

Minding the tax gap at the heart of macroeconomic policy

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1. Abstract

Much macroeconomic thinking has been reappraised since the global financial crisis of 2008. However, little attention has yet been given to the ways in which the macroeconomy might be managed given that many governments have chosen to constrain their own ability to intervene in the economies of their jurisdictions by prioritising balanced budgets as the goal of economic policy. Such policy necessarily put tax at the heart of macroeconomic practice even if tax is notably absent from much of its theoretical discussion. This paper shows that given the constraints on their own actions that many governments have adopted a key remaining policy option available to them to raise government spending would be reducing their tax gaps. Despite the significance of this issue, a review of tax gap methodologies reveals that such gaps are rarely measured. Our article suggests that this is because at present tax gap analyses are mainly seen as microeconomic tools to be used for the appraisal of the efficiency of tax authorities in collecting taxes due instead of as a tool of macroeconomic management indicative of the potential effectiveness of fiscal economic management. To support this argument the tax gap is explored anew in this paper within the framework of national income accounting. Using this framework it is suggested that there are five potential levels, or tiers, at which the tax gap can be explored. Broader research using this approach is suggested as a way of creating new policy options for governments facing macroeconomic constraints on their actions.

Key words: Tax, tax gap, tax avoidance, tax evasion, tax compliance, tax tiers, fiscal policy, macro-prudential risk management.

2. Introduction

The global financial crisis is widely recognised to have caught macroeconomics unawares. Maybe Professor Robert Lucas, then-president of the American Economics Association, was too widely believed when he claimed in 2003 that the 'macroeconomics in [its] original sense has succeeded: Its central problem of depression prevention has been solved.' (Lucas, 2003). Regardless, as Lord Adair Turner said in 2009 when reviewing the impact of the crisis for the UK Financial Services Authority, all the major assumptions of macroeconomics have been subject to fundamental review since 2008 (Turner, 2009, 39). That review of macroeconomics after the 2008 crisis is still progressing (see, for example, Wren-Lewis, 2018). The stated aim of at least some participants is to make macroeconomics more robust in the future (Blanchard, 2018). That, however, only sets the context in which this paper must be considered. The reality is that since 2010, when the brief post-crisis era of Keynesian reaction came to an end and austerity began (Blyth, 2013), a key issue influencing macroeconomic management in many of the world's major economies is the voluntary constraint that politicians chose to adopt by implementing policy that identified balanced government budgets as the primary goal of post-crash economic policy.

As a matter of fact, that constraint has not resulted in a reduction in actual government spending¹. What it has, however, done is result in significantly reduced rates of growth and productivity (Lewis, 2018 and IMF²) whilst delivering reductions in average deficits as a proportion of GDP³. The consequence has been considerable pressure on governments of all complexions from International Financial Institutions who are concerned at the lack of investment globally (IMF, 2014b) and domestic pressure for the relaxation of austerity (Davies, 2017). This does however pose problems for governments that have sold the idea of balanced budgets as the objective of macro economic policy whilst also promising not to raise taxes or even reduce them, as many have done (Blyth, 2013). These two 'voluntary' political constraints (balanced budgets and no tax rises) mean that such governments' range of apparently available actions to combat the inflation that might arise from increasing public spending without matching additional tax revenues appears to be very limited. This problem is exacerbated by the decision of those governments that have made use of QE to usually limit the uses to which it may be put to the purchase of government bonds from private sector financial institutions with the primary aim of lowering the yield on those bonds to encourage

¹ See Murphy and Palan (2015), who report a trend confirmed by the OECD who, using national accounts for 2009 to 2015 show that average spend per capita rose from \$US16.36 to US\$18.5 over that period with the only states where spending was approximately flat (bit still rising) being the UK and USA. Source: <https://data.oecd.org/gga/general-government-spending.htm> accessed 27 April 2018

² IMF data shows that in advanced economies average growth rates from 1980 to 2007 were 2.8% per annum, on average. From 2011 to 2017, once the relative chaos of the immediate crash period was over the trend was for increasing growth from 1.3% pa to 2.1% pa, which is much lower than the pre-crash norm. Source http://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOORLD accessed 27 April 2018 and authors' calculations

³ OECD data shows that deficits as a percentage of GDP peaked at an average of 6.6% amongst EU member states in 2009 and declined to 1.7% of GDP on average in 2017. Source <https://data.oecd.org/gga/general-government-deficit.htm> accessed 27 April 2018 and authors' calculations.

those selling these assets to use the proceeds to buy assets with a higher yield instead, like company shares and bonds rather than to use quantitative easing to create new funds available for a government to invest itself (Bank of England, 2018)

This paper explores the conundrums that these constraints create and their impact on the role of tax in macroeconomic thinking. In doing so it suggests that because governments aspire not to run deficits and to instead balance their budgets, tax has, by necessity, become a key element in the practice of macroeconomic planning even though this is not reflected in much academic literature on the issue. The paper seeks to readdress this issue in a number of ways. Firstly it considers how tax fits into macroeconomics, using national income accounting as its entry point. Second, it then demonstrates that it is possible to use that framework to explore the limitations that these constraints impose on the actions governments might take if they wish to increase their spending within such constraints. It does this by showing that tackling the tax gap gives them the room for manoeuvre to achieve that increase in spending. Third, it looks at the current understanding of tax gaps by way of a review of current literature available on that issue. As this reveals, their estimation is restricted to relatively few states, many of whom prepare them sporadically, and usually only for VAT purposes. In most cases the only intended use for this data is to assess the efficiency of the domestic tax authority. The fourth part of the paper suggests that this might be too limited an aspiration for tax gap data: by developing the model for tax within national income accounting it is suggested that there might be new ways to understand tax gaps. This novel approach suggests that there are at least five tiers of tax gap and that policy may be created at each tier, but that cognisance is required of potential spillovers between each level. The paper suggests that further empirical research on the resulting hypothesis would be of benefit.

3. Macroeconomics and tax gaps

Tax is deeply embedded in macroeconomic theory. We know that national income accounting does, in one of the formulations of GDP, suggest that:

$$Y = C + S + T$$

Where

Y = GDP

C = End user consumer expenditure

S = Savings

T = Net taxation paid

All figures are measured over a defined period.

