural costing

The second type of costing that should be produced is a behavioural costing. This is an estimate of the cost/yield from a policy change when allowing individuals or businesses that are directly affected by the reform to change their behaviour in response to it, thus changing the tax base for the tax in question and potentially other related taxes, even if there are no definitional or mechanical changes to them. Behavioural responses may or may not be an intended consequence for policymakers but they could have an important impact on revenues collected.

In this section, we discuss incorporating behavioural responses induced by the policy into the costing process in a simple way. Note that wider economic impacts due to feedback effects through the macroeconomy should not be accounted for at this stage – they should be accounted for in step 5.

Much of the behavioural costing can proceed as in the static costing, but in addition, to produce a behavioural costing the analyst must do the following.

- Choose which behavioural margins to include in the costing.
- Identify sources for estimates of the degree of responsiveness on each of these margins, and choose an appropriate estimate of responsiveness (or range of estimates if one wishes to examine a range of scenarios as part of sensitivity testing). It will be necessary to refer to the academic literature and to estimates of previous responses using historic data from one's own country. Box 2.5 considers how these responses can be sourced.
- Using the policy change and the estimate of responsiveness, estimate how the relevant tax base will change as a result of behavioural response to the policy, and recalculate the cost/yield with updated tax bases.

Box 2.5. Selecting behavioural response parameters

The precise magnitude of any behavioural response to a change in policy is impossible to know *ex ante* but it can have a significant impact on estimates of the cost/yield from a tax policy change and it is an important consideration for policy regardless. It may be possible to draw on evidence from previous experience from similar policy changes, and from consultation responses. But in the absence of context-specific estimates of relevant elasticities, the analyst will be required to make use of other research and expert advice, and to use their economic reasoning to select an appropriate assumed elasticity.

An abundance of research exists on how economic agents respond to changes in prices and taxes, and relevant evidence can be carefully selected from both the academic literature and from evidence provided by policy institutions. A number of examples of online databases for estimated elasticities exist – particularly for agricultural products – such as the information generated by the Food and Agricultural Policy Research Institute at the University of Missouri (FAPRI-MU) or the US Department of Agriculture's Commodity and Food Elasticities database.[5] In addition, for a given policy costing, the analyst is likely to be able to make use of results from online searches to find evidence relevant to their task. In sourcing behavioural responses from existing evidence, it is important to take estimates from contexts that are as similar as possible, in terms of both the economic and institutional structure of the country in question, and the policy issue being considered.

As well as – or, in some cases, instead of – using existing evidence, economic intuition can also provide guidelines on the magnitude of behavioural response to be used. A whole host of factors will determine the magnitude of behavioural response that one might expect. For indirect tax changes, one might consider, for instance, whether the affected good/service has available substitutes (in which behavioural elasticities may be larger), whether it is a necessity or a luxury (with elasticities typically larger for the latter), and whether businesses or consumers are responsible for more of the total expenditure. For direct taxes, relevant factors might include the quality of tax enforcement and the mobility of the base (with poorer enforcement and greater mobility associated with bigger elasticities).

The analyst may need to combine their understanding of their specific context with existing evidence on similar policies in other contexts to help them to decide on a sensible degree of

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[5]   See https://www.fapri.missouri.edu/ and https://www.ers.usda.gov/data-products/commodity-and-food-elasticities/. Note that the latter database is no longer being actively updated and maintained, but it remains a useful resource.

behavioural response. While it is always prudent to test the sensitivity of a given costing to parameter choices, in cases where there is a high degree of uncertainty this is even more important.

There are a range of behavioural responses one might wish to account for, depending on the policy in question. Examples might include the following.

- Changes in the demand for (taxable) supplies of goods and services, as a result of a change in the VAT or duty rate on that good/service. The degree of responsiveness is measured by the *own-price elasticity* of demand. The own-price elasticity of demand is the percentage change in demand for a given good when price increases by 1%. This is usually negative; when prices increase, it is anticipated that demand will fall, and vice versa. If demand is *inelastic*, overall spending on a given good increases when the price increases. Note that such elasticities can implicitly capture the effect of both a change in the number of transactions and a change in average tax compliance.
- Changes in the amount of taxable income reported to the tax authorities as a result of changes in the tax treatment of (different forms of) income. The degree of responsiveness is measured by the *taxable income elasticity*.
- Changes in the levels of investment made by companies as a result of changes in the CIT rate. The degree of responsiveness is measured by *investment elasticities.*
- Changes in the amount of profits reported in the country as a result of changes in the CIT rate. The degree of responsiveness is measured by the *profit-shifting elasticity.*

Again, these are just illustrative examples, and the analyst should consider carefully which specific behavioural responses are relevant for a specific policy costing. For some policies, multiple behavioural responses may be possible, and one may want to take into account more than one response. In other instances, responses along one dimension may preclude responses along others. For instance, if one were to assume an overall taxable income elasticity for CIT, one would not want to additionally make an assumption about the elasticity of the corporate share of business, as this would already be accounted for implicitly.

Analysts should also consider carefully whether resource constraints in the economy could constrain the size of behavioural responses or lead to offsetting

behavioural responses for other tax bases.[6] It is likely to be more important to account for such effects in the following cases.

