FINLAND

TECHNICAL ASSISTANCE REPORT— REVENUE ADMINISTRATION GAP ANALYSIS PROGRAM—THE VALUE-ADDED TAX GAP

February 2016

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FINLAND

REVENUE ADMINISTRATION GAP ANALYSIS PROGRAM— THE VALUE-ADDED TAX GAP

Mick Thackray, Eric Hutton, and Kartik Kapoor

November 2015

Mr. Hutton of the Fiscal Affairs Department (FAD) Revenue Administration Gap Program (RA-GAP) visited Finland in May 2014, to deliver a technical assistance (TA) mission. During this mission, he presented the RA-GAP value-added tax (VAT) gap model to the Finnish Customs and Tax Administration (VERO), and worked with VERO analysts, including Mr. Aki Savolainen, to identify the data required for the RA-GAP model and to conduct some preliminary analysis.

Mr. Thackray, also from FAD RA-GAP, visited Finland in October 2015 to present the RA-GAP estimate of the VAT gap in Finland to VERO officials, and to Finnish Ministry of Finance and National Audit Office officials.

FINLAND

REVENUE ADMINISTRATION GAP ANALYSIS PROGRAM— THE VALUE-ADDED TAX GAP

EXECUTIVE SUMMARY

This report presents estimates of the tax gap for Finland for the period 2008–14. There are two main components to the RA-GAP methodology for estimating the VAT gap: 1) estimate the potential VAT collections for a given period; and 2) determine the accrued VAT collections for that period. The difference between the two values is the VAT gap. The methodology employs a top-down approach for estimating the potential VAT base, using statistical data on value-added generated in each sector and constructs the accrued VAT collections value from tax record data.

One of the main purposes of this report is to estimate the compliance gap. The compliance gap is the difference between the potential VAT that could have been collected given the current policy framework and actual accrued VAT collections. Other tax gap measures can be determined using different methods for determining potential VAT, and these other measures are important in understanding all the factors which are affecting current collections. This report will provide estimates for these other gap measures as well, and compare and contrast them with the compliance gap.

Main Findings

The compliance gap in Finland for 2008 through 2014 has been low, below ten percent of the estimated potential, or less than one percent of GDP (Figure 1). These values indicate high levels of compliance. Furthermore, as the results show that the gap fell from around 0.7 percent of GDP in 2008 to less than half a percent in 2012, they indicate that compliance has been improving over this period. [1]
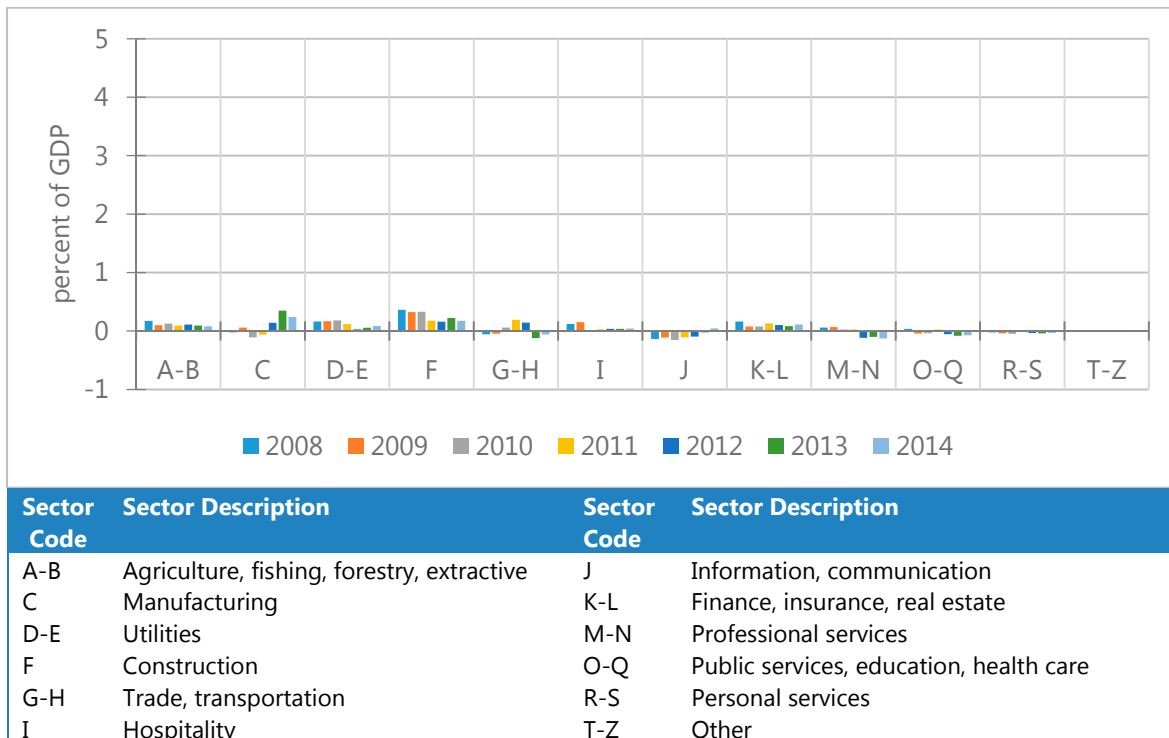
Figure 1. Value-Added Tax Compliance Gap
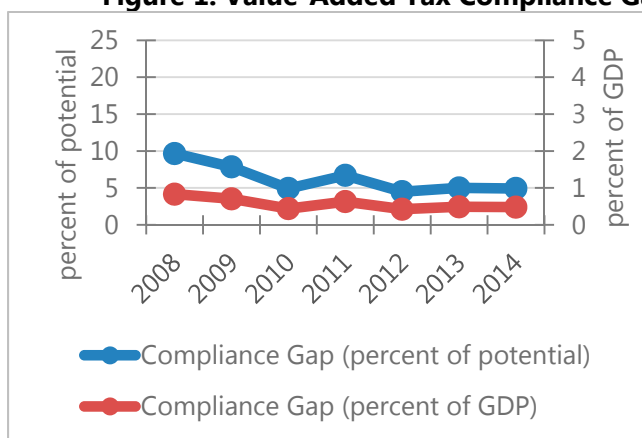
Sources: Finland Statistics, VERO, and staff calculations.

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[1] Tables with the values used in all the figures in this report are included in Appendix I.

The compliance gap is distributed across a number of sectors, with no particular point of strong concentration (Figure 2). The sectors that consistently show the highest levels of noncompliance, in relative terms, are the construction sector and the professional services sector. While the trade sector also has some values of the same magnitude, this is likely an allocation issue and is likely offset by the negative gap appearing for the manufacturing sector (which displays an almost perfect negative correlation). The results also suggest that the improvements in compliance between 2008 and 2010 came in the agriculture, forestry, fishing, extractive sector and the finance, insurance, real estate sector.

Figure 2. The Compliance Gap by Sector

Sector Code	Sector Description	Sector Code	Sector Description
A-B	Agriculture, fishing, forestry, extractive	J	Information, communication
C	Manufacturing	K-L	Finance, insurance, real estate
D-E	Utilities	M-N	Professional services
F	Construction	O-Q	Public services, education, health care
G-H	Trade, transportation	R-S	Personal services
I	Hospitality	T-Z	Other

Note: The whitespace in this chart is intentional—the scale is selected to show the level of the gap per sector in sizes relative in scale to the actual collections per sector.

Sources: Finland Statistics; VERO; and staff calculations.

While the compliance gap was decreasing from 2008–10, the policy gap has been increasing (Figure 3). The change in the policy gap reflects a change in both policy and consumer behavior. Between 2009 and 2012 policy changes (namely the reduction in the reduced rate, and the application of the reduced rate to restaurants and catering services) contributed significantly to the growth in the policy gap. Growth in the policy gap was also occurring across the whole period due to reductions in the proportion of supplies at the standard rate in final consumption (with an increased proportion of consumption of reduced rate or exempt supplies).

Figure 3. Value-Added Tax Gap, Compliance Gap, and Policy Gap
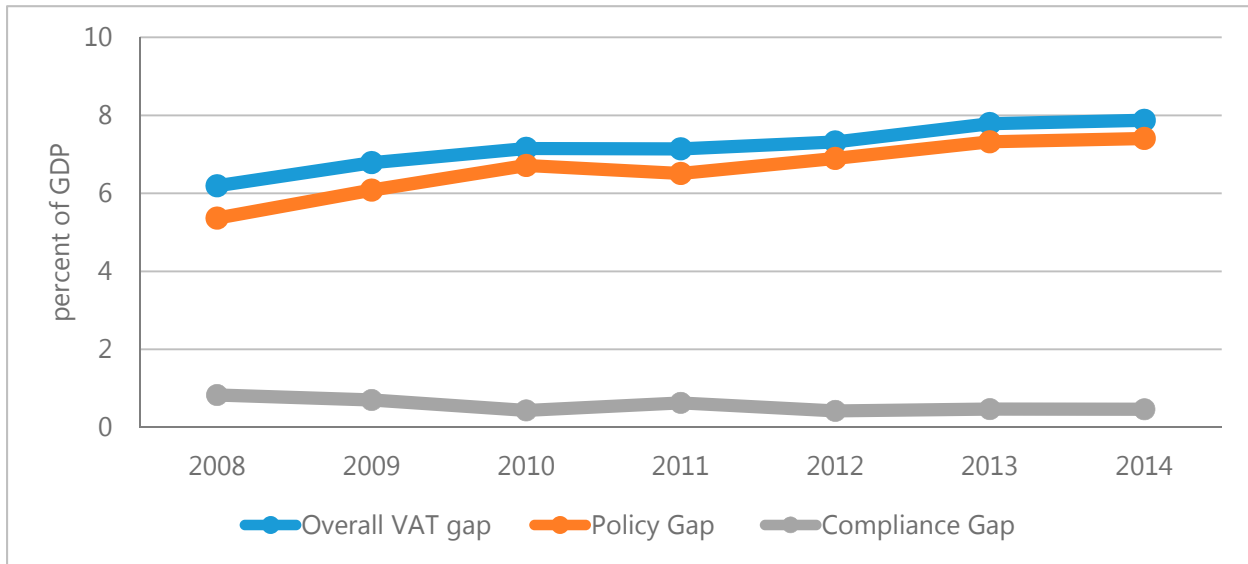
Sources: Finland Statistics; VERO; and staff calculations.

Comparison to Other Estimates

The compliance gap results show consistent levels with other estimates (Figure 4). The other source for compliance gap estimates for Finland is the EU-wide estimates commissioned by the European Commission (EC). The RA-GAP results are consistent with the latest EC estimates (Center for Social and Economic Research "CASE" results in the figure)—see Section 3 below for more details on these results.

Figure 4. Comparison of Compliance Gap Estimates
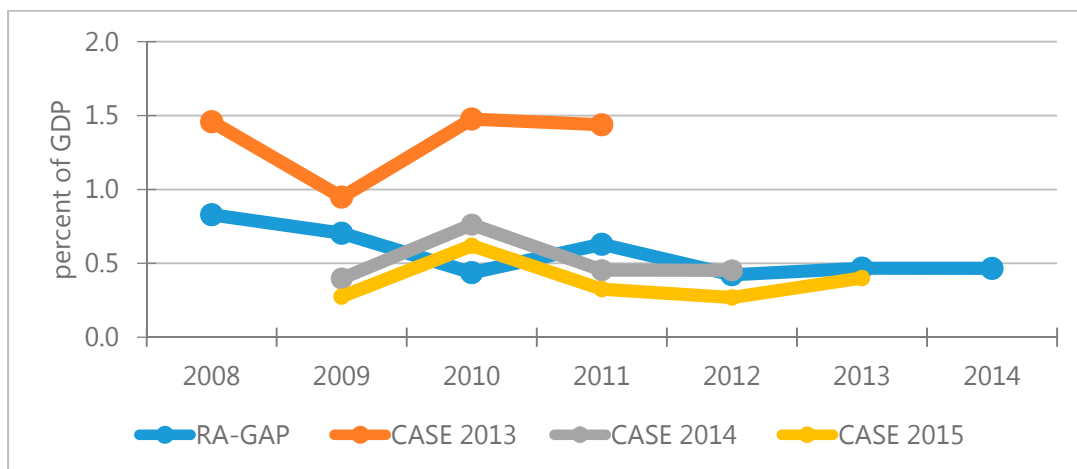
Sources: Finland Statistics; VERO; and staff calculations.

Observations and possible future work

- **VERO has an advanced analytical capability, and should continue with its existing and planned tax gap analysis.**

- **The quality and coverage of data available to VERO is excellent, allowing them to develop a more analytical approach to risk management.**

- **It is recommended that VERO publish its tax gap analysis and estimates of tax gaps in Finland.**

ABBREVIATIONS AND ACRONYMS

CASE	Center for Social and Economic Research (Poland)
EC	European Commission
Eurostat	Statistical Office of the European Communities
EUR	Euro
FAD	Fiscal Affairs Department
RA-GAP	Revenue Administration GAP Analysis Program
VERO	Finnish Customs and Tax Administration
TA	Technical assistance
TAXUD	Taxation Customs Union
VAT	Value-added tax
WEO	World Economic Outlook

GLOSSARY

Assessment Gap	The difference between the between potential collections given the current policy framework and the VAT declared or assessed (a component of the compliance gap).
C-efficiency	The ratio of actual VAT to potential VAT if all final consumption were taxed at the current standard rate.
Collections Gap	The difference between VAT declared or assessed and the actual VAT revenue collected (a component of the compliance gap).
Compliance Gap	The difference between the potential VAT given the current policy framework and actual VAT revenue.
Efficiency Gap	The difference between the potential VAT if all final consumption were taxed at the current standard rate and the potential VAT where most of final consumption is taxed at the standard rate, but where a set of minimal standard exemptions are maintained (a component of the policy gap).
Expenditure Gap	The difference between the potential VAT where most of final consumption is taxed at the standard rate, but where a set of minimal standard exemptions are maintained, and the potential VAT given the current policy framework (a component of the policy gap).