It is also, of course, commonplace to define GDP in the following way:

$$Y = C + G + I + (X-P)$$

Where:

G = Government expenditure

I = Business investment

X = Exports

P = Imports⁴

The most modest of rearrangements results in the following, well known, formulation:

$$(G-T) = (S-I) - (X-M)$$

What Sandbu makes clear is that since 2010 the policy decision that has been taken across much of Europe that:

$$(G - T) \leq 0$$

In other words, governments sought to spend less than their taxation revenues so that their net borrowing (B) is reduced over the period for which measurement is made. The question remains why governments chose to self-impose this macroeconomic constraint upon their capacity to engage in their economies through the use of fiscal policy when their ability to engage using monetary policy was also constrained by interest rates being almost universally at or near the zero bound.

The purpose of this paper is not to explore why this voluntary constraint has been imposed. Instead it accepts that this choice has been made either because of a belief that Ricardian equivalence requires it, or because the work of Reinhart and Rogoff (2010) which suggested that there are optimal limits to the scale of government debt to GDP) has been taken literally, even if there is controversy over that claim (Herndon, Ash and Pollin, 2014). The question we seek to address is how governments might, if they wish, increase their spending despite this belief when macroeconomic theory does not at present seem to provide any answer to this question. The policy demand of politicians is for a mechanism that can let them spend more to appease their electorates whilst living within the imposed constraints of fiscal rectitude. It is our suggestion that addressing the tax gap can contribute to solving this dilemma in modern macroeconomics, both in theory and practice, and deliver the growth in spending that many politicians desire.

4. Spend and tax: the linkage that macroeconomic policy requires at present

To express this more formally, as a matter of fact, and despite the stated goals of most governments' macroeconomic policy, government spending has increased in most (but not all) countries since the global financial crisis. This means that in practice in most cases:

⁴ P has been used to allow M to be used to denote Money later in the analysis

$$G - T > 0$$

This has in turn meant that recourse has been made to both borrowing and, in some (but by no means all) countries, to quantitative easing to fund deficits. As a result, it is suggested that as a matter of fact the following has actually held true:

$$(G - T) = \Delta M + \Delta B$$

Where

B = government borrowing

and if t is the time period then:

$\Delta B = B_{(t)} - B_{(t-1)}$ or the change in the level of government borrowing in period t

and likewise if:

M = the quantum of the sums expended on quantitative easing and other mechanisms of central government money creation, then

$\Delta M = M_{(t)} - M_{(t-1)}$ is the change in the level of government created money in a period.

However, policy makers have decided that as a matter of choice:

$$\Delta B \rightarrow 0$$

and simultaneously

$$\Delta M \rightarrow 0$$

meaning that if it is desired that:

$$\Delta G > 1$$

then it must follow that:

$$\Delta T > 1$$

In other words, it has been decided that any increase in government spending must be financed by additional tax revenues. The consequence is that tax is a part of current practical macroeconomic debate whether or not much of the non-heterodox literature on the issue suggests that this is really necessarily the case, or not.

The issue is complicated still further by other politically imposed constraints. For example, under the terms of the Stability and Growth Pact between European Union member statesⁱ it has been agreed that the a government's deficit in any period shall be less than 3 per cent of its GDP, or, at least within the European Union:

$$(G - T) \leq 0.03Y$$

and that national debt shall be less than 60% of GDP i.e. again within the European Union:

$$B \leq 0.6Y$$

Very clearly this brings tax into macroeconomic debate,

That is furthermore true because those central banks that have made use of quantitative easing have also deliberately constrained its use. As the Bank of England noted in 2014 (McLeay, Radia and Thomas, 2014), it is only willing to use its power to create new money using quantitative easing when its ability to control inflation through monetary policy is constrained at the zero bound, and not for any other purpose. What this means is that in times of inflation it has been decided that, whether it is necessary or not:

$$\Delta M = 0$$

Finally, to add to this long list of constraints that have been adopted by governments, whether on an evidence base or not, there is a belief amongst many politicians that tax rates cannot be raised and that new tax bases are not available for exploitation within most economies. The consequence can also be formally stated. If:

$$T_n = T_b \times T_r$$

and:

T_n = net tax yield

T_b = net tax base

T_r = effective tax rate

then if T_r is assumed to be a constant the only way to increase T_n (which is a term identical to T in national income accounting in that both represent net receipts of tax by a government during a period) must be to increase T_b , which is the net tax base for those taxes that already exist. In practice this can only be achieved by improving tax collection, or to use the terminology now commonly used by tax authorities, by reducing the tax gap.

5. The tax gap - the current state of play

There is at present largely consistent opinion across academic literature and amongst many national and regional tax authorities as to how the tax gap might be defined, although subtle

and significant differences remain. Mazur and Plumely (2007), for example, define the tax gap as the difference between the amount of tax that should be imposed by the tax code of a country and the amount that is actually reported and paid on timely filed returns. The UK's HM Revenue & Customs in similar vein defines the tax gap as "the difference between the amount of tax that should, in theory, be collected by HMRC, against what is actually collected." (HMRC, 2016, 3). The US's Internal Revenue Service ('IRS') adds a twist by defining the tax gap as "the difference between the tax that taxpayers should pay and what they actually pay on a timely basis" (IRS 2016). The language is similar to the one adopted by the HMRC with a slight but important difference: the IRS introduces the notion of 'timely payment' as a factor in the consideration of the tax gap. The International Monetary Fund's ('IMF') shares core aspects of the definitions above, but adds an important element to understanding:

A commonly used definition of the tax gap is the difference between current and potential collections. Under this definition, the term "tax gap" tends to describe the difference between the actual tax collections and the tax collections a revenue administration should collect given the current policy framework (potential collections). (IMF 2013,11)

In doing so the IMF suggest that there are two aspects to the tax gap requiring consideration. One is the effect of taxpayer-noncompliance on tax revenue, a notion that is captured in the definitions above. The other aspect is the impact that policy choices made by legislators and regulators might have had in reducing available tax revenues. These two different aspects of tax gap are labelled by the IMF as a) the 'compliance gap' caused by non-payment that results from noncompliance with tax rules, and b) the 'policy gap', which referred to tax laws granting exemptions, tax liability deferrals or preferential tax rates (IMF 2013,11).

The European Commission Director General of Taxation (ECDGT) who commissions the annual study of the EU's VAT gap (EC, 2017) explicitly embraces the IMF's concept of the 'tax policy gap', noting that:

[T]he Policy Gap captures the effects of applying multiple rates and exemptions on the theoretical revenue that could be levied in a given VAT system. In other words, the Policy Gap is an indicator of the additional VAT revenue that a Member State could theoretically, i.e. in case of perfect tax compliance, generate if it applied a uniform VAT rate on all goods and services (EC, 2016a, 51).