- The main behavioural response being considered is relatively large. For example, if demand for a product subject to a tax cut is highly elastic – i.e. its demand increases by substantially more than 1% for a 1% reduction in its price – then total expenditure on that good would increase following a tax cut. This would require less to be spent on other products, unless savings were reduced or earnings increased.
- The activities for which offsetting behavioural responses take place are subject to relatively high tax rates. Continuing with the previous example, suppose that the products on which less is spent were not subject to tax. In that case, the reduction in spending on them would *not* lead to a reduction in tax revenues that needs to be accounted for in the policy costing. But, if the tax rate on these products was positive, there would be a reduction in tax revenues that needs to be accounted for.

Once the analyst has selected their chosen behavioural response(s) and appropriate elasticities, these can be used to estimate new tax bases that account for the induced behavioural response, for each year of the forecast period. Exactly how the chosen behavioural response is utilised for this step may vary according to the specific policy and margin of behaviour. For instance, in the case of an indirect tax change and modelling a change in consumer demand, the post-reform tax base, after taking into account behavioural response, can be approximated as

$$BASE_{reform} = BASE_{no\text{-}reform} * (1 + (\varepsilon * \Delta P)),$$

where ε is the assumed price elasticity of demand and ΔP is the total change in price of the affected tax base. One can then use this new estimate of the 'post-reform' tax base to calculate the cost/yield of the policy, accounting for behavioural effects:

$$Yield = \left(RATE_{reform} * BASE_{reform}\right) - \left(RATE_{no\text{-}reform} * BASE_{no\text{-}reform}\right)$$

In addition to providing the behavioural costing, the costing document should set out what responses are allowed for, the degree of responsiveness assumed (and the

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[6] See Brown (2019) for further discussion of resource constraints in tax policy costings.

sources for those assumptions), and the key uncertainties around these assumptions. As well as the type of possible uncertainties noted for the static costing (e.g. underlying forecasts and estimated tax bases), for a behavioural costing the assumed behavioural responses will generally be important uncertainties to note at this stage.

It is useful to note that in most cases the effects of the behavioural response will not be likely to overturn the direction of a revenue impact – this rule of thumb can provide a useful sense check on analysis.

Box 2.6. Producing a behavioural costing of the policy

Indirect tax example: removal of VAT on financial services

The behavioural responses to be considered in this example depend on whether banks pass on the change in VAT to their customers. If the final price of fee-based services is reduced, households and small and informal businesses may respond by increasing their demand for fee-based financial services. The amount by which they increase demand is represented by the own-price elasticity of demand, which may need to be estimated or assumed and is therefore a key uncertainty. However, the price of fee-based financial services faced by large and formal businesses may increase, as the banks would no longer be able to reclaim the input VAT paid on inputs into the production of fee-based services. Such businesses may therefore decrease their demand for fee-based financial services. In turn, these changes in demand could have knock-on effects for the other taxes paid by banks by affecting profits, employment, wages, etc.

If banks instead keep final prices fixed for consumers and small business customers, these demand-side effects may not take place, but banks' higher profits may lead them to pay higher dividends to their shareholders (so as well as higher revenues from taxes on profits, there could be higher revenues from taxes on dividends).

In addition to the uncertainties in the static costing, the pass-through of VAT changes to prices; and the elasticity of demand of different types of users of fee-based services are key uncertainties for the behavioural costing.

Direct tax example: reduction in the rate of CIT

The behavioural responses in this example will be specific to the institutional and economic context. In the UK, CIT policy costings typically incorporate profit-shifting and incorporation elasticities, but elsewhere policymakers may feel that other responses are more relevant.

In this example, we incorporate a profit-shifting response. Multinational companies have opportunities to report higher/lower profits in the different countries in which they operate. Through transfer pricing, companies may increase payments to low-tax subsidiaries on within-company transactions. Through thin capitalization, companies may shift debt financing to high-tax subsidiaries. Lower rates of CIT may attract international mobile revenues and increase the size of the tax base.

Modelling a profit-shifting elasticity requires data on the share of corporate profits that are internationally mobile, and the elasticity of mobile profits. This means that the tax base will have to be divided into 'mobile' and 'immobile' portions. A profit-shifting response will only be modelled for the mobile portion. In response to the policy change, the tax base may grow over time, leading to the revenue costs being smaller than they are for a static costing.

In terms of additional uncertainties over and above the static costing, the share of the tax base that is responsive to the incentive to shift profits into, and out of, the country is uncertain. The profit-shifting elasticity is also uncertain.

It is important to note that in our spreadsheet example, we assume that the tax base in the year prior to the rate reduction will be unaffected by behavioural response. This may seem sensible because there is not yet a rate change to respond to. In reality, however, there may be some anticipatory responses as companies begin the process of profit-shifting in the period leading up to the reform. Companies may also shift their profits over time to take advantage of the new tax rate. This could decrease the size of the tax base in the year before the reform, and temporarily boost the size of the tax base after the reform has been introduced.

2.5 Consider wider economic effects

In addition to affecting the behaviour of individuals and businesses that are directly affected, policies may have second-round effects on the wider macroeconomy. It is important to note that, in most instances, these effects will be relatively small

relative to the direct impact of a measure and may not be worth quantifying. In the UK, as well as Australia, Canada, New Zealand and the United States, it is very rare for the policy costing process to go further than considering behavioural effects for directly affected groups. However, in some cases, the effects may be more material and important to consider.

Wider economic impacts may include the following.

▪ Demand-side effects, whereby a tax change that increases or reduces the amount of money held privately increases or reduces the level of the demand in the economy. Fiscal multipliers can measure these effects.