Overall VAT Gap   The difference between the potential VAT if all final consumption were taxed at the current standard rate and actual VAT revenue.

Policy Gap   The difference between the potential VAT if all final consumption were taxed at the current standard rate and the potential VAT given the current policy framework.

CONTENTS

FIGURES

BOXES

1. BACKGROUND

1.   **This report provides estimates of the VAT gap in Finland, produced under the IMF's RA-GAP program.** The RA-GAP Program, conducted by the Fiscal Affairs Department's Revenue Administration Divisions, provides revenue administrations with an estimate and quantitative analysis of the gap between potential and actual collections, referred to as the tax gap.[2] The RA-GAP program aims to provide an evaluation of the tax gap for a specific tax, and a breakdown by contributing factors, along with the distribution across economic sectors, to help revenue administrations monitor and identify what is contributing to the gap.

2.   **The main purpose of this report is to provide the revenue administration with analysis regarding compliance performance.** This section provides an overview of the VAT revenue performance, using standard metrics such as revenue to GDP and c-efficiency. Section 2 then provides the estimate of the compliance gap, plus other associated tax gap measures. Section 3 breaks the estimated levels of noncompliance down by economic sector in an attempt to identify the key sources of the compliance gap.

A. Value-Added Tax Revenue Performance

3.   **VAT revenues measured as a percent of GDP in Finland has grown by around two percentage points in the past four years (Figure 5).** While nominal revenue shows a dramatic dip for the period 2008 to 2011, the VAT to GDP ratio actually started to improve over this period. A large part of the improvement in the VAT to GDP ratio is likely due to increases in the standard rate; the rate was increased from 22 percent to 23 percent in mid-2010 and again increased to 24 percent at the beginning of 2013. The reduced and super reduced rates were also increased over this period (after a substantial reduction in the reduced rate at the end of 2009).

Figure 5. Value-Added Tax Revenues
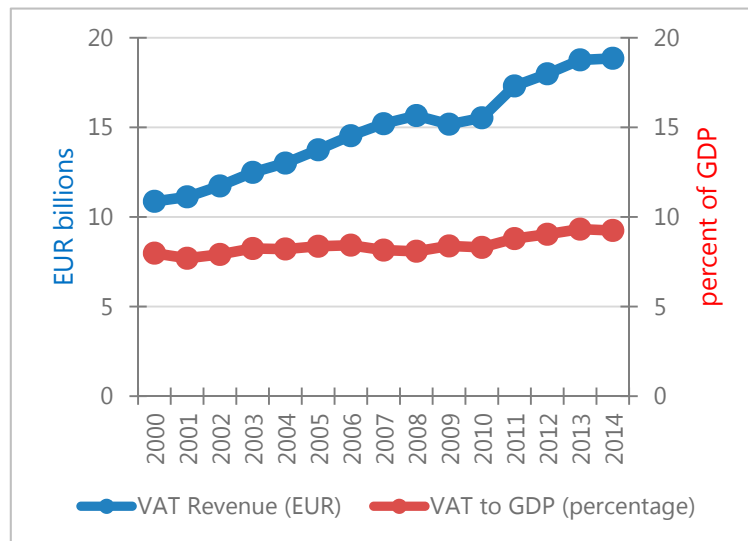
Sources: Statistical Office of the EC (Eurostat); and staff calculations.

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[2] The model and methodology used in assessing the VAT gap are detailed in Appendix II.

4.   **The c-efficiency ratio provides a more indicative measure of the relative performance of the VAT in relation to economic aggregates than the simple ratio of collections to GDP**.[3] VAT is a tax on final consumption, and final consumption by households is generally the largest part of the tax base for VAT; so, in principle, a movement in VAT collections as a share of GDP could be explained by a change in the standard VAT rates and the relative share of final consumption to GDP. The c-efficiency measure is used to control for such effects.

5.   **C-efficiency in Finland has consistently been at the average for Europe (Figure 6).** While both Finland's c-efficiency ratio and the average ratio for Europe have shown some minor fluctuations over the period 2000–13, since 2005 Finland has been around the average. Prior to 2005 Finland's c-efficiency level was slightly over the average. Of interest is the fact that while Finland's VAT to GDP ratio improved over the period 2009–13, the c-efficiency level dropped—this is indicative that the improvement VAT to GDP ratio was being driven by the rate increase.

6.   **Finland's c-efficiency is amongst the highest values observed for Europe (Figure 7).** While Finland's c-efficiency rate is currently around the average for Europe, it is still among the higher performing countries—the overall average is skewed upwards due to the exaggerated performance of Luxembourg.[4] While the c-efficiency ratio provides a convenient means of comparing general VAT revenue performance across countries, it is limited in being able to identify why differences might exist. C-efficiency captures the combined impact of changes in compliance gap, policy changes, and changes in the tax base. Two countries can therefore have similar c-efficiency values for completely different reasons; for example a country with high compliance and a lot of exemptions might have the same c-efficiency value as a country with few exemptions and low compliance.[5] It is for this reason that it is necessary to understand how all these factors combine to influence c-efficiency, through a detailed analysis of the tax gap and it's component parts.

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[3] Commonly used as a measure of the degree of VAT revenue mobilization for a given country's economic level and composition, c-efficiency is defined as the ratio of VAT collections to final consumption, divided by the main VAT rate. It provides a more relevant measure of the generation of VAT in relation to the tax base than the simple ratio of collections to GDP, because it controls for VAT standard rates and (partially) the composition of GDP. However, other components of expenditure, such as intermediate consumption by government and exempt industries also contribute to net VAT collections and consequently to observed c-efficiency values. It has limitations, however, in that final consumption as measured for national accounts purposes is not exactly the same as the final consumption targeted by a VAT; for example in the national accounts treatment hotel services provided to nonresidents are not included in final consumption but treated as an export.

[4] VAT revenue in Luxembourg is disproportionate to final consumption there as there are many VAT taxpayers producing services for export to other EU countries during this period, for example e-services and telecoms.

[5] See *"From Stimulus to Consolidation: Revenue and Expenditure Policies in Advanced and Emerging Economies,"* by a staff team led by Benedict Clements, Victoria Perry, and Juan Toro (IMF, 2010) for a good discussion on the relationship between the c-efficiency measure and the compliance gap and policy gap.

Figure 6. C-Efficiency for Finland Compared to Average for Europe
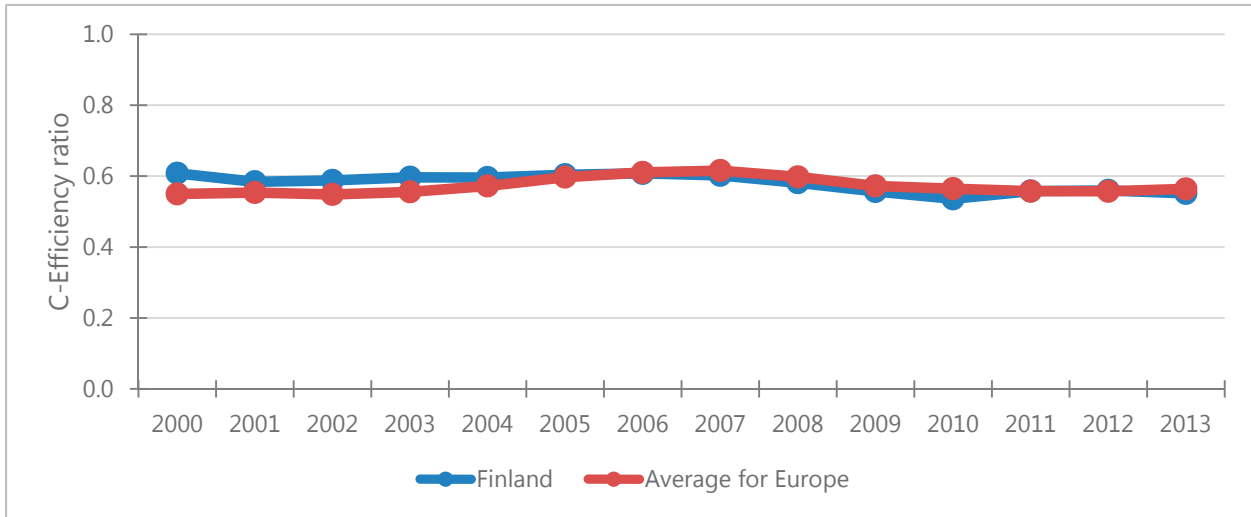
Sources: Eurostat; World Economic Outlook (WEO); and staff calculations.

Figure 7. Average C-Efficiency for Europe over the Period 2000–13
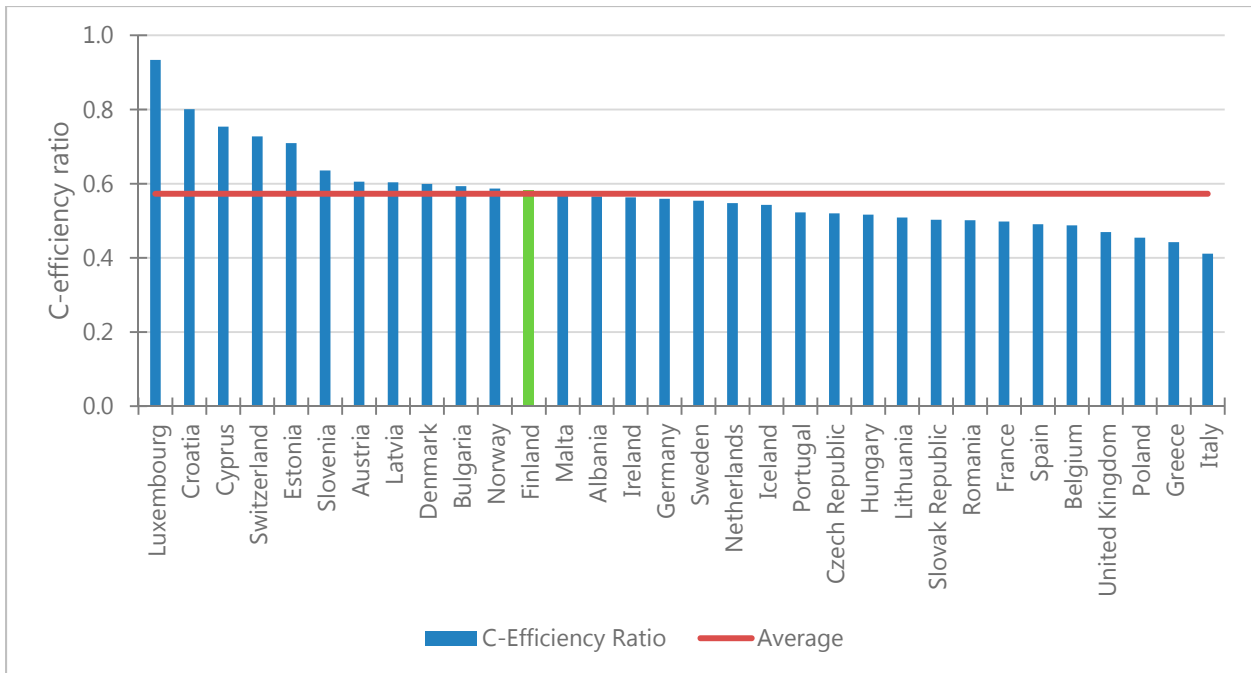
Sources: Eurostat; WEO; and staff calculations.

2. ESTIMATES OF THE VALUE-ADDED TAX GAP

7.   **The VAT gap for a particular year is the difference between revenues collected for a given year and the potential revenues that could have been collected given the economic activity that took place during that year**. The RA-GAP approach was used to estimate the VAT gap for the years 2008 to 2014 in this report. Potential VAT revenues were estimated using detailed national accounts data published by national statistics agency, Statistics Finland, to determine the potential VAT base[6] For VAT actual collections the RA-GAP methodology for determining accrued net VAT was employed—VAT payments accrued to the tax periods for which they were paid less accrued excess credit for each taxpayer for each tax period, aggregated by sector—for the same period.[7]

A. The Compliance Gap

8.   **The *compliance gap* is the difference between the potential VAT given the current policy framework and actual VAT revenue.** The compliance gap thus directly measures the performance of a revenue administration in collecting the tax due from taxpayers. As estimates for the compliance gap must rely on statistical data to determine the level of Potential VAT, the estimates will have an error margin similar to that for the underlying statistics. It is therefore generally more useful to use estimates of the compliance gap to assess *trends* in compliance, rather than the *level*.

9.   **The estimated compliance gap has been relatively low since 2008 (Figure 8).** The values obtained for Finland indicate that the compliance gap is very small, with some improvements since 2008.

10.   **There are some interesting correlations between the changes in the compliance gap and policy measures.** Rate increases were introduced in 2010 (July 1) and in 2013 (January 1), and in both cases the compliance gap then increased slightly. There is no clear causal link between these events however, and it is also important to note that the compliance gap quickly fell back down after the increase that followed the 2010 rate increases.

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[6] As discussed in Appendix 1, while the model employs data on output, intermediate demand, imports and exports to determine the tax base, this is potential VAT base is identical to final consumption.

[7] The accruals values used are those as measured as of February 2015, the time at which the data extraction was performed. The time elapsed between the end of 2013 and the date of extraction is sufficiently large that any remaining late collections for tax periods used in this report will likely only have a very marginal impact on the total collections figures.