As is noted below, the ECDGT provides estimates of the policy gap with regard to value added tax ('VAT'). The ECDGT also extend their work to the compliance gap for that tax. These two international institutions apart it would appear that tax policy gaps are not measured: no national tax authority appears to appraise this issue in any effective way at present. This may well be because many have yet to estimate their tax compliance gaps. They may also be discouraged from doing so by academic opinion on the worth of measuring tax gaps: Gemmell and Hasseldine (2012: 17) noted, for example, that "There are few, if any, reliable methods of measuring direct tax gaps as conventionally defined." The OECD when offering another

succinct definition of the tax gap as “the difference between tax due and tax collected” (OECD, 2017, 182) appear to, at least in part, share this view when saying:

While the tax gap has intuitive attraction for both the public and political representatives, it is a difficult concept to define precisely. Estimation is also difficult as much of the tax gap is either deliberately concealed from view and/or data may be difficult to find. The measurement and publishing of tax gaps should therefore be navigated and communicated carefully. Limitations of tax gap estimates mean they are not a good basis for explicit performance targets (OECD, 2017, 181).

In so doing the OECD appear to endorse three opinions. The first is that tax gap appraisal is about the measurement of the efficiency of tax administrations. The second is that the ‘bottom-up’ approaches currently used by most tax authorities for this purpose are not especially suited to this task. The third is that tax gap methodology does not extend to policy gaps.

What is clear from this brief review is that whilst there is a relatively high degree of uniformity of opinion on what constitutes tax gaps, there is discrepancy with regards to the significance of time in their estimation and on the usefulness and significance of tax policy gaps. That said, there seems to be agreement on there being two possible methods of estimation of the tax gap, one employing a ‘bottom-up’ approach, while the other is ‘top-down’. For example, the IMF note that:

The HMRC [tax gap] program follows a pattern of employing ‘bottom-up’ based estimates for the direct tax gaps, and ‘top-down’ estimates for the indirect tax gaps. Both approaches are applied consistently with good international practices (IMF 2013, 9).

The OECD reflects the same view in 2017, suggesting:

The use of tax gap measurements is becoming more common, especially for VAT, as jurisdictions increasingly see the benefits of having high level estimates of non-compliance within the tax system. Top-down methodologies that use national accounts data represent a relatively low-cost means of producing such estimates. These approaches are often associated, though, with a fairly high degree of uncertainty and therefore are of limited operational use. Bottom-up methodologies that include information from random audits, on the other hand, can provide a more accurate picture of lost revenue across segments and tax types. (OECD 2017, 62)

In doing so they succinctly express the difference between the two approaches as viewed from the perspective of the tax administration. HMRC’s permanent secretary has explained the difference as follows (Troup, 2015):

HMRC use a mixture of “top-down” and “bottom-up” methods to measure the various constituent tax gaps, which make up the overall figure. We tend to use top-down

methods – which compare consumption expenditure data with tax receipts – for indirect taxes, while using bottom-up procedures – building from departmental operational data and management information – for direct taxes.

A top-down approach as described here uses macroeconomic data to estimate the potential tax base within an economy. So, taking VAT as an example, the likely VAT due on each part of consumption within national income can be estimated. Allowance is then made for the items exempted from charge as a result of policy decisions as well as those allowances and reliefs granted either for reasons of tax administrative ease or to influence taxpayer behaviour to come to an actual tax base, from which a total theoretical VAT yield can be estimated. This is described as the VAT Total Tax Liability ('VTTL') (EC, 2017, 8). This is then compared with the actual yield to suggest a compliance tax gap in a 'top down' approach.

VAT gap analysis of this sort is dependent upon the existence of statistics of sufficient quality on the size of the tax base, derived from sources other than taxpayer records (IMF 2017, 33). The IMF appears to be satisfied with the quality of statistics available in the UK but the fact that there have been concerns on this issue within the EU is apparent from the fact that the EC's VAT gap estimates excluded Cyprus until 2017 because of a lack of reliable national statistics (EC, 2017, 8).

In contrast a "bottom-up" approach uses an audit sample of submitted tax returns to estimate errors found within them and then extrapolates this error rate across the whole population of submitted returns. However the method leaves this approach vulnerable to estimates of tax not declared at all on tax returns not submitted by persons whose identity may not even be known, and it is also not good at capturing tax not paid by relatively small groups in society, such as the very wealthy. For this reason HMRC say in their note on 'bottom-up methodologies':

Different methods and data sources are used, depending on best available, to estimate how much tax is lost within each area. HMRC uses internal data and operational knowledge to identify areas of potential tax loss (HMRC, 2017a, 13).

The IMF notes that there is room for improvement which would enhance HM Revenue & Customs' analysis of the tax gap, including the construction of bottom-up estimates for the VAT gap in order to compare results from top-down estimates (IMF 2013, 35). Further, the IMF warns that any tax gap estimates, and especially those based on bottom-up methods, should not be used as the sole basis for inference about taxpayer compliance behaviour (IMF 2013, 44). In so doing the IMF endorses the two methodologies but suggests they should be used simultaneously and reconciled when possible, and not be considered in isolation. What the IMF added was that 'bottom-up' approaches offer very limited explanation of tax policy gaps because the method cannot be extended to consider them. As they note:

In general top-down models can be easily extended to estimate the policy gap. (IMF, 2013, 48)

They added:

As top down models generally involve creating an estimate of potential revenue by modelling how the current tax applies to the tax base, modelling the policy gap would require replacing the current tax structure in the model with some normative version of the tax structure. (ibid)

It is this normative approach that is referred to later in this paper.

With this being noted it is important to note that the IMF's advice appears to have been ignored: although the tax gap reporting by the UK's HMRC is the most comprehensive such exercise undertaken by any country in the world (HMRC, 2017a, 16) 'bottom-up' methods of estimation are still relied on for all taxes but VAT. In addition, the estimates of tax avoidance and evasion within personal income tax, national insurance contributions and capital gains tax are all described by HMRC as being based on 'developing methodologies' (HMRC, 2017a, 16) whilst the estimates for the tax gaps for stamp duty reserve tax, inheritance tax, petroleum revenue tax, environmental taxes and insurance premium tax are described as 'illustrative indicators for gaps with no direct measure' (ibid). If HMRC stands at the forefront of tax gap methodology, their present lack of appropriate methodologies to estimate tax avoidance and evasion in key taxes suggests there is room for progress, whilst on tax policy, with the notable exception of the ECDGT's work on VAT (EC, 2017) tax policy gaps remain largely ignored.