▪ Supply-side effects, whereby a tax change leads to changes in the level of potential GDP or the structure of GDP, affecting tax revenues. Different supply-side effects need to be estimated using different methods. For instance, an estimate of the second-round effects of a cut in CIT rates may rely on an elasticity of investment with respect to the CIT rate, and an estimate of the impact of investment on potential GDP.

Whether to incorporate such second-round effects is a matter of judgement. When costing the impact of a package of policies, one must also use judgement to determine whether to incorporate such second-round effects in the costings of specific policies or as an *ex post* adjustment to the overall package of reforms. In the UK, the typical approach is to do the latter unless any one individual policy is expected to have a particularly large effect on the macroeconomy.

The process of updating macroeconomic forecasts in response to policy changes may involve, for instance, the use of calibrated economic models (such as computable general equilibrium, or CGE, models) or a more judgement-based and holistic assessment of macroeconomic conditions, or a combination of both. Producing and updating macroeconomic forecasts is beyond the scope of this manual. However, in Box 2.7, we provide a couple of suggestions on how to incorporate both the demand- and supply-side effects of tax policy changes into policy costings in relatively simple assumption-driven ways.

Box 2.7. Incorporating assumptions about demand- and supply-side macroeconomic effects

Demand-side effects can be incorporated in a relatively simple way by using fiscal multipliers in the following steps.

- Calculate the revenue yield/cost of a policy as a percentage of GDP.
- Select the fiscal multiplier to use, drawing on estimates from the economics literature. These multipliers show how much GDP changes for each unit change in taxation or government spending.[7] Importantly, existing evidence suggests that the magnitude, and even the direction of fiscal multipliers, may be sensitive to the country context. For instance, Ilzetzki, Mendoza and Végh (2013) estimate much lower fiscal multipliers in developing countries and open economies, and under flexible exchange rate regimes, and they suggest that multipliers may even be negative in high-debt contexts. As a result, the analyst will likely need to apply judgement on this margin.
- Multiply the change in tax revenues measured as a percentage of GDP by the chosen fiscal multiplier(s) – this is the short-term impact on GDP. For example, for a tax cut equivalent to 0.5% of GDP and a fiscal multiplier of 0.2, the short-term impact would be a 0.1% increase in GDP.
- Assuming that the tax-to-GDP ratio did not change in response to the change in GDP, the impact of the change in GDP on revenues can then be calculated. This could be added to any specific policy costings calculated using the methods and spreadsheets associated with this document to produce an overall costing accounting for wider economic effects. It would be important to note that any such costings are likely to be subject to a high degree of uncertainty and, as with other steps in the costing process, sensitivity to a range of fiscal multipliers could be examined.

These demand-side effects might last a few years but in the longer term it will be supply-side effects that dominate. A similar approach to that outlined above could be utilised to estimate the longer-run effects on GDP and tax revenues, drawing instead on the literature that examines the impact of tax rates and structure on the level of GDP. Evidence of the long-run effects of taxes on the level of GDP is limited, however, and is again likely to be highly context-specific.

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[7] See Riera-Crichton, Végh and Vuletin (2016) for a discussion of the challenges in estimating tax multipliers, and an overview of some existing evidence.

Given the very high level of uncertainty surrounding any estimate of long-run supply-side effects, one option may be to examine how large the growth effect would have to be for these wider economic effects to offset the direct revenue losses from the tax changes. This would provide an indication of the plausibility of the supply-side effects required to make a reduction in taxation revenue-neutral.

An important point to note at this stage is that care should be taken to avoid 'double-counting' the behavioural effects in stages 4 and 5. For instance, the impacts of a cut in CIT on investment and hence GDP should not be counted as both a 'behavioural impact' and a 'broader economic impact'. Related to this is the importance of being aware of the potential interactions between wider economic effects and the underlying revenue forecasts used for the policy costing. While it is important not to double-count the wider economic effects, if a plausible wider economic impact might affect the underlying tax base in the policy costing, then it is prudent to try to incorporate this too.

Box 2.8. Considering wider economic effects

Indirect tax example: removal of VAT on financial services

If consumption of financial services increases, this might increase private investment, which would have demand-side effects in the short term and supply-side effects in the longer term. Increases in private investment might also be observed if banks retain fee income and earn higher profits. If wages are increased, this would be likely to increase consumption but potentially also savings. Any (direct or indirect) price effects from removing VAT would also feed into inflation. However, given that none of these effects is likely to be large, one might choose not to consider wider economic effects for this example.

Direct tax example: reduction in the rate of CIT

As outlined above, wider economic effects for this example could potentially affect different tax bases and be large enough to warrant consideration in the policy costing process. In addition to encouraging firms to shift taxable profits into the country, a large reduction in the rate of CIT might lead to an increase in investment, leading to higher levels of GDP in both the short term (via demand-side effects) and in the long term (via supply-side effects). Such effects will affect multiple tax bases – in addition to CIT revenues, growth from

investment will boost personal income tax and VAT revenues, for example. In the long run, revenue impacts may exceed the effects of the direct behavioural responses.

The size of economic impacts for large policy changes, such as the reduction in the CIT rate, is highly uncertain, however.

2.6 State the final costing

Once the analyst has carried out static, behavioural and, perhaps, macroeconomic costings, it is important to make clear what the final cost of the policy change is. Typically, this will be the costing from stage 4, or where wider economic effects are taken into account, from stage 5. Only if the behavioural effects of a policy change are likely to be very small on net, or perhaps impractical to incorporate into the costing, will the static costing be the final costing.