Figure 8. The Compliance Gap
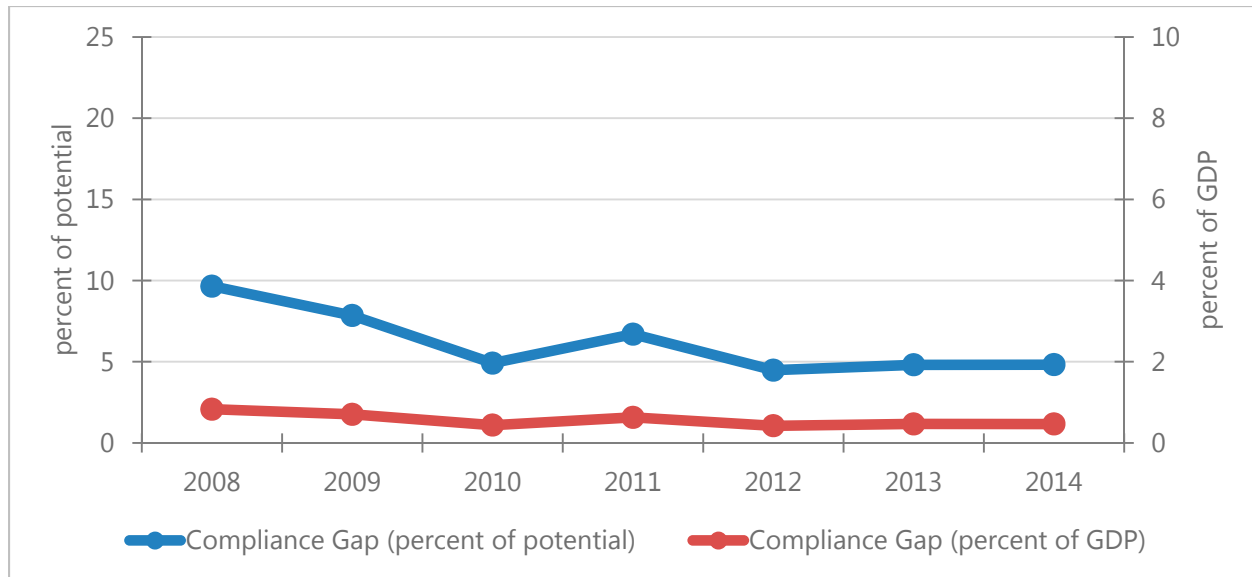
Sources: Finland Statistics; VERO; and staff calculations.

The Assessment and Collection Gaps

11.   **The compliance gap can be broken down into an *assessment gap* and a *collection gap*.** The assessment gap is the difference between the estimated VAT that should have been declared (i.e., potential VAT collections under existing VAT policies) and the VAT which has been declared or assessed. The collections gap is the difference between VAT declared or assessed and the VAT actually paid. The collections gap, in other words, represents known outstanding debt by taxpayers, while the assessment gap represents taxable activity that the administration has not assessed. These two gaps are also sometimes referred to as the known portion of the compliance gap (the collections gap) and the unknown portion of the compliance gap (the assessment gap).[8]

12.   **The assessment gap makes up the bulk of the compliance gap (Figure 9)**. While the collection gap is small relative to actual collections, it is a notable portion of the overall compliance gap. This suggests that efforts to collect on tax debts could have a significant impact on the compliance gap. Because of changes to VERO's collections accounting system, the apparent changes in the collection gap over the period 2008-2014 could not be attributed to particular changes in debt management. However, it should be noted that the collection gap is very marginal relative to overall collections, and so small changes in collections can have a disproportionate impact on the estimated gap.

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[8] These basic measures, with compliance gaps in general, do not take into account uncollectible arrears. This would include arrears written off for cases of bankrupt businesses for example. As such, the collections gap will tend to overstate the amount of potential gain to be achieved from further closing the identified portion of the tax gap. In other words, there might be some normal, or even optimal, nonzero state for the collections gap.

Figure 9. The Assessment and Collection Gap
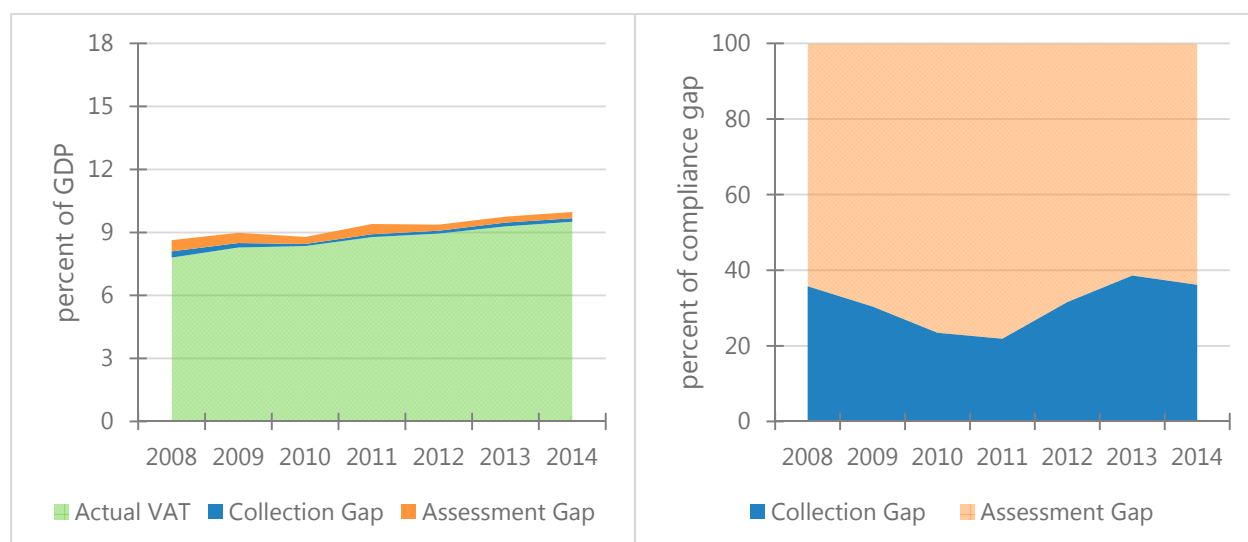
Sources: Finland Statistics; VERO; and staff calculations.

B. The Compliance Gap and the Policy Gap

13.   **The policy gap is the difference between the potential VAT if all final consumption were taxed at the current standard rate and the potential VAT given the current policy framework.** The size of the policy gap is affected by two factors; changes in the policy structure, and changes in the composition of the tax base. In other words the policy gap may increase or decrease without any explicit changes in policy; if there is a shift in final consumption from items subject to standard-rated VAT to exempt or reduced rate items the policy gap will increase.

14.   **The changes to the compliance gap were more than offset by changes in the policy gap (Figure 10).** The policy gap has shown significant growth during the period. It is important to note that the policy gap is not only influenced by explicit changes in tax policy, but it will also capture the impact of changes in the tax base; if the proportion of final consumption of exempt supplies to taxable supplies increases, the policy gap will increase. So while some of this growth is the result of explicit policy changes (such as the large reduction in the reduced rate in November 2009 and moving restaurants and catering services to the reduced rate in 2010), there is also an impact due to a shift towards a greater proportion of consumption of reduced rate or exempt supplies.

Figure 10. The Policy Gap versus Compliance Gap
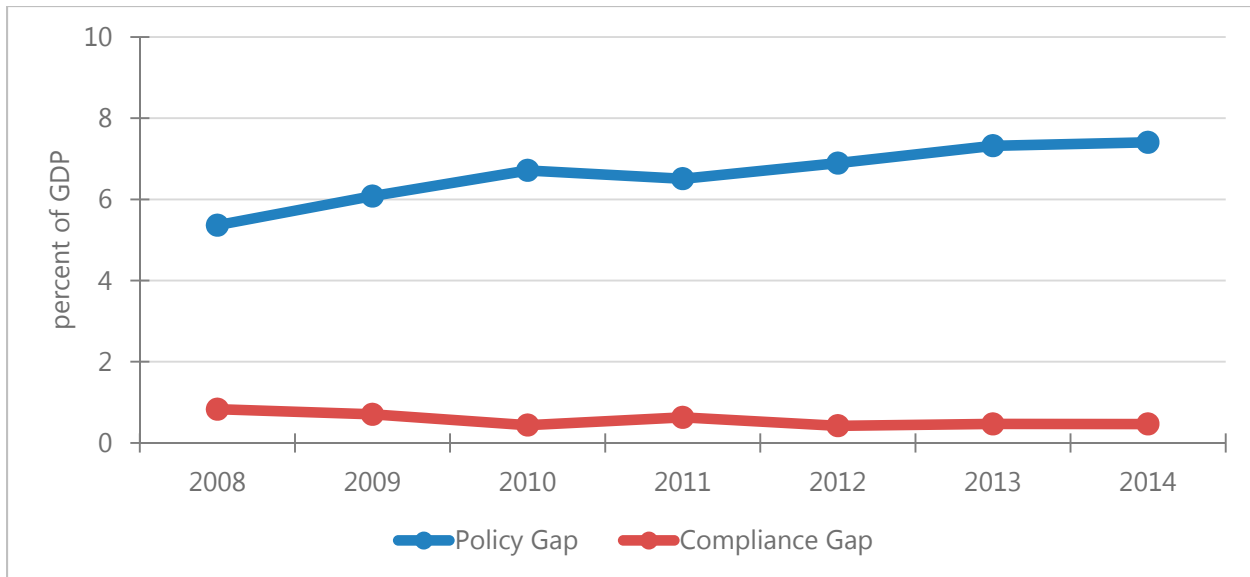
Sources: Finland Statistics; VERO; and staff calculations.

The Expenditure and Efficiency Gap

15.   **The policy gap can be broken down into an *expenditure gap* and an *efficiency gap*.** The expenditure gap is the difference between the potential VAT where most of final consumption is taxed at the standard rate, but where a set of minimal standard exemptions are maintained, and the potential VAT given the current policy framework. In other words the expenditure gap is the component of the policy gap due to tax expenditure decisions. The efficiency gap is the difference between the potential VAT if all final consumption were taxed at the current standard rate and the potential VAT where most of final consumption is taxed at the standard rate, but where a set of minimal standard exemptions are maintained.[9] In others words the efficiency gap is the portion of the policy gap that results from the typical VAT exemptions necessary due to pragmatic considerations in the design of a VAT. Another way to look at these two measures is that these two components divide the policy gap into the portion where revenue mobilization opportunities exist (the expenditure gap) and the portion where there is little opportunity for revenue mobilization (the efficiency gap).

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[9] The set of minimum exemptions includes: maintaining the exemption for financial services, which is typical of almost all VATs in the world; retaining the current treatment of the public sector, since changes to the treatment of the public sector might yield revenue changes in the VAT model but would actually be netted out by equivalent changes to public expenditures; and maintaining the exemption for housing, as this is a common characteristic of almost all VATs in the world, and the measurement of housing in national accounts includes imputed rents which are not actual market transactions and so would not be subject to VAT in any case. It should be noted that the EU's sixth directive prescribes a broader set of exemptions than the list included here; this normative structure is not meant to be a policy prescription, but is simply an attempt to establish a baseline value in line with international norms.

16.   **The efficiency gap makes up the bulk of the policy gap (Figure 11).** The full policy gap is a theoretical concept; there is no country that has implemented a VAT on all final consumption, as defined in national accounts. This decomposition of the policy gap provides a better sense of the amount of revenue foregone due to policy design—the tax expenditure gap—versus the amount of revenue foregone due to the structure of the economy—the size of the financial sector, the public sector, and imputed rents on home ownership.

Figure 11. The Efficiency and Expenditure Gap
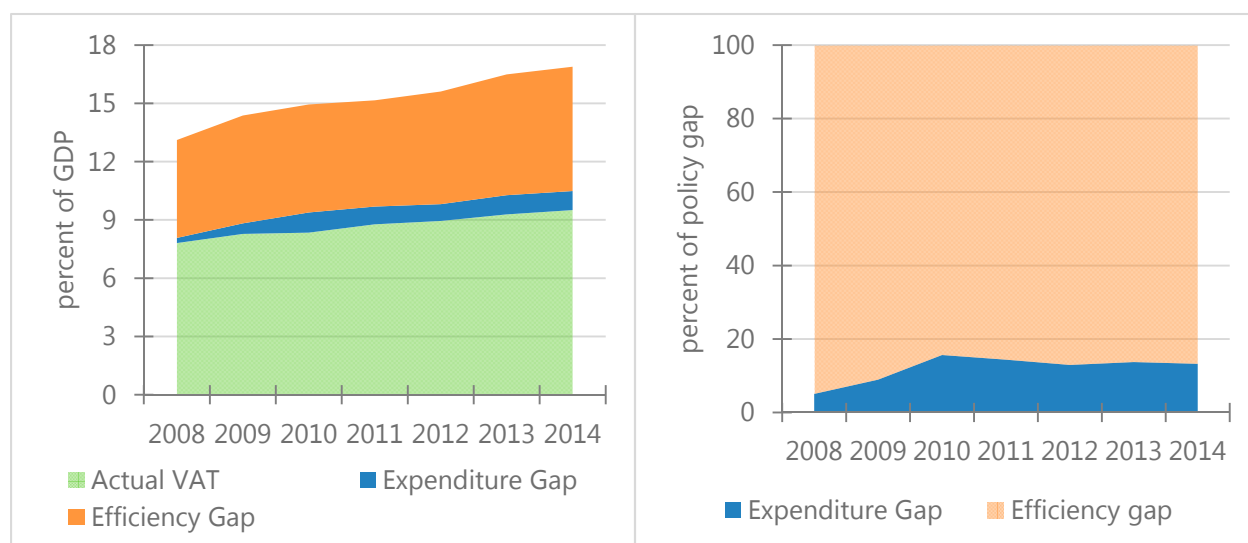
Sources: Finland Statistics; VERO; and staff calculations.

17.   **Movements in the policy gap since 2010 have been more the result of movements in the efficiency gap than in the expenditure gap.** This breakdown reveals how the policy changes in 2009 and 2010 were the drivers of the increase in the policy gap in that period, but that the subsequent increases in the policy gap are the results of a shift to a higher proportion of exempt activity; that is an increase in the proportion of final consumption provided through the public sector and/or the financial sector.

C. The Overall Value-Added Tax Gap

18.   **Combining the policy gap and the compliance gap into the overall VAT gap yields an indicator of overall revenue performance.** The overall VAT gap can either be measured directly, as being difference between the potential VAT if all final consumption were taxed at the current standard rate and actual VAT revenue, or derived by combining the policy and compliance gaps.