This is also the case within much academic literature on the subject. Some such literature fits firmly into the framework used by tax and regulatory authorities and seeks to improve the methodologies used by them; for example, Hamilton (2015) suggests there is a need to improve sample selection used in the bottom-up methods of tax gap estimation. Others are critical of specific methods of official tax gap estimation (Slemrod and Johns, 2010), whilst still using them as a basis for analysis as the only ones available at present (Slemrod, 2007). Yet others argue that all current and conventional tax gap estimates are unreliable as they omit behavioural responses: Gemmell and Hasseldine (2012), for example, make clear their lack of faith into current methodologies.

The strategic significance of tax gap data is, however, reflected in another body of literature which uses the concept of the shadow economy as the basis for the assessment of tax gaps (Christie & Holzner, 2006; Murphy, 2012; Williams & Nadin, 2012). This work appears to only be replicated by the Finnish government amongst regulatory and tax agencies (FTA, 2016). The Finnish tax authority's use of shadow economy data in this way is sufficiently unusual to mean that neither the OECD nor the EC consider the country in the list of those countries preparing tax gap estimates. This might be because doing so would open up a question of difference of opinion on the potential behavioural response of those who would be targeted if effort was made to limit the size of the shadow economy, meaning that the loss arising is itself hard to predict (Schneider, 2013).

Civil society activists (for example Henry, 2012, Murphy, 2006, 2008, 2011, 2012 and 2014, and Cobham and Jansky, 2015) have also been involved in estimating tax gaps, although most

have focussed on international and not national dimensions of this issue. Zucman (2015) has done the same in academic literature. These civil society surveys do share in common with the estimates prepared by tax authorities a focus on tax lost as an issue in its own right.

The broader academic literature on the issue makes it clear that a wider dimension exists, partly as a result of the high rates of non-compliance that are repeatedly found. Kleven et al. (2011) find that almost 45% of those self-employed in Denmark routinely avoid taxes, broadly replicating the findings of Advani (2017, 2) who suggested, based on HMRC audit data, that 36% of self-assessment taxpayers who were randomly audited included errors in their tax returns that resulted in an average underpayment of £2,320, a sum equivalent to 32% of the average initial tax amount declared. Advani found that the rate of non-compliance did not vary greatly with income, but it is likely that a random audit programme would not reveal the behaviour of the wealthiest. That the ratio of aggregate misreported income to true income is generally higher with increasing income is found in several studies (Bishop, Formby, and Lambert 2000; Johns and Slemrod 2010; Zucman et al. 2017). There are suggestions that this is partially the case because high incomes are often received in a form more prone to misreporting (Johns and Slemrod 2010). It has also been mooted that this trend may be more than just a coincidence and that in fact financial institutions, for example in Switzerland, could specifically cater to the tax management needs of higher earners (Zucman et al. 2017) and that they might in the process assist tax non-compliance by those using their services.

This issue of non-compliance is also addressed by Zucman (2013), who estimates that approximately 10% of the global GDP is held in tax havens. Whilst much of this activity is perfectly legal, many instances are not: for example, two reports by the United States Senate in 2008 and in 2014 found that before 2009 between 85 – 95% of accounts owned by U.S. entities in Switzerland at Credit Suisse or UBS were left undeclared (Zucman et al. 2017). It is likely that domestically based tax gap estimates do not properly assess these losses. Roussille (2015) found similar results for European accounts in Switzerland: between 90% and then 80% remained undeclared before 2010 and before 2013 respectively.

Many of the above cited studies also focus upon the impact of tax non-compliance on levels of inequality. Zucman et al. (2017) argue that inequality should no longer simply be measured by tax data because of its lack of reliability: they suggest that previous studies based on tax data may significantly underestimate the actual levels of wealth concentration, the rise in the concentration of wealth since the 1970s, and as a result the levels of inequality.

Of significance for this paper is that what this work on shadow economies, tax havens, international tax gaps and inequality all make clear is that tax gap data has a much greater purpose than simply assisting assessment of the efficiency of tax authorities. The implication is that the tax policy gap has a role in appraising macroeconomic policy, and that the tax compliance gap is a measure of the effectiveness of a government in delivering this policy.

6. Potential developments in tax gap methodologies

If, as the IMF have noted, calculation of a tax policy gap assumes the existence of a normative version of the tax structure of a jurisdiction (IMF, 2013, 48), questions need to be posed about a government's capacity to engage through taxation with the economy that it seeks to manage through its fiscal policy. A normative structure of this type requires more extensive investigation of the tax gap than most states have shown willing to undertake. For example, it requires a review of which of the potentially available tax bases are to be taxed, at what rates, and with what permissible variations delivered by way of higher and lower rates, allowances and reliefs. Issues that are at the heart of taxation policy do, as a result, move within the scope of this type of tax gap analysis.

There are good reasons to suggest that considering this linkage is appropriate, not least because many of the measures introduced by the OECD Base Erosion and Profits Shifting process (OECD, 2015b) have made taxation of income and wealth previously considered beyond the reach of national tax authorities well within their scope. For example wealth taxes are now possible because automatic information exchange from tax havens, assisted by the OECD Convention on Mutual Administrative Assistance in Tax Matters (OECD, 2018) should mean that this tax base can no longer escapes taxation, and if it does its absence should now be considered to be part of the tax gap. In addition, the IMF's consideration of tax gaps also makes clear that tax spends i.e. the amount and type of tax reliefs and allowances, is also a tax gap concern when considered on a top down basis (IMF, 2013). The IMF also considered the possibility of using national income accounting data as the basis for top down tax gap estimation, at last for corporation tax. It would now appear to be appropriate to reconsider their apparent hesitation at the time for extending that suggestion to other taxes, barring VAT, and propose that national income accounting should be the basis for considering a much broader range of issues relating to the tax gap.