At this stage, it will be important to justify the choice between a costing accounting for only behavioural effects or one also accounting for wider economic effects. One may also wish to display a range of estimates for the final costing, with a central estimate, and then high and low variants reflecting uncertainty in relation to key assumptions.

2.7 Complete the policy costing scorecard

Often, policy costings will be undertaken for a number of individual policies in an overall policy package. The final stage of the costing process is to collate the costings of each policy to calculate the cost/yield from the full package of measures being proposed or implemented.

In the UK, one (central) estimate of the cost/yield of the package is presented. If analysts prefer to produce high- or low-cost variants of the scorecard, whether for internal discussion or external dissemination of the uncertainties involved, it is important to realise that it is not always possible to sum up high- or low-cost variants of the costs of individual policy proposals. This is because assumptions across different policy changes may interact, and thus analysts must be careful to ensure such interactions are accounted for in the final scorecard. An example of this issue is considered in Box 2.8.

Box 2.9. Summing the high- and low-cost variants of individual measures

To see why it is not possible to sum the high- and low-cost variants of individual measures, consider a hypothetical policy. Suppose both international and domestic airline tickets are subject to VAT, and while the total 'airline ticket' tax base is known, the proportions that are international and domestic are not. Suppose there is a proposal to cut taxes on both types of tickets but with a bigger tax cut on international flights. The high-cost variant of the overall policy would not be the sum of the high-cost variants of the two specific policies. This is because if a high proportion of the overall tax base comes from international flights, which raises the cost of reducing taxes on such flights, then by definition a low proportion of the overall tax base comes from domestic flights, which lowers the cost of reducing taxes on domestic flights

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3. Worked examples

This chapter uses the methodology outlined above to work through practical examples of policy costings for hypothetical indirect and direct tax reforms. The calculations can be found in the *Costing Examples Spreadsheet*.

In all costings examples, the spreadsheets are flexible and use formulae that link to cells so it is possible to easily update assumptions (e.g. growth rates, tax rates, elasticity, etc.).

Example 1: simple costing – import duty cut

The first policy to be costed in this exercise is a hypothetical abolition of import duties, which are initially levied at a rate of 15%.

Assumptions and preliminary steps

The first step, shown in Section 1 of the associated spreadsheet, is to specify the key assumptions that will be used for the policy costing. It is advisable that the analyst sets up calculations in such a way that any assumptions can be easily adjusted and new estimates generated – this is useful for sensitivity analysis and for easily updating results if any assumptions need to be updated at a later stage.

In the case of an import duty cut, the key assumptions made include the following.

- For the underlying projection of revenues, we assume that after 2021 (for which we use available official forecasts) the tax base grows 10% faster than GDP (so, for example, if GDP grows 10%, the tax base grows 11%).
- For behavioural modelling, we assume an own price elasticity for imports of −0.7, and ignore any cross-price elasticities.
- The tax being changed in this example is an import duty. We assume, in addition, that VAT is levied on imports at a rate of 17.5%, and the tax base for VAT includes the import duty paid.

Section 1 provides space to enter a value for each of these variables, plus projected GDP growth for each year and the relevant tax rates. Section 2 gives details of the baseline information to be used in the policy costing relating to tax bases, rates and revenues. This includes historic information on the tax base and revenues of import duties and VAT, and future import duty rates, VAT rates and GDP growth forecasts.

Static costing

Section 3 describes the steps required for the static costing, calculating tax revenues under both a 'no-reform' and a 'post-reform' scenario. Unless more sophisticated revenue forecasting methods exist at baseline, the first step is to project forward the import duty tax base, given GDP growth and the aforementioned assumptions. This stage invokes the first stated assumption above. The evolution of the tax base is given by

$$BASE_t = (1 + (1.1 \times GDP\_GROWTH_{t-1})) \times BASE_{t-1}.$$

Note that the pre-reform and post-reform tax bases for import duties are the same for a static costing. Post-reform import duty revenues can be easily calculated using this base and the new tax rate. However, as has been previously noted, static costings should also account for any mechanical effects that reflect the rules of the tax system. In this case, the tax base on which VAT is levied includes any other taxes charged, including import duties. Thus, all things equal, an import duty cut reduces the total VAT liability. The post-reform VAT tax base is calculated by summing the import duty tax base and import duty revenues.

With this information, it is then possible to calculate a static costing of the policy for each year between 2022 and 2024: one simply applies the pre- and post-reform tax rates to the tax bases for import duties and for VAT. The overall cost in 2022 is calculated as the cost due to changes in import duty revenues and VAT revenues. In turn, the cost due to changes in import duty revenues is calculated as import duty revenues post-reform minus import duty revenues pre-reform.

Behavioural costing

Section 4 details the steps required for a behavioural costing. The pre-reform tax base and revenues for the behavioural costing are the same as for the static costing. It is the post-reform values that differ.

The behavioural change that we are allowing for in this instance is a demand response. Responsiveness to this is measured by the price elasticity of demand, which in this case is assumed to be −0.7. The overall response is a function of this elasticity and the change in price generated by the fall in the duty.

The change in price can be calculated by comparing the pre-reform and post-reform import cost, inclusive of tax, for each year in the static costing. This is calculated as

$$\Delta P = (COST_{post\text{-}reform} / COST_{pre\text{-}reform}) - 1.$$

The post-reform tax base, after taking into account behavioural response, can then be approximated as

$$BASE_{post\text{-}reform} = BASE_{pre\text{-}reform} * (1 + (\varepsilon * \Delta P)),$$

where ε is the assumed price elasticity of demand and ΔP is the change in price calculated above.