19.   **The estimated overall VAT gap for Finland increased from 2008–10, was relatively stable over the period 2010–12, and then increased again in 2013 (Figure 12).** The overall VAT gap appeared to increase from around six percent of GDP in 2008 to around seven percent in 2010.

Then from 2012 to 2013 the gap appears to have increased by another percentage point of GDP.

Figure 12. The Tax Gap, the Compliance Gap, and the Policy Gap
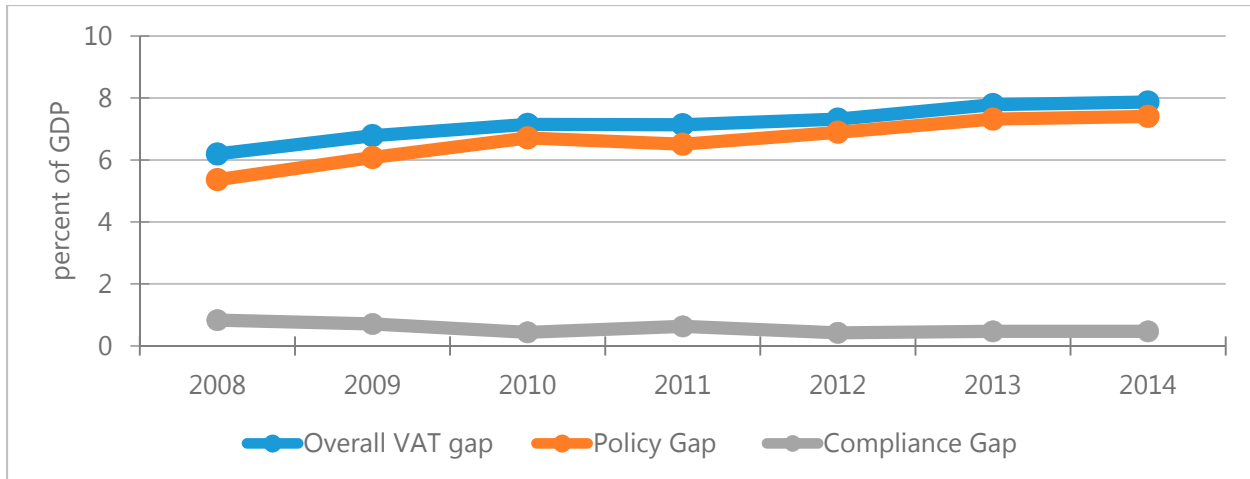
Sources: Finland Statistics; Eurostat; VERO; and staff calculations.

20.   **The efficiency gap makes up the bulk of the overall VAT gap (Figure 13).** These four components of the overall gap could also be grouped by those with revenue mobilization potential (the collections gap, assessment gap, and expenditure gap) and those without (the efficiency gap). Viewed together in this way another interesting trend appears to emerge—that as the policy gap grew, the assessment gap shrank, so that the revenue mobilization portion of the gap maintained a relatively consistent share of the overall gap.

21.   **These estimates are consistent with the observed trend in the c-efficiency ratio for the period (Figure 14).** In theory the c-efficiency ratio should be the inverse of the tax gap. In practice, however, there are a few differences in the measurement that could lead to differences in the values.[10] In this case the two measures are consistent.

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[10] The actual VAT used in the calculation of the c-efficiency ratio uses the revenues reported by country authorities, which are typically on a cash basis or in the case of European countries a lagged cash basis. For the tax gap measurement the RA-GAP methodology employs an accrued value for revenues. In addition the c-efficiency ratio uses final consumption as measured by national accounts as a proxy for the potential VAT base, but the model employed in the RA-GAP methodology makes some adjustments to this base to better align it with taxable domestic final consumption. For example, in the National Accounts domestic consumption by nonnationals is treated as an export and removed from final consumption, but in most cases this is subject to VAT. Similarly the national accounts treats consumption abroad by nationals as imports and added to final consumption, but these are not subject to VAT.

Figure 13. Actual Value-Added Tax and Components of the Tax Gap
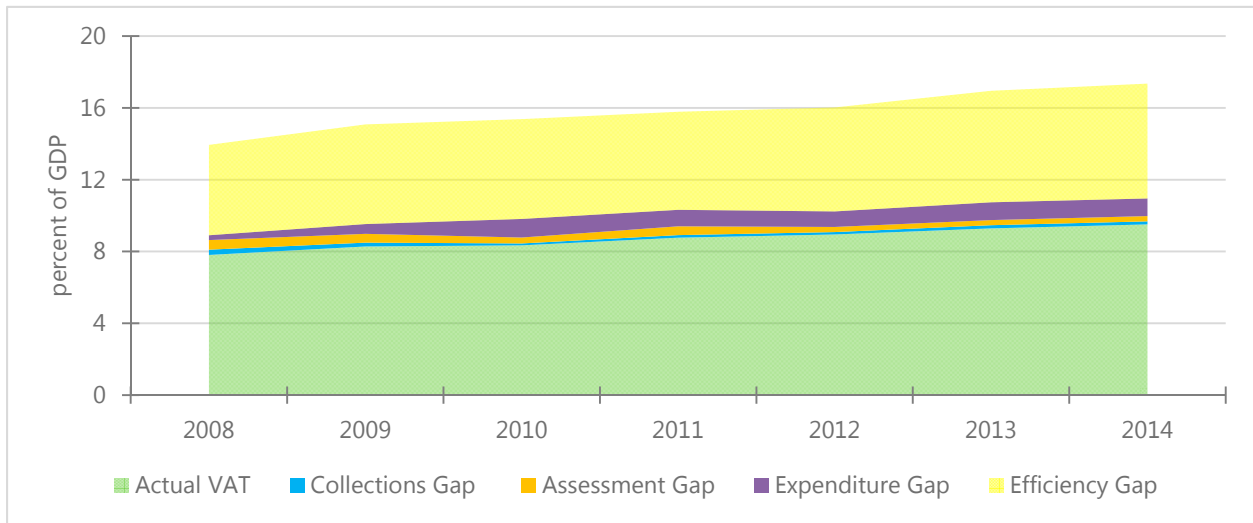
Sources: Finland Statistics; Eurostat; VERO; and staff calculations.

Figure 14. The Inverse of the Value-Added Tax Gap Versus the C-efficiency Ratio
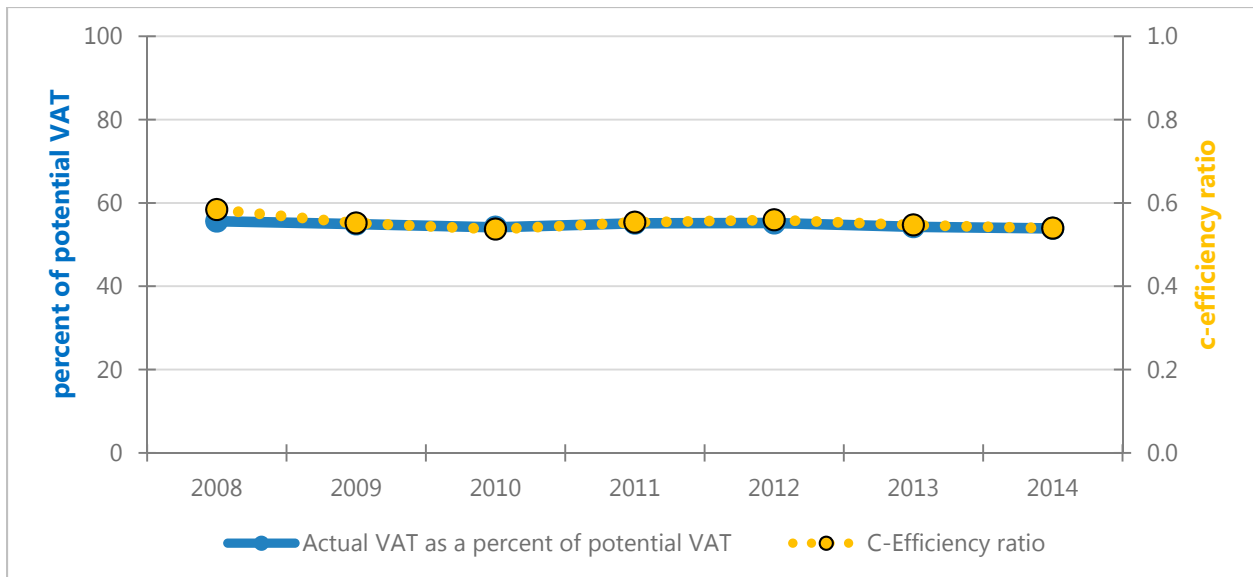
Sources: Finland Statistics; VERO; Eurostat; and staff calculations.

How the Components of the Tax Gap Affect C-Efficiency

22.   **Between 2008 and 2010 there were both large positive and negative factors affecting the c-efficiency ratio, with the negative factors outweighing the positive ones (Figure 15)**. In addition to the above impacts of the various components of the tax gap (identified as the compliance gap effect, expenditure gap effect, and efficiency gap effect) there is also a "cash effect" identified. The cash effect measures the changes due to differences between the cash measurement of actual VAT used in the c-efficiency ratio and the accrual values used for the tax gap estimates (see Box 1 for a more detailed breakdown of these differences). What is most interesting in this case is that for 2009, the cash effect was the largest contributor to the declining c-efficiency ratio; variations in the cash effect tend to be highest when countries are using an excess credit carry-forward system, and so the move to a pure refund system in Finland in 2010 explains why the cash effect loses prominence in subsequent periods.

Figure 15. Impact of the Tax Gap Components on C-Efficiency
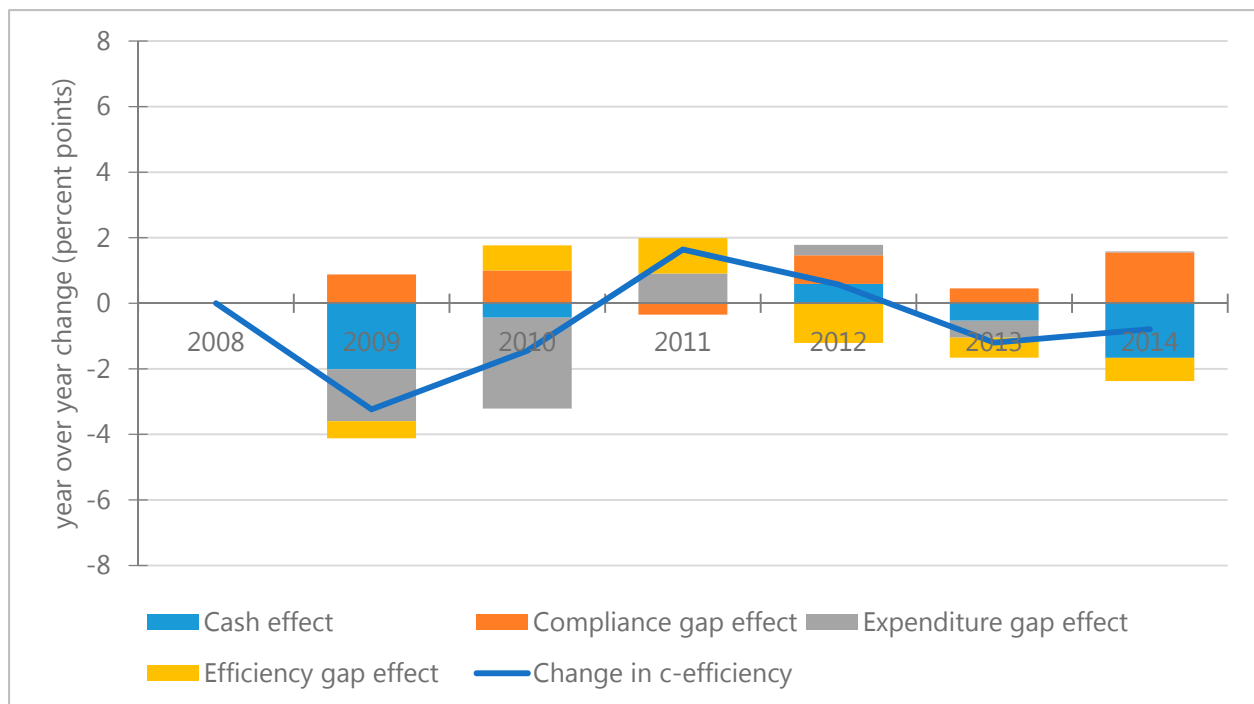
Sources: Finland Statistics; Eurostat; VERO; and staff calculations.

Box 1. Measurement of Actual Value-Added Tax

The RA-GAP approach to estimating the compliance gap employs an accrual measurement for actual VAT; that is using micro-level taxpayer data to associate the tax with the relevant tax period, rather than with the payment period. This is done to better match the economic activity declared by the taxpayer (as provided on their VAT declaration) and corresponding payments to the economic activity as recorded in the statistical data. In the long run, cash values for revenue should average out with the accrued values (ignoring penalties and interest). In the short run cash performance tends to be more volatile than accruals. In the case of Finland there does not appear to be any significant difference between the accrual and cash performance (Figure 16). However, while these differences do not appear to be too significant in relation to overall collections, the differences can matter for the compliance gap.