When doing so, and taking into consideration the discussion in part 3 of this paper, attention has to be given to the expression T (that can also be expressed as T_n , as previously noted) in national income accounting. This is, as used in that accounting, a measure of cash flow. However, if the IMF are right to suggest that there are both tax policy and tax compliance gaps it is possible to restate that net tax cash flow as follows:

$$T = T_t - T_f - T_c$$

Where T is net cash receipts in a period, T_t is the total potential tax due on the tax base in that same period, T_f is the net tax foregone as a result of policy decisions and T_c is the tax compliance gap. It is important to note that each of these can in turn be expanded, so that the following may be stated:

$$T_t = (T_b \times T_r)$$

Where T_b is the sum of tax bases and T_r the standard tax rate for those bases, It then follows that:

$$T_f = T_p + T_s$$

Where T_p represents the value of tax bases not taxed as a matter of policy (e.g. wealth) and T_s represents the value of tax spends i.e. those allowances, reliefs and varying tax rates granted within bases that are taxed to encourage varying taxpayer behaviours. This then suggests:

$$T_c = T_e + T_a + T_u$$

Where T_e is the part of the tax compliance gap resulting from tax evasion; T_a is the part resulting from tax avoidance and T_u is the part of the tax compliance gap resulting from non-payment of tax debts, or unpaid taxes.

Substituting this understanding in the equation for G:

$$G = \Delta B + \Delta M + ((T_b \times T_r) - T_p - T_s - T_e - T_a - T_u)$$

We believe that this expanded explanation for G offers new bases for interpretation of both the tax gap and the role of fiscal policy by making clear the relationship between borrowing, changes in the government created money supply and the tax gap and tax revenues in all their varying aspects. What it does also suggest is that there are at least five potential levels, or tiers, at which the tax gap might be explored. It would be simple to suggest that each tier might be represented by one of the variables T_p , T_s , T_e , T_a and T_u in the identity, but we suggest that the reality is a little more complex than that, and explanation is required.

a. The Tier 1 tax gap: Tax foregone

Tax foregone by government choice is the first tier of the tax gap and is made up of T_p and T_s i.e. revenues foregone because the government has chosen not to tax a base and revenues foregone because a government has allowed deductions and reliefs within a tax base. These deductions can be made from all the various tax bases that can be defined in national income accounting (e.g. being based on C, or consumption; W, or wages; R, or interest; and so on, to which other potential bases might be added such as E, to express the value of mineral extraction; F, to indicate the value of financial flows and V, which might indicate net worth, as well as L, which could be a measure of land value).

This tier of the tax gap then estimates the total potential tax base, T_t for each such tax base as a standard, or as the IMF would put it, normative rate (via the sub formulation $(T_b \times T_r)$) as indication of the taxable capacity of the economy, before explicitly making clear the policy decisions taken to forego part of those available bases (as indicated by T_p) as well as that part of the tax take foregone as a result of tax spends through variations in tax rates and the granting of tax allowances and reliefs (T_s).

It is our suggestion that a calculation of the tax foregone gap will be of considerable value at a time when discussion is required within the macroeconomic framework of the political economy on issues such as inequality, management of the environment and negative externalities, and so on, as well as on issues such as the appropriate incentives that are

required to deliver growth. What the consideration of these issues within this identity does do is make clear that tax is not just about raising revenue: it is also about redistribution, repricing market failure and the delivery of fiscal policy (Murphy, 2015, 66). The explicit recognition of this fact would transform tax debate.

b. The Tier 2 tax gap: tax spends and their abuse

The second tier of tax gap covers a range of issues. In effect it represents tax spend i.e. those sums that the government decides not to charge tax upon even though it has considered the tax base to which they relate to be within the scope of tax itself.

Some of these tax spends are relatively easy to explain. They include, for example, the granting of an annual tax-free sum to each person subject to an income tax, social security or capital gains tax system. Likewise, the relief from taxes charged on gifts when the total sum given away is less than a pre-agreed limit meets this criterion. Others are more complex. Some tax spends substitute for expenses not considered tax allowable when computing a person's income from trading, for example. So, capital allowances substitute for the depreciation charges that a business might include in its financial statements. To complicate that same example a little further, some of those allowances may represent spending that has never actually been incurred: many states do now, for instance, weight expenditure on research and development so that more relief for expenditure is given as an offset for tax purposes than has actually been incurred. The reason is readily apparent: the government in question wishes to incentivise certain types of activity. It should be noted that the reverse can also be true. So, for example, some expenses (such as business entertaining costs) are simply not allowed as a business tax deduction in certain jurisdictions even if legitimately accounted for in a set of financial statements, and higher rates of tax are sometimes charged on activities considered to impose a cost to society such as some aspects of banking and rental income activity. This tier of the tax gap does, then, represent the use by a government of its tax system to both encourage and disincentive economic activity.

There are further dimensions to this. For example, the decision to bring income arising outside a jurisdiction within the scope of tax within it is a contentious issue. Whilst it was once commonplace for companies to be taxed on their worldwide income within the jurisdiction in which they are tax resident this is no longer commonly the case. The move towards what is called territorial taxation of companies has instead become commonplace over the last fifteen or so years, with the USA being one of the last to come into line with the Trump tax reforms. Corporate taxation does now sharply contrast with the taxation of individuals within most states as a result, because the taxation of natural persons on their worldwide income remains commonplace in most countries. This then gives rise to the possibility of arbitrage of the opportunities that such differing policies create. This is considered as a component in the tier 4 tax gap, noted below.

c. The Tier 3 tax gap: tax evasion

The final three tiers of the tax gap could be argued to relate to tax evasion, avoidance and tax paid late or not at all, but as useful as those three measures are (and this is indisputable when considering the data required for management purposes by tax authorities), such an approach is too simplistic to be really useful for the management of fiscal policy. There may also be practical problems in some cases in distinguishing each of these gaps. For example, the boundary between tax avoidance and tax evasion is notoriously fluid whilst it is entirely possible that the deliberate insolvency of a company to avoid tax payment might, in effect, be tax evasion even if it has a different superficial form. A more nuanced approach is, therefore, required.

We therefore suggest that whilst the third tier of the tax gap must estimate the cost of tax evasion, the existing logic of most of those who have calculated tax gaps, which is to estimate this activity in isolation for each tax without consideration of the consequence for other tax bases, has to be abandoned. Instead this tier of the tax gap must also take into consideration the consequence of tax spillovers as they impact tax evasion. As Baker and Murphy (2017) argue, the limited approach to tax spillover promoted by the IMF (2014a) insufficiently explores the use of this methodology in appraising tax gaps. Our argument here is that spillover methodology is important when estimating tax gaps because it must be appreciated that a tax loss arising in one tax might also indicate a loss in another tax. This will have an impact on the estimation process for losses from tax evasion because, for example and to use accounting logic, if the reporting of turnover is suppressed within a business to evade declaration of a value added tax liability then it follows that, firstly, the suppressed income cannot be reintroduced into other tax declarations (such as those for corporation tax or personal income tax) without the VAT under-declaration being apparent, meaning, secondly, that under-declarations of those other taxes must follow. The most likely other such liabilities that will be understated are personal income tax and social security contributions due on funds implicitly or illicitly passed from a trading entity to its owner as a result of the suppression of trading income for the purposes of increasing the owner's net income, declared or otherwise, but it is also possible that corporation tax liabilities might be suppressed.

