CASE REPORTS

Study and Reports on the VAT Gap in the EU-28 Member States: 2019 Final Report

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List of Acronyms and Abbreviations

B2C	Business-to-Consumer
CASE	Center for Social and Economic Research (Warsaw)
COICOP	Classification of Individual Consumption according to Purpose
CPA	Statistical Classification of Products by Activity in accordance with Regulation (EC) No 451/2008 of the European Parliament and of the Council of 23 April 2008 establishing a new statistical classification of products by activity
EC	European Commission
ESA	European System of National and Regional Accounts
EU	European Union
EU-28	Current Member States of the European Union
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
HMRC	Her Majesty's Revenue and Excise
IC	Intermediate Consumption
MOSS`	Mini One Stop Shop
NPISH	Non-Profit Institutions Serving Households
OECD	Organisation for Economic Cooperation and Development
ORS	Own Resource Submissions
o/w	of which
RR	Reduced Rate
SR	Standard Rate
SUT	Supply and Use Tables
TAXUD	Taxation and Customs Union Directorate-General of the European Commission
VAT	Value Added Tax
VTTL	VAT Total Tax Liability
VR	VAT Revenue

Executive Summary

This Report has been prepared for the European Commission, DG TAXUD under contract TAXUD/2017/DE/329, "Study and Reports on the VAT Gap in the EU-28 Member States" and serves as a follow-up to the six reports published between 2013 and 2018.

This Study contains new estimates of the Value Added Tax (VAT) Gap for 2017, as well as updated estimates for 2013-2016. As a novelty in this series of reports, so called "fast VAT Gap estimates" are also presented the year immediately preceding the analysis, namely for 2018. In addition, the study reports the results of the econometric analysis of VAT Gap determinants initiated and initially reported in the 2018 Report (Poniatowski et al., 2018). It also scrutinises the Policy Gap in 2017 as well as the contribution that reduced rates and exemptions made to the theoretical VAT revenue losses.

In 2017, growth in the European Union (EU) continued to accelerate with a combined real GDP growth of 2.5 percent, providing a sound environment for an increase in VAT collections. As a result, VAT revenue increased in all Member States (MS). An increase in the base was the main, but not the only, source for growth. Increase in compliance contributed to an approximate 1.1% increase in VAT revenue. In nominal terms, in 2017, the VAT Gap in EU-28 MS fell to EUR 137.5 billion, down from EUR 145.4 billion. In relative terms, the VAT Gap share of the VAT total tax liability (VTTL) dropped to 11.2 percent in 2017 and is the lowest value in the analysed period of 2013-2017. Fast estimates for 2018 indicate that the downward trend will continue and that VAT Gap will likely fall below EUR 130 billion in 2018.

Of the EU-28, the VAT Gap as percentage of the VTTL decreased in 25 countries and increased in three. The biggest declines in the VAT Gap occurred in Malta, Poland, and Cyprus. The smallest Gaps were observed in Cyprus (0.6 percent), Luxembourg (0.7 percent), and Sweden (1.5 percent). The largest Gaps were registered in Romania (35.5 percent), Greece (33.6 percent), and Lithuania (25.3 percent). Overall, half of EU-28 MS recorded a Gap above 10.1 percent (see Figure 2.2 and Table 2.1).

The Policy Gaps and its components remained stable. The average Policy Gap level was 44.5 percent, out of which 9.6 percentage points are due to the application of various reduced and super-reduced rates instead of standard rates (the Rate Gap). The countries with the most flat levels of rates in the EU, according to the Rate Gap, are Denmark (0.8 percent) and Estonia (3 percent). On the other side of spectrum are Cyprus (29.6 percent), Malta (16.5 percent), and Poland (14.6 percent). The Exemption Gap, or the average share of Ideal Revenue lost due to various exemptions, is, on average, 35 percent in the EU, whereas the Actionable Policy Gap – a

combination of the Rate Gap and the Actionable Exemption Gap – is, on average, 13 percent of the Notional Ideal Revenue.

The econometric analysis repeated after the 2017 Study confirmed the earlier results. We observe that the dispersion of tax rates and unemployment rate have a positive impact on the VAT Gap. Regarding the variables in hands of the administration, on the extended times series compared to the previous year, our results suggest that the nature of the expenditure of the administration, in particular IT expenditure, is more important that the amount of the overall resources.

Introduction

This Report presents the findings of the 2019 "Study to quantify the VAT Gap in the EU Member States", which is already the sixth update following the Study originally conducted by Barbone et al. in 2013.[1]

This Report contains new Value Added Tax (VAT) Gap estimates for 2017, as well as updated estimates for 2013-2016. As a novelty in this series of reports, we use a simplified methodology to forecast the VAT Gap for 2018. We also present the updated results of the econometric analysis of VAT Gap determinants initiated and initially reported in the 2018 Report (Poniatowski et al., 2018).

The VAT Gap, which is addressed in detail by this Report, is also referred to as the Compliance Gap. It is understood as the difference between the expected and actual VAT revenues and represents more than just fraud and evasion and their associated policy measures. The VAT Gap also covers VAT lost due to, for example, insolvencies, bankruptcies, administrative errors, and tax optimisation. It is defined as the difference between the amount of VAT collected and the VAT Total Tax Liability (VTTL) – namely, the tax liability according to tax law. The VAT Gap can be expressed in absolute or relative terms, commonly as a ratio of the VTTL or gross domestic product (GDP).

In addition to the analysis of the Compliance Gap, this Report also examines the Policy Gap in 2017 as well as the contribution that reduced rates and exemptions made to the theoretical VAT revenue losses.

The structure of this Report builds on the previous publications. Chapter I presents the main economic and policy factors that affected Member States (MS) during the course of 2017. It also includes a decomposition of the change in VAT revenues. The overall results are presented and briefly described in Chapter II. Chapter III provides detailed results and outlines trends for individual countries coupled with analytical insights. In Chapter IV, we examine the Policy Gap and the contribution that VAT reduced rates and exemptions have made to this Gap. Chapter V discusses the findings of the econometric analysis. Annex A contains methodological considerations and Annex B provides statistical data and a set of comparative tables.

1 The first study of the VAT Gap in the EU was conducted by Reckon (2009); however, due to differences in methodology, it cannot be directly compared to these latter studies.

I. Background: Economic and Policy Context in 2017

a. Economic Conditions in the EU during 2017

In 2017, growth in the European Union (EU) continued to accelerate, providing a sound environment for an increase in VAT collections. More specifically, growth of the EU economy amounted to 2.5 percent (a 0.5 percentage point increase compared to 2016) in real terms and was record high in the post-crisis period. The highest GDP growth rates in 2017 were observed in Ireland (7.2 percent), Romania (7 percent), and Malta (6.8 percent).

In nominal terms, GDP increased by 2.9 percent and consumer prices by 1.8 percent. GDP growth was largely driven by final consumption. Final consumption, which is the core of the VAT base (68 percent of the VTTL in 2017), increased by 2.3 percent on average.

The change in gross fixed capital formation (GFCF) was volatile across countries and varied from -29.3 percent in Ireland to 29.3 percent in Cyprus. However, the growth and volatility of GFCF was largely driven by the private sector. The pace of government GFCF was slower than the overall growth of GFCF and amounted to 2.5 percent.[2]

Due to the volatility and the frequent revisions of GFCF figures by Statistical Offices, GFCF is the main source of VAT Gap revisions. Whenever new information on the actual investment figures of exempt sectors becomes available, the estimates of VAT Gap are revised backwards.

Table 1.1. Real and Nominal Growth in the EU-28 in 2017 (in national currencies [NAC])

Member State	Real GDP Growth (%)	Nominal Growth (%)		
		GDP	Final Consumption	GFCF
Belgium	1.7	3.4	2.9	4.1
Bulgaria	3.8	7.3	6.9	7.0
Czechia	4.4	5.9	6.3	5.2
Denmark	2.3	3.7	2.9	5.3
Germany	2.2	3.7	3.5	5.0
Estonia	4.9	8.9	6.4	15.9
Ireland	7.2	7.6	3.8	-29.3
Greece	1.5	2.1	1.3	9.2
Spain	3.0	4.3	3.7	7.1
France	2.3	2.7	2.3	5.9
Croatia	2.9	4.1	4.6	4.1
Italy	1.7	2.2	2.5	4.7
Cyprus	4.5	6.3	5.0	29.3

2 Source: AMECO Database, European Commission, Directorate General for Economic and Financial Affairs, https://ec.europa.eu/economy_finance/ameco/user/serie/SelectSerie.cfm.

Member State	Real GDP Growth (%)	Nominal Growth (%)		
		GDP	Final Consumption	GFCF
Latvia	4.6	8.0	7.4	15.0
Lithuania	4.1	8.6	6.4	7.9
Luxembourg	1.5	3.7	5.1	5.4
Hungary	4.1	8.1	7.7	22.5
Malta	6.8	9.3	4.3	-5.5
Netherlands	2.9	4.2	3.2	4.9
Austria	2.6	3.8	3.1	5.6
Poland	4.8	6.9	6.4	4.1
Portugal	2.8	4.4	3.3	12.0
Romania	7.0	12.0	13.6	9.7
Slovenia	4.9	6.5	3.6	12.4
Slovakia	3.2	4.5	5.0	5.1
Finland	3.0	3.6	1.2	6.8
Sweden	2.1	4.4	3.9	8.8
United Kingdom	1.8	4.1	3.7	6.0
EU-28 (total, EUR)[1]	**2.5**	**2.9**	**2.3**	**3.9**

Source: Eurostat.

b. VAT Regime Changes

Similar to 2016, VAT legislation in 2017 was rather stable in terms of both EU-wide and country-specific changes affecting the VTTL.

The change that most notably affected the distribution of revenue of Member States (MS) was an amendment in the rules for the rules for sharing proceeds from taxation of cross-border electronic and digital services. As of 1 January 2017, the percentage of revenue retained in the country of origin was reduced from 30 percent to 15 percent. This resulted in a decrease of the revenue and VTTL for MS providing services to foreigners (i.e. Cyprus and Malta) and an increase in the VTTL and revenue for the MS which are the destination of such services.

Only one MS implemented significant changes to the structure of its VAT rates in 2017. As of January 2017, Romania reduced its standard rate further from 20 percent to 19 percent. This change of the standard rate followed a four percentage point decrease in 2016. Overall, the effective rate fell from 17.2 percent in 2015 to 12.7 percent in 2017 (see Table 1.2). No substantial changes in the effective rate were observed in other MS.[3]

Table 1.2. VAT Rate Structure as of 31 December 2016 and Changes during 2017

Member State	Standard Rate (SR)	Reduced Rate(s) (RR)	Super Reduced Rate	Parking Rate	Changes during 2017	Effective rate[4]
Belgium	21	6 / 12	-	12	-	10.3
Bulgaria	20	9	-	-	-	14.1
Czechia	21	10/15	-	-	-	12.9
Denmark	25	-	-	-	-	14.7
Germany	19	7	-	-	-	10.6
Estonia	20	9	-	-	-	13.0
Ireland	23	9 / 13.5	4.8	13.5	-	12.1
Greece	24	6 / 13	-	-	-	13.0
Spain	21	10	4	-	-	8.5
France	19.6	5.5 / 10	2.1	-	-	9.4
Croatia	25	5/13	-	-	-	16.5
Italy	22	10	4 / 5	-	-	10.2
Cyprus	19	5 / 9	-	-	-	10.3
Latvia	21	12	-	-	-	12.2

3 Changes in the effective rate compared to the 2017 Report also result from the revision of the VTTL estimates and the statistical data underlying the estimates.

4 Ratio of VTTL and tax base. See methodological considerations in Section III in Annex A.

Member State	Standard Rate (SR)	Reduced Rate(s) (RR)	Super Reduced Rate	Parking Rate	Changes during 2017	Effective rate[4]
Lithuania	21	5 / 9	-	-	-	13.4
Luxembourg	17	8	3	14	-	11.6
Hungary	27	5 / 18	-	-	-	15.4
Malta	18	5 / 7	-	-	-	10.1
Netherlands	21	6	-	-	-	10.1
Austria	20	10 / 13	-	12	-	11.2
Poland	23	5 / 8	-	-	-	12.0
Portugal	23	6 / 13	-	13	-	11.4
Romania	20	5 / 9	-	-	SR 20 to 19	12.7
Slovenia	22	9.5	-	-	-	11.6
Slovakia	20	10	-	-	-	12.3
Finland	24	10 / 14	-	-	-	12.6
Sweden	25	6 / 12	-	-	-	13.4
United Kingdom	20	5	-	-	-	9.5

Source: TAXUD, VAT Rates Applied in the Member States of the European Union: Situation of 1st January 2017.

c. Sources of Change in VAT Revenue Components

The value of the actual VAT revenue can be decomposed into components, which is helpful in understanding the underlying sources of its evolution. Since revenue is a product of the VTTL and the compliance ratio, VAT collection could be expressed as:

> Actual Revenue = VTTL * Compliance Ratio,
>
> where Compliance Ratio is: 1 - VAT Gap (%).

As the VTTL is a product of the base and the effective rate, the actual revenue could be further decomposed and expressed as:

> Actual Revenue = Net Base * Effective Rate * Compliance Ratio,
>
> where Effective Rate is the ratio of the theoretical VTTL to the Net Base. The Net Base (which is the sum of the final consumption and investment by households, non-profit institutions serving households (NPISH), and government), in turn, is calculated as the difference between the Gross Base, which includes VAT, and the VAT revenues actually collected.

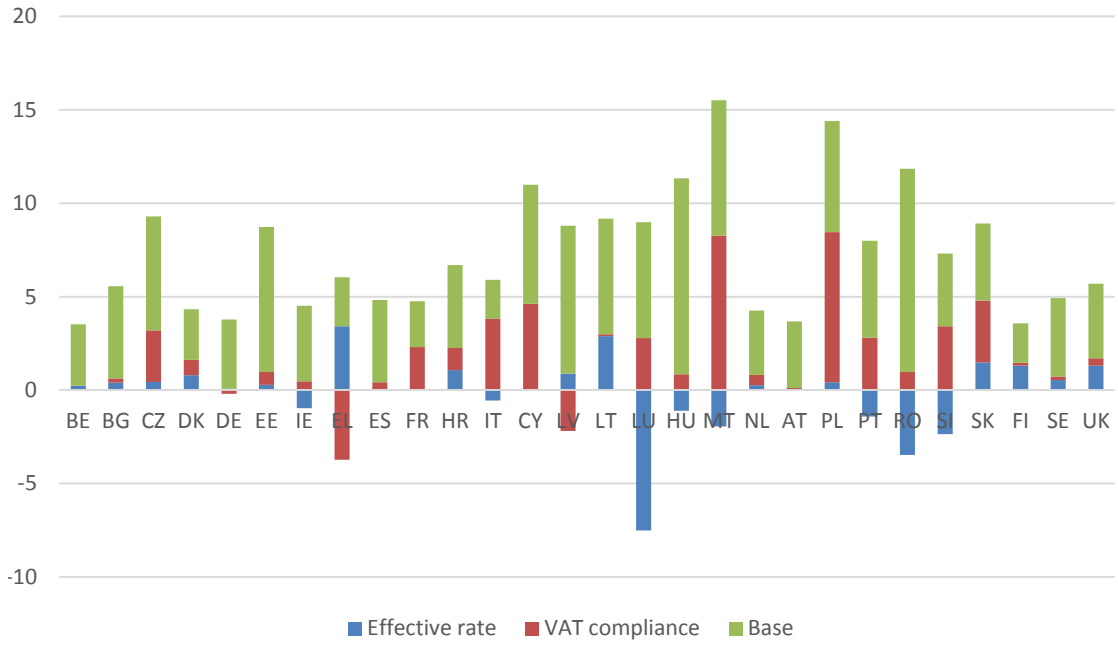
Table 1.3 and Figure 1.1 present the decomposition of the total changes in nominal VAT revenues into these three components: change in net taxable base, change in the effective rate applied to the base, and change in the compliance ratio.