Figure 16. RA-GAP Accrual Measurement and Official Values for Value-Added Tax Collections
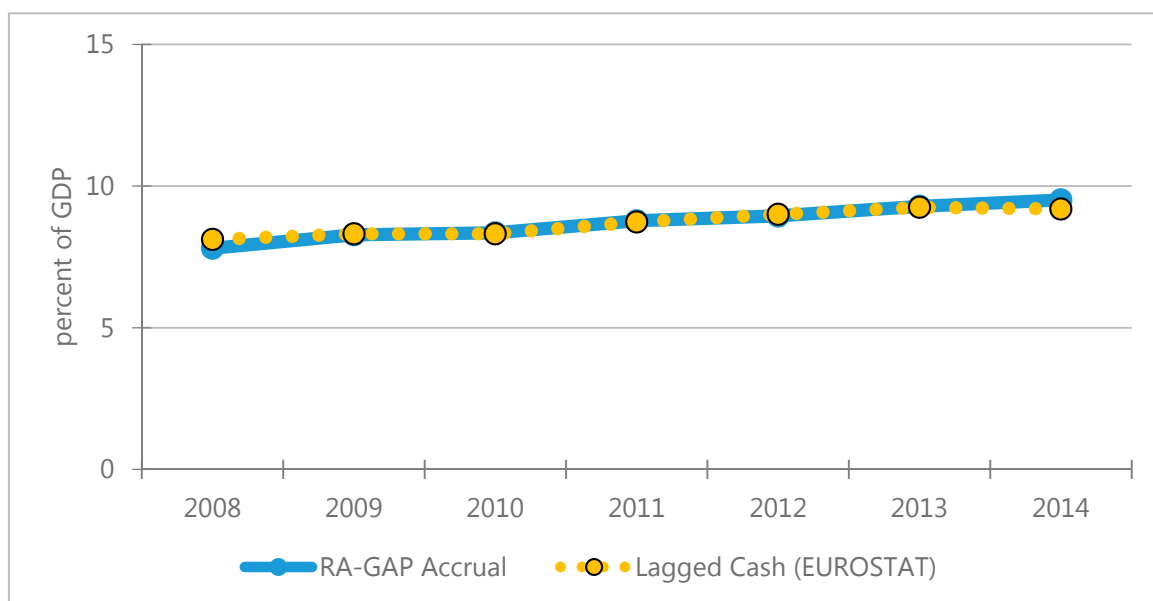
Sources: Eurostat; VERO; and staff calculations.

Differences between the accrual and cash values are largely driven by cash management issues; timing of debt collections, timing of refund payments, and the use of excess credit carry-forward mechanisms (wherein excess VAT credit is not immediately refunded, but is to be used as a credit towards future VAT obligations). Generally speaking there is a tendency for the cash measure to be pro-cyclical. Cash collections improve and excess credit carry forwards accumulate during periods of economic growth, and cash collection worsens and excess credit is drawn down in periods of economic decline. Inflation can also play a role in differing accruals and cash measures. Due to the lag between a tax period and the payment deadline, severe inflation will produce lower ratios of cash collections to economic activity as compared to the accrued collections to economic activity.

3. FURTHER ANALYSIS OF THE COMPLIANCE GAP

23.   **It is not enough to understand how compliance has been changing, it is also necessary to understand why it may have been changing.** While an understanding of how the compliance gap has been changing over time is useful in evaluating the overall performance of a revenue administration, it does not necessarily assist an administration in understanding how to address any compliance issues. This section of the report includes some additional breakdowns of factors which affect the compliance gap in order to better understand what might be contributing to the changes in the compliance gap.

A. Potential and Actual Value-Added Tax

24.   **Both potential and actual VAT, as a share of GDP, exhibited fairly small but constant growth over the period (Figure 17).** The compliance gap, as discussed above is the difference between the potential VAT as estimated using the current policy framework, and accrued actual VAT collections. This means that the changes could be the result of changes in either or both of these measures, and so both should be reviewed when trying to determine where a change in the compliance gap might be coming from. In this case both measures are showing fairly consistent trends, with the actual VAT slowly catching up on the potential.

Figure 17. Potential and Actual Value-Added Tax
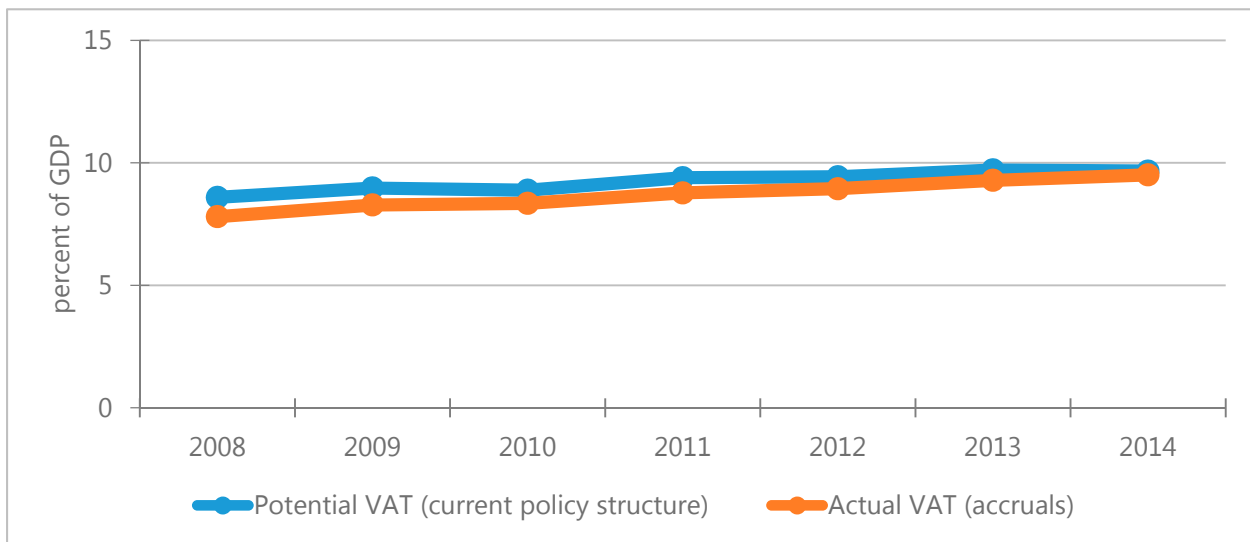
Sources: Finland Statistics; VERO; and staff calculations.

25.   **Potential VAT per sector exhibits a little more year over year volatility than actual VAT in some sectors (Figure 18)**. The general distribution of the collection burden is highly similar however. The most notable discrepancy between the trends—the volatility in the potential VAT for the manufacturing sector—is likely a problem in the allocation of exports between the

manufacturing sector and the trade sector in the potential VAT model.[11] It should also be remembered that the statistical data used to calculate potential VAT for 2013–14 is still preliminary and subject to potential revisions in the future. The negative potential VAT in the "Other" sector is an issue with the statistical data received; the data included values for intermediate consumption that were not attributed to any sector, resulting in input tax credits being calculated that could not be linked to any output.

Figure 18. Trends in Potential and Actual Value-Added Tax by Sector

Sector Code	Sector Description	Sector Code	Sector Description
A-B	Agriculture, fishing, forestry, extractive	J	Information, communication
C	Manufacturing	K-L	Finance, insurance, real estate
D-E	Utilities	M-N	Professional services
F	Construction	O-Q	Public services, education, health care
G-H	Trade, transportation	R-S	Personal services
I	Hospitality	T-Z	Other

Sources: Finland Statistics; VERO; and staff calculations.

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[11] In the statistical data exports of a commodity are assigned to the sector which manufactured them, not the sector which handled the exports (for example, export agents in the trade sector acting on behalf of manufacturers), so the model has to redistribute these values in order to properly attribute the associated zero-rated output.

B. The Compliance Gap by Sector

26.   **The compliance gap appears to be fairly well distributed, with perhaps a slight, but declining, concentration in the construction sector (Figure 19).** While there appears to be a sudden spike in the gap in the manufacturing sector in 2013, this could be a modelling issue, as mentioned above, and so is likely offset by the drop in the gap in the trade sector for that period.

Figure 19. The Compliance Gap by Sector

Sector Code	Sector Description	Sector Code	Sector Description
A-B	Agriculture, fishing, forestry, extractive	J	Information, communication
C	Manufacturing	K-L	Finance, insurance, real estate
D-E	Utilities	M-N	Professional services
F	Construction	O-Q	Public services, education, health care
G-H	Trade, transportation	R-S	Personal services
I	Hospitality	T-Z	Other
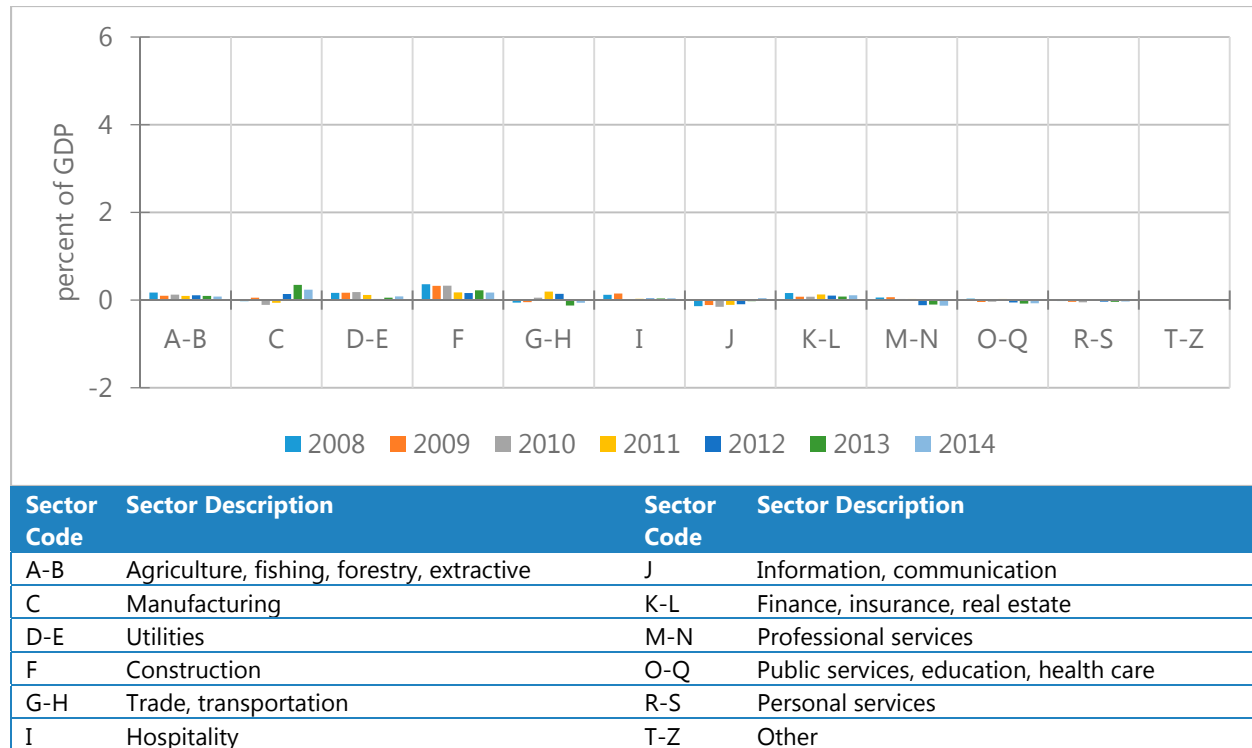
Sources: Finland Statistics; VERO; and staff calculations.

27.   **The larger compliance gap for 2008–10 appears to have been coming from the construction sector, where persistent compliance gaps in 2008–10 decreased sharply in 2011–14.** These results suggest that VERO's recent campaign to improve compliance in the construction sector, which included the introduction of a reverse charge for construction services in 2011, was both well targeted and effective. The apparent gap in the public utilities sector (electricity, water, gas and waste removal services) is likely due to classification differences between national accounts and VAT reporting. In Finland, large paper manufacturers and the peat industry generate heat and electricity both for their own use and for market sale. These market sales will be reported in national accounts as utilities but reported for VAT purposes under the main activity of the companies concerned—causing an apparent gap between potential and actual VAT in the utilities sector and a corresponding increase in actual VAT in the companies' main sector. Typically, as utilities sectors

tend to be dominated by a few well-regulated entities, there should be little to no compliance gap in this sector.

28.   **The negative gaps appearing are either due to modelling issues, misallocation of actual VAT (a business might have the wrong sector code attributed to it in the registry) or due to overestimation of the potential taxable activity.** The first two effects would not affect the overall gap estimate just the distribution of the gap, while the latter effect could imply an overestimation of the overall gap if the potential VAT is on final consumption—in either case the overall impact is quite small. As discussed above, the negative gap for the trade sector is likely due to a misallocation of exports to the sector from the manufacturing sector. The negative gap for the information and communications sector and the professional services sector is likely due to misallocation of the actual VAT—taxpayers are being registered as participating in these sectors when they are really engaged in another. However, it should be borne in mind, these negative gaps are extremely small, and well within likely margins of error for this analysis.

C. Comparison to Other Estimates

29.   **There is one main other source for compliance gap estimates for Finland: the EU-wide estimates commissioned by the EC.** The EC has so far commissioned two main VAT gap studies for the EU; the "Reckon report," published in 2009, and the Center for Social and Economic Research (CASE) studies, published originally in 2013 with updates released in 2014 and 2015.[12] As the Reckon reported only covered the period 2000–06 their results will not be included in this comparison.

30.   **The RA-GAP results are consistent with the latest CASE results (Figure 20).[13]** While the general level of the RA-GAP results are consistent with the CASE results, there is a distinct difference in the trend. The CASE results indicate an abrupt increase in 2010, and then a drop back down to the 2009 level. The RA-GAP results however show a spike in the following year, 2011. It should be noted though that the differences between these three estimates are within a relatively narrow band of a quarter point of GDP.

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[12] Reckon, 2009: "*Study to quantify and analyse the VAT Gap in the EU-25 Member States,*" Reckon LLP, September 2009.
CASE, 2013; "*Study to quantify and analyse the VAT Gap in the EU-27 Member States*" Final Report Taxation and Customs Union (TAXUD)/2012/DE/316 for the EC, TAXUD.
CASE, 2014; "*2012 Update Report to the Study to quantify and analyse the VAT Gap in the EU-27 Member States,*"
TAXUD/2013/DE/321 FWC No TAXUD/2010/CC/104 for the EC TAXUD.
CASE, 2015; "*Study to quantify and analyse the VAT Gap in the EU Member States 2015 Report*" TAXUD/2013/DE/321 FWC No TAXUD/2010/CC/104 for the EC TAXUD.