This understanding has significant methodological consequences for those engaged in tax gap estimation: it suggests that if a VAT gap can be estimated with reasonable confidence other tax gaps might also be estimated because of the impact that the unrecorded revenue, suppressed to ensure evasion of VAT arises, might have for the purposes of other taxes. In effect, what the tier three analysis might indicate in future work is that where base levels of evasion are shown to exist in indirect taxes this will necessarily establish a benchmark for the overall rate of evasion likely to be prevalent in an economy as a whole that will then require explanation based on data findings. The tier three tax gap does then consider directly calculable tax evasion but, by considering the behavioural aspects of spillover effects can also suggest overall tax compliance rates.

d. The Tier 4 tax gap: tax avoidance

Estimates of the cost of tax avoidance are the focus of tier four risk. Like most estimates of tax evasion prepared to date such data has usually been calculated with regard to individual taxes without consideration of any spillover consequences. There can be occasions when this is appropriate: at this level of the tax gap many transactions are deliberately undertaken in a fashion that the taxpayer knows may not be tax compliant, meaning that the taxpayer is knowingly taking a calculated risk that the form in which the declaration takes place might be wrong but that, on the balance of probabilities, this is a risk worth taking because the prospect of penalty in the form of additional liability is limited, even if the error might become apparent in a manner described by Quentin (2015). Much so-called tax avoidance is of this nature. In these cases the risk of a tax gap is usually inherent within a particular transaction. The chance of spillover effect from that transaction is, therefore, limited and risk can be considered to be contained. Quite specific estimates of this risk can be prepared, most especially if types of avoidance activity can be widely observed within an economy by, for example, assessing the schemes widely used by tax practitioners.

This is not, however, the only type of risk to which tier 4 might relate. As noted above, tax spends, and the policy decisions that give rise to them, also create the possibility that differing policies in different tax bases might be arbitrated to secure a tax advantage. Whether these arise in the form of reduced or deferred tax payments for a taxpayer does not matter: both reduce the net tax receipts of a government and are, therefore, of significance for macroeconomic management. This is another aspect of tax spillovers that (Baker and Murphy, 2017). In this context spillover means that one tax base or spend has consequences either directly or behaviourally on another tax base.

This issue is of some considerable concern: the OECD Base Erosion and Profits Shifting project (OECD, 2015b), which has driven the international tax agenda since 2012, is based on the belief that it is commonplace that at least some part of the tax base that should be recorded in one jurisdiction is in fact recorded in another. That is a widely recognised spillover effect of the problem in determining the appropriate territory in which a taxable source of income might be considered to arise. The issue is not as simple as a matter of location though. This tier of the tax gap has to embrace all aspects of tax behaviour that seek to record income correctly attributable to one party as if it is the income of another for the purpose of securing a tax advantage (which can simply be defined as an overall reduction in the tax liability accruing to the party instigating the conduct giving rise to the misstatement when all factors are taken into consideration, including the effluxion of time). The tier four tax gap is then not just about tax avoidance within a tax base but also about the arbitrage of the tax spends governments create to provide a tax advantage to a taxpayer that no legislator intended that they enjoy, which is what tax avoidance might best be considered to be.

e. The tier 5 tax gap: the weaknesses in tax administration

Baker and Murphy's spill-over methodology suggests a fifth tier of tax risk. Whilst, superficially, this fifth tier of the tax gap is simply about unpaid tax, it should be much more broadly based if it is to be really useful. That is because whilst some non-payment of tax might arise due to genuine insolvency for reasons that have arisen beyond the taxpayer's control,

some also results from the design of the tax system itself, and from the level of administrative resources provided to it. In other words, unpaid tax can indicate a broader issue of concern, which is that the failure to supply sufficient resources to a tax authority, or the failure to provide it with access to the sufficiency of data resources that it might require to undertake its work, can also create considerable tax risk. In effect this tier of the tax gap measures the failure of government to take steps to enforce the law that it enacts, with consequent behavioural risk to the credibility of the tax system as a whole.

This five-tier approach is different from that adopted by those EU countries addressing tax gap issues at present. The difference is essentially one of scope and ambition. HMRC typifies current thinking on this issue when it says that ‘thinking about the tax gap helps the department to understand how non-compliance occurs and how the causes can be addressed.’ (2017a, 3). This paper suggests that the tax gap can assist that process but that it is also something substantially more significant and should be at the core of the whole process of macro-prudential regulation used by a state to assess the systemic risks that it faces both within and beyond its jurisdiction.

5. Conclusion

This paper suggests that the tax gap has a significantly more important role to play in the management of macroeconomies than has previously been afforded to it. As it demonstrates, this is especially true during periods when governments are choosing to constrain the range of interventions that they believe they can undertake in their economies for what appear to be political reasons. In effect, given those constraints it is the case that macroeconomic theory, when expressed in the way that this paper chooses to present it, suggests that it is only by raising tax revenues through tackling the tax gap that governments can hope to comply with the constraints upon their possible courses of action. As a result, it is suggested that there is a new role for the tax gap to play that contrasts considerably with the current purpose its analysis is used for, as a survey of present usage demonstrates. The five-tier approach to the tax gap that the paper proposes does, given the situation that the paper describes, provide a new tool for appraisal of how tax policy can influence macroeconomic wellbeing. Further research into the practicalities of measuring the suggested tax gaps would now seem appropriate as a basis for appraising whether tax gap management can become a key tool in macroprudential management of a stable economy.

References

Advani, A. 2017. *Who does and doesn't pay taxes?* London: Institute for Fiscal Studies Briefing note BN218.

Baker, A and Murphy, R. 2017. *Tax spillover: a new framework*. London, The All Party Parliamentary Group of the House of Commons on Inclusive Growth https://www.inclusivegrowth.co.uk/appg_publications/tax-spillover-new-framework/

Bank of England. 2018. *Quantitative Easing*. London. Available at <https://www.bankofengland.co.uk/monetary-policy/quantitative-easing> accessed 27 April 2018.