Table 1.3. Change in VAT Revenue Components, 2017 over 2016

Member State	Change in Revenue (%)	Change in the VTTL (%)	Change in Base (%)	Change in Effective Rate (%)	Change in Compliance (%)
Belgium	3.5%	3.5%	3.3%	0.2%	0.0%
Bulgaria	5.6%	5.4%	4.9%	0.4%	0.2%
Czechia	9.5%	6.6%	6.1%	0.4%	2.8%
Denmark	4.4%	3.5%	2.7%	0.8%	0.8%
Germany	3.6%	3.8%	3.7%	0.1%	-0.2%
Estonia	8.8%	8.1%	7.8%	0.3%	0.7%
Ireland	3.5%	3.0%	4.0%	-1.0%	0.5%
Greece	2.2%	6.1%	2.6%	3.4%	-3.7%
Spain	4.8%	4.4%	4.4%	0.0%	0.4%
France	4.8%	2.5%	2.5%	0.0%	2.3%
Croatia	6.8%	5.5%	4.4%	1.1%	1.2%
Italy	5.4%	1.5%	2.1%	-0.6%	3.8%
Cyprus	11.3%	6.4%	6.4%	0.0%	4.6%
Latvia	6.5%	8.9%	7.9%	0.9%	-2.2%
Lithuania	9.4%	9.3%	6.2%	2.9%	0.1%
Luxembourg	1.0%	-1.8%	6.2%	-7.5%	2.8%
Hungary	9.9%	9.0%	10.4%	-1.1%	0.8%
Malta	13.9%	5.2%	7.2%	-1.9%	8.3%
Netherlands	4.3%	3.7%	3.5%	0.3%	0.5%
Austria	3.7%	3.6%	3.6%	0.0%	0.1%
Poland	14.9%	6.4%	6.0%	0.4%	8.0%
Portugal	6.6%	3.7%	5.2%	-1.4%	2.8%
Romania	8.1%	7.0%	10.9%	-3.5%	1.0%
Slovenia	4.9%	1.4%	3.9%	-2.4%	3.4%
Slovakia	9.2%	5.7%	4.1%	1.5%	3.3%
Finland	3.6%	3.4%	2.1%	1.3%	0.2%
Sweden	5.0%	4.8%	4.2%	0.5%	0.2%
United Kingdom	5.8%	5.5%	4.0%	1.4%	2.9%
EU-28 (total, EUR)[3]	4.1%	2.9%	2.5%	0.4%	1.1%

Source: own calculations.

Figure 1.1. Change in VAT Revenue Components, 2017 over 2016 (%)



Source: own calculations.

The increase in the VTTL had the most significant impact on the revenue, contributing to an approximate 2.8 percent growth. In addition, the increase in the VAT compliance led to a 1.2 percent growth in revenue. VTTL increase was driven mainly by the change of the base. The effective rate remained nearly unchanged (0.3 percent increase).

II. The VAT Gap in 2017

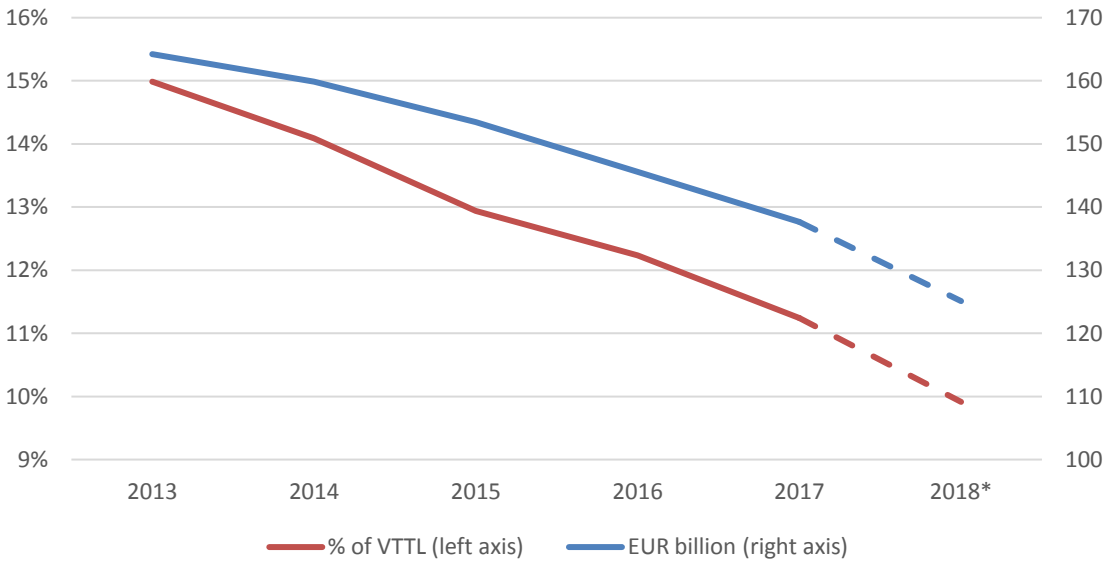
The estimates of the VAT Gap presented in this section were derived using the same methodology as in the previously cited VAT Gap Studies. The VAT Gap is defined as the difference between the VTTL, sometimes also known as VAT total theoretical liability, and the amount of VAT actually collected. We compute VTTL in a "top-down" "consumption-side" approach by deriving the expected VAT liability from the observed national accounts data, such as supply and use tables (SUT). For this reason, the methodology used in this Study relies on the availability and quality of SUT data, which may vary from country to country.

The VAT liability is estimated for final household, government, and NPISH expenditures; non-deductible VAT from intermediate consumption of exempt industries; and VAT from the GFCF of exempt sectors. We also account for country-specific tax regulations, such as exemptions for small business under the VAT thresholds (if applicable); non-deductible business expenditures on food, drinks, and accommodation; and restrictions to deduct VAT on leased cars, among others. The precise formula is given in Section III in Annex A.

The results presented in this report are not fully comparable with the results presented in the earlier Reports, as each year some figures are revised backwards. The main source of the revisions are the updates of national accounts figures. In the course of our computations, some expenditure and investment figures, which are not available for the most recent years, are estimated. Thus, whenever actual national accounts data is published or new information on taxable investment becomes available, VAT Gap estimates need to be revised. A detailed discussion on the sources of the revisions is presented in Section I in Annex A.

In nominal terms, in 2017, the VTTL increased to EUR 1,223 billion (2.9 percent), whereas VAT revenue amounted to EUR 1,086 billion (increase by 4.1 percent). As a result, the VAT Gap fell from EUR 145.4 billion in 2016 to EUR 137.5 billion in 2017. In relative terms, the EU-wide Gap dropped to 11.2 percent, down from 12.2 percent in 2016. Fast estimates indicate that the VAT Gap will likely continue its downward trend and fall below EUR 130 billion and 10 percent of the VTTL in 2018.

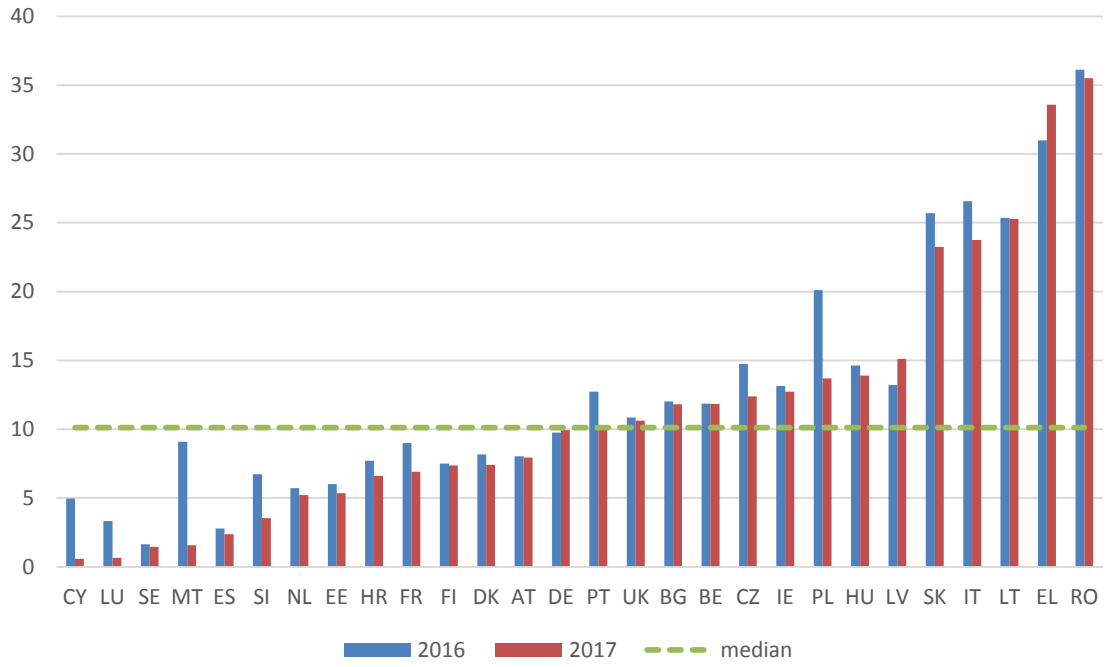
Figure 2.1. Evolution of the VAT Gap in the EU, 2013-2018



Source: own calculations.

The smallest Gaps were observed in Cyprus (0.6 percent), Luxembourg (0.7 percent), and Sweden (1.5 percent). The largest Gaps were registered in Romania (35.5 percent), Greece (33.6 percent), and Lithuania (25.3 percent). Overall, half of the EU-28 MS recorded a Gap above 10.1 percent (see Figure 2.2 and Table 2.1). In nominal terms, the largest Gaps were recorded in Italy (EUR 33.6 billion), Germany (EUR 25 billion), and the United Kingdom (EUR 19.2 billion).

Figure 2.2. VAT Gap as a percent of the VTTL in EU-28 Member States, 2017 and 2016[5]

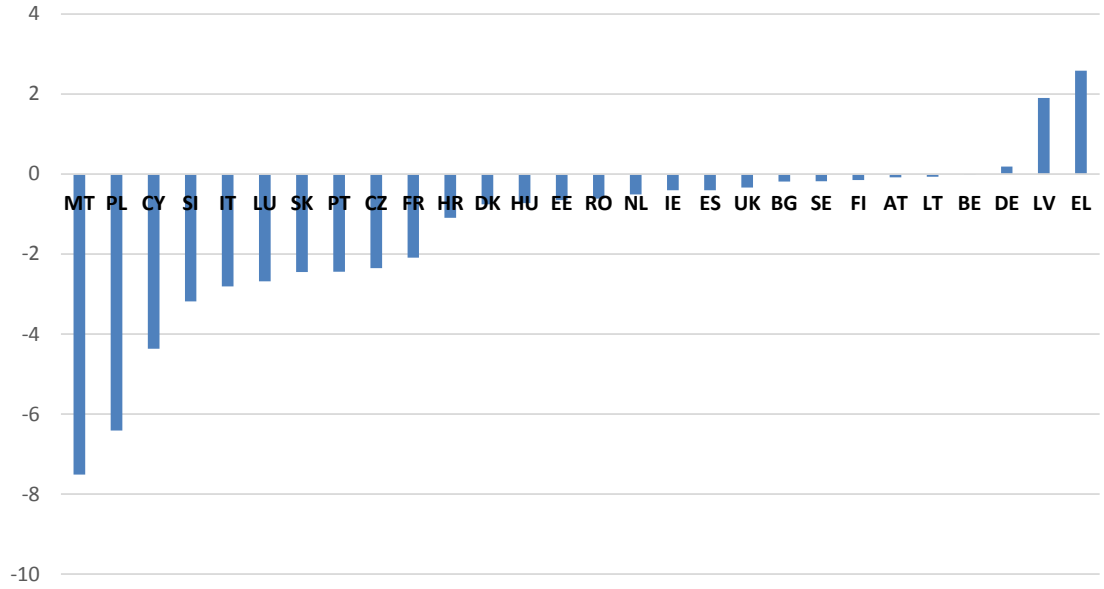


Source: own calculations.

Of the EU-28, the VAT Gap share decreased in 25 countries and increased in three – namely, Greece, Latvia, and Germany in 2017 (see Figure 2.2). The biggest decreases in the VAT Gap occurred in Malta, Poland, and Cyprus (see Figure 2.3).

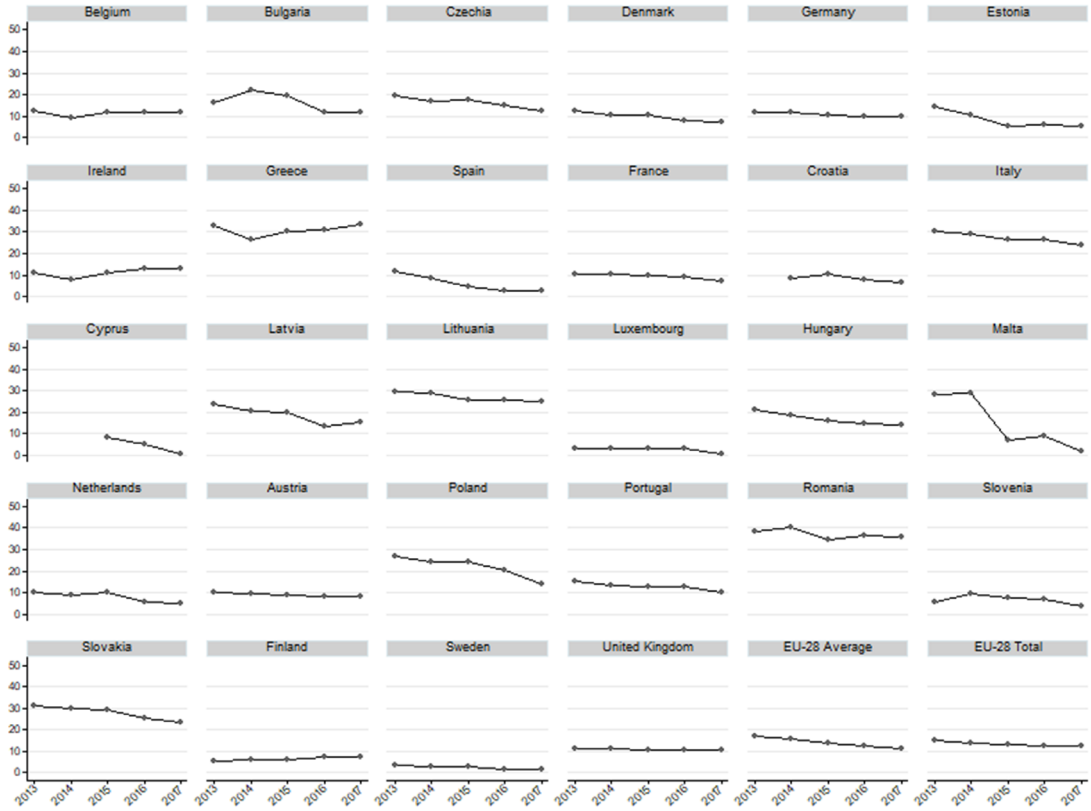
5 Note: data for Cyprus in 2014 was unavailable.

Figure 2.3. Percentage Point Change in VAT Gap, 2017 over 2016



Source: own calculations.

Figure 2.4. VAT Gap in EU Member States, 2013-2017



Source: own calculations.