[13] The 2013 CASE result is shown in figure 20 for completeness. However, the authorities believe it is too high, because it overstates VAT liability—for example, imputed rents are included in the VAT base. Subsequent revisions by CASE in 2014 produce estimates much closer to both the authorities' expectations and RA-GAP estimates.

Figure 20. Comparison of Compliance Gap Estimates
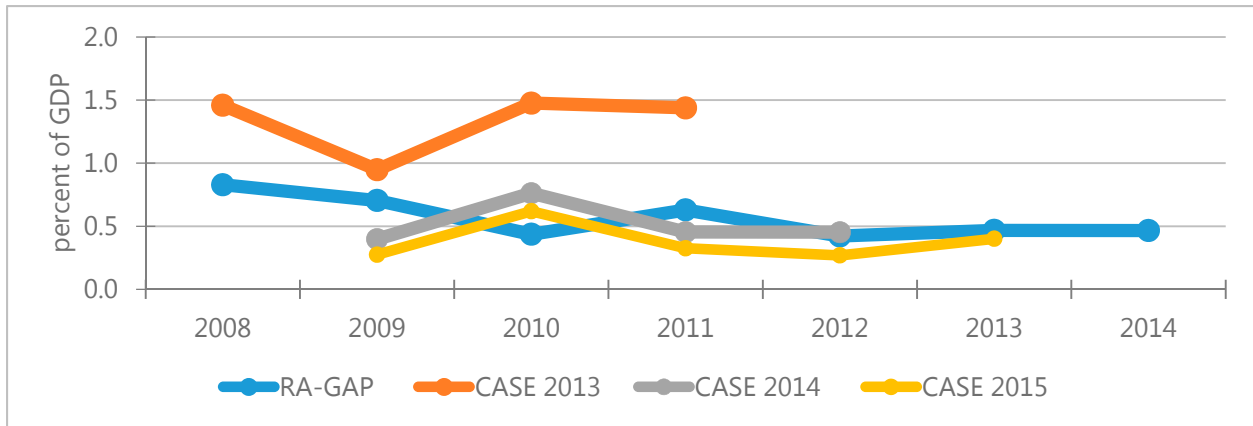
Sources: Center for Social and Economic Research; Finland Statistics; VERO; and staff calculations.

4. OTHER ANALYSIS

A. Value-Added Tax Compliance Analysis by VERO

31.   **The RA-GAP results are consistent with the authorities' own risk assessment and strategic priorities**. Operational intelligence available to VERO also suggests a low tax gap generally, but a persistent compliance gap in the construction sector (above). Evidence for the low compliance gap estimated by RA-GAP and CASE includes the results from annual taxpayer attitude and customer satisfaction surveys run by VERO. These consistently show very high levels of taxpayer morale and appreciation of VERO's effectiveness and customer satisfaction levels (Figure 21). Staff satisfaction levels within VERO are also very high, indicating high levels of professionalism. Communications and the communications strategy presented by VERO stress a balanced combination of positive engagement with compliant taxpayers and proportionate sanctions for noncompliant taxpayers (in line with generally accepted best practice).

Figure 21. Selected Results from VERO's Annual Customer Surveys
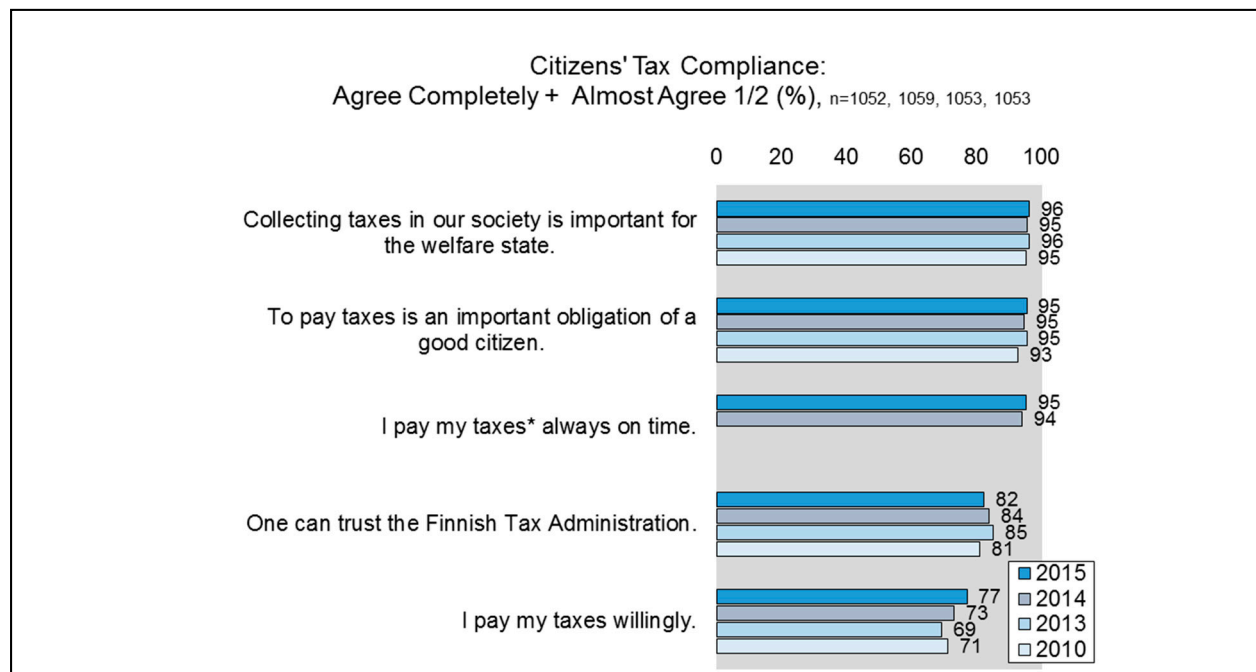
32.   **Detailed RA-GAP results also provide positive indicators of VERO's effectiveness in two key areas.** The sustained reduction in the compliance gap in the construction sector from 2011 strongly indicates the effectiveness of the compliance measures implemented in that year and subsequently. Although VAT revenues dipped in 2009–10, this was due to the economic effects of the great recession and does not appear to have been due to higher noncompliance, particularly not the higher payment noncompliance observed in many countries at that time. This suggests active

management of taxpayers' short-term cash issues by VERO, so that short-term arrears did not become long-term or bad debt.

33.   **In addition to monitoring regular VAT risks, VERO established their Grey Economy Information Unit in 2011.** An independent study commissioned by the Finnish parliament in 2009 found that the grey economy accounts for about 6–7 percent of GNP in Finland, with consequential tax losses of around EUR 4–6 billion per year. There was some criticism of the methodology used in the study, but these results are broadly consistent with RA-GAP's findings. The grey economy is considered by the authorities to be a high priority compliance risk, not just in VAT or tax but in regulated areas more generally. VERO established their Grey Economy Information Unit in 2011 to collate and disseminate information about grey economy activities, and liaise with other enforcement and compliance agencies. The outputs of the Unit include:

- Strategic assessments of the threat in particular segments of the population, usually in response to a request from an operational unit.

- Compliance reports for individual taxpayers using data taken from the extensive registry data available to the Unit, which are made available to a number of official agencies. These individual reports may be compiled individually, semi-automatically or automatically by large-scale data matching exercises. The number of such individual reports has risen exponentially since the inception of the unit, and now numbers around 200,000 per year.

34.   **The Grey Economy Information Unit publishes an annual report that summarizes studies conducted by the unit during the preceding year**.[14] The unit also publishes an annual statistics digest.[15] The National Audit Office has also recently published a report on the grey economy in Finland, focusing on counter-measures and operations.[16]

35.   **VERO is developing its internal quantitative analysis capability in risk**. Quantitative analysts embedded in VERO's operational units are developing risk profiles and other tools for automated risk identification and case selection. This should help inform VERO tax gap estimates in future years.

B. Other tax gap analysis by VERO

36.   **VERO has reported indirect tax gap estimates for the tax year 2013 to the Finnish Parliament.** Originally mandated by Parliament to produce tax gap estimates for all major taxes, the Finnish Tax Authority and Customs delivered their estimates for VAT and excise duties to Parliament

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[14] For example, *"The Grey Economy 2014"*, Grey Economy Information Unit, Finnish Tax Administration, link: http://www.vero.fi/download/The_Grey_Economy_2014/%7BB108A9DB-3AD6-4377-8D54-47349CA2D496%7D/10269.

[15] http://www.vero.fi/download/Grey_Economy_Control_Statistics_2014/%7BBB010B5A-5282-4568-81A5-D65CB5917D90%7D/10756.

[16] https://www.vtv.fi/files/4850/14_2015_Programmes_for_combating_the_grey_economy_and_coordinating_the_work_.pdf.

for the tax year 2013. Work is ongoing to develop means of estimating the direct tax gaps, using random audit programs (below) and predictive analytics applied to regular audit results. Large-scale data-matching exercises are also being undertaken, to identify income received (e.g. bank interest and dividends) by Finnish taxpayers but not declared. Provisionally, desk audit results for income taxes suggest a tax gap of around 1 percent. Random audits in agriculture and forestry indicate a tax gap of around 2.5 percent.

37.   **Customs estimate tax gaps in indirect tax are up to 7 percent of potential collections (Table 1)**. The estimates produced by Customs are based on extrapolation from audit results. Because of the uncertainties inherent in this approach, the estimates are presented as ranges. The VAT gap used by VERO is based on CASE results (above). Customs is reviewing other ways to estimate indirect tax gaps in the future, but has encountered a challenge in trying to identify consumption data that are sufficiently independent of tax data to provide an appropriate estimate of the tax base.

Table 1. Indirect Tax Gaps, 2013

Head of Duty	Tax Gap (In percent of Total Tax)	Tax Gap Amount (In € millions)
Customs	**5–7**	**131–170**
- Warehousing and transport		31–40
- Imports and other customs		100–130
Excise	**2–4**	**160–259**
- Tobacco	4–7	34–60
- Snuff	*(no legal market)*	32–48
- Alcohol	5–6	63–81
- Liquid fuels	0.5–1.5	15–44
- Sweets, ice cream, and soft drinks	2–4	4–8
- Beverage containers	60–80	9–12
- Other excise duties		3–6
Car tax	**2**	**16**
Nonpayment	**0.25**	**26**

Source: Finnish Customs Agency.

38.   **VERO's planned expansion of its random audit programs, should enable direct tax gap analysis.** Currently, limited random audit programs are in place for specific taxpayer segments in Finland, for example agriculture and forestry. These results of these programs suggest high compliance rates, over 95 percent. However, applying predictive analytics to regular audit results indicates much higher noncompliance, which suggests persistent selection bias in the results not removed in the predictive modelling process. VERO is planning to implement a more comprehensive random audit program, using a representative sample of 500 small and medium enterprises. The corporate income tax and VAT declarations by each entity selected for the exercise will be comprehensively audited by VERO field staff. The program is to be implemented in 2016, with the

last audit due to take place in March 2017. The program is designed to provide data in the following areas:

- Tax compliance gaps.
- Accuracy of registration details.
- Tax procedures.
- Corporation demographics.

C. Observations and Possible Future Work

39. **VERO has an advanced analytical capability, and should continue with its existing and planned tax gap analysis.** For VAT, the EC is publishing annual estimates of the VAT gap in all member states (CASE, above), using a well-established approach; and this reduces the need for VERO to produce their own, independent estimates, However, maintaining some analytical capability in this area will allow them to understand and interpret the results. In other taxes, VERO is working to improve existing estimates for indirect taxes and develop new estimates for direct taxes; and this should continue.

40. **The quality and coverage of data available to VERO is excellent, allowing them to develop a more analytical approach to risk management.** This process is underway, with embedded analysts in VERO's operational unit, and in the approach to identifying compliance risks and targets by the Grey Economy Information Unit. The advantage of such operationally-based analytical functions is that they facilitate close working between quantitative analysts and operational specialists. The working relationship between analysts in different operational units also needs to be encouraged and supported, to maximize the sharing of professional knowledge and standards.

41. **It is recommended that VERO publish its tax gap analysis and estimates of tax gaps in Finland.** VERO already demonstrates its support for the transparency agenda by publishing regular reports on tax morale and its own performance. It also publishes annual updates on the impact of the grey economy in Finland. Publication of its tax gap estimates, and the methodology behind them, would complement existing publications, setting them in their strategic context and allowing an evaluation of the strategic performance of VERO.