Bishop, John A., John P. Formby, and Peter Lambert. 2000. *Redistribution through the Income Tax: The Vertical and Horizontal Effects of Noncompliance and Tax Evasion*. Public Finance Review 28 No. 4 (July 2000): 335-50.

Blanchard, O. 2018. *On the future of macroeconomic models*. Oxford Review of Economic Policy, 2018: Volume 34, Issue 1-2, Spring-Summer 2018 pages 43-54.

Blyth, M. 2013: *Austerity*. Oxford: Oxford University Press.

Christie, E. and Holzner, M. 2006. *What Explains Tax Evasion? An Empirical Assessment based on European Data*. The Vienna Institute for International Economic Studies, Working Paper 40 <http://www.wiwi.ac.at/pdf/wp40.pdf>

Cobham, A and Jansky, P. 2015. *Measuring Misalignment: the Location of US Multinationals' Economic Activity Versus the Location of their Profits*. Brighton: International Centre for Tax and Development Working Paper 42 <http://www.ictd.ac/publication/2-working-papers/91-measuring-misalignment-the-location-of-us-multinationals-economic-activity-versus-the-location-of-their-profits>

Davies, G. 2017. *Hammond's narrow path through Brexit and austerity*. London: The Financial Times, June 19 2017. Available at <https://www.ft.com/content/91fc4aa8-a994-308a-b294-aa2ce9f7261e> accessed April 27 2018.

EC. 2016a. *Study and Reports on the VAT Gap in the EU-28 Member States: 2016 Final Report*. Brussels: European Commission TAXUD/2015/CC/131

EC 2016b. *Tax Policies in the European Union 2016 Survey*, Brussels: European Commission, https://ec.europa.eu/taxation_customs/business/company-tax/tax-good-governance/eu-semester/tax-policies-european-union-2016-survey_en

EC, 2017, Study and Reports on the VAT Gap in the EU-28 Member States: 2017 Final Report, Brussels: European Commission TAXUD/2015/CC/131

FTA, 2016. *The Grey Economy 2016*. Helsinki: Finnish Tax Authority. https://www.vero.fi/download/The_Grey_Economy_2016/%7B30075BD0-6B33-4C12-80FA-F05BBF7C743B%7D/12687

Gemmell, N and Hasseldine, J, 2012, "The Tax Gap: A Methodological Review", in Toby Stock (ed.) *Advances in Taxation* (Advances in Taxation, Volume 20) Emerald Group Publishing Limited, pp.203 – 231

Hamilton, S, 2015, Regulatory compliance, case selection and coverage—calculating compliance gaps, *eJournal of Tax Research* (2015) vol 13, no. 2, pp. 616-673

Henry, J. 2012. *The price of offshore revisited*. London: The Tax Justice Network

HMRC, 2016, *Measuring tax gaps 2016 edition*, London: HM Revenue & Customs https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/561312/HMRC-measuring-tax-gaps-2016.pdf accessed 6 February 2017

HMRC, 2017a, *Measuring tax gaps 2017 edition*. London: HM Revenue & Customs https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/655097/HMRC-measuring-tax-gaps-2017.pdf

HMRC, 2017b, *Measuring tax gaps 2017 edition: Methodological annex*. London: HM Revenue & Customs https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/655098/HMRC-measuring-tax-gaps-2017-methodological-annex.pdf

Herndon, T; Ash, M; Pollin, R. 2014. *Does high public debt consistently stifle economic growth? A critique of Reinhart and Rogoff*. *Cambridge Journal of Economics*, 03/2014, Volume 38, Issue 2

IMF, 2013, *Assessment of HMRC's Tax Gap Analysis*, Washington DC: The International Monetary Fund <https://www.imf.org/external/pubs/ft/scr/2013/cr13314.pdf>

IMF, 2014a. *IMF policy paper spillovers in international corporate taxation*. Washington DC: <http://www.imf.org/external/np/pp/eng/2014/050914.pdf>

IMF, 2014b. *World Economic Outlook, Legacies, Clouds, Uncertainties, Chapter 3*. Washington DC: <http://www.imf.org/external/pubs/ft/weo/2014/02/>

IMF, 2017, *Fiscal Monitor: Tackling Inequality, October 2017*, Washington DC: The International Monetary Fund, available at <http://www.imf.org/en/Publications/FM/Issues/2017/10/05/fiscal-monitor-october-2017>

Johns, A. and Slemrod, J. 2010. *The Distribution of Income Tax Noncompliance*: National Tax Journal 63(3), 397–418.

Kelton, S. 2011. *Limitations of the Government Budget Constraint: Users vs. Issuers of the Currency*. Panoeconomicus, 2011, Volume 58, Issue 1

Kleven et al. (2011), *Unwilling or unable to cheat? Evidence from a tax audit experiment in Denmark*. Econometrica, Vol. 79 (3), 651–692.

Lewis, J. 2018. *The past decade's productivity growth in historical context*. London: The Bank of England. Available at <https://bankunderground.co.uk/2018/04/25/bitesize-the-past-decades-productivity-growth-in-historical-context/> accessed 27 April 2018

Lucas Jr, R. 2003: *Macroeconomic Priorities*: American Economic Review March 2003 available at <http://pages.stern.nyu.edu/~dbackus/Taxes/Lucas%20priorities%20AER%2003.pdf> accessed 26.3.18

McLeay, M., Radia, A., Thomas, R. 2014. *Money creation in the modern economy*. London: Bank of England Quarterly Bulletin, Spring 2014.

Murphy, R. 2006, *Mind the Tax Gap*. Ely: The Tax Gap Limited [http://www.taxjustice.net/cms/upload/pdf/Mind the Tax Gap - final - 15 Jan 2006.pdf](http://www.taxjustice.net/cms/upload/pdf/Mind_the_Tax_Gap_-_final_-_15_Jan_2006.pdf)

Murphy, R. 2008. *The Missing Billions*. London: Trades Union Congress

Murphy, R. 2011. *The cost of tax abuse: a briefing paper on the cost of tax evasion worldwide*. London: The Tax Justice Network

Murphy, R. 2012. *Closing the European Tax Gap*. Group of the Progressive Alliance of Socialists & Democrats

Murphy, R. 2014a. *Tax Evasion in 2014*. London: Public & Commercial Services Union <http://www.taxresearch.org.uk/Documents/PCSTaxGap2014Full.pdf>