Post-reform revenues are then calculated on the basis of the post-behavioural-response tax base, once again multiplying the tax rate by the tax base for both import duties and VAT, after accounting for the fact that import duties form part of the tax base for VAT. Updated costs of the reforms can then easily be calculated.

The worked example shows that for the abolition of the import duty, the behavioural costing is around 9% smaller than for the static costing. This is because the reduction in price increases demand for the goods and services in question, which means more VAT is collected on them.

For this worked example, the behavioural costing is the final static costing. This is because the cut in import duties is not expected to have wider economic effects substantial enough to be incorporated into the costing. In terms of key uncertainties for the costing, the assumed price elasticity of demand is an obvious candidate, and adjustment of this parameter in order to test the sensitivity of results is easily done given the set-up in the worked example. In addition, the underlying growth of the tax base – as determined by assumptions on GDP growth and tax buoyancy – is also an area of uncertainty.

Example 2: complex costing – VAT exemption

In this second exercise, there is a hypothetical 17.5% VAT on fees charged by banks for a range of services. The policy proposal that requires costing is to make such fee-based services exempt from VAT. This means that VAT does not need to be charged on sales of financial services. However, it is also important to note that this VAT treatment would prevent the reclaim of VAT on an apportioned share of banks' input costs, despite VAT being chargeable on those inputs. The former effect will tend to decrease VAT revenues, while the latter will increase VAT revenues.

Note that this is an example costing that assumes that financial services companies can reclaim input VAT paid. In general, this is not possible (so that VAT on fee-based financial services operates more like a turnover tax than a true VAT).

This is a more complex costing because of the way that VAT operates. In particular, introducing the exemption will reduce output VAT charged, but also reduce input VAT reclaimed, and the overall costing estimate needs to account for both effects. As we will see, to do so comprehensively requires reliable data about the extent to which fee-based financial services are sold to other VAT-registered businesses, as opposed to consumers or non-VAT businesses, as well as data on the share of banks' input VAT that can be apportioned to fee-based financial services output for the affected firms. Such data may not always be available, necessitating assumptions to complete the costing.

Assumptions and preliminary steps

Again, the first step is to set out the key assumptions required for this costing (see Section 1 of the relevant spreadsheet of the worked example).

- For the underlying projection of revenues, we assume that after 2021 (for which we use available official forecasts) the tax base grows 20% faster than GDP (e.g. if GDP grows 10%, the tax base grows 12%).
- For underlying projection of revenues, we assume that input VAT reclaimed grows in line with pre-VAT financial services turnover.
- We assume that the share of bank fees paid by consumers is 30%, with the remainder being paid by businesses able to reclaim VAT.

- We assume that the elasticity of demand for financial services is −0.9 for consumers, and −0.3 for businesses.
- The 17.5% VAT is being replaced by a VAT exemption from 2022, so that businesses can no longer reclaim their input VAT (assuming that they pass costs on to consumers).
- We assume that the input VAT paid by banks as a percentage of the pre-VAT value of their sales is equal to 5%.
- In addition, GDP growth forecasts for each year of the costing are required, plus the pre- and post-reform VAT rates.

Section 2 provides the baseline information on historic pre-VAT turnover, output VAT charged, input VAT reclaimed and net VAT paid by banks.

Static costing

Section 3 details the steps necessary for calculating the static costing.

The first step is to project forward the import duty tax base given GDP growth and the aforementioned assumptions. To do this, note that the first assumption above states that the tax base grows 20% faster than GDP. Hence, the tax base for 2022 is calculated using the following formula:

$$BASE_t = \left(1 + (1.2 * GDP\_GROWTH_{t-1})\right) * BASE_{t-1}.$$

The pre-reform and post-reform tax bases are the same for a static costing. With this information, it is then possible to calculate a static costing of the policy for each year between 2022 and 2024. However, it is more complex to produce a static policy costing for a VAT change than for a duty change. This is because we need to account for two features of VAT.

First, in the pre-reform world, banks can reclaim the input VAT they have paid when purchasing their inputs. However, in the post-reform world – when fee-based financial services are made exempt from VAT – they can no longer reclaim this input VAT. This increases VAT revenue on business-to-business transactions.

Second, in the pre-reform world, the business customers of banks can reclaim the VAT they have paid when purchasing fee-based financial services. Hence, when VAT is abolished, the amount of VAT actually paid by business customers does not change because they were never really paying it in the first place. Consumer

customers of banks, however, cannot reclaim VAT and hence do benefit from the abolition of VAT on these services.

To take these effects into consideration, it is necessary to calculate pre-reform revenues by customer type. To do this, one must apportion banks' total sales of fee-based services into those to consumers and those to businesses.

For instance, the consumer sales tax base for 2022 is simply the overall tax base multiplied by the consumer share. The pre-reform VAT chargeable on that tax base can then be calculated. One can also apportion the bank's overall VAT reclaims to consumers in the same way as we apportion the banks' tax base. One can then calculate banks' net payments of VAT as the output VAT charged minus the input VAT reclaimed. Note that consumers cannot reclaim any of the VAT that they would pay on fee-based financial services.

Analogous calculations can be undertaken for the business share of the tax base. This time, note that businesses can reclaim the VAT they pay on fee-based financial services. One can then calculate the post-tax cost to businesses, accounting for the fact that they can reclaim the VAT they pay. When calculating post-reform revenues, one must first account for the fact that banks can no longer reclaim their input VAT when fee-based services are made exempt. Assume that this pushes up the pre-tax price they charge for their fee-based services, increasing the overall VAT tax base for financial services.