APPENDIX I. Data Tables for Included Figures

Table 2. Data for Figure 5: Value-Added Tax Revenues

Year	VAT Revenue (In EUR billions)	VAT to GDP (In percent of GDP)
2000	10.869	8.0
2001	11.118	7.7
2002	11.731	7.9
2003	12.487	8.2
2004	13.010	8.2
2005	13.748	8.4
2006	14.537	8.4
2007	15.207	8.2
2008	15.658	8.1
2009	15.176	8.4
2010	15.533	8.3
2011	17.315	8.8
2012	17.987	9.0
2013	18.763	9.3
2014	18.855	9.2

Table 3. Data for Figure 6: C-Efficiency Ratios for Finland and Average for Europe

Year	Finland	Average for Europe
2000	0.61	0.53
2001	0.58	0.54
2002	0.59	0.54
2003	0.60	0.55
2004	0.60	0.57
2005	0.60	0.59
2006	0.61	0.60
2007	0.60	0.61
2008	0.58	0.59
2009	0.56	0.54
2010	0.55	0.56
2011	0.56	0.55
2012	0.56	0.55
2013	0.55	0.55
2014	0.54	0.54

Table 4. Data for Figure 7: Average C-Efficiency for
Europe over the Period 2000–13

Row Labels	C-Efficiency Ratio
Luxembourg	0.93
Croatia	0.80
Cyprus	0.75
Switzerland	0.73
Estonia	0.71
Slovenia	0.64
Austria	0.61
Latvia	0.60
Denmark	0.60
Bulgaria	0.59
Norway	0.59
Finland	0.58
Malta	0.57
Overall average	*0.57*
Albania	0.57
Ireland	0.56
Germany	0.56
Sweden	0.55
Netherlands	0.55
Iceland	0.54
Portugal	0.52
Czech Republic	0.52
Hungary	0.52
Lithuania	0.51
Slovak Republic	0.50
Romania	0.50
France	0.50
Spain	0.49
Belgium	0.49
United Kingdom	0.47
Poland	0.45
Greece	0.44
Italy	0.41

Table 5. Data for Figures 1 and 8: Value-Added Tax Compliance Gap

Year	Compliance Gap (In Percent of Potential)	Compliance Gap (In Percent of GDP)
2008	10	0.8
2009	8	0.7
2010	5	0.4
2011	7	0.6
2012	5	0.4
2013	5	0.5
2014	5	0.5

Table 6. Data for Figure 9: The Assessment and Collection Gap

(In percent of GDP)

Year	Actual VAT	Collection Gap	Assessment Gap
2008	7.8	0.3	0.5
2009	8.3	0.2	0.5
2010	8.3	0.1	0.3
2011	8.8	0.1	0.5
2012	8.9	0.1	0.3
2013	9.3	0.2	0.3
2014	9.5	0.2	0.3

Table 7. Data for Figure 10: The Value Added Tax Policy Gap versus Compliance Gap

(In percent of GDP)

Year	Policy Gap	Compliance Gap
2008	5.4	0.8
2009	6.1	0.7
2010	6.7	0.4
2011	6.5	0.6
2012	6.9	0.4
2013	7.3	0.5
2014	7.4	0.5

Table 8. Data for Figure 11: The Efficiency and Expenditure Gap

(In percent of GDP)

Year	Actual VAT	Expenditure Gap	Efficiency Gap
2008	7.8	0.3	5.0
2009	8.3	0.5	5.6
2010	8.3	1.0	5.5
2011	8.8	0.9	5.5
2012	8.9	0.9	5.7
2013	9.3	1.0	6.2
2014	9.5	1.0	6.4

Table 9. Data for Figures 3 and 12: The Tax Gap, Compliance Gap, and Policy Gap

(In percent of GDP)

Year	Overall VAT gap	Policy Gap	Compliance Gap
2008	6.1	5.4	0.8
2009	6.8	6.1	0.7
2010	7.0	6.5	0.4
2011	7.0	6.4	0.6
2012	7.1	6.6	0.4
2013	7.7	7.2	0.5

Table 10. Data for Figure 13: Actual Value-Added Tax and Components of the Gap

(In percent of GDP)

Year	Actual VAT	Collection Gap	Assessment Gap	Expenditure Gap	Efficiency Gap
2008	7.8	0.3	0.58	0.3	5.1
2009	8.3	0.2	0.5	0.5	5.6
2010	8.3	0.1	0.3	1.0	5.5
2011	8.8	0.1	0.5	0.9	5.5
2012	8.9	0.1	0.3	0.9	5.7
2013	9.3	0.2	0.3	1.0	6.2
2014	9.5	0.2	0.3	1.0	6.4

Table 11. Data for Figure 14: The Inverse of the Value-Added Tax Gap and C-efficiency Ratio

(In percent of GDP)

Year	Actual VAT	C-Efficiency Ratio
2008	56	0.58
2009	55	0.55
2010	54	0.54
2011	55	0.55
2012	55	0.56
2013	54	0.55
2014	54	0.54

Table 12. Data for Figure 15: Impact of the Tax Gap Components on C-Efficiency

(In percent of change over previous year)

Year	Cash Effect	Compliance Gap Effect	Expenditure Gap Effect	Efficiency Gap Effects	Change in C-Efficiency
2008					0.0
2009	-2.0	0.9	-1.6	-0.5	-3.2
2010	-0.4	1.0	-2.8	0.8	-1.4
2011	0.0	-0.3	0.9	1.1	1.6
2012	0.6	0.9	0.3	-1.2	0.6
2013	-0.5	0.5	-0.5	-0.6	-1.2
2014	-1.7	1.6	0.0	-0.7	-0.8

Table 13. Data for Figure 16: RA-GAP Accrual Measurement and Official Values for Value-Added Tax Collections

(In percent of GDP)

Year	RA-GAP Accrual	Lagged Cash (EUROSTAT)
2008	7.8	8.1
2009	8.3	8.3
2010	8.3	8.3
2011	8.8	8.7
2012	8.9	9.0
2013	9.3	9.3
2014	9.5	9.2

Table 14. Data for Figure 17: Potential and Actual Value-Added Tax

(In percent of GDP)

Year	Potential VAT (Current Policy Structure)	Actual VAT (Accruals)
2008	8.6	7.8
2009	9.0	8.3
2010	8.9	8.3
2011	9.4	8.8
2012	9.4	8.9
2013	9.7	9.3
2014	9.7	9.5

Table 15. Data for Figure 18: Potential and Actual Value-Added Tax by Sector

(In percent of GDP)

	Sector	2008	2009	2010	2011	2012	2013	2014
Potential VAT	Agriculture, fishing, forestry, extractive	0.2	0.2	0.3	0.2	0.2	0.3	0.2
	Manufacturing	0.1	0.4	0.1	0.2	0.6	0.6	0.6
	Utilities	0.5	0.5	0.6	0.6	0.5	0.6	0.6
	Construction	1.3	1.3	1.3	1.1	1.1	1.1	1.0
	Trade, transportation	4.3	4.0	4.2	4.4	4.2	4.2	4.1
	Hospitality	0.3	0.3	0.1	0.1	0.1	0.1	0.1
	Information, communication	0.5	0.6	0.6	0.6	0.7	0.8	0.8
	Finance, insurance, real estate	0.1	0.3	0.4	0.4	0.4	0.4	0.5
	Professional services	1.0	1.1	1.1	1.2	1.1	1.1	1.1
	Public services, education, health care	0.1	0.2	0.2	0.4	0.4	0.5	0.4
	Personal services	0.0	0.0	0.0	0.1	0.1	0.1	0.1
	Other					0.0	0.0	0.0
Actual VAT	Agriculture, fishing, forestry, extractive	0.1	0.1	0.2	0.1	0.1	0.2	0.2
	Manufacturing	0.1	0.3	0.2	0.2	0.4	0.2	0.3
	Utilities	0.3	0.3	0.5	0.5	0.5	0.5	0.5
	Construction	1.0	1.0	1.0	1.0	0.9	0.9	0.9
	Trade, transportation	4.3	4.1	4.1	4.2	4.1	4.3	4.2
	Hospitality	0.2	0.2	0.1	0.1	0.1	0.1	0.1
	Information, communication	0.7	0.7	0.7	0.7	0.8	0.8	0.8
	Finance, insurance, real estate	0.0	0.3	0.3	0.3	0.3	0.3	0.4
	Professional services	1.0	1.0	1.1	1.2	1.2	1.2	1.3
	Public services, education, health care	0.1	0.2	0.2	0.4	0.5	0.5	0.5
	Personal services	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 16. Data for Figures 2 and 19: The Compliance Gap by Sector

(In percent of GDP)

Sector	2008	2009	2010	2011	2012	2013	2014
Agriculture, fishing, forestry, extractive	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Manufacturing	0.0	0.1	-0.1	-0.1	0.1	0.4	0.2
Utilities	0.2	0.2	0.2	0.1	0.0	0.1	0.1
Construction	0.4	0.3	0.3	0.2	0.2	0.2	0.2
Trade, transportation	-0.1	0.0	0.1	0.2	0.1	-0.1	-0.1
Hospitality	0.1	0.2	0.0	0.0	0.0	0.0	0.0
Information, communication	-0.1	-0.1	-0.2	-0.1	-0.1	0.0	0.0
Finance, insurance, real estate	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Professional services	0.1	0.1	0.0	0.0	-0.1	-0.1	-0.1
Public services, education, health care	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.1
Personal services	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 17. Data for Figures 4 and 20: Comparison of Compliance Gap Estimates

Year	RA-GAP	CASE 2013	CASE 2014	CASE 2015
2008	0.8	1.5		
2009	0.7	0.9	0.4	0.3
2010	0.4	1.5	0.8	0.6
2011	0.6	1.4	0.5	0.3
2012	0.4		0.5	0.3
2013	0.5			0.4
2014	0.5			

APPENDIX II. The Revenue Administration-Gap Analysis Program Model and Methodology

A. Introduction

RA-GAP aims at estimating potential tax revenues from macroeconomic data, and finding out the magnitude of gap by comparing it to appropriately evaluated actual tax revenues. In order to analyze the gap, the best way is to break down both revenue data into economic sectors and trace the trend of gap through time. This enables us to capture the reasons for fluctuations in the overall gap indicator, whether due to changes in potential revenue or to compliance issues in specific sectors.

The difference between the potential revenue under the current tax rules with full compliance and the actual revenue is called a compliance gap. RA-GAP will treat this gap as a representative indicator, and analyze its level and changes. Other indicators based on hypothetical tax legislation and the analyses of effects due to changes in tax policies ('policy gap' in RA-GAP) will be provided as supplementary components to help to explain the level and changes of potential revenues and gaps.

The general approach of the RA-GAP methodology is to estimate the size of the compliance gap on a *top-down* basis. That is, it sets out to estimate the total size of compliance losses by comparing actual VAT collections to potential VAT collections estimated from economic statistics covering the whole of the VAT tax base. The critical advantages of this approach are that (a) it should cover all compliance losses, whether or not they have been separately identified; and (b) the results can be compared to the costs of tax expenditures and reliefs as barriers to revenue mobilization. The alternative, *bottom-up*, approach of estimating losses of each behavioral component of the compliance gap individually may also be used to help identify drivers of the total gap.

Estimating Potential Value-Added Tax Revenue

Potential tax revenue can be generally calculated as the sum of the product of potential tax bases and corresponding statutory tax rates. For VAT, there are several approaches to estimate the tax bases from macroeconomic statistics, e.g., from simply taking final consumption or by capturing the ends of VAT chains by looking at demand data.

In the RA-GAP, the aim is to deal with each sector's value added, i.e., output minus input, as VAT tax bases. Tracking value added by each sector along the line of production chains is exactly how VAT due is actually determined. In addition, in real VAT systems there are a large number of different treatments for commodities and sectors, such as exemption and the application of different tax rates. This approach enables us to directly reflect such systems in the estimation of overall potential tax revenues. It also carries an advantage that sectoral potential revenues can

be easily estimated and matched to actual sectoral tax collections in the analysis, which enables the identification of causes of the level and changes to the overall gap.

It may be possible to adopt other approaches, such as using detailed household surveys and demand data, depending on the nature and quality of available data in a specific country. The worth of any method depends on the quality of data, and alternative approach might produce more reliable estimate if the used data are more reliable than the value added approach.

It should be noted that any approaches using macroeconomic statistics have error margins— due to simplifications in modeling and difficulty in measuring the full impact of the shadow economy. In addition, this kind of top-down approach in estimating potential revenues carries an inherent risk of overestimating potential VAT within the extant tax law because of tax avoidance activities and other questions of legal interpretation. Those may be technically complying with tax rules, but the reduction of revenue cannot easily be captured in the estimation. Without a specific adjustment, it would therefore be included in the compliance gap number, even though it requires a policy response or litigation, not administrative measures.

Determining the Corresponding Actual Value-Added Tax Revenue

The next step is to measure the amount of actual VAT collections. Tax is obviously collected in cash and all tax authorities record yearly cash collections, netting out payments and refunds during the period. However, in the analysis of RA-GAP, it is important to compare the potential tax revenue with the amount actually collected out from that potential in order to trace correctly the relative changes in compliance. Since cash collection in a specific period does not necessarily correspond to the tax due that accrued in the same period, it is necessary to allocate the cash collection data to the periods in which tax due actually accrued.

In general, yearly cash collection is the most eye-catching data, not least because total cash payments are one of the most reliable sets of data. The RA-GAP approach will use cash collection data, but it will link collected tax revenue and underlying economic activities. This can be achieved through fully utilizing the vast volume of individual tax return and payment records available to tax authorities. This procedure helps us to capture the real trend of the compliance gap without the effects of concurrent lags in payments and refunds. Where appropriate, the RA-GAP estimates will be reconciled to cash-based estimates so as to allow tax administrations to better understand this linkage.

The tax collection data will be sorted out into sectors in the economy, and compared to the potential revenues for each sector. Using sectoral or institutional collections data will help us to understand trends, by considering specific features. A comparison of potential VAT collections against actual collections for each individual sector also allows us to identify those sectors with larger compliance gaps, and thus some insight as to the nature and placement of noncompliance in the country.

It would be also useful to take into account assessment data showing amounts assessed but not yet collected at specific points. Such data will also help analyzing the causes of changes in compliance level, and may give useful information of a need for streamlining systems such as investigation, assessment and enforcement.

Relative Size of 'Compliance Gap' to 'Policy Gap'

RA-GAP will treat a compliance gap as a representative indicator, and analyze its level and changes. As a further analysis, the magnitude of the compliance gap can be compared with the impact of policy measures, by using the indicators based on hypothetical tax legislation and the analyses of effects due to changes in tax policies. RA-GAP will provide this indicator as a 'policy gap' (Figure 19). This analysis can provide policy makers and administrators with a perspective on necessary actions for revenue mobilization.