Murphy, R. 2014b. *In the shade: Research on the UK's missing economy*. Downham Market, UK: Tax Research LLP, <http://www.taxresearch.org.uk/Documents/Intheshade.pdf>

Murphy, R. 2015. *The Joy of Tax*. London, Transworld Publishers

Murphy, R. and Palan, R. 2015. *Why the UK's Fiscal Charter is Doomed to Fail*. London: City University of London Political Economy Research Centre Working Paper 2015/3 available at https://www.city.ac.uk/_data/assets/pdf_file/0003/296301/CITYPERC-WPS-201503.pdf

OECD, 2015a. *Comparative Information on OECD and Other Advanced and Emerging Economies*. Paris: Organisation for Economic Cooperation and Development <http://www.oecd.org/ctp/administration/tax-administration-23077727.htm>

OECD. 2015b. *BEPS 2015 Final Reports*. Paris: Organisation for Economic Cooperation and Development <http://www.oecd.org/ctp/beps-2015-final-reports.htm>

OECD. 2017. *Tax Administration 2017 Comparative Information on OECD and Other Advanced and Emerging Economies*, Paris: Organisation for Economic Cooperation and Development

OECD. 2018. *Convention on Mutual Administrative Assistance in Tax Matters*. Paris: Organisation for Economic Cooperation and Development. Available at <http://www.oecd.org/ctp/exchange-of-tax-information/convention-on-mutual-administrative-assistance-in-tax-matters.htm> accessed 27 April 2018

Quentin, D. 2014. *Risk-mining the public exchequer*. London, self published, http://www.davidquentin.co.uk/Risk-Mining_The_Public_Exchequer.pdf

Reinhart, C., & Rogoff, K. (2010). *Growth in a time of debt*. American Economic Review, 100, 573–578

Roussille, N. 2015. *Tax Evasion and the 'Swiss Cheese' Regulation*. Available at <http://www.piketty.pse.ens.fr/files/Roussille2015.pdf> accessed 28.3.18.

Schneider, F. 2013: *Tax Losses Due to Shadow Economy Activities in OECD Countries from 2011 to 2013: A Preliminary Calculation*. CESifo Working Paper Series No. 5649. Available at SSRN: <https://ssrn.com/abstract=2718882>

Skatteverket, 2014, *The development of the tax gap in Sweden 2007-12*, Stockholm: The Swedish Tax Agency, Report 1(91) Date 08/01/2014

Slemrod, J, 2007: *Cheating Ourselves: The Economics of Tax Evasion* [http://darp.lse.ac.uk/papersdb/slemrod_\(jep07\).pdf](http://darp.lse.ac.uk/papersdb/slemrod_(jep07).pdf) , 21(1), 25-48

Slemrod, J and Johns, A. 2010: *The distribution of income tax noncompliance*. National Tax Journal, September 2010, 63 (3), 397–418

Troup, E. 2015, *Measuring the Gap*. London: Taxation, October 14, 2015, <https://www.taxation.co.uk/Articles/2015/10/13/333815/measuring-gap>

Turner, A. 2009. *The Turner Review A regulatory response to the global banking crisis*. London: The Financial Services Authority available at http://www.fsa.gov.uk/pubs/other/turner_review.pdf

UK Treasury. 2017. *Spring Budget Report*. London: HM Treasury, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/597467/spring_budget_2017_web.pdf

Williams, C.C. and Nadin, S. 2012 “Work beyond employment: representations of informal economic activities”, *Work, Employment & Society* 26(2), 1-10.

Wren-Lewis, S. 2018: *Ending the microfoundations hegemony*. Oxford Review of Economic Policy, 2018: Volume 34, Issue 1-2, Spring-Summer 2018 pages 55-69.

Zucman, Gabriel. 2013. “The Missing Wealth of Nations: Are Europe and the US net Debtors or net Creditors?” *Quarterly Journal of Economics*, 128(3), 1321–1364.

Zucman, Gabriel. 2014. “Tax Evasion on Offshore Profits and Wealth ”, *Journal of Economic Perspectives*, 28(4), 121–148.^[1]_{SEP}

Zucman, G. 2015. *The hidden wealth of nations*. Chicago: The University of Chicago Press

Zucman, G., Alstadsæter, A. and Johannesen, N. (2017), “Tax Evasion and Inequality”, *Working Paper*.

Appendix 1

Who prepares tax gap data?

The most comprehensive survey of tax gap methodologies undertaken to date was prepared by the OECD:

Almost one half of the 55 surveyed administrations report producing periodic tax gap estimates for one or more of the main tax types, with the production of estimates of VAT the most prevalent. The majority of administrations that produce assessments do so for all three major tax types [personal income tax, corporation tax and VAT], with around half of those making their estimates publicly available (OECD, 2017, 62).

What this survey found was that twenty-three tax administrations out of the fifty-five surveyed (the latter including all EU member states) undertake tax gap estimates of some sort (OECD, 2017, 21). Of these fourteen publish data, and of these fourteen eight cover all major taxes, including personal income tax, corporate income tax and VAT. (The OECD data does not clarify how many EU countries meet this criterion.)

Earlier OECD reports have been more forthcoming: in 2015 the OECD reported that countries that had undertaken tax gap research were Australia, Chile, Denmark, Estonia, the EU, Finland, South Korea, Latvia, Lithuania, Mexico, Slovak Republic, Slovenia, Sweden, the UK and the USA. Nine of these were EU member states, not counting work by the EU itself (OECD, 2015a, 132). A year later the European Commission suggested that more of its member states had been involved in this activity (EC, 2016b, 42). In their opinion the following states were preparing tax gap estimates:

Table A

Member state	Taxes covered
Czech Republic	VAT
Estonia	VAT, income tax and social security
Finland	VAT
Germany	VAT and corporation tax
Italy	VAT, income tax and corporation tax
Latvia	VAT, income tax and social security
Poland	VAT
Portugal	VAT
Slovakia	VAT

Slovenia	VAT
UK	VAT, income tax, corporation tax, social security

Source: As noted in the text

It is notable that Denmark, Lithuania and Sweden are in the OECD list but not the European Commission's: Denmark is known to be working on this issue whilst Sweden has published a report on its work (Skatterverket, 2014). It is our estimation that currently fourteen EU member states are working on the tax gap estimates in some way, with most only working on VAT tax gap estimates. The European Union also prepares a VAT gap annually for all member states excluding Cyprus.

Endnotes

ⁱ See https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-economic-governance-monitoring-prevention-correction/stability-and-growth-pact_en accessed 28.3.18