

THE PRACTICALITY OF A TOP DOWN APPROACH TO THE DIRECT TAX GAP

Summary

- This Working Paper reviews the literature and the experience of other tax administrations to assess the value of top down methods for estimating the UK direct tax gap.
- The key insights are: a top down approach to the entire UK tax gap is impractical, as previous less detailed analysis has also concluded; but top down methods can potentially support the estimation of some elements of the direct tax gap.
- The reasons that a top down approach to the entire direct tax gap is impractical are:
 - (i) The absence of suitable data (in contrast to indirect taxes where consumption data from the national accounts is independent); and
 - (ii) The uncertain calculation of theoretical liability.
- Top down approaches can potentially support the estimation of some elements of the direct tax gap through surveys that approach undeclared income indirectly or infer income from spending. Matching with taxpayer records, which may be possible through the HMRC Datalab, may enhance the value of surveys.

1A) Background

1) The HMRC Vision starts with a commitment to close the tax gap. HMRC estimates indirect tax gaps using a top-down method, the difference between theoretical tax liability calculated from the national accounts and tax paid. In contrast direct tax gaps are calculated bottom up, by adding up estimates of all elements of the gap, generally using tax data, such as information from random enquiries, risk registers and data matching.

2) There are a number of benefits of using top down methods. They give a single estimate, which by definition includes all elements of the tax gap, and are more timely. However, the single estimate gives no information on the constituent elements. HMRC has previously taken the view that top down methods cannot be used to measure entire direct tax gaps, because of the lack of independent data.

1B) Outline

3) This Working Paper reassesses the practicality of top down methods of estimating entire direct tax gaps. Section 2 discusses whether top down methods meet the requirements for direct tax gap estimates. Then, Section 3 looks at the use by tax administrations of top down methods to estimate entire direct tax gaps. In Section 4, and the Appendix, the value of the various top down methods is assessed, with particular reference to the UK. Section 5 concludes that, while top down methods are not suitable for entire UK direct tax gaps, they can potentially be used to support the estimation of some elements of the personal tax gap.

2) Requirements for Top Down Estimates of the Tax Gap

- 4) Top down estimates of the tax gap require suitable information and a calculation of theoretical liability. Both these requirements are problematic for direct taxes.
- 5) To be suitable, information must be both reasonably reliable and independent of HMRC. The national accounts certainly meet the requirement of reasonable reliability.
- 6) For consumption, the tax base for indirect taxes, the national accounts are independent of HMRC. However for income, the tax base for direct taxes, the national accounts rely largely on information from HMRC.
- 7) An alternative data source to the national accounts suitable for direct tax gaps has not been found. While there are methods of estimating the shadow economy without reference to the national accounts, these methods are of questionable reliability.
- 8) Theoretical liability is more difficult to calculate for direct than for indirect taxes. Top down methods estimate income, not the actual tax base, which is taxable income. Taxable income is income less various allowances, which depend on individual circumstances.
- 9) Top down methods do not give the amount of allowances claimable without avoidance. They also do not capture avoidance that reduces declared income before allowances.
- 10) The dependence of allowances on individual circumstances makes measurement of theoretical liability difficult for direct taxes. A top down estimate of income can be converted into theoretical liability through a 'theoretical effective tax rate', the tax due (without avoidance) as a share of income. The theoretical rate is higher than the effective tax rate, the tax actually paid as a share of income, because avoidance reduces tax paid.
- 11) Tax records show how much allowances reduce taxable income, but give no indication of how much avoidance increases allowances. A 'theoretical effective tax rate' requires a split between legitimate allowances and allowances claimed through avoidance that is not readily available.
- 12) To estimate allowances claimed through avoidance requires detailed examination of the circumstances of individual taxpayers, for example, HMRC's 'tax under consideration' for corporation tax avoidance by large companies. Such detailed examination is very much a bottom up method.
- 13) Where avoidance depends on individual allowances, purely top down methods are of limited value for estimating the part of the tax gap due to avoidance.