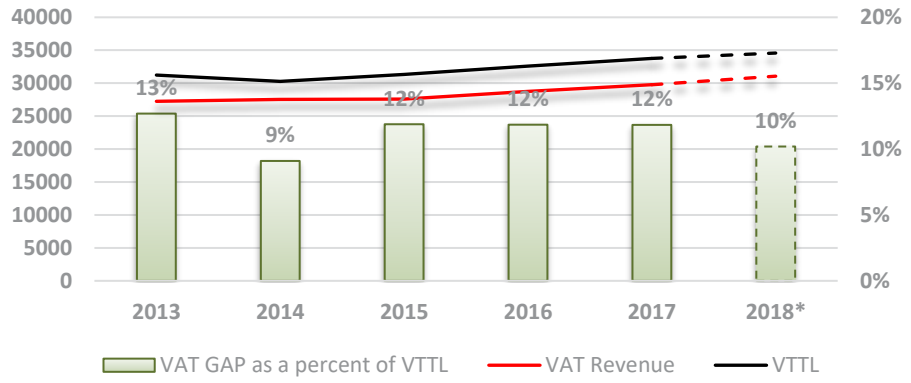
Table 2.1. VAT Gap Estimates, 2016-2017 (EUR million)

	2016				2017				VAT Gap Change (pp)
MS	Revenues	VTTL	VAT Gap	VAT Gap (%)	Revenues	VTTL	VAT Gap	VAT Gap (%)	
BE	28750	32615	3865	11.9%	29763	33759	3996	11.8%	0.0
BG	4417	5020	603	12.0%	4664	5289	625	11.8%	-0.2
CZ	13091	15355	2264	14.7%	14721	16803	2082	12.4%	-2.3
DK	26735	29113	2378	8.2%	27931	30166	2235	7.4%	-0.8
DE	218779	242441	23662	9.8%	226582	251598	25016	9.9%	0.2
EE	1974	2101	126	6.0%	2148	2270	122	5.4%	-0.7
IE	12826	14767	1941	13.1%	13278	15215	1938	12.7%	-0.4
EL	14333	20769	6436	31.0%	14642	22041	7399	33.6%	2.6
ES	70705	72729	2024	2.8%	74107	75913	1806	2.4%	-0.4
FR	154490	169784	15294	9.0%	161932	173962	12030	6.9%	-2.1
HR	6016	6519	503	7.7%	6485	6944	459	6.6%	-1.1
IT	102378	139422	37044	26.6%	107901	141530	33629	23.8%	-2.8
CY	1664	1750	87	5.0%	1851	1862	11	0.6%	-4.4
LV	2032	2342	310	13.2%	2164	2549	385	15.1%	1.9
LT	3026	4054	1027	25.3%	3310	4429	1119	25.3%	-0.1
LU	3436	3554	119	3.3%	3469	3492	23	0.7%	-2.7
HU	10587	12400	1813	14.6%	11725	13617	1893	13.9%	-0.7
MT	712	783	71	9.1%	810	823	13	1.6%	-7.5
NL	47849	50755	2906	5.7%	49900	52644	2744	5.2%	-0.5
AT	27301	29685	2384	8.0%	28304	30748	2444	7.9%	-0.1
PL	30838	38599	7761	20.1%	36330	42094	5764	13.7%	-6.4
PT	15767	18069	2301	12.7%	16809	18738	1929	10.3%	-2.4
RO	10968	17169	6201	36.1%	11650	18063	6413	35.5%	-0.6
SI	3316	3555	239	6.7%	3479	3606	128	3.5%	-3.2
SK	5420	7294	1874	25.7%	5917	7708	1791	23.2%	-2.5
FI	19694	21293	1599	7.5%	20404	22026	1622	7.4%	-0.1
SE	42770	43484	714	1.6%	44115	44769	654	1.5%	-0.2
UK	163344	183224	19880	10.9%	161509	180708	19199	10.6%	-0.2
Total EU-28	1043219	1188647	145428	12.2%	1085899	1223369	137470	11.2%	-1.0
Median				10.3%				10.1%	

III. Individual Country Results

Table 3.1. Belgium: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (EUR million)

	2013	2014	2015	2016	2017	2018*
VTTL	31212	30272	31316	32615	33759	34578
o/w liability on household final consumption	17586	17326	17642	18459	19005	
o/w liability on government and NPISH final consumption	1419	1424	1464	1505	1568	
o/w liability on intermediate consumption	6407	6103	6576	6906	7216	
o/w liability on GFCF	4725	4739	4957	5055	5246	
o/w net adjustments	1075	680	677	691	724	
VAT Revenue	27250	27518	27594	28750	29763	31068
VAT GAP	3962	2755	3722	3865	3996	
VAT GAP as a percent of VTTL	13%	9%	12%	12%	12%	10%
VAT GAP change since 2013					-1 pp	

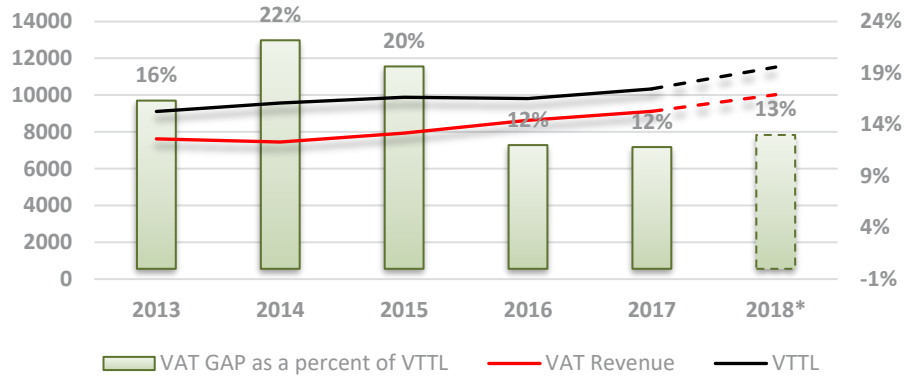


Hghlights

- Over the period 2015-2017, the VAT Gap in Belgium remained nearly constant, amounting to, on average, 11.9 percent of the VTTL.
- In 2018, VTTL is expected to increase more slowly than revenue, which will result in decrease in the VAT Gap to 10.2 percent.

Table 3.2. Bulgaria: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (BGN million)

	2013	2014	2015	2016	2017	2018*
VTTL	9112	9576	9881	9818	10344	11526
o/w liability on household final consumption	6750	6910	7091	7244	7753	
o/w liability on government and NPISH final consumption	270	302	275	284	298	
o/w liability on intermediate consumption	972	1111	1104	1141	1246	
o/w liability on GFCF	1020	1174	1328	1133	1034	
o/w net adjustments	100	79	82	15	14	
VAT Revenue	7624	7451	7940	8639	9121	10028
VAT GAP	1488	2124	1941	1179	1222	
VAT GAP as a percent of VTTL	16%	22%	20%	12%	12%	13%
VAT GAP change since 2013					-5 pp	

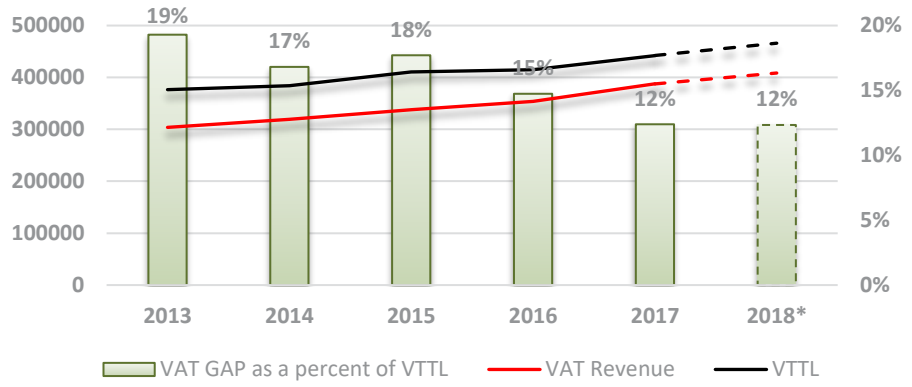


Highlights

- The VAT Gap in Bulgaria remained stable in 2017, amounting to approximately 12 percent of the VTTL.
- Since 2014, which was a year of increased non-compliance, the VAT Gap has fallen by 8 percentage points. The increase in compliance was accompanied by the rapid growth of the economy that exceeded 3 percent each (between 2015 and 2018).

Table 3.3. Czechia: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (CZK million)

	2013	2014	2015	2016	2017	2018*
VTTL	376467	384062	410469	415110	442353	466041
o/w liability on household final consumption	241691	245538	254583	262406	281228	
o/w liability on government and NPISH final consumption	18903	19387	21179	21591	21112	
o/w liability on intermediate consumption	72040	71811	75262	78497	83826	
o/w liability on GFCF	43902	48021	59799	52942	56803	
o/w net adjustments	-69	-695	-354	-327	-616	
VAT Revenue	303823	319485	337774	353915	387537	408538
VAT GAP	72644	64577	72695	61195	54816	
VAT GAP as a percent of VTTL	19%	17%	18%	15%	12%	12%
VAT GAP change since 2013					-7 pp	

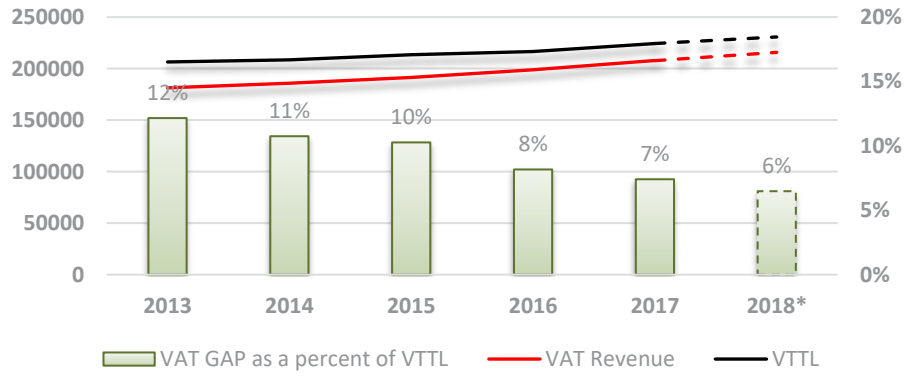


Highlights

- In 2017, the VAT Gap in the Czechia was approximately 12.4 percent of the VTTL (a decrease of 2.4 percentage points with respect to 2018).
- The VAT Gap is expected to remain stable in 2018.

Table 3.4. Denmark: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (DKK million)

	2013	2014	2015	2016	2017	2018*
VTTL	206490	208401	213396	216753	224395	230778
o/w liability on household final consumption	119265	120503	123843	127509	131791	
o/w liability on government and NPISH final consumption	5222	5283	5395	5473	5564	
o/w liability on intermediate consumption	52897	52826	53321	51209	52878	
o/w liability on GFCF	23709	24421	25372	27095	28457	
o/w net adjustments	5397	5368	5465	5467	5705	
VAT Revenue	181378	185994	191479	199046	207768	215821
VAT GAP	25112	22407	21917	17707	16627	
VAT GAP as a percent of VTTL	12%	11%	10%	8%	7%	6%
VAT GAP change since 2013					-5 pp	

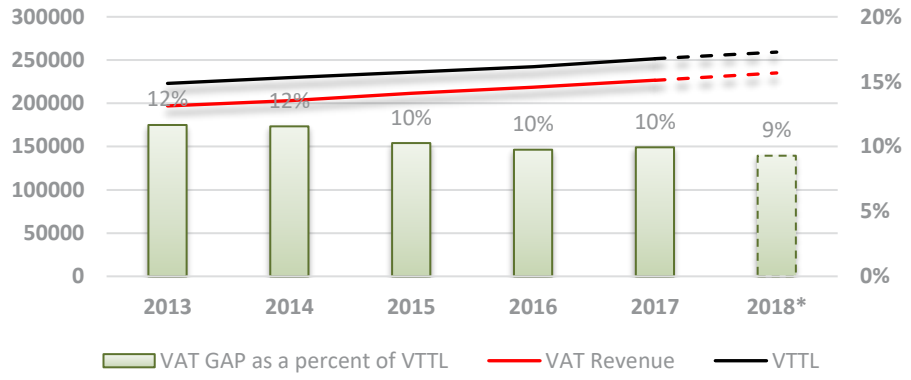


Highlights

- The VAT Gap in Denmark has decreased between 2013 and 2017. In 2017, it amounted to 7.4 percent of the VTTL.
- In 2018, the VAT Gap is expected to continue its downward trend

Table 3.5. Germany: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (EUR million)

	2013	2014	2015	2016	2017	2018*
VTTL	223018	229624	235841	242441	251598	259231
o/w liability on household final consumption	139672	142430	145749	148921	153903	
o/w liability on government and NPISH final consumption	5896	6207	6530	6778	7006	
o/w liability on intermediate consumption	39982	42450	44295	45505	47382	
o/w liability on GFCF	36084	37176	37843	39792	41794	
o/w net adjustments	1384	1360	1424	1446	1513	
VAT Revenue	197005	203081	211616	218779	226582	235130
VAT GAP	26013	26543	24225	23662	25016	
VAT GAP as a percent of VTTL	12%	12%	10%	10%	10%	9%
VAT GAP change since 2013					-2 pp	

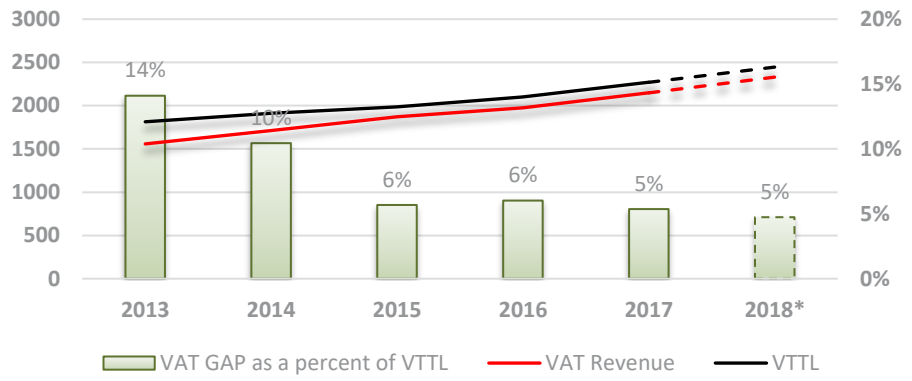


Highlights

- The VAT Gap in Germany amounted to approximately 9.9 percent of the VTTL in 2017.
- Between 2013 and 2017, the Gap decreased by approximately 0.4 percentage points each year and is expected to decrease further in 2018.

Table 3.6. Estonia: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (EUR million)

	2013	2014	2015	2016	2017	2018*
VTTL	1814	1911	1985	2101	2270	2446
o/w liability on household final consumption	1273	1338	1374	1441	1532	
o/w liability on government and NPISH final consumption	26	34	35	61	66	
o/w liability on intermediate consumption	227	232	244	262	280	
o/w liability on GFCF	278	298	323	327	379	
o/w net adjustments	9	9	9	10	12	
VAT Revenue	1558	1711	1873	1974	2148	2330
VAT GAP	256	200	113	126	122	
VAT GAP as a percent of VTTL	14%	10%	6%	6%	5%	5%
VAT GAP change since 2013					-9 pp	

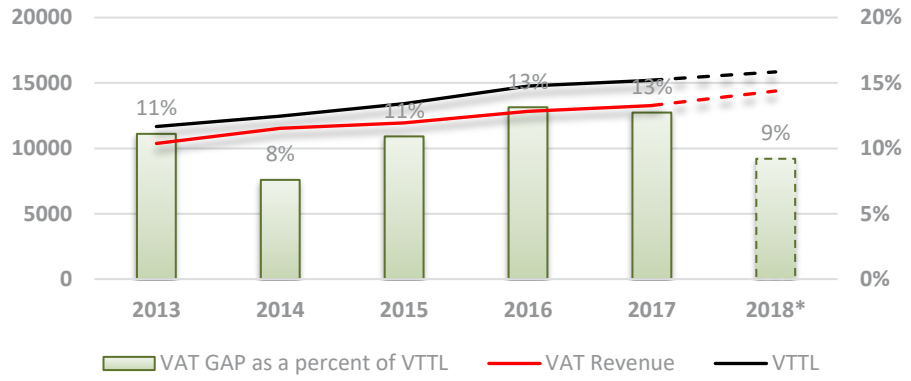


Highlights

- The VAT Gap in Estonia fell to 5.4 percent of the VTTL in 2017, which marked an approximate 9 percentage point decrease over a 5-year period.
- No sudden changes in the VAT Gap are expected in 2018.

Table 3.7. Ireland: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (EUR million)

	2013	2014	2015	2016	2017	2018*
VTTL	11668	12467	13420	14767	15215	15846
o/w liability on household final consumption	7243	7471	7842	8378	8588	
o/w liability on government and NPISH final consumption	181	153	164	170	174	
o/w liability on intermediate consumption	3054	3236	3591	3982	4155	
o/w liability on GFCF	1031	1443	1649	2046	2085	
o/w net adjustments	160	165	174	192	213	
VAT Revenue	10372	11521	11955	12826	13278	14387
VAT GAP	1296	946	1464	1941	1938	
VAT GAP as a percent of VTTL	11%	8%	11%	13%	13%	9%
VAT GAP change since 2013					+2 pp	

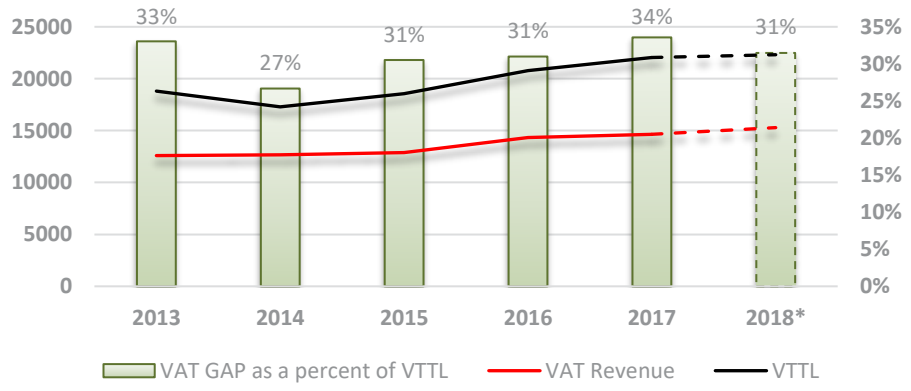


Highlights

- The VAT Gap in Ireland was relatively volatile over the analysed period, with the lowest value observed in 2014 (7.6 percent) and the highest in 2016 (13.1 percent).
- In 2017, the Gap was approximately 12.7 percent. In 2018, it is expected to fall to a single digit value.