The tax base can then be apportioned and VAT revenues calculated by customer type, as was done for the pre-reform tax regime.

For consumers, the static revenue effects of the reform are the reduction in output VAT minus the reduction in input VAT reclaimed.

For businesses, the revenue effects of the reform are the reduction in output VAT charged minus the reduction in input VAT reclaimed minus the reduction in output VAT reclaimed by downstream business customers. Note that the replacement of a standard rate of VAT with an exemption actually increases VAT revenue from business-to-business sales of fee-based financial services. This is because the bank's input VAT is no longer reclaimable and no VAT was ever really paid on the banks sales to businesses, as downstream businesses could previously reclaim it.

The total impact on revenue is the sum of the revenue effects for consumer and business sales.

Behavioural costing

Section 4 considers the revenue implications of the policy after accounting for behavioural impacts. The pre-reform tax base and revenues for the behavioural costing are the same as for the static costing. It is the post-reform values that differ. Again, this policy costing uses demand response(s) to account for behavioural response. Recall that these responses will be a function of both the elasticity and the change in price.

For this example, it is necessary to calculate separate price changes for consumers and businesses. Consumer prices fall because while pre-VAT prices have risen (as banks can no longer reclaim their input VAT), consumers save on the VAT banks currently must charge on their fees. Business prices rise because businesses never really paid VAT (they could reclaim it) so there is no tax fall to offset the increase in the pre-VAT price charged by banks. For consumers, the change in price is calculated by comparing the pre- and post-reform consumer costs; for businesses, the actual cost to business given reclaims is the relevant number. The change in price for each group is given by

$$\Delta P = (COST_{post\text{-}reform}/\ COST_{pre\text{-}reform}) - 1.$$

For each group, the post-reform tax base after taking into account behavioural response can then be approximated as

$$BASE_{pre\text{-}reform} * (1 + (\varepsilon * \Delta P)).$$

For this example, it is necessary to account for the fact that the post-reform tax base would change even in the absence of modelling behavioural response. This is because of the assumption in the static costing that banks pass on their now non-reclaimable input VAT into higher pre-VAT prices for their fee-based services.

Post-reform revenues can be calculated on the basis of the post-behavioural-response tax base, and updated costs of the reforms calculated.

At this point the behavioural costs calculated would be exactly the same as the static costing: the fact that the exemption means a 0% VAT rate on the sale of these

financial services means that any change in demand for these financial services would not directly affect VAT revenues. This does not, however, mean that the behavioural response has had no impact on revenues, because there is one further impact to account for: the change in demand for financial services may affect the amount of VATable inputs used by the banks to produce said services.[8] Because banks can no longer reclaim this input VAT, this behavioural response will have revenue implications.

One might assume, for example, that inputs are required in proportion to real output (i.e. 'quantities' not value) – this is based on assumption (2) above. We therefore need to calculate the change in real output. To do this one first needs to work out the overall value of the tax base, including sales to consumers and producers.

One then needs to convert this value-based tax base into a quantity-based measure. To work out how much the non-recoverability of input VAT raises the pre-VAT price of fee-based services, calculate $VAT_{input}/BASE_{pre-reform}$. The quantity-based measure of the tax base is therefore the value-base multiplied by $1/(1 + 1.05)$. The post-reform amount of input VAT paid by banks is therefore $BASE_{post-reform}$ * (0.05/1.05).

Finally, one can calculate the change in input VAT paid by banks, which is the new amount paid minus the amount paid, holding the quantity fixed at pre-reform quantity levels.

The overall impact on revenues is then the sum of the effect on revenue from consumer sales plus the effect on revenue from business sales plus the effect of changes in input VAT paid by banks as a result of changes in demand.

Example 3: corporate income tax rate cut

In this final example, the aim is to cost a proposed reduction in the standard rate of CIT with the rates reducing in a phased way by 1% each year. This results in a reduction from 25% to 20% between 2021 and 2026.

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[8] In principle, it may also affect bank profits, but we abstract from that issue in this costing exercise.

This costing will also incorporate a profit-shifting elasticity, reflecting the fact that some multinational companies have opportunities to report higher/lower profits in the different countries in which they operate. Through transfer pricing, companies may increase payments to low-tax subsidiaries on within-company transactions. Through thin capitalization, companies may shift debt financing to high-tax subsidiaries. Lower rates of CIT may attract international mobile revenues and increase the size of the tax base. Modelling a profit-shifting elasticity requires data on the share of corporate profits that are internationally mobile, and the elasticity of mobile profits.

Assumptions and preliminary steps

Similarly to the other examples, the first step is to outline the key assumptions required for this costing (see Section 1 of the spreadsheet).

- We assume a tax base buoyancy of 1.1.
- We assume nominal GDP growth rates between 10% and 13%, depending on the year in question.
- We assume that 75% of overall CIT revenues come from standard rated firms.
- We assume that the proportion of corporate profits that are internationally mobile is 30%.
- For behavioural modelling, we assume a profit-shifting elasticity of −2.

Section 2 sets out actual CIT revenues in 2019 and 2020 as well as a forecast for 2021.

Using our assumption that 75% of these revenues come from the standard rate, we can work out the revenues from the standard rate (*Overall_Revenues* * 75%), and then work out the tax base for the standard rate by dividing that revenue estimate by the tax rate (25%).

Static costing

The static costing is in Section 3 of our solutions. Note that the pre-reform and post-reform tax bases are the same for a static costing.