3) Possible Top Down Methods and Tax Administration Experience

3A) Introduction

14) Table 1 lists the eight top down methods of estimating the direct tax gap, or major elements of the gap, that have been evaluated.

Table 1 Top down methods

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| <i>A) Methods based on the national accounts</i> |
| 1) Calculation of theoretical liability from income |
| 2) Discrepancy using the income measure of GDP |
| <i>B) Macro model methods</i> |
| 3) Monetary methods |
| 4) Other single indicator methods |
| 5) Latent variable method |
| <i>C) Micro methods</i> |
| 6) Discrepancy in labour force measures |
| 7) Direct surveys of households |
| 8) Discrepancy between reported income and income inferred from spending |

15) A partial survey of top down methods used by tax administrations to give an entire direct tax gap has been conducted.¹ Table 2 summarises the results.

Table 2 Use of top down methods by tax administrations

| <i>Country/region</i> | <i>Method used and what is or was estimated</i> | <i>Application of results</i> |
|-----------------------|---|---|
| Denmark | Method 2 Pre-tax personal income tax gap | Used to calculate a performance objective, but administration is seeking to measure objective bottom up |
| Latin America | Method 1 Corporate tax gap Method 7 Personal tax gap | Broad assessment of relative levels of tax gaps for different taxes |
| New Zealand | Method 5 Total tax gap | None - the administration has considerable reservations about the methodology |
| Sweden | Method 2 Personal tax gap | Reconciliation with bottom up concealed income estimates No plan for further top down work |

3B) Denmark

¹ The survey is based on the publications in the references and correspondence with colleagues in Denmark, New Zealand, Sweden and the USA.

16) In Denmark a pre-tax personal tax gap is estimated as the difference between personal income in the national accounts and income declared in tax returns. Estimating the tax gap pre-tax avoids a highly uncertain calculation of theoretical liability, but there is still considerable annual fluctuation. To reduce fluctuation estimates are only published as a five year moving average.

3C) Latin America

17) In Latin America work on the tax gap has tended to focus on VAT rather than direct taxes. Still, all seven countries covered in a recent survey have used Method 1 to estimate a corporation tax gap from the gross operating surplus in the national accounts, adjusted to allow for income subject to personal income tax. The seven countries have also estimated personal income tax gaps through Method 7 surveys.

18) Unlike Denmark and the UK, where the tax gap is estimated each year as a performance measure, the Latin American countries use tax gap estimates for broad comparisons between different taxes

19) Latin America is of limited relevance to the UK. Tax gap estimates used to assess the relative levels of gaps for different taxes require less precision than performance measures.

3D) New Zealand

20) In 1999 New Zealand commissioned a Method 5 latent variable macro study to estimate the tax gap, but shortly later decided not to estimate a tax gap at all. The reason for not using top down methods is that they lack reliability and do not indicate where the tax gap exists. A measure that fails to indicate where the tax gap exists is of no use for decisions on targeting compliance activity.

3E) Sweden

21) In 2006 Sweden made experimental use of Method 2, estimating under-declared personal income from the national accounts discrepancy between household expenditure and income. Sweden calculated theoretical liability, but the calculation was subject to a margin of error of plus or minus 10 per cent. For comparison with bottom up estimates under-declared income was used.

3F) Other countries

22) Comprehensive information on countries that do not appear in Table 2 is lacking. Yet, tax administrations more closely comparable to HMRC, such as the IRS in the USA, have never used top down methods to estimate entire direct tax gaps.² Perhaps, the main reason top down methods are not used is a widespread view that there are no reliable estimates of under-declared income. Most administrations focus on identifying and assessing risk factors and prioritising compliance resources to areas of highest risk. Top down estimates are of no value for decisions on compliance priorities.

² Australia, Canada and New Zealand have decided not to estimate tax gaps by any method.

4) Applicability of Top Down Methods to the UK

4A) Method 1, Calculation from national accounts income data

23) Even where National accounts are independent of the tax administration, Method 1 may not be applicable. In the USA the Bureau of Economic Affairs until recently regularly reconciled its personal income data with IRS data, but concluded that the unexplained discrepancy was “not a proper measure of non-compliance.” Method 1 cannot be applied to UK national accounts data, which depends on HMRC.