Table 3.8. Greece: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (EUR million)

	2013	2014	2015	2016	2017	2018*
VTTL	18807	17287	18545	20769	22041	22310
o/w liability on household final consumption	13498	12750	13695	15785	16486	
o/w liability on government and NPISH final consumption	582	424	603	608	637	
o/w liability on intermediate consumption	1769	1759	1858	2029	2137	
o/w liability on GFCF	2691	2114	2143	2067	2489	
o/w net adjustments	267	239	246	281	292	
VAT Revenue	12593	12676	12885	14333	14642	15288
VAT GAP	6214	4611	5660	6436	7399	
VAT GAP as a percent of VTTL	33%	27%	31%	31%	34%	31%
VAT GAP change since 2013					+1 pp	

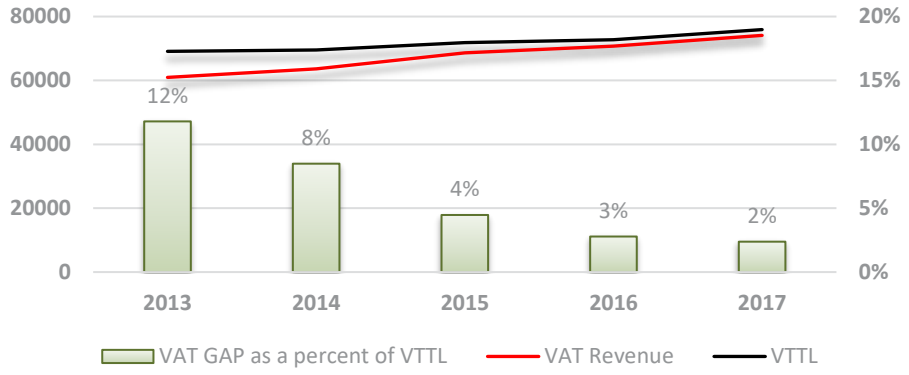


Highlights

- In 2017, the VAT Gap was 33.6 percent, which was a record high in the 2013-2017 period.
- The increase in the VTTL in 2017 was largely driven by the increase in GFCF. As more detailed information on the structure of GFCF in 2017 becomes available, the VAT Gap for 2017 may be subject to revisions.
- In 2018, the Gap is expected to fall by approximately 3 percentage points.

Table 3.9a. Spain: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (EUR million)

	2013	2014	2015	2016	2017
VTTL	69100	69543	71810	72729	75913
o/w liability on household final consumption	50150	50920	52864	53873	56165
o/w liability on government and NPISH final consumption	2387	2413	2433	2473	2536
o/w liability on intermediate consumption	8818	8525	8451	8710	8834
o/w liability on GFCF	7353	7311	7637	7239	7922
o/w net adjustments	392	374	426	434	455
VAT Revenue	60951	63643	68601	70705	74107
VAT GAP	8149	5900	3209	2024	1806
VAT GAP as a percent of VTTL	12%	8%	4%	3%	2%
VAT GAP change since 2013					-9 pp



Highlights

- The VAT Gap in Spain followed a steep downward trend over the analysed period. Between 2013 and 2017, the Gap fell by approximately nine percentage points, down to 2.4 percent of the VTTL.
- Due to an important component of the country-specific adjustments and a potentially large estimation error, fast estimates for Spain are not published.

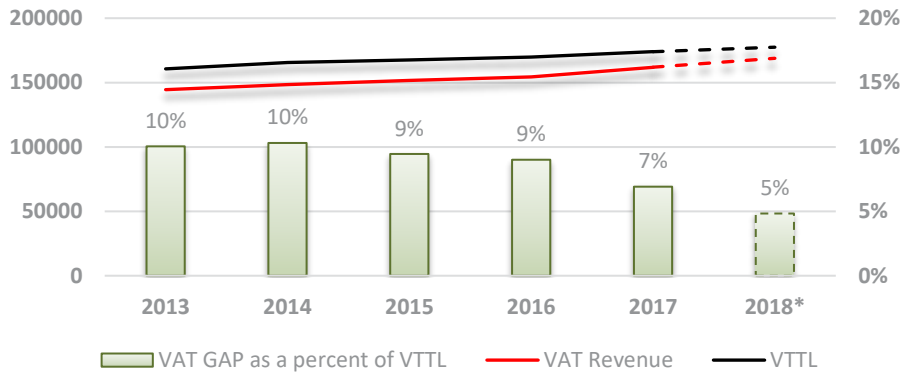
Table 3.9b. Spain: Alternative Estimates

Spain	2013	2014	2015	2016	2017
VAT Gap based on alternative data	4483	2756	1922	815	-1085
VAT Gap based on alternative data, as a percent of VTTL	7%	4%	3%	1%	-1%

N*ote: Adjusting revenues for the continuing reduction in the stock of claims and adjusting the VTTL for the difference between national accounting and tax conventions in the construction sector based on the data received from Spanish Tax Authorities led to a downward revision of the VAT Gap for the entire period 2013-2017.*

Table 3.10. France: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (EUR million)

	2013	2014	2015	2016	2017	2018*
VTTL	160630	165520	167521	169784	173962	177480
o/w liability on household final consumption	94591	98441	98826	100515	102158	
o/w liability on government and NPISH final consumption	1426	1606	1631	1656	1696	
o/w liability on intermediate consumption	27867	27176	30159	30060	30571	
o/w liability on GFCF	31814	32852	31667	32356	34300	
o/w net adjustments	4932	5445	5238	5198	5237	
VAT Revenue	144490	148454	151680	154490	161932	168849
VAT GAP	16140	17066	15841	15294	12030	
VAT GAP as a percent of VTTL	10%	10%	9%	9%	7%	5%
VAT GAP change since 2013					-3 pp	

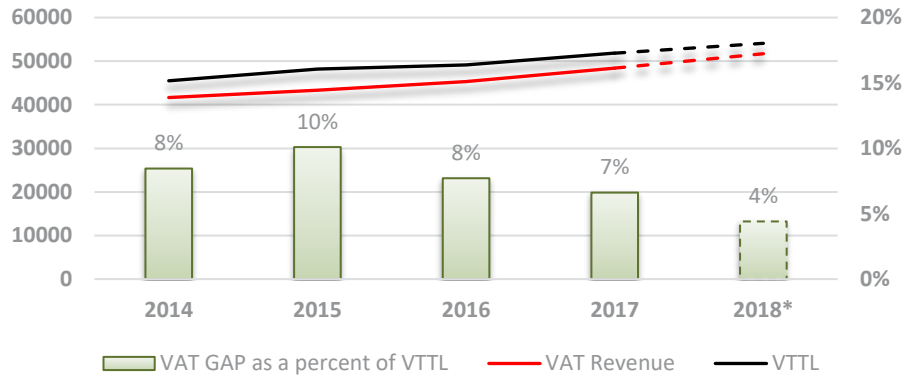


Highlights

- The VAT Gap in France followed a downward trend over the period 2013-2017. In 2017, it fell to 6.9 percent and is expected to decrease further in 2018.
- Thanks to the inclusion of more detailed information on household consumption structure, the estimates were revised downwards.

Table 3.11. Croatia: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2014-2017 (HRK million)

	2014	2015	2016	2017	2018*
VTTL	45493	48187	49110	51831	54094
o/w liability on household final consumption	33517	34679	35424	37368	
o/w liability on government and NPISH final consumption	1596	1615	1646	1886	
o/w liability on intermediate consumption	5641	6722	7112	7488	
o/w liability on GFCF	4485	4508	4694	4871	
o/w net adjustments	254	663	233	218	
VAT Revenue	41647	43322	45322	48402	51709
VAT GAP	3846	4865	3788	3429	
VAT GAP as a percent of VTTL	8%	10%	8%	7%	4%
VAT GAP change since 2014				-2 pp	

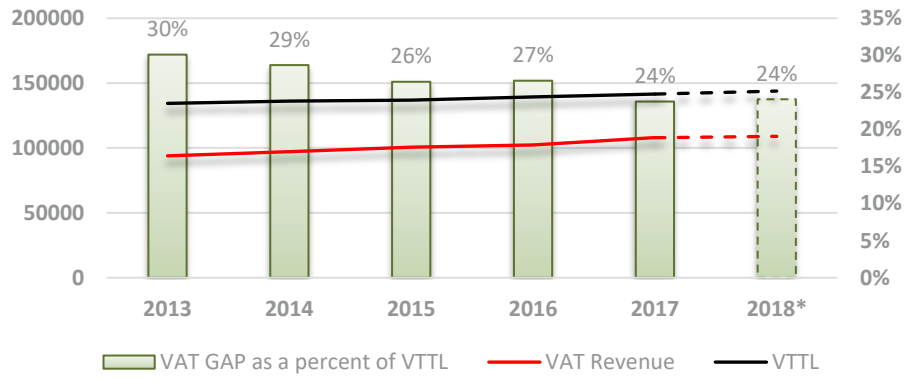


Highlights

- The VAT Gap in Croatia in 2017 was approximately 6.6 percent, which was a 1.1 percentage point decrease from 2016. In 2018, it is expected to follow downward trend.
- Croatia substantially revised its national accounts figures in the course of 2018. As a result, the Gap was revised upwards by nearly 7 percentage points.

Table 3.12a. Italy: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (EUR million)

	2013	2014	2015	2016	2017	2018*
VTTL	134345	136104	136859	139422	141530	143824
o/w liability on household final consumption	95797	97232	99615	101477	102676	
o/w liability on government and NPISH final consumption	2095	2054	1842	1865	1870	
o/w liability on intermediate consumption	18786	19721	18756	19208	19906	
o/w liability on GFCF	13564	13305	13345	13550	13797	
o/w net adjustments	4102	3792	3302	3322	3282	
VAT Revenue	93921	97071	100692	102378	107901	108966
VAT GAP	40424	39033	36167	37044	33629	
VAT GAP as a percent of VTTL	30%	29%	26%	27%	24%	24%
VAT GAP change since 2013					-6 pp	



Highlights

- In 2017, the VAT Gap fell by 2.8 percentage points, to 23.8 percent of the VTTL.
- No sudden changes in the VAT Gap are expected for 2018.

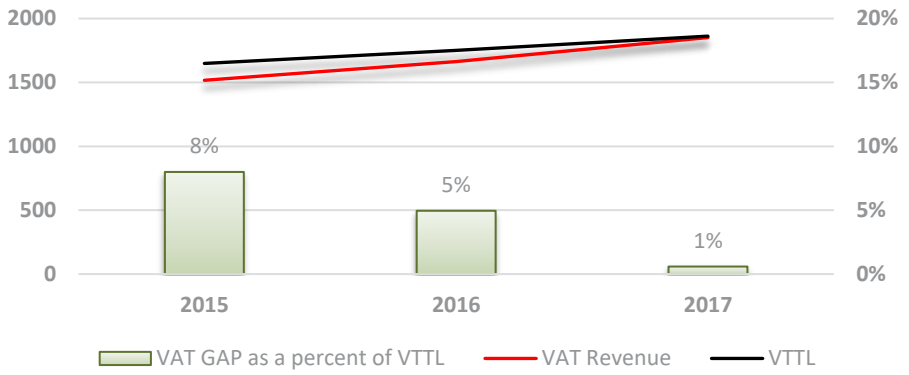
Table 3.12b. Italy: Alternative Estimates

Italy	2013	2014	2015	2016	2017
VAT Gap based on alternative data	37819	37591	37031	37920	38038
VAT Gap based on alternative data, as a percent of VTTL	28%	28%	27%	27%	27%

Note: the estimates above are based on adjusted revenues for the changes in outstanding stocks of net reimbursement claims (to better approximate accrued revenues) and Italy's own estimates of illegal activities, namely illegal drugs and prostitution activities.

Table 3.13. Cyprus: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2014-2017 (EUR million)

	2015	2016	2017
VTTL	1648	1750	1862
o/w liability on household final consumption	1046	1084	1135
o/w liability on government and NPISH final consumption	26	26	28
o/w liability on intermediate consumption	437	474	496
o/w liability on GFCF	108	148	179
o/w net adjustments	31	18	23
VAT Revenue	1517	1664	1851
VAT GAP	132	87	11
VAT GAP as a percent of VTTL	8%	5%	1%
VAT GAP change since 2015			-7 pp

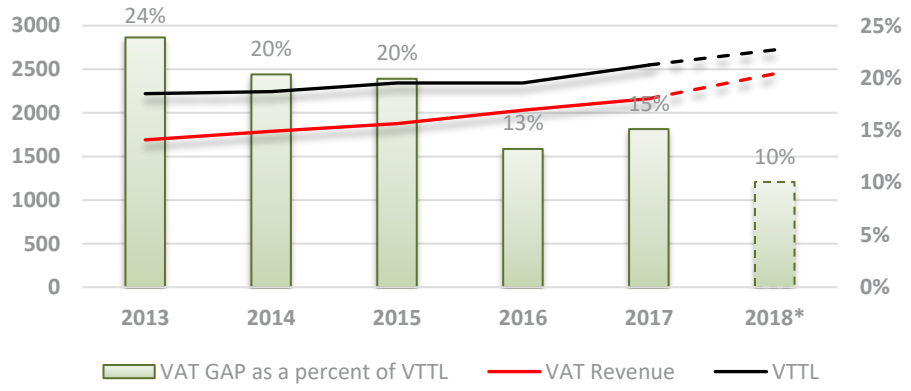


Highlights

- In 2017, the VAT Gap is estimated at 0.6 percent of the VTTL. Low estimates of the VAT Gap for Cyprus, albeit possible, may also point to underestimation and to quality issues in the data underlying the estimation.
- As a net exporter of electronic services, VTTL and revenue in Cyprus were affected by the change in the MOSS retention fee, which fell from 30 percent to 15 percent.
- Due to an important component of the country-specific adjustments and a potentially large estimation error, fast estimates for Cyprus are not published.

Table 3.14. Latvia: VAT Revenue VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (EUR million)

	2013	2014	2015	2016	2017	2018*
VTTL	2220	2244	2343	2342	2549	2723
o/w liability on household final consumption	1729	1745	1801	1837	1978	
o/w liability on government and NPISH final consumption	45	43	49	53	56	
o/w liability on intermediate consumption	299	293	311	319	342	
o/w liability on GFCF	186	211	238	194	238	
o/w net adjustments	-39	-47	-56	-62	-65	
VAT Revenue	1690	1787	1876	2032	2164	2449
VAT GAP	530	456	467	310	385	
VAT GAP as a percent of VTTL	24%	20%	20%	13%	15%	10%
VAT GAP change since 2013					-9 pp	

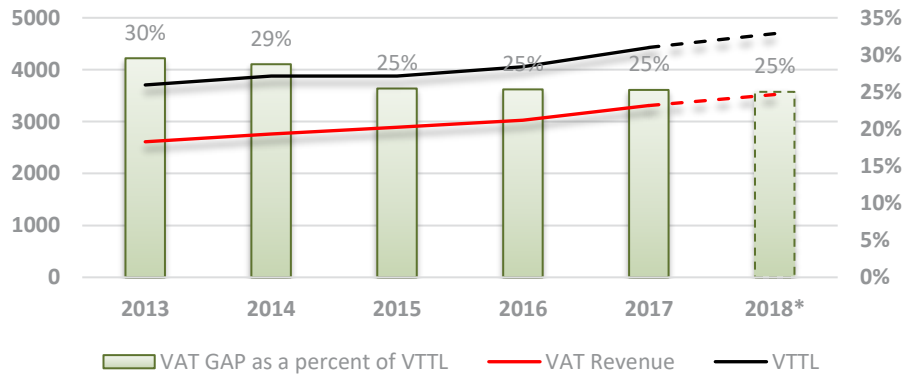


Highlights

- In 2017, the VAT Gap amounted to 15.1 percent, which was a 1.9 percentage point increase from 2016. Overall, between 2013 and 2017, the Gap fell by 9 percentage points and EUR 204 million.
- The Gap is expected to fall substantially in 2018.