Using the previous year's figures, the first step is to project forward the CIT tax base given GDP growth and tax base growth assumptions. To do this, we first take

the tax base from the previous year and then project forward the tax base to that year, using the formula:

$$BASE_t = (1 + GDP\_GROWTH_t * BUOYANCY_t) * BASE_{t-1}.$$

Once we have the tax base and the tax rate, we can calculate the projected CIT revenues by applying the no-reform and post-reform tax rates to the tax base. For the static costing, the tax base is the same before and after the reform (all that changes is the tax rates that are applied to that base):

$$Revenues = RATE * BASE.$$

We then calculate the annual differences in CIT revenues for the no-reform and post-reform scenarios:

$$Yield/Cost = (RATE_{post\text{-}reform} * BASE_{post\text{-}reform}) - (RATE_{pre\text{-}reform} * BASE_{pre\text{-}reform}).$$

Finally, we calculate the overall cost of the policy by totalling the annual costs.

Given the change in taxes modelled and the assumptions made, we end up with a static costing of 17.0 million in 2022, rising to 140.6 million in 2026.

Behavioural costing

In Section 4 of the spreadsheet, we conduct a behavioural costing.

The first steps of the costing are the same as the static costing; that is, we project forward the CIT tax base given GDP growth and tax base growth assumptions.

We then calculate the change in tax rate, which is used alongside the profit-shifting elasticity to work out the change in the tax base as a result of profit-shifting. Note that the change in tax rate is measured in percentage points (e.g. 25% to 24% is -1 percentage points).

Next, we must split the tax base into the immobile component (for which we assume there is no profit-shifting response) and the mobile component. For the immobile component, we multiply the overall tax base by (1 − the mobile share). We then project this forward using the GDP and buoyancy assumptions as under the static costing.

To calculate the mobile portion, we multiply the overall tax base by the mobile share in 2022. In subsequent years, we project this forward using the GDP and buoyancy assumptions.

We then calculate the projected CIT revenues by applying the no-reform tax rate to the base.

It is then necessary to model the change in the tax base as a result of profit-shifting responses. This allows us to model changes in the tax base as a function of the semi-elasticity. The first part does the usual projection forward of the tax base. The last part applies the behavioural effect according to the following formula:

$$BASE_{reform} = BASE_{no\text{-}reform} * \left(1 + (\varepsilon * \Delta P)\right).$$

Note that when we are modelling the no-reform tax base, the change in tax rate is 0, so there is no change in the tax base as a result of the behavioural response. After the reform, the tax rate is being reduced by 1% each year between 2022 and 2026, so the behavioural response does now affect the size of the mobile portion of the CIT tax base. This makes the overall post-reform tax base bigger than the pre-reform tax base.

We then calculate the annual differences in CIT revenues for the no-reform and post-reform tax bases. The cost of the reform is calculated by comparing revenues each year, for the no-reform and post-reform tax regimes.

We calculate the overall cost of the policy by totalling the annual costs.

Finally, we compare the figures for the static and behavioural costings by revenues and percentage difference.

After the reform, the tax rate is being reduced by 1% each year between 2022 and 2026, so the behavioural response does now affect the size of the mobile portion of the CIT tax base. This makes the overall post-reform tax base bigger than the pre-reform tax base.

The growth in the tax base means that the revenue cost of the tax rate cut is smaller than it was in the static costing. It now grows from 14.5 million in 2022 to 123 million in 2026.

A note on uncertainties in this costing

The only thing we know for certain in this costing is that we want to model a cut in the rate from 25% to 20%, phased in over five years.

Our other assumptions are all uncertain:

- GDP growth and tax buoyancy are both highly uncertain;
- the share of the tax revenues that come from the standard rate is likely to be uncertain and could change over time;
- the share of the tax base that is responsive to the incentive to shift profits into and out of the country is uncertain;
- the profit-shifting elasticity is also uncertain.

As with the other examples, because of the uncertainties, it is better to set up the spreadsheet so it can easily be updated. We should also note more general uncertainties about our costings. Here we have modelled only one behavioural response (profit-shifting) and others could also be relevant.

We have also assumed that the tax base in the year prior to the cut in rates (2021) will be unaffected by behavioural response, so do not update revenue forecasts for this year. This may seem sensible because there is not yet a tax rate change to respond to. However, in reality, there may be responses; for example, there may be an 'anticipatory' response as companies begin the process of profit-shifting in the run up to the reform.

As well as shifting profits between countries, companies may try to shift their profits over time to take advantage of lower tax rates. Companies may try to shift some of their income from 2021 to 2022 and later years, to take advantage of the lower tax rates that apply; they could, for example, pay bonuses early, or delay booking payments from customers. This could cause a fall in the tax base in 2021, before the tax rate cuts take effect, and could temporarily boost the tax base in 2022, for instance.

Annex I: policy costing template

The costing template and policy scorecard template below set out a transparent and structured way to set out policy costings internally (e.g. in discussions with ministers or between departments) and potentially externally (to accompany Budget documents online).

[Insert title of tax policy change]

1. Description of change
[Precise description of policy change. Where possible, if multiple changes are being made to the same tax, separate policy change descriptions and costings should be made, taking care to ensure that the sum of the individual costings equals the overall costing (so, taking account of interactions between policies).]

2. Rationale for change
[Set out the rationale for the policy change, paying particular attention to ensure that the rationale is coherent and grounded in sound economic reasoning.]