4B) Method 2, Discrepancy in measures of GDP

24) Method 2 can be used where Method 1 is not applicable. The ‘Initial Residual Difference’ (IRD) between expenditure and income measures of GDP has been used as a measure of the shadow economy.³

25) The IRD in the UK was measured as negative in the mid-1980s. This suggests that fluctuations in the underlying statistics were larger than the shadow economy. While, after later revisions, the IRD in the mid-1980s is no longer negative, fluctuations are still large relative to estimates of the shadow economy and the IRD cannot even provide an indication of trends in the shadow economy.

4C) Method 3 to 5, Macro model methods

26) Macro model methods, which are considered in the Appendix, are of questionable reliability.

4D) Method 6, Discrepancy in labour force

27) Discrepancies in labour force measures are widely used to estimate the number of illegal workers and to ensure comprehensiveness in national accounts. The idea is that household surveys give all workers while business surveys only give legal workers. The difference in survey results represents the number of illegal workers.

28) Method 6 generally gives no information on ‘moonlighters’, who do not pay tax in one employment, while paying tax in another, or on people paying tax on only part of the income from a single employment. Estimates of the number of illegal workers are even of limited value in looking at the tax gap due to ‘ghosts’, who work without paying any tax. Some illegal workers pay tax and are not ‘ghosts’ while some ‘ghosts’ would be working legally if they paid tax. Further, an estimate of the tax gap due to ‘ghosts’ also requires information on their average earnings.

4E) Method 7, Direct surveys

29) A Method 7 study by the Rockwool Foundation of Denmark in 2003 is currently used by HMRC to estimate the earnings of ‘moonlighters’. However,

³ The shadow economy includes income from illegal production, such as drug smuggling, as well as income from underground production, which corresponds with under-declared income. The inclusion of illegal production is a reason for not using shadow economy estimates for tax gap work, but this Paper focuses on other reasons discussed later.

a 2007 pilot survey for HMRC indicated that a full study was unlikely to give useful information on 'ghosts' and 'moonlighters'.

30) The design of the pilot survey paid insufficient attention to work on questionnaire design by the Rockwool Foundation, Netherlands Statistics and the European Commission DG for Employment and Social Affairs. A gradual approach, first asking less sensitive questions, such as on opportunities to earn extra money in the interviewee's type of work, produces more frank answers to sensitive 'core' questions about undeclared income than the direct approach of the pilot survey.

31) While direct surveys of households can potentially give valuable information on under-declared income, they are not without problems. Tax evaders may not agree to take part and, where they do, may not give accurate information on income that they have deliberately concealed. The design of survey questionnaires, and of advance letters, is crucial in addressing these problems.

4F) Method 8, Reported and inferred income

32) Method 8 first estimates the marginal propensities of the employed and self-employed to consume food from survey results. It then uses the difference in marginal propensities to infer self-employed concealed income.

33) HMRC carried out its own Method 8 work in 2001 and 2005. The results were a check on findings from random enquiries and were also valuable in identifying employments where the tax gap was greatest.

34) Methods 7 and 8 share the difficulty of all top down methods in calculating a tax gap from concealed income. If possible, data matching with HMRC records, which could be achieved without jeopardising taxpayer confidentiality, potentially overcomes this difficulty. National insurance numbers of individuals of interest for concealed income could potentially be used in a booster to the ONS Living Costs and Food survey with the main sample a control group.

5) Conclusions on Entire Direct Tax Gaps

5A) Tax administration experience

35) Experience in Denmark and Sweden shows that the uncertainty of theoretical liability is a problem for direct tax gaps (see paragraphs 16) and 21). Denmark avoids the uncertainty by estimating only a pre-tax tax gap. When Sweden calculated theoretical liability, the margin of error, 10 per cent, was so large as to cast doubt on the value of the calculation.