Table 3.15. Lithuania: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (EUR million)

	2013	2014	2015	2016	2017	2018*
VTTL	3706	3879	3875	4054	4429	4696
o/w liability on household final consumption	3063	3168	3173	3363	3632	
o/w liability on government and NPISH final consumption	43	41	43	44	48	
o/w liability on intermediate consumption	330	373	393	394	396	
o/w liability on GFCF	398	442	461	454	494	
o/w net adjustments	-127	-145	-195	-202	-141	
VAT Revenue	2611	2764	2888	3026	3310	3522
VAT GAP	1095	1115	987	1027	1119	
VAT GAP as a percent of VTTL	30%	29%	25%	25%	25%	25%
VAT GAP change since 2013					-4 pp	

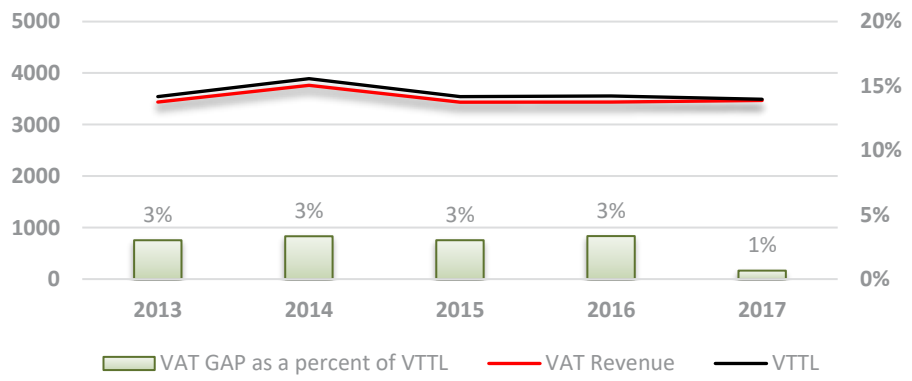


Highlights

- The VAT Gap remained nearly unchanged between 2015 and 2017 and is also expected to be stable in 2018.
- In 2017, the Gap accounted for 25.3 percent of the VTTL and EUR 1,119 million.

Table 3.16. Luxembourg: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (EUR million)

	2013	2014	2015	2016	2017	2018*
VTTL	3545	3891	3541	3554	3492	
o/w liability on household final consumption	1129	1240	1320	1374	1344	
o/w liability on government and NPISH final consumption	31	31	36	35	48	
o/w liability on intermediate consumption	820	874	1066	1121	1199	
o/w liability on GFCF	306	348	411	440	516	
o/w net adjustments	1259	1398	709	584	384	
VAT Revenue	3438	3762	3435	3436	3469	
VAT GAP	107	129	107	119	23	
VAT GAP as a percent of VTTL	3%	3%	3%	3%	1%	
VAT GAP change since 2013					-2 pp	

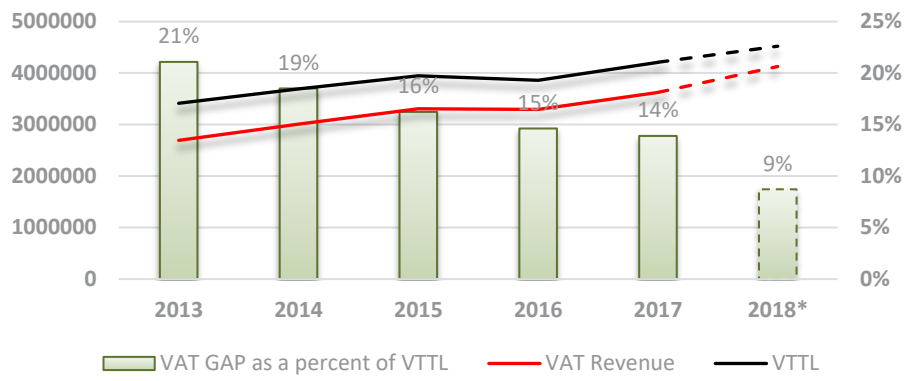


Highlights

- The VAT Gap in Luxembourg fell to approximately 0.7 percent of the VTTL.
- Due to an important component of the country-specific adjustments and a potentially large estimation error, fast estimates for Luxembourg are not published.

Table 3.17. Hungary: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (HUF million)

	2013	2014	2015	2016	2017	2018*
VTTL	3413225	3695038	3948143	3861850	4210262	4521931
o/w liability on household final consumption	2440438	2561233	2679346	2777597	2894662	
o/w liability on government and NPISH final consumption	114398	114447	118440	124162	135188	
o/w liability on intermediate consumption	435834	495980	519500	534323	568029	
o/w liability on GFCF	362648	464953	576458	377355	553092	
o/w net adjustments	59907	58426	54399	48413	59292	
VAT Revenue	2693555	3011162	3307312	3297156	3625111	4127678
VAT GAP	719670	683876	640831	564694	585152	
VAT GAP as a percent of VTTL	21%	19%	16%	15%	14%	9%
VAT GAP change since 2013					-7 pp	

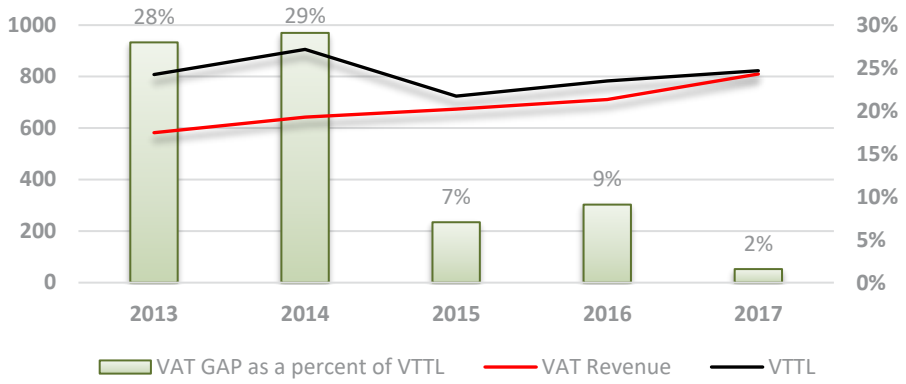


Highlights

- In 2017, the VAT Gap fell by approximately 0.7 percentage points to 13.9 percent of the VTTL.
- The VAT Gap as a percent of the VTTL fell by approximately 7 percentage points between 2013 and 2017.

Table 3.18. Malta: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (EUR million)

	2013	2014	2015	2016	2017
VTTL	808	906	724	783	823
o/w liability on household final consumption	437	457	485	502	524
o/w liability on government and NPISH final consumption	15	16	18	49	54
o/w liability on intermediate consumption	304	367	123	135	148
o/w liability on GFCF	50	63	82	74	81
o/w net adjustments	3	2	16	22	16
VAT Revenue	582	642	673	712	810
VAT GAP	226	264	51	71	13
VAT GAP as a percent of VTTL	28%	29%	7%	9%	2%
VAT GAP change since 2013					-26 pp

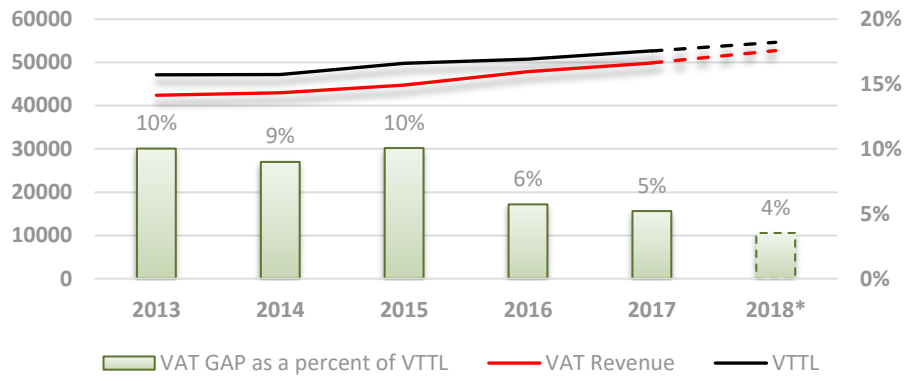


Highlights

- The estimates of the VAT Gap show the largest decline among all EU MS, to 1.6 percent of the VTTL.
- The significant drop in the VAT Gap in Malta resulted from the reclassification of inputs (from non-deductible to deductible) to the financial sector in 2015.
- Due to an important component of the country-specific adjustments and a potentially large estimation error, fast estimates for Malta are not published.

Table 3.19. Netherlands: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (EUR million)

	2013	2014	2015	2016	2017	2018*
VTTL	47134	47199	49756	50755	52644	54654
o/w liability on household final consumption	25882	25363	25953	26320	27207	
o/w liability on government and NPISH final consumption	565	556	595	599	618	
o/w liability on intermediate consumption	13000	12853	13718	13661	13964	
o/w liability on GFCF	7205	7867	8962	9642	10342	
o/w net adjustments	482	560	528	533	513	
VAT Revenue	42408	42951	44746	47849	49900	52730
VAT GAP	4726	4248	5010	2906	2744	
VAT GAP as a percent of VTTL	10%	9%	10%	6%	5%	4%
VAT GAP change since 2013					-5 pp	

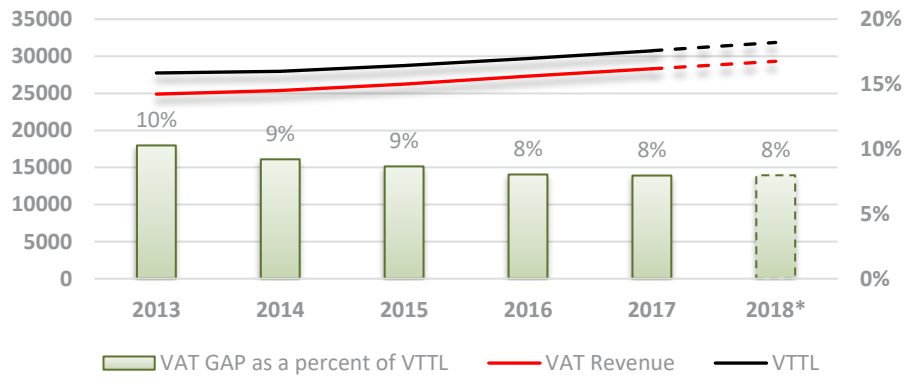


Highlights

- In 2017, the VAT Gap in the Netherlands was 5.2 percent of the VTTL and EUR 2,744 million.
- In 2018, the Gap is expected to decrease to less than 5 percent of the VTTL.

Table 3.20. Austria: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (EUR million)

	2013	2014	2015	2016	2017	2018*
VTTL	27744	27958	28733	29685	30748	31858
o/w liability on household final consumption	18984	18998	19200	19869	20524	
o/w liability on government and NPISH final consumption	758	957	997	1035	1071	
o/w liability on intermediate consumption	4021	4103	4205	4257	4343	
o/w liability on GFCF	2545	2585	2890	3060	3232	
o/w net adjustments	1436	1315	1442	1464	1578	
VAT Revenue	24895	25386	26247	27301	28304	29319
VAT GAP	2849	2572	2486	2384	2444	
VAT GAP as a percent of VTTL	10%	9%	9%	8%	8%	8%
VAT GAP change since 2013					-2 pp	

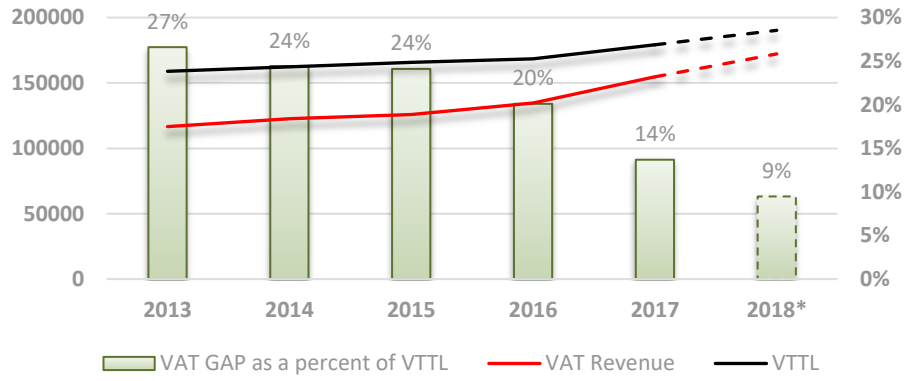


Highlights

- The VAT Gap in Austria remained stable in 2017. It also expected to remain stable in the course of 2018.
- In 2017, the estimated VAT Gap accounted for approximately 7.9 percent of the VTTL.

Table 3.21. Poland: VAT Revenue VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (PLN million)

	2013	2014	2015	2016	2017	2018*
VTTL	158882	162359	165817	168416	179194	190246
o/w liability on household final consumption	109749	112465	114399	118645	125895	
o/w liability on government and NPISH final consumption	6716	7113	7380	7574	7974	
o/w liability on intermediate consumption	22919	22939	24649	25852	26848	
o/w liability on GFCF	15306	16875	17038	13879	15976	
o/w net adjustments	4191	2967	2351	2467	2502	
VAT Revenue	116607	122671	125836	134554	154656	172210
VAT GAP	42275	39689	39981	33862	24538	
VAT GAP as a percent of VTTL	27%	24%	24%	20%	14%	9%
VAT GAP change since 2013					-13 pp	

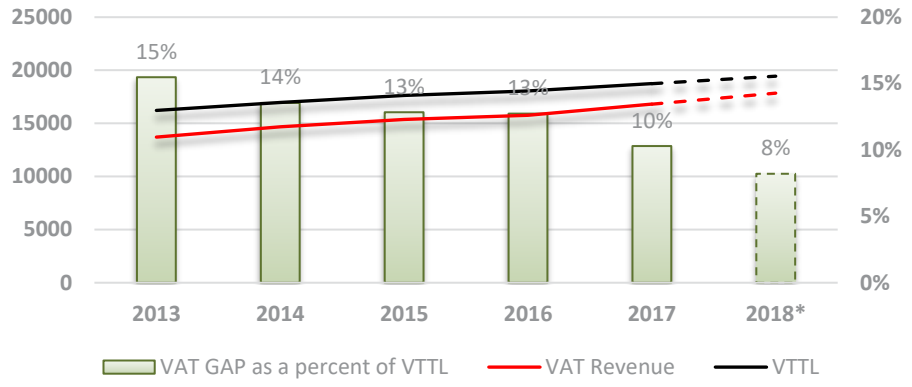


Highlights

- Similar to 2016, VAT compliance showed a significant improvement in 2017 (a decrease of 6.4 percentage points to 13.7 percent). Overall, the Gap fell by approximately 13 percentage points between 2013 and 2017.
- In 2018, the Gap is expected to decrease further to 9.5 percent.

Table 3.22. Portugal: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (EUR million)

	2013	2014	2015	2016	2017	2018*
VTTL	16220	16982	17632	18069	18738	19445
o/w liability on household final consumption	12210	12788	13190	13358	14055	
o/w liability on government and NPISH final consumption	219	218	444	484	551	
o/w liability on intermediate consumption	2568	2624	2454	2728	2512	
o/w liability on GFCF	887	1017	1170	1103	1249	
o/w net adjustments	336	334	373	396	371	
VAT Revenue	13710	14682	15368	15767	16809	17850
VAT GAP	2511	2300	2264	2301	1929	
VAT GAP as a percent of VTTL	15%	14%	13%	13%	10%	8%
VAT GAP change since 2013					-5 pp	

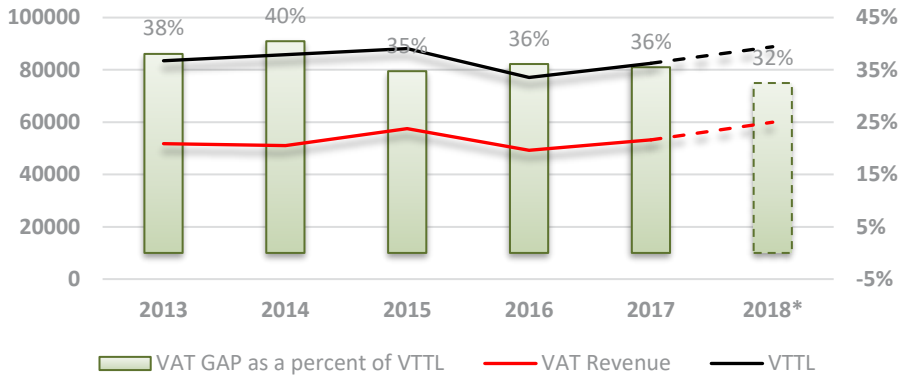


Highlights

- The VAT Gap fell in 2017 by roughly 3 percentage points down to 10.3 percent of the VTTL and continued its downward trend.
- In 2018, the Gap is expected to decline further.