B. Measuring Potential Revenues for a Value-Added Tax

The RA-GAP employs a model designed to estimate the taxable value-added across all sectors of the economy. The approach is similar in structure to the method individual taxpayers use to determine their individual liabilities. The tax liability for an individual taxpayer is determined by the amount they pay customs on their imports, plus the VAT they must charge on their output sold domestically (exports being zero-rated), less the VAT they paid on their inputs. The value-added model works with statistical data available through national accounts supply-use tables, or input-output tables, to estimate the potential amount of tax on imports by a sector, plus the tax applicable to the output of a sector, less the amount of input tax credit due the sector.[17]

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[17] An alternate model structure for estimating the potential revenues for a VAT is to use statistical data on final consumption to determine the VAT paid by the end consumer, and then add an estimate of the amount of final VAT borne by exempt businesses using statistics on intermediate demand. In theory both methods should yield similar results, as they are both theoretically identical definitions of the potential tax base. This equivalence is similar to the basic National Accounts identity:

$$C \ [+G] \ = \ Y - I - X + M \ [- G]$$

The consumption based approach to estimating the base would be represented by the left-hand side of the equation, with the value-added based approach represented on the right hand-side. "G" is appearing as potentially being on either side of the equation, as its location, for a VAT gap model, would depend on the precise treatment of government—whether they have to pay tax on their purchases, and so more closely relate to final consumption, or whether they are not subject to the VAT and so are excluded from the potential VAT base.

The Potential Revenues Model

The value-added based potential revenues model is:

$$PV^s = \sum_c (M_c^s \times \tau_c) \times r^s + \left[\sum_c (Y_c^s - X_c^s) \times \tau_c\right] \times r^s - \left[\sum_c (N_c^s + I_c^s) \times \tau_c\right] \times r^s \times (1 - e^s) \times \eta_c^s$$

Where,

PV^s = the potential net VAT for a sector,

M_c^s = imports by sector s of commodity c,

Y_c^s = output by sector s of commodity c,

X_c^s = exports by sector s of commodity c,

N_c^s = intermediate demand (consumption) by sector s of commodity c,

I_c^s = investment by sector s of commodity c,

τ_c = the VAT rate that applies to commodity c (zero if zero-rated or exempt),

η_c^s = the proportion of input tax credits for commodity c by sector s allowed to be claimed,

r^s = the proportion of output for a sector produced by registered businesses, and

e^s = the proportion of output for a sector which is exempt output.

Values for each of these variables are determined as follows:

Y, X, M, N, and I: Data for these variables is obtained from their respective components in statistical supply-use (or input-output) tables. The data for the external trades, X and M, require some adjustment before being input into the model; this adjustment is described below.

τ_c: This is the first of the two "policy variables" in the model. The values for τ_c are obtained from the tax rate structure for each commodity, except for trade services. The explanation and method for the trade services are described below. For the calculation of hypothetical revenues under reference tax structure, the standard rate is assigned to the full vector τ_c, apart from those supplies typically exempted internationally (margin-based financial services, life insurance, and residential rents).

η_c^s: This is the second policy variable in the model. The values in estimating current potential revenues are determined by any specific statutory limitations on input tax credits, such as a general disallowance of input tax credits for restaurant meals; such a disallowance would be indicated by a value of 0 for the commodity of restaurant meals across all sectors; the default value is 1. All values in η_c^s are set to 1 for the calculation of revenues under reference tax structure.

r^s: Estimates for the values for r^s are determined in conjunction with the authorities, possibly making use of business licensing data, or Customs transactions data.[18]

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[18] There is an assumption here that the same value of r^s applies across Y, X, I, and N. It can be shown that this assumption is only of consequence if there are any significant difference between the level of r^s for Y and X. As the level of r^s is generally fairly close to one, the results are not that sensitive to this assumption. As such, while it might be more technically correct to come up with separate values for Y and X, this would likely greatly increase the time and effort required to construct the model with no discernible difference in the final results.

e^s: The proportion of output for a sector which is taxable is a function of τ_c. The values for e^s are determined by comparing the value of exempt output in a sector to the total output of the sector. That is $e^s = \sum_c(Y_c^s \times \tau'_c)/\sum_c(Y_c^s)$, where τ'_c is a vector which distinguishes whether commodity c is exempt ($\tau'_c = 1$) or taxable ($\tau'_c = 0$).[19]

Adjustments for Variables X and M

Adjustments to the raw statistical data for exports and imports as supplied by the supply-use tables (or input-output table) are necessary. Specifically the values for exports needs to be adjusted to remove the value of domestic consumption by nonnationals, and the value of consumption abroad by nationals which is included in the values for imports needs to be removed.[20]

Determining the Weighted Average Statutory Rate for the Output of the Trade Sector

To determine the value for τ_c applicable to the retail and wholesale trade services, a weighted average statutory rate is determined based on the trade margins by commodity type. This rate is determined as follows:

$$\tau_T = \sum_{c'}(\tau_{c'} \times K_{c'})/\sum_{c'}(K_{c'}) \ ,$$

where,

τ_T = the weighted average statutory rate for the trade services commodities,
$\tau_{c'}$ = the statutory rate for commodity c', where c' includes all commodities but the trade services commodities, and
$K_{c'}$ = is the trade margins associated with commodity c'.

Accommodating Complexities in the Policy Structure

While the two policy variables τ_c and η_c^s can be used to model most policy structures, there are some structures which they are able to accommodate. There are too not uncommon

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[19] This assumes that the proportion of inputs to output used in producing the taxable supplies and nontaxable supplies is identical. While this is most likely not the case for any individual taxpayer, many jurisdictions use just such an apportionment rule to determine the allowable amount of input tax credits for businesses making split supplies (taxable and exempt supplies). In such case this model treatment would exactly coincide with the statutory requirement. In jurisdictions where taxpayers are allowed to apportion their supplies based on actual use, e^s could be determined by tax return data on the proportion of input tax being creditable to those sectors with exempt output—presuming the required information is being captured on the return.

[20] In a best case scenario the supply and use tables will specifically include the data used for these out these special categories of imports and exports (domestic consumption by nonnationals, and consumption abroad by nationals) making it simple to adjust the tables to the definitions for VAT purposes. In cases where this specific data is not available, an approximation can be made by removing values for the import or export of services which are typically consumed at the place of supply—such as hotel and restaurant supplies, and local transportation supplies.

circumstances in particular which either requires adjustments to the inputs into the model, or adjustments to the structure of the model:

   a) a tax structure that has provisions which relate to a sector as a whole, as opposed to a particular type of supply or commodity; for example an exemption which applies to the financial sector instead of particular financial services; and

   b) a tax structure that has special provisions for particular types of transactions; for example the zero-rating of certain otherwise taxable business-to-business transactions.

Sector Specific Tax Rates

Sector specific tax rates can be accommodated by using a sector by commodity matrix of tax rates, τ_c^s, instead of the simple vector in commodity space, τ_c, for the treatment of the tax to be applied to output, and in the computation of input tax credits. The simple τ_c vector of rates would still apply against imports.

The calculation of e^s also needs to be adjusted in such cases. Instead of using $\sum_c(Y_c^s \times \tau'_c)$, to determine e^s, as specified in the equation above, the calculation would include the term $\sum_c(Y_c^s \times \tau_c^{s'})$, where $\tau_c^{s'}$ is a matrix of specific vector of ones and zeros, with one indicates an exempt commodity c for sector s–so $\tau_c^{s'}$ would have a vector of zeros for any exempt sectors.

Transaction Specific Treatments

Dealing with transaction specific treatments, where a different rate schedule might apply to a supply depending on the nature of either the supplier or recipient generally requires additional data on the value of these supplies. These specific treatments cannot, in fact be accommodated in the model and must be dealt with on the data side. There are two classes of these types of transactions, taxpayer-to-taxpayer transactions, and taxpayer-to-final consumer transactions. These two classes of transactions require separate treatments.

   a)   *Taxpayer-to-taxpayer transactions*

There are two potential solutions to deal with this circumstance: split the commodity into two component commodities based on their tax treatment, or to ignore such transactions. To split a commodity requires adding a new commodity to the supply use tables and to the policy variables. Adjustments to both the output and input variables would be needed. This treatment requires data on the value of these transactions.

It is also possible to simply ignore these transactions. These transactions have no net impact on the overall gap estimate; they only impact the value of the gap at the sectoral level. The gap for one sector in the transaction will include some of the gap which should be allocated to the other sector.

   b)   Taxpayer-to-final consumer transactions

Again special tax treatments under this category require treatment on the data side. In this case the final estimate of the potential VAT from the retail sector would need to be reduced by external estimates of the cost of the tax expenditure.

C. Measuring Actual Collections

The RA-GAP measures actual tax collections from the same economic activities upon which potential revenues are estimated. It requires reallocation of cash collection data into the periods in which tax due actually accrued.[21] These reallocated data are called 'accrued collections,' formulated as follows:

$$AV^s \,=\, C^s + \, P^s - \, R^s \,(+ \, OP^s)$$

Where,

   AV^s = accrued VAT collections for the period;
   C^s = collections at customs in the period;
   P^s = payments received for the period;
   R^s = excess credit accrued for the period; and
   OP^s = payments offset by excess credit (excess credit carried forward to offset tax due, or excess credit accrued for the period used to offset tax owing for the past periods).

Values for each of these variables are determined as follows:

   C^s: Collections at customs in the period, by sector, are obtained from the customs declaration database. Declaration data necessary to determine these amounts includes: the value of VAT payments on imports, the date of entry for the declaration the payment is associated with, and the sector of activity for the taxpayer making the declaration.
   P^s: Payments received for a period is obtained from the payments transaction database. The data needed from the payment transactions database would include: the value of VAT payments made (exclusive of interest or penalties), the date of payment, the tax period for which the payment is for, and the sector of the taxpayer who made the payment.
   R^s: To determine the amount of excess credit in a tax period, data from the tax returns database is required.[22] The data to be extracted would include: the value of excess credit, the

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[21] While in the long run cash collections and accrual cash collections should balance out, there can be wide variations between the two for a given period, as cash collections will include arrears collections from other periods and the stock of arrears changes.

[22] While the transactions database may include data on actual refunds paid, data on the value of excess credits accrued in a period will be needed in order to properly measure the accrued collections. If the excess credit is used to offset other tax obligations, it should be recognized as a reduction in net VAT collections.

tax period the excess credit return was submitted for, the date of filing for the return, and the sector of activity of the taxpayer who filed the return.[23]

OP^s: This variable only applies in jurisdictions where taxpayers are required, or allowed, to carry excess credit generated in one period forward for use against any obligations in the next period, in place of a refund request, or to offset past tax liabilities by excess credit. These data would again need to be obtained from the tax return database, in addition to the related tax period, and the sector of the taxpayer.[24]

There are a few additional nuances to the tax return and payments data necessary to consider when completing gap estimates, which are discussed below.

D. Measuring and Reporting the Compliance Gap

The compliance gap, as stated above, is measured by the current potential collections, as determined in step 1, minus the actual collections, as determined in step 2. As the value for accrued collections will change over time, the value for the gap will change over time. There are two general measures that RA-GAP uses in order to provide standardized static measures of the compliance gap which can be used comparatively over time, and across jurisdictions:

1) the compliance gap at the time of filing; and
2) the compliance gap at the time of Estimation.

The methods for measuring these two indicators, specifically the data considerations, are provided below. In addition there are some other measures which could be conducted dependent on data availability.

The Compliance Gap at the Time of Filing

The compliance gap at the time of filing is measured at the original filing/payment deadline. In measuring the accrued collections, data for P^s, R^s, and OP^s are filtered to only select payments and returns received before their appropriate deadlines. The tax return data selected for R^s and

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[23] In order to properly measure excess credit for a given period, it may be necessary to compute it from some of the fundamental line items on the return, rather than using the reported value for net tax owing. The proper computation of net tax for the period should be: output tax on supplies made in the period, plus any self-assessed VAT on imports, minus VAT paid on inputs used in making taxable supplies. If this value does need to be recomputed, it will need to be computed on a taxpayer by taxpayer basis.

[24] The amount of excess credit used to offset tax owing is generally not recorded explicitly on either the return or in the return database. The method for determining this value is: if the net tax owing (as determined above) is greater than zero, and the excess credit carried forward is greater than zero then the amount of excess credit used as a tax payment is either the net tax owing, if the excess credit carried forward is greater than the net tax owing, or the excess credit carried forward, if the net tax owing is greater than the excess credit carried forward.

OP^s is the data as originally submitted by the taxpayer.[25] This measure for the gap will not change over time, and provides a basis for comparison as to how the gap evolves over time as the administration collects on arrears and yields additional assessments.

The Compliance Gap at the Time of Estimation

The compliance gap at the time of estimation is measured using the latest available data for returns filed, assessment values, and collection and refund payment values. Ideally this measurement would occur annually using the annual anniversary of the last filing/payment deadline for a tax year. Data for the variable P^s is filtered to select payments made by that date. The tax returns data for variables R^s and OP^s is the current assessed values for the data as of that date.[26] This value will change from year to year, but the value as measured at a particular point in time will remain static. Comparing changes to this measure of the compliance gap over time can provide insight into the collection performance of the administration.

Reporting the Compliance Gap

While the measure for the compliance gap above was expressed as simply being the difference between the potential revenues and actual collections, RA-GAP more commonly expresses the compliance gap as:

$$\frac{CPV - AV}{CPV}$$

or the compliance gap as a percentage of current potential revenues. This provides a more useful measure for comparing changes in the value over time, and across jurisdictions. [27] The values of the compliance gaps are also expressed as percentages of GDP, to provide a common basis for comparison with economic activities and the magnitude of policy gaps.

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[25] Most tax administration information systems keep track of the original values on a tax return, plus all subsequent changes. As the notion with this compliance gap measure is to attempt to measure only voluntary compliance, then it is important that the return values used not reflect any subsequent assessment actions by the authorities.

[26] Some compromise might be needed in regards to the assessed values, as not all administration information systems record the date for all changes to a return. As such, the compliance gap calculation might have to specify that it is based on the assessed data as of the date of extraction. Managing a consistent timeframe between each annual measurement would then involve maintaining a fairly consistent data extraction anniversary date.

[27] While an argument could be made that a value for the compliance gap measured purely as *CPV—AV* is of more relevance, as it provides the authorities and policy makers a value for the potential yield to be gained in particular period from increased compliance efforts, this can be misleading—the value does not on its own give an indication of how much of that yield might be *reasonably* gained.