36) Tax administrations similar to HMRC do not generally estimate entire tax gaps by top down methods. Even in Denmark, which is an exception, the administration would prefer a performance measure calculated bottom up.

5B) National accounts methods

Method 1 cannot be applied to the UK because the UK national accounts depend on HMRC information. While the UK national accounts identify an Initial Residual (IRD) that can be used for Method 2, large fluctuations in the IRD relative to estimates of the shadow economy mean that it is unsuitable as a measure of the shadow economy.

37) The dependence of the national accounts on HMRC information means that the Office for National Statistics (ONS) and HMRC have a common interest in under-declared income. Estimates are required to ensure the comprehensiveness of the national accounts as well as for tax gap purposes.

5C) Macro model methods

38) The conclusion from the discussion in the Appendix is that macro model methods are insufficiently reliable for tax gap work. This conclusion is very much in line with a declaration by the world's statistical authorities.⁴

Declaration by the world's statistical authorities

"Unofficial estimates [of the shadow economy] are often based on macro economic models. ... The OECD-ILO-IMF-CIS manual on measuring the non-observed economy rejects such 'macro-model' methods because these methods suffer from serious problems that cast doubt on their utility for any purpose in which accuracy is important. In particular, they are completely unsuitable for use in compiling the national accounts."

5D) Micro Methods

39) The Method 7 and 8 Micro methods, direct surveys, and reported and inferred income, can potentially support the estimation of some elements of the personal tax gap. Yet, they do not enable estimates of entire direct tax gaps to be produced.

⁴ Declaration of the ISWGNA (2006). The members of the ISWGNA are the European Commission (Eurostat), the International Monetary Fund, the Organisation for Economic Co-operation and Development, the United Nations and the World Bank.

APPENDIX: Macro Model Methods

A) Method 3, Monetary methods

- 1) Monetary methods assume that the shadow economy can be traced from monetary statistics. The part of the demand for cash that cannot be explained by conventional factors is attributed to the shadow economy.
- 2) These methods only identify changes in indicators, such as cash demand, unexplained by conventional factors. They rely on assumptions to estimate the size of the shadow economy. First, there is an assumption to estimate the change in the shadow economy from the unexplained change in the indicator. Then, there is another assumption to estimate the size of the shadow economy from the change in the shadow economy.
- 3) The assumption generally made to estimate the change in the shadow economy, an equal velocity of circulation of cash in the shadow and observed economies, is justified only by ignorance.⁵ However, if, as seems probable, the hoarding of cash in the shadow economy significantly lowers velocity, the assumption causes serious over-estimates. While monetary method studies generally fail to include any sensitivity analysis, research that look critically at these studies finds that their assumptions determine their results.⁶

B) Other single indicator methods

- 4) In addition to monetary statistics, there are other single indicator methods based on: different measures of electricity consumption; labour force data such as multiple job holding and the number of self-employed; and the number of very small enterprises. These methods rely on assumptions as much as the monetary methods. For example, to estimate changes in the shadow economy the electricity consumption methods assume relative electricity consumption in the shadow and observed economies, just as the monetary methods assume the relative velocity of circulation.

C) Latent variable method

- 5) The latent variable method uses a 'multiple indicator multiple causes' (MIMIC) model or a dynamic variation (a DYMIMIC) model. This method is designed for true latent variables, such as intelligence, which have no natural units of measurement. The shadow economy, however, has the same units of measurement as the observed economy. At best the results of the latent variable method give estimates of changes in the shadow economy.
- 6) To estimate the level of the shadow economy the latent variable method relies on the results of other methods. Yet, these methods effectively assume the size of the economy by unjustified assumptions about a base year.⁷

⁵ "Without knowledge about the velocity of circulation in the shadow economy, one has to accept the assumption of an 'equal' money velocity" (Schneider et al, 2010, repeating earlier publications by Schneider back to 2000).

⁶ Breusch (2005a), Breusch (2005b) and OECD (2002).

⁷ Even the initial assumption that the shadow economy can be traced in cash demand is questionable, at least for the UK (Franklin, 2010).

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