Table 3.23. Romania: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (RON million)

	2013	2014	2015	2016	2017	2018*
VTTL	83525	85828	88151	77097	82528	88851
o/w liability on household final consumption	49363	51889	53728	48071	52773	
o/w liability on government and NPISH final consumption	3510	4177	3745	4110	4259	
o/w liability on intermediate consumption	7859	9760	9646	7849	8362	
o/w liability on GFCF	20944	16978	18640	14955	14992	
o/w net adjustments	1849	3025	2391	2111	2142	
VAT Revenue	51745	51086	57520	49253	53229	59990
VAT GAP	31780	34742	30631	27844	29299	
VAT GAP as a percent of VTTL	38%	40%	35%	36%	36%	32%
VAT GAP change since 2013					-3 pp	

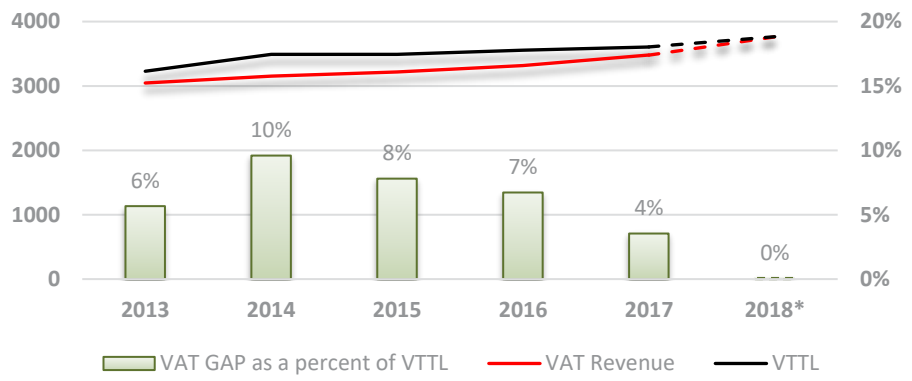


Highlights

- The VAT Gap a percent of the VTTL remained the highest in the EU.
- In 2018, the VAT Gap is expected to decrease to 32.5 percent from 35.5 percent in 2017.
- As of January 2017, Romania reduced its standard rate from 20 to 19. The change of the standard rate in 2017 and earlier in 2016 had a substantial impact on the effective rate, which fell to 12.7 percent.

Table 3.24. Slovenia: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (EUR million)

	2013	2014	2015	2016	2017	2018*
VTTL	3229	3490	3491	3555	3606	3765
o/w liability on household final consumption	2284	2442	2448	2535	2629	
o/w liability on government and NPISH final consumption	62	69	76	81	84	
o/w liability on intermediate consumption	447	491	468	535	470	
o/w liability on GFCF	334	401	419	328	355	
o/w net adjustments	101	87	79	75	69	
VAT Revenue	3046	3155	3218	3316	3479	3762
VAT GAP	183	335	272	239	128	
VAT GAP as a percent of VTTL	6%	10%	8%	7%	4%	0%
VAT GAP change since 2013					-2 pp	

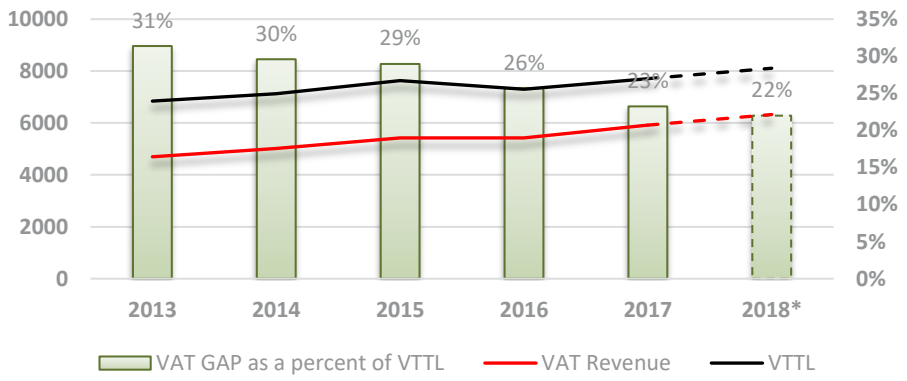


Highlights

- The VAT Gap in Slovenia followed a downward trend between 2014 and 2017. In 2017, it fell to 3.5 percent from 6.7 percent of the VTTL in 2016.
- Fast estimates show that the Gap will decrease further in 2018.

Table 3.25. Slovakia: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (EUR million)

	2013	2014	2015	2016	2017	2018*
VTTL	6844	7132	7630	7294	7708	8109
o/w liability on household final consumption	5101	5303	5369	5330	5611	
o/w liability on government and NPISH final consumption	96	93	96	99	102	
o/w liability on intermediate consumption	911	883	969	982	1036	
o/w liability on GFCF	725	869	1206	893	963	
o/w net adjustments	11	-16	-11	-10	-5	
VAT Revenue	4696	5021	5420	5420	5917	6326
VAT GAP	2147	2111	2209	1874	1791	
VAT GAP as a percent of VTTL	31%	30%	29%	26%	23%	22%
VAT GAP change since 2013					-8 pp	

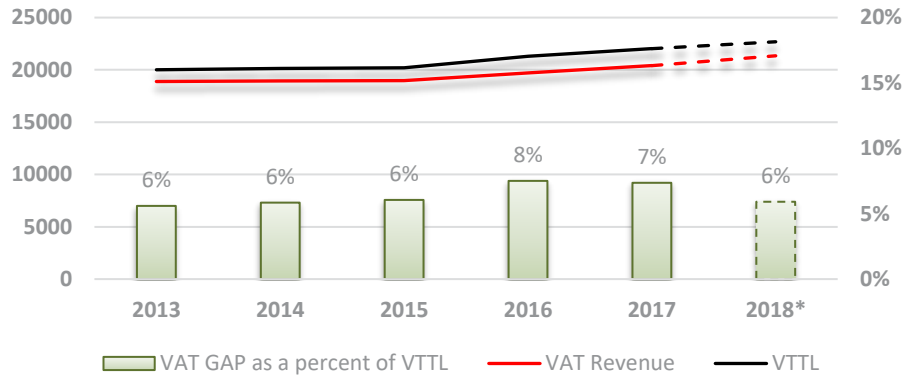


Highlights

- The VAT Gap in Slovakia in 2017 accounted for approximately 23.2 percent of the VTTL. Over the analysed period, the Gap followed a downward trend that will likely continue in 2018.

Table 3.26. Finland: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2012-2016 (EUR million)

	2013	2014	2015	2016	2017	2018*
VTTL	20008	20125	20197	21293	22026	22687
o/w liability on household final consumption	11041	11074	11135	11450	11745	
o/w liability on government and NPISH final consumption	456	465	474	532	520	
o/w liability on intermediate consumption	4343	4485	4644	4877	5031	
o/w liability on GFCF	3622	3498	3316	3745	3969	
o/w net adjustments	545	602	628	690	762	
VAT Revenue	18888	18948	18974	19694	20404	21345
VAT GAP	1120	1177	1223	1599	1622	
VAT GAP as a percent of VTTL	6%	6%	6%	8%	7%	6%
VAT GAP change since 2013					+2 pp	

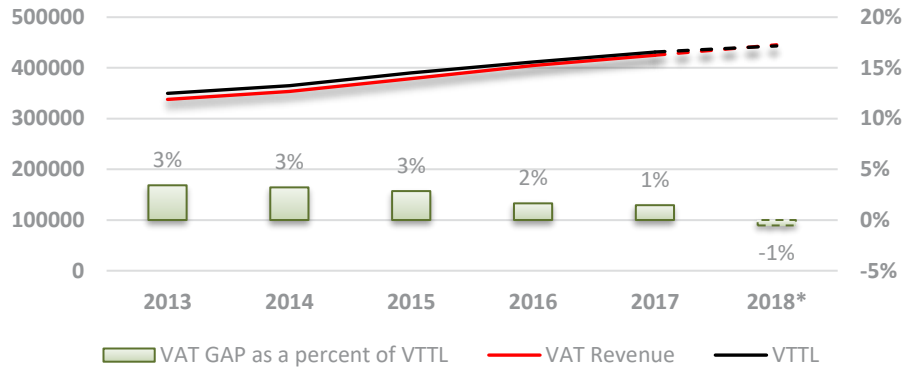


Highlights

- The VAT Gap in Finland remained relatively stable and significantly below the EU median.
- In 2017, it was estimated at approximately 7.4 percent of the VTTL.

Table 3.27. Sweden: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (SEK million)

	2013	2014	2015	2016	2017	2018*
VTTL	349797	365187	389952	411748	431357	443351
o/w liability on household final consumption	182545	188056	197358	205017	213676	
o/w liability on government and NPISH final consumption	19231	19869	20549	22024	22730	
o/w liability on intermediate consumption	86002	89068	95339	98606	101475	
o/w liability on GFCF	56775	62428	70346	79592	86733	
o/w net adjustments	5244	5766	6360	6509	6743	
VAT Revenue	337823	353439	378830	404987	425053	445571
VAT GAP	11974	11748	11122	6761	6304	
VAT GAP as a percent of VTTL	3%	3%	3%	2%	1%	-1%
VAT GAP change since 2013					-2 pp	

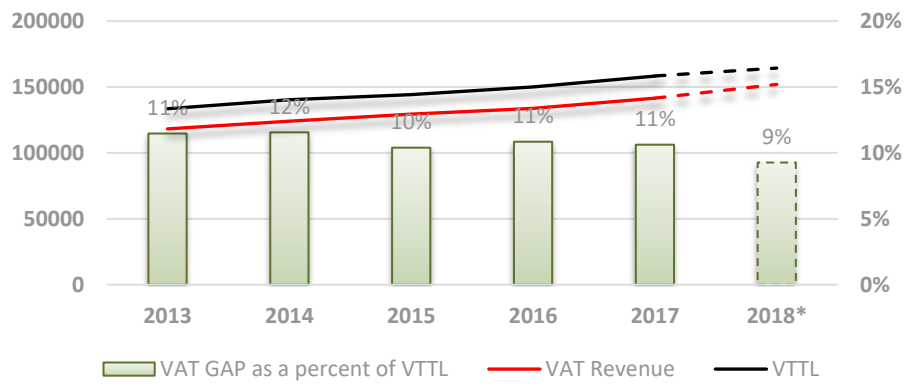


Highlights

- The VAT Gap in Sweden remained one of the lowest in the EU, with a share of 1.5 percent of the VTTL in 2017.
- Fast estimates show that the Gap may fall below 0, thus the simplified estimates need to be treated with caution.

Table 3.28. United Kingdom: VAT Revenue, VTTL, Composition of VTTL, and VAT Gap, 2013-2017 (GBP million)

	2013	2014	2015	2016	2017	2018*
VTTL	133557	140452	144337	150149	158421	164399
o/w liability on household final consumption	87245	93128	95346	100497	105552	
o/w liability on government and NPISH final consumption	2520	2726	3536	3206	3283	
o/w liability on intermediate consumption	29255	30354	30729	31254	33224	
o/w liability on GFCF	11436	12255	13468	13761	14717	
o/w net adjustments	3101	1989	1258	1432	1644	
VAT Revenue	118234	124211	129327	133857	141590	152013
VAT GAP	15323	16241	15010	16292	16831	
VAT GAP as a percent of VTTL	11%	12%	10%	11%	11%	9%
VAT GAP change since 2013					-1 pp	



Highlights

- The VAT Gap as a percent of the VTTL remained stable between 2013 and 2017. No sudden changes are expected in 2018.
- In 2017, the VAT Gap was approximately 10.6 percent of the VTTL.

IV. Policy Gap Measures for 2017

In this chapter, we present an update of the series of estimates of the Policy Gap and its components for the EU-28.

As discussed in the previous Reports, the 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 MS could theoretically (i.e. in the case of perfect tax compliance) generate if it applied a uniform VAT rate on all goods and services. Due to the idealistic assumption of perfect tax compliance and a very broad base that captures entire final consumption,[6] the practical interpretation of the Policy Gap draws criticism. Nonetheless, the assumption of perfect VAT collectability is indispensable, as interdependencies between tax compliance and rate structure are not straightforward.

In order to learn how different components contribute to revenue losses, we compose the Policy Gap into different components of revenue loss, as we show in Section IV in Annex A. Such elements are, for instance, the Rate Gap and the Exemption Gap, which capture the loss in VAT liability due to the application of reduced rates, and the loss in liability due to the implementation of exemptions.

Moreover, following Barbone et al. (2013), the Policy Gap and its components could be further adjusted to address the issue of the extent to which the loss of theoretical revenue depends on the decisions of policymakers. Measures that exclude liability from the final consumption of "imputed rents" (the notional value of home occupancy by homeowners), financial services, and the provision of public goods and services, as charging them with VAT is impractical or beyond the control of national authorities, are named the "Actionable Gaps".

The estimates of the Policy Gap, Rate Gap, Exemption Gap, Actionable Policy Gap, and Actionable Exemption Gap for the EU-28 MS for 2017 are presented in Table 4.1.

For the EU overall, the average Policy Gap level was 44.5 percent and remained nearly unchanged from 2016. Our interpretation of the numbers is that VAT levied on final consumption and household investment, even in the case of 100 percent compliance, generates just slightly more than half of what it could bring in if taxed uniformly at the full rate. Of this 44.52 percent, in 2017, approximately 9.56 percentage points were due to the application of various reduced and super reduced rates (the Rate Gap).

6 We also include housing GFCF in the Notional Ideal Revenue, which is explained in Section V in Annex A.

According to the Rate Gap estimates, reduced rates are least applied in Denmark (0.77 percent) and Estonia (2.91 percent). On the other side of spectrum are Cyprus (29.55 percent), Malta (16.46 percent), and Poland (14.61 percent).

The Exemption Gap, or the average share of Ideal Revenue lost due to various exemptions, is 35 percent in the EU on average. The MS with the highest values of the Exemption Gap are Spain (46.64 percent), due to the application of other than VAT indirect taxes in the Canary Islands, Ceuta, and Melilla, and the United Kingdom (44.32 percent). The lowest value of the Exemption Gap was observed in Cyprus (15.86 percent). In six other countries, the Exemption Gap was below 30 percent (Bulgaria, Croatia, Lithuania, Luxembourg, Malta, and Romania).

The largest part of the Exemption Gap is composed of exemptions on services that cannot be taxed in principle, such as imputed rents, the provision of public goods by the government, or financial services. The remaining level of the so-called "Actionable" Exemption Gap is about 3.5 percent, on average.

The Actionable Policy Gap – a combination of the Rate Gap and the Actionable Exemption Gap – is 13.00 percent on average. This figure shows the combined reduction of Ideal Revenue due to reduced rates (9.52%) and exemptions (3.46%) which could theoretically be removed. In other words, VAT revenue would increase by 13 percent of the Notional Ideal Revenue (equivalent to 33% of the actual collections in 2017) if MS applied the Standard Rate of VAT on the goods and services without exemptions that could be subject to such a rate. However, the room for manoeuvre differs substantially between Member States, from under one percent in Bulgaria and Denmark to more than 20 percent in Spain, Cyprus, Luxembourg and Poland.

The estimates of some components of the Exemption Gaps, like *Financial Services Gap* for Cyprus, are negative. It means that more revenue was levied by taxing their intermediate input than would be generated if the output was taxed. Such a situation is possible in the case of large investments or losses for a given year, but may also indicate inconsistencies in national accounts figures.