3. Static costing of the policy
[Provide details of the cost/yield from a policy change holding relevant tax bases fixed at pre-reform levels. If possible, costings should be set out by year for each year of the fiscal forecast period.] *Data and methodology* [A description of the data used for the costing, and the method for calculating the costing. This should include any approximations or assumptions required, and highlight when changes to revenues from other taxes have been taken into account – such as when the tax in question forms part of the tax base for another tax.] *Key uncertainties* [Set out key uncertainties related to data and methodology, giving an indication of their potential magnitude/significance. Consider whether illustrating the use of alternative low/high estimates is helpful in communicating this uncertainty.]

4. Behavioural costing of the policy

[Provide details of the cost/yield from a policy change allowing for first-round behavioural effects – such as changes in demand for a product when the tax on it changes – for the forecast period.]

Data and methodology

[A description of the method for incorporating behavioural change. This should include the margins of change allowed for, the elasticities or other assumptions utilised, and sources for those elasticities.]

Key uncertainties

[Set out key uncertainties related to methodology, such as the type of behavioural responses and the elasticities, giving an indication of their potential magnitude/significance. Consider whether illustrating the use of alternative high/low estimates is helpful in communicating this uncertainty.]

5. Broader economic impacts

[State whether you think policy is likely to have material and quantifiable effects on the macroeconomy, distinguishing between demand-side and supply-side effects. If so, set these out here, and set out final estimate of the policy's impact on revenue, incorporating these effects. Note that, in many circumstances, these broader effects are likely to be small and therefore can be ignored.]

The sections on 'data and methodology' and 'key uncertainties' should also be provided here

6. Final costing of the policy

[Set out a final costing for the policy: either the 'behavioural' costing or the 'broader economic impacts' costing. Could have 'low', 'central' and 'high' estimates if considered desirable.]

Annex II: policy costing scorecard

Policy	2022	2023	2024	2025	Long-term
Policy 1					
Policy 2					
Policy 3					
Policy 4					
Total					

Note: + = net yield from policy; − = net cost of policy. The policy scorecard should incorporate the final cost from the individual policy costings.

Annex III: worked example of the policy costing template

This annex uses the hypothetical example of the removal of VAT from fee-based financial services to demonstrate how the policy costing could be used to set out the costing of a real policy. In this example, it is assumed that banks are able to reclaim input VAT paid on the purchases of VATable services – often in reality this is not possible unless it can be demonstrated that these inputs were used uniquely for the provision of VATable fee-based services but this issue is abstracted from here.

Removal of VAT from fee-based financial services

1. Description of change
Currently, 17.5% VAT must be added to the fees charged by banks for a range of services. The proposal is to make such fee-based services exempt from VAT.
2. Rationale for change
The rationale for this policy is to reduce the cost of banking services to households and businesses that are not registered for VAT, and so cannot reclaim the VAT charged on fee-based financial services. This will encourage them to make use of formal financial institutions, potentially boosting wider economic formalisation efforts, and increasing the supply of investible funds. The policy will also remove an economic distortion whereby the tax system encourages banks to charge for services via means not subject to VAT, such as interest rate differentials, rather than fees.   The drawback of this policy is that by removing this distortion, it creates a new distortion, whereby the tax system encourages people to make more use of fee-based financial services relative to other goods and services which are subject to VAT.
3. Static costing of the policy

The static estimates of the policy's impact on revenue are:
 	
      349,871 for 2022;
      396,054 for 2023;
      453,085 for 2024.

Data and methodology

This costing is produced by projecting forwards 2020 revenues from VAT on financial services for the next four years, using an assumed growth rate of the overall VAT tax base of 20% above GDP growth. An assumption is also made about the share of bank fees paid by consumers and businesses – these proportions are set at 30% and 70%, respectively. This is important because pre-reform VAT-registered businesses could reclaim the VAT paid on their purchases of fee-based financial services and thus were not really ever paying VAT.

Key uncertainties

The key uncertainties with this costing are:
- the projected growth in the tax base, which may be higher or lower than the 20% above GDP growth assumed;
- the percentage of fee-based services paid by VAT-registered businesses, which may be higher or lower than the 70% assumed.

4. Behavioural costing of the policy

The behavioural estimates of the policy's impact on revenue are:
  222,354 for 2022;
  251,705 for 2023;
  287,950 for 2024.

Data and methodology

This costing is produced by assuming that the removal of VAT is passed fully to the purchasers of fee-based services in lower fees. We assume a price elasticity of demand for consumers of −0.9, so that a 1% fall in price increases demand by 0.9%. We assume a price elasticity of demand for businesses of −0.3, so that a 1% fall in price increases demand by 0.3%.

Revenue costs are reduced slightly because we assume that an increase in demand for fee-based financial services requires banks to increase their purchases of inputs subject to VAT. We assume the VAT paid on such inputs is equivalent to 5% of the amount banks receive for fee-based services.

Key uncertainties

The key uncertainties are:
- whether VAT is fully passed on to the prices purchasers pay;
- the elasticities of demand;
- the amount of additional input VAT the banks pay; and
- the potential for other revenue impacts from changes to demand for fee-based banking services (such as the potential for higher corporate tax receipts if bank profits increase).

5. Broader economic impacts

We have not modelled any wider economic impacts of this policy. Wider economic impacts could include additional investment or additional formal sector activity as a result of the greater use of financial-sector intermediation. These are difficult to quantify.

6. Final costing of the policy

The final costing of this policy is our behavioural costing:
  222,354 for 2022;
  251,705 for 2023;
  287,950 for 2024.

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