Table 4.1. Policy Gap, Rate Gap, Exemption Gap, and Actionable Gaps

	A	B	C	D	E	F	G	H
	Policy Gap (%)	**Rate Gap (%)**	**Exemption Gap (%)**	**o/w Imputed Rents (%)**	**o/w Public Services (%)**	**o/w Financial Services (%)**	**Actionable Exemption Gap (C - D - E - F) (%)**	**Actionable Policy Gap (G + B) (%)**
BE	51.50	10.20	41.30	7.12	27.43	3.45	3.30	13.50
BG	29.47	3.88	25.59	10.05	16.66	2.56	-3.68	0.20
CZ	37.96	5.77	32.19	8.31	19.40	2.50	1.99	7.76
DK	41.59	0.77	40.82	7.48	27.94	5.23	0.18	0.95
DE	44.26	7.35	36.91	6.71	22.47	3.24	4.50	11.85
EE	35.01	2.91	32.10	7.00	19.96	2.57	2.57	5.48
IE	47.91	14.00	33.91	10.20	26.01	-0.89	-1.41	12.59
EL	46.03	8.20	37.83	9.20	18.91	1.90	7.82	16.02
ES	59.42	13.07	46.35	9.81	19.59	2.53	14.42	27.49
FR	53.78	11.84	41.94	9.37	25.15	3.61	3.81	15.65
HR	33.90	8.44	25.47	7.59	14.43	2.06	1.40	9.83
IT	53.81	12.75	41.06	10.87	20.44	1.35	8.40	21.15
CY	45.41	29.55	15.86	8.55	20.66	-5.66	-7.69	21.86
LV	40.29	3.12	37.17	9.90	19.62	1.98	5.66	8.78
LT	33.48	4.20	29.28	5.21	17.28	1.65	5.13	9.33
LU	39.49	12.14	27.35	8.78	4.71	2.59	11.27	23.41
HU	43.48	5.75	37.73	7.48	22.87	3.59	3.79	9.54
MT	43.70	16.46	27.23	4.31	19.72	2.84	0.37	16.83
NL	51.84	11.19	40.65	7.28	27.56	7.00	-1.19	10.00
AT	45.85	10.40	35.45	7.22	21.97	2.93	3.32	13.73
PL	48.36	14.61	33.74	3.82	18.40	3.81	7.71	22.32
PT	51.21	11.95	39.27	8.38	21.22	3.21	6.45	18.40
RO	34.00	8.37	25.63	9.75	15.07	0.12	0.70	9.07
SI	47.78	11.29	36.49	7.87	20.79	2.95	4.89	16.18
SK	38.29	2.44	35.85	6.71	20.83	3.79	4.52	6.96
FI	48.86	9.89	38.97	10.09	23.75	2.83	2.30	12.19
SE	46.45	7.95	38.50	5.42	30.59	3.94	-1.45	6.50
UK	53.50	9.18	44.32	11.72	21.23	4.00	7.37	16.56
EU-28	44.52	9.56	34.96	8.08	20.88	2.56	3.44	13.00

V. Econometric Analysis of VAT Gap Determinants

The econometric analysis of VAT Gap determinants was first carried out in the 2018 Report. Following the approach proposed therein, we apply it again having one more year of the VAT Gap, 2016. Some sections, in particular V.a and V.b, have been slightly shortened as they were already included in the 2018 Report.

a. Introduction: The Incentives of the Agents Involved

Most of the literature on tax evasion has focused on personal taxes, where the taxpayer has to submit his or her return with fiscal information. This dependence on the information provided by the taxpayer, and given the probability the return is audited, creates incentives for the taxpayer to misreport that information. This is well known, and the taxpayer's behaviour is modelled under the "deterrence model" (Allingham and Sandmo, 1972). Independently of the efforts carried out by the tax administration to avoid misreporting, the literature on "tax morale" (see a recent survey by Luttmer and Singhal, 2014) argues that taxpayers might have a "sense of civic duty" such that taxpayers find intrinsic incentives not lo lie.

In contrast to the above framework, it is key to recall that in the EU, VAT is based on an invoicing mechanism. In any transaction, the seller issues an invoice and charges the *output tax* to the buyer. That amount of money minus the amount of VAT paid by the seller (*input tax*) has to be transferred to the tax administration. This is the basis of the self-enforcement mechanism, which *a priori* promotes voluntary tax compliance (Pomeranz, 2015);[7] the seller has incentives to charge the tax in order to get back the money from input taxes. An exception to this has to do with the incentives of final consumers. As they will not be able to deduct the input tax, they face *some* incentives to evade taxes. However, they require that the retailer accedes not to charge the output tax (Fedeli and Forte, 1999). Hence, they both play a role in the decision to evade taxes. This is a legal framework that departs from the standard theoretical models based on personal income taxes.

Therefore, in order to estimate the determinants of the tax gap, we have to acknowledge this particular context of the tax. In particular, to do so, we will account for the factors identifying the incentives of final consumers. Given the existence of these incentives, we will also account for the willingness of sellers to accept that demand from final consumers (basically, the share of

7 In fact, the theoretical literature has stressed this positive characteristic of the tax (i.e. self-enforcing mechanism) to justify its inclusion in the tax system despite the existence of a personal income tax (Boadway et al., 1994).

retailers in the economy). Finally, we will include in our empirical analysis the scale and nature of the means of the tax administration to reduce the extent of the tax gap. Thus, the final consumers, sellers, and tax administration are the three key players to take into account in the empirical analysis.

b. Variables to Explain Agents' Incentives

Due to a sense of civic duty, individuals [ac]ting as final consumers may have an intrinsic incentive to comply with the tax law. This can be picked up by *Age structure* (*Age*), as usually the literature assumes that older people are more aware of the benefits of adopting a prosocial behaviour. Hence, we will include in the regression the percentage of people over 50 years old as a proxy of tax morale.[8] Other structural factors related to prosocial behaviour will be picked up by the fixed effects in our regression model.

Taxpayers might suffer from liquidity constraints. If so, tax evasion could be interpreted as a risky loan where the expected penalty rate is part of the financial cost (Andreoni, 1992). This constraint could affect both businesses (either incorporated or not) and final consumers (see also Alm et al., 2019). We will control for this potential impact through the unemployment rate (*Unemp*).[9] The incentive to free ride, and so to avoid paying taxes, can also be affected by the perception of how well public revenues are spent or by the perception about the performance of the public sector, as we explained earlier. In particular, as Godin and Hindriks (2015) indicate, the quality of the government – that is, the degree of independence of the tax administration from political pressures as well as the quality of policy formulation and implementation – affects the effectiveness of the tax system. We will account for this potential impact by means of a country variable of government effectiveness (*Gov't Effect*), which was constructed by the World Bank.

Due to the presence of a final consumer, we expect that B2C transactions are those more prone to tax incompliance. Thus, we include as explanatory variables the productive structure of the country; in particular, we distinguish the following sectors: retail (*Sellers*), which could be the key sector, along with other labour-intensive sectors; as well as real estate (*Estate*), construction (*Constr*), industry (*Ind*), telecommunications (*Teleco*), and art (*Art*). The sum of all shares amounts to 100 percent once we have excluded those sectors that are not subject to or are exempted from VAT (such as health, education, or financial services).

The success of our empirical model lies in the fact that our explanatory variables are time variant within a country; otherwise, the influence would be captured as a fixed effect. Unfortunately for our purposes, statutory VAT tax rates do not change very often; hence, we will not be able to estimate their impact on the Gap.[10] Instead, we will control for the dispersion of tax

8 This range of age might be too wide, but we wanted to include taxpayers who are still active; otherwise, if we define it in a more restrictive way (for example, above 65 years old), we would be picking up retired people, for whom the nature of their most likely main source of income (pensions) is very peculiar.

9 See also Durán-Cabré et al. (2018) for an analysis of how tax enforcement evolves along the economic cycle.

10 Ideally, we would have liked to control for firm size as well. *A priori*, one could argue small firms are more likely

rates (within a country) (*Disp*) – that is, the standard deviation of tax rates given the potential existence of reduced and super-reduced tax rates, apart from the standard tax rate. In this case, there is more within-variation over time. We include this variable because of the potential effect that the dispersion of rates has on the VAT Gap, as the wider the dispersion, the greater the benefits from a misapplication of reduced and super-reduced rates.

Finally, as further controls in all regressions, we have included population (*Pop*) and GDP per capita (*GDPpc*).

In accordance with the deterrence model, we will employ variables that promote voluntary tax compliance. Hence, *ceteris paribus*, the greater the expected efforts of the administration, the greater the level of voluntary tax compliance, and so the lower the tax gap. This is the hypothesis we want to test with respect to the behaviour of the tax administration. In order to minimize the risk of biased estimates due to endogeneity and to account for a potential delayed impact on the Gap, these variables are lagged two periods.

In particular, we have used the following three variables:

- Scale of the Tax Administration (*Scale*), constructed as the ratio of total administrative costs divided by GDP;
- Information and Technology Expenditure (*IT Exp*), constructed as the share of information and technology expenditures over total administrative costs; and
- Public Deficit (*Def*), the tax administration might have greater incentives to close the tax gap and, in our case, to promote voluntary tax compliance when public finances are in a worse financial condition (Esteller-Moré, 2005), given the resources in hands of the tax administration picked up by the two previous variables.

The first variable is picking up the scale of the tax administration primarily through the number of tax professionals in the administration, and the second one is picking up the nature of that expenditure. In particular, we will test whether greater emphasis on information and technology promotes voluntary tax compliance either as a deterrent to fraud or simply as a way to facilitate the taxpayer to comply *ex-ante* with tax obligations.

c. Empirical Application

Descriptive Statistics and Sources

Table 5.1 shows the descriptive statistics of the variables used in the econometric model. For every variable, we have the number of observations, the unity of measure, the mean, the standard deviation, and the minimum and maximum values. There are 448 observations of VAT Gap. The average value of these observations is 16.17 percent, with a standard deviation of 10.49,

(probably, due to relatively lower expected control from the tax administration) to accept the demand of final consumers not to charge the output tax. However, this variable does not show much within-variation over time. Thus, we have the same problem we found with VAT tax rates: we cannot identify its impact. Thus, this has to be left for future research.

a minimum value of -1.42 percent (Sweden, 2015), and a maximum of 49.28 percent (Romania, 2009). The ratio of total administrative costs divided by GDP (*Scale*) is available 316 times, with a mean value of 0.25 percent, a standard deviation of 0.45, a minimum value of 0.04 percent (Malta, 2004), and a maximum value of 1.13 percent (Cyprus, 2004). Finally, for example, the share of information and technology expenditures over total administrative costs (*IT Exp*), with 216 observations, has a mean value of 10.19 percent, a standard deviation of 7.01, a minimum value of 0.1 percent (Malta, 2012), and a maximum value of 27.8 percent (Finland, 2012).

Table 5.1. Descriptive Statistics and Data Sources

VARIABLES	SOURCE	OBS	MEAN	STD DEV	MIN	MAX
VAT Gap (Vatgap)	2013, 2014, 2015, 2016, 2017, and 2018 Studies	448	0.16	0.11	-0.01	0.49
Retail sellers (Sellers)	Eurostat	476	0.30	0.05	0.13	0.44
Real estate (Estate)	Eurostat	476	0.14	0.04	0.05	0.28
Construction (Constr)	Eurostat	476	0.09	0.02	0.03	0.19
Industry (Ind)	Eurostat	448	0.30	0.07	0.08	0.55
Telecommunications (Teleco)	Eurostat	476	0.07	0.02	0.04	0.16
Art (Art)	Eurostat	476	0.05	0.02	0.01	0.21
Dispersion of tax rates within a country (Disp)	Own, based on DG TAXUD	464	0.07	0.03	0.00	0.12
Unemployment (Unemp)	Eurostat	476	0.09	0.04	0.02	0.28
Government effectiveness (Gov't Effect)	World Bank	476	1.15	0.62	-0.37	2.35
Age structure/Old (Age)	Eurostat	476	0.35	0.03	0.26	0.43
Information and technology expenditure (IT Exp) (%)	OECD	216	10.19	7.01	1.00	27.8
Scale of the tax administration (Scale) (%)	OECD	316	0.25	0.11	0.04	1.13
Public deficit (Def)	Eurostat	441	-0.03	0.04	-0.32	0.07
Population (Pop) (x 10^{-7})	Eurostat	476	1.78	2.25	0.04	8.25
GDP per capita (GDPpc) (EUR thousand & PPP)	Eurostat	474	24.04	11.04	5.60	77.40

Source: own.

Empirical Model

We estimate a fixed effects model in order to test the impact of the different actors on the VAT Gap. Our endogenous variable runs from 2000 to 2016 for the EU-28 MS and comes from the most recent vintages of the Study available.

A fixed effects model seems particularly appropriate, as one could argue some explanatory factors like the efforts of the tax administration or institutional variables might be correlated with many other factors that are not included in the regressions. As we suggested before, though, the drawback is that we will not be able to interpret the estimates of the fixed effects, or to estimate the impact of the variables that show little within-country variation, as for example, level of VAT tax rates or firm size. This has to be explicitly acknowledged.

Analytically, the basic model we estimate is as follows:

$$VAT\ GAP_{it} = \beta_1 Age_{it} + \beta_2 Unemp_{it} + \beta_3 Gov't\ Effect_{it} +$$

$$+ \beta_4 Sellers_{it} + \beta_5 Estate_{it} + \beta_6 Constr_{it} + \beta_7 Ind_{it} + \beta_8 Teleco_{it} + \beta_9 Art_{it} + \beta_{10} Disp_{it} +$$

$$+\beta_{11} Scale_{it-2} + \beta_{12} IT\ Exp_{it-2} + \beta_{13} Def_{it-2} +$$

$$+ \beta_{14} GDPpc_{it} + \beta_{15} Pop_{it} + \beta_{16} Pop^2{}_{it} + Fixed\ Effects + Time\ Effects + Error\ Term_{it}$$

Our endogenous variable, VAT Gap of country *i* in year *t*, is explained by a set of covariates. In particular, in the first row, there are the variables related to final consumers; in the second row, we include the variables related to the behaviour of firms; in the third row, lagged two periods to account for a likely sluggish and minimize probability of the endogeneity problem, there are the variables related to the behaviour of the tax administration. Finally, in the fourth row, there are the control variables, including fixed effects (a variable for each country that remains unchanged along time), time effects (a common variable for all countries that varies along time), and the error term with the usual statistical properties. The beta coefficients are the estimates of the impact of a given variable on our endogenous variable. With the exception of population *(Pop)*, we expect the impact of all variables to be linear – that is, to be independent of the value of the corresponding variable. However, due to its potential interest for policymakers, we will also test whether the impact of the variables under direct control of the tax administration is non-linear. This could imply that its impact holds from a given value of the explanatory variable onwards or that its impact vanishes when the variable has reached a given threshold. We will be able to be more precise about this later.

Empirical Results

We have proceeded parsimoniously – that is, we have tested one group of factors after another, and in the end, we have tested all groups simultaneously. In all models, though, we control for population (and its square), VAT tax rate dispersion, and GDP per capita. Next, we discuss the results, which are shown in Table 5.2.

In column 1, we have tested the importance of only those factors picking up the impact of the tax administration. As there are external data limitations for the tax administration variables and we use second lags, we only have 190 observations. The estimates are statistically not significant, likely due to data limitations. However, in general, the greater the importance of the information and technology expenditure and of the public deficit, the lower the level of the VAT Gap. On the other hand, the greater the scale of the tax administration, the larger the VAT Gap. As this result was unexpected, we also verify whether the impact is non-linear in its nature.[11]

These estimates have to be taken with caution, though, as we still have not included all variables that might have an impact on the Gap. However, we can use the results of column 1 as an example of how to quantitatively interpret the estimates. For example, when *IT Exp* increases by 0.1 percentage points (recall the pooled average of the sample of *IT Exp* is 10.19 percent over GDP), the Gap decreases by 0.018 percentage points (pooled average of the Gap = 16.17 percent).

Similarly, in column 2, we have included only those factors that might explicitly affect seller behaviour. In column 3, we have included only those explicitly affecting final consumers. In column 4, we have included both groups of factors, that is those affecting sellers and final consumers. In column 5, we have included all factors simultaneously. Finally, in column 5 and column 6 we included specifications that tested non-linearites of *Scale*.

Regarding the variables affecting firms' behaviour, we see that the higher the dispersion of rates, the higher the VAT Gap.[12] Regarding the productive structure of the economy, results are not clear-cut. The residual category is agriculture; hence, the estimates have to be interpreted as whether the share in a given sector has an impact on VAT with respect to the impact of agriculture Regarding the variables affecting individuals, we observe that the higher the unemployment rate (as a proxy of "liquidity constraints"), the higher the level of the Gap (this estimate is statistically significant also in columns 5 and 6).

Hence, liquidity constraints and the tax design play a role in the VAT Gap, but they cannot be directly affected by the tax administration. In spite of this, the added value of this type of analysis is making the tax administration aware of the exogenous constraints it faces on reducing the VAT Gap. That is, efforts to reduce the tax gap should be larger when the economy suffers liquidity constraints or when the tax is more difficult to administer.[13]

We think the most interesting results are those dealing with the impact of the variables under the direct control of the tax administration. In this regard, there is a robust result regarding *IT Exp*, namely – the greater the importance of this type of expenditure, the lower the Gap. Regarding the scale of the tax administration, the estimation shown in column 6 suggests the impact is non-linear. In particular, it has a favourable impact on the reduction of the Gap only

11 Note we are working with aggregate tax administration variables. Thus, the estimates do not specifically account for the impact of resources of the tax administration dedicated to promoting VAT compliance. In this regard, the estimate will be a combination of the importance of those resources and their productivity in promoting tax compliance.

12 In columns 5 and 6, we still have a positive sign for that variable but due to sample limitations statistical inference is not so precise.

13 Another potential explanatory variable – which we left for future research – would be the share of labour as an input factor at the aggregate level by country.

for very high levels of the *Scale* (around 0.77%). Hence, it seems that in order to promote tax compliance it is more important the nature of the expenditure (*IT Exp*) than the size or scale of the administration.

Finally, note the impact of GDP per capita is not statistically significant. The impact of population is statistically significant (with the exception of column 5) and non-linear, and, in particular, it shows an inverted-U shape. The threshold (or bliss point of the function) is around 61.3-70.3 million inhabitants, depending on the estimation. While the nature of the impact of population on the Gap is unknown, it is clear that either being a small country or an extremely large country (recall the pooled average of population size is 82.5 million inhabitants) is beneficial for the size of the VAT Gap.

Table 5.2. Estimation of the Determinants of VAT GAP. Fixed Effects Specification

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	VAT GAP	VAT GAP	VAT GAP	VAT GAP	VAT GAP	VAT GAP
Retail sellers		0.247		0.098	0.413	0.384
		(0.207)		(0.225)	(0.318)	(0.331)
Real estate		-0.149		-0.355*	-0.360	-0.354
		(0.129)		(0.191)	(0.367)	(0.377)
Construction		-0.156		0.230	0.518	0.555
		(0.309)		(0.350)	(0.425)	(0.435)
Industry		0.300		0.227	0.0399	0.0689
		(0.223)		(0.269)	(0.232)	(0.235)
Telecommunications		-0.364		0.165	-0.0579	-0.0833
		(0.448)		(0.415)	(0.466)	(0.458)
Art		1.408***		1.848***	-1.216**	-1.115*
		(0.251)		(0.304)	(0.531)	(0.549)
Dispersion of tax rates within a country	0.409	0.330*	0.547***	0.532**	0.297	0.378
	(0.376)	(0.193)	(0.184)	(0.202)	(0.324)	(0.315)
Unemployment			0.115	0.265*	0.656**	0.522*
			(0.163)	(0.144)	(0.273)	(0.257)
Government effectiveness			0.0438	0.0407	-0.0118	-0.0112
			(0.0289)	(0.0320)	(0.0382)	(0.0375)
Age structure			1.089	1.087*	0.772	(0.989)
			(0.651)	(0.606)	(0.998)	(0.880)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	VAT GAP	VAT GAP	VAT GAP	VAT GAP	VAT GAP	VAT GAP
Information and technology expenditure (-2)	-0.178				-0.174	-0.191
	(0.130)				(0.129)	(0.127)
Scale of the tax administration (-2)	4.432				12.39**	32.98
	(4.516)				(5.830)	(22.27)
Scale of the tax administration (-2)^2						-2,141
						(2,138)
Public deficit (-2)	-0.165				-0.0537	-0.0761
	(0.100)				(0.108)	(0.0952)
Population	0.830**	0.393**	0.534**	0.519**	0.473	0.683**
	(0.338)	(0.149)	(0.193)	(0.192)	(0.316)	(0.330)
Population ^2	-0.0649**	-0.0307**	-0.0384**	-0.0387**	-0.0386	-0.053**
	(0.0259)	(0.0126)	(0.0159)	(0.0161)	(0.0242)	(0.0254)
GDP per capita	0.000436	-0.00139	0.000175	-0.000188	0.00228	0.00185
	(0.00174)	(0.00187)	(0.00164)	(0.00169)	(0.0025)	(0.00263)
Constant	-0.931**	-0.475*	-0.952***	-1.085***	-0.898*	-1.269***
	(0.412)	(0.249)	(0.333)	(0.327)	(0.484)	(0.433)
Observations	190	446	414	414	186	186
R-squared	0.343	0.230	0.214	0.284	0.437	0.447
Number of countries	28	28	28	28	28	28

Source: own. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Annex A. Methodological Considerations

This section of the Annex is based to a large extent on the methodological considerations already presented in earlier VAT Gap Reports. More detailed considerations regarding the approaches to estimate the VAT Gap are presented in the seminal VAT Gap Report (Barbone et al., 2013) and the European Commission (2016).

I. Source of Revisions of VAT Gap Estimates

Every year, the estimates of the VAT Gap are updated and revised backwards. There are three different sources of such revisions, which are beyond our control at the moment of publication. These are:

1. Updates in the underlying national accounts data published by Eurostat: updates in VAT revenues, new supply and use tables, and revised industry specific growth rates, among others.
2. Updates in the estimated GFCF liability, based on the new information from the own resource submissions (ORS) on taxable shares of GFCF by five sectors: households, government, NPISH, and exempt financial and non-financial enterprises.
3. Revision of the parameters of the VTTL model: effective rates, pro-rata coefficients, and net adjustments, either due to new information from ORS or due to correcting errors in the previous computation.

In nominal terms, the most significant revisions in 2017 concerned the VTTL of the United Kingdom and France. The revision of the VTTL in the United Kingdom resulted from the amended treatment of the refunds that, contrary to the convention used by HMRC, are not deducted from the receipt and thus do not decrease the VTTL. The revisions for France were possible thanks to detailed data on household final consumption structure received from the French Authorities. These revisions result from multiple meetings and exchanges, which picture a very good collaboration between national tax administrations, CASE and the European Commission.

Another significant revision concerned Croatia, which substantially revised its national accounts figures. Moreover, thanks to the information provided as of this year, we were able to accurately account for the MOSS retention fee for the three MS[14] receiving the non-negligible collection of its revenue for providing electronic services abroad. In 2017, the MS of identifica-

14 i.e. Cyprus, Luxembourg and Malta.

tion retains 15 percent (a decrease of 15 percentage points and, equivalently, half of the amount with respect to 2016) of the VAT payments to be transferred to the MS of consumption.

The estimates of the VAT Gap were also somewhat affected by the changes in the ESA standard of compiling VAT revenue data, which currently include a change in the pace of VAT refunds. Thanks to this amendment, the VTTL, which is estimated on the accrual basis, is now better aligned with VAT collections figures. This improves the accuracy of estimates and eliminates one of the sources of criticism of our method.

II. Decomposition of VAT Revenue

As VAT Revenue (VR) is the difference between the VTTL and the VAT Gap (VR = VTTL - VAT Gap), and the VTTL is a product of the effective rate and the base (VTTL = effective rate × base), VAT revenue could be decomposed using the following formula:

$$VR = VTTL \times VAT\ compliance = effective\ rate \times base \times \left(1 - \frac{VAT\ Gap}{VTTL}\right)$$

Thus, the year-over-rear relative change in revenue is denoted as:

$$\frac{\Delta VR}{VR} = \frac{\Delta(effective\ rate)}{effective\ rate} \times \frac{\Delta base}{base} \times \Delta\left(1 - \frac{VAT\ Gap}{VTTL}\right) \Big/ \left(1 - \frac{VAT\ Gap}{VTTL}\right)$$

where:

$\frac{\Delta(effective\ rate)}{effective\ rate}$ denotes change in effective rate,

$\frac{\Delta base}{base}$ denotes change in base, and

$\Delta\left(1 - \frac{VAT\ Gap}{VTTL}\right) \Big/ \left(1 - \frac{VAT\ Gap}{VTTL}\right)$ denotes change in VAT compliance.

III. Data Sources and Estimation Method

The "top-down" method that is utilised for VAT Gap estimation relies on national accounts figures. These figures are used to estimate the VAT liability generated by different sub-aggregates of the total economy. The VTTL is estimated as the sum of the liability from six main components: household, government, and NPISH final consumption; intermediate consumption; GFCF; and other, largely country-specific, adjustments.

In the "top-down" approach, VTTL is estimated using the following formula:

$$VTTL = \sum_{i=1}^{N} (rate_i \times Value_i) + \sum_{i=1}^{N} (rate_i \times propex_i \times IC\ Value_i) + \sum_{i=1}^{N} (rate_i \times propex_i \times GFCF\ Value_i) + net\ adjustments$$

Where:
Rate is the effective rate,
Value is the final consumption value,
IC Value is the value of intermediate consumption,
Propex is the percentage of output in a given sector that is exempt from VAT,
GFCF Value is the value of gross fixed capital formation, and
index *i* denotes sectors of the economy.

To summarise, VTTL is a product of the VAT rates and the propexes multiplied by the theoretical values of consumption and investment (plus country-specific net adjustments).

For the purpose of VAT Gap estimation, roughly 10,000 parameters are estimated for each year, including the effective rates for each 2-digit CPA (i.e. in the VTTL formula presented above) group of products and services and the percentage of output in a given sector that is exempt from VAT for each type of consumption (i.e. $propex_i$ in the VTTL formula presented above). For instance, for *Education services* (CPA no. 85) in Croatia, like for any other country and group of products and services, we estimated effective rates in household, government, and NPISH final consumption, as well as the percentage of output that is exempt from VAT. The main source of information is national accounts data and Own Resource Submissions (ORS), i.e. VAT statements provided by MS to the European Commission. In a number of specific cases where the ORS information was insufficient, additional data provided by MS were used. As these data are not official Eurostat publications, we decline responsibility for inaccuracies related to their quality.

A complete description of data and sources is shown in Table A1.

Table A1. Data Sources

	DESCRIPTION	PURPOSE	SOURCE	COMMENT
1	Household expenditure by CPA/COICOP category.	Estimation of effective rates for household final consumption for each 2-digit CPA category.	4ORS / HBS[5]	...
2	The intermediate consumption of industries for which VAT on inputs cannot be deducted, pro-rata coefficients, alternatively share of exempt output.	Estimation of propexes.	ORS / assumptions common for all EU MS	...
3	Investment (gross fixed capital formation) of exempt sectors.	Estimation of VAT liability from investment.	ORS / Eurostat	Values forecasted two years ahead of available time series.
4	Government expenditure by CPA/COICOP category.	Estimation of effective rates for government final consumption for each 2-digit CPA category of products and services.	ORS	Only individual government consumption and social transfers in kind specifically are a part of the tax base. However, effective rate is estimated using broad definition the base that includes entire government consumption.
5	NPISH expenditure by CPA/COICOP category.	Estimation of effective rates for NPISH final consumption for each 2-digit CPA category of products and services.	ORS	...
6	VTTL adjustment due to small business exemption, business expenditure on cars and fuel, and other country-specific adjustments.	Estimation of net adjustments.	ORS	In general, adjustments forecasted two years ahead of available time series.
7	Final household consumption, government final consumption, NPISH final consumption, and intermediate consumption.	Estimation of VTTL.	Eurostat	As national accounts figures do not always correspond to the tax base, two corrections to the base are applied: (1) adjustments for the self-supply of food and agricultural products and (2) adjustments for the intermediate consumption of construction work due to the treatment of construction activities abroad. If use tables are not available for a particular year or available use tables include confidential values, use tables are imputed using the RAS method.[6]
8	VAT revenue.	VAT revenue.	Eurostat	...

IV. Fast VAT Gap estimates

The methodology used to estimate the VTTL for 2018 differs markedly from the one employed to estimate the VTTL for 2013-2017. The main simplifications and assumptions include:

1. Structure of household final consumption does not change with respect to 2017. In fact, due to unavailability of up-to-date figures, it relies in most of the cases on a three-year lagged series.
2. Non-deductible GFCF liability changes in line with the year-over-year change in government GFCF published by AMECO.[15]
3. In the vast majority of cases where there are no significant changes in the statutory rates, net adjustments and intermediate consumption liability are rescaled from 2017 using growth rates for the entire tax base.

Due to the simplified methodology, the figures for 2018 are referred to as "fast estimates" or "forecasts" since uncertainty around these numbers is substantially larger than for the full estimates. For three Member States, namely Cyprus, Malta, and Luxembourg, where the estimation error was exceptionally large due to the considerable role of country-specific adjustments, these estimates need more refinement, therefore we decided not to publish them.

The accuracy of the fast estimates depends on the stability of the structure of the liability components, which results, among others, from economic conditions and tax policies. In our training period 2014-2017, the root of the mean squared error of the fast estimates was equal to 0.038. This translates to approximately 0.4 percentage point correction to the results derived using full estimation procedure. However, in the case of sudden changes that may happen in the future, the inaccuracy will likely be higher.

V. Derivation of the Policy Gap

This section of the Annex defines the concepts used in Chapter V for estimating foregone revenue due to policies introduced and discusses some of the methodological considerations.

We begin with the **Notional Ideal Revenue** that, by definition, should indicate an upper limit of VAT revenue (i.e. the revenue levied at a uniform rate in the environment of perfect tax compliance). As shown in Figure A1, ideal revenue is larger than VTTL and subsequently larger than VAT collection. However, due to the existence of exemptions, it does not capture the entire VTTL and tax collection. If no exemptions were applied, neither intermediate consumption nor the GFCF of the business sector would be the base for computing VTTL.

The problem arises when deciding whether investment by the non-business sector should be part of the VAT base. According to the OECD (2014), Notional Ideal Revenue is defined as the standard rate of VAT times the aggregate net final consumption. Multiplying the standard rate and final consumption would yield, however, lower liability than in the case where a country

15 https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/macro-economic-database-ameco_en

applied no exemptions, no reduced rates, and was able to enforce all tax payments. In real life, VTTL is comprised partially from VAT liability from investment made by households, government, and NPISH. In the case of the non-inclusion of this investment to the base, VTTL would be partially extended beyond the ideal revenue despite "no exemptions" present in the system (see Figure A1 (c)).

Policymakers can see the upper limit of VAT revenue by considering all final use categories of the household, non-profit, and government sectors. Thus, in this Report, Notional Ideal Revenue is defined as the standard rate of VAT times the aggregate net final and net GFCF of the household, non-profit, and government sectors, as recorded in the national accounts (interdependence among the various concepts presented is shown in Figure A1).[16]

The **Policy Gap** is defined as one minus the ratio of the "legal" tax liability (i.e. the chunk of the Notional Ideal Revenue that, in the counterfactual case of perfect tax compliance, is not collected due to the presence of exemptions and reduced rates). The Policy Gap is denoted by the following formula:

$$\text{Policy Gap} = (\text{Notional Ideal Revenue} - \text{VTTL})/\text{Notional Ideal Revenue}$$

The Policy Gap could be further decomposed to account for the loss of revenue. Such components are the **Rate Gap** and the **Exemption Gap**, which capture the loss in VAT liability due to the application of reduced rates and the loss in liability due to the implementation of exemptions.

The Rate Gap is defined as the difference between the VTTL and what would be obtained in a counterfactual situation, in which the standard rate, instead of the reduced, parking, and zero rates, is applied to final consumption. Thus, the Rate Gap captures the loss in revenue that a particular country incurs by adopting multiple VAT rates instead of a single standard rate (Barbone et al., 2015).

The Exemption Gap is defined as the difference between the VTTL and what would be obtained in a counterfactual situation, in which the standard rate is applied to exempt products and services, and no restriction of the right to deduct applies.[17] Thus, the Exemption Gap captures the amount of revenue that might be lost because of exempted goods and services. Note that the Exemption Gap is composed of the loss in the VAT on the value added of exempt sectors, minus the VAT on their inputs, minus the VAT on GFCF inputs for these sectors. Thus, in principle, the Exemption Gap might be positive or negative (if the particular sector had negative

16 National accounts for most countries report final consumption on a gross (i.e. VAT-inclusive) basis. Net consumption is estimated on the basis of the gross consumption recorded in the use tables, from which VAT revenues are subtracted.

17 *The additive decomposition of the Policy Gap into the Exemption and Rate Gap presented in this Report differs from that in Keen (2013). Keen (2013) defines the Rate Gap as the loss from applying reduced and zero rates to the final consumption liability, measured as a percentage of the Notional Ideal Revenue. The Exemption Gap measures unrecovered VAT accumulated in the production process as a percentage, on the contrary, of final consumption liability. Due to these definitions, the Policy Gap can be split multiplicatively into gaps attributable to reduced rates and exemptions. Since the numerator of the "[1 - Rate Gap]" and denominator of the "[1 - Exemption Gap]" are equal, multiplication of these two components yields – VAT revenue as a percentage of Notional Ideal Revenue, which equals "[1 - Policy Gap]"* (Barbone et al., 2015).

value added, or if it had large GFCF expenditures relative to final consumption) (Barbone et al., 2015).

In algebraic terms, we have the following:

Definitions:

$T_i^{*,E} = \frac{VTTL_i^{*,E}}{C_i}$ – effective rate for group *i* of products in the case where the standard rate instead of the zero rate, parking rate, or reduced rate is applied (for final consumption and the GFCF of non-business activities).

$VTTL_i^{*,E}$ – liability from final consumption GFCF of non-business activities of group *i* of products, in the case where the standard rate instead of the zero rate, parking rate, or reduced rate is applied. Actual liability from intermediate consumption and the GFCF of business activities is assumed.

$T_i^{*,R} = \frac{VTTL_i^{*,R}}{C_i}$ – effective rate for group *i* of products in the event where exempt products within the group are taxed at the standard rate and VAT on sector's input is deductible .

$VTTL_i^{*,R}$ – liability from **final consumption** of group *i* when exempt products within the group are taxed at the standard rate. Actual liability from final consumption GFCF of non-business activities is assumed[18].

τ_s – statutory rate.

$i \in (1; 65)$ – sectors of the economy.

Policy Gap:

$$1 - P = \left(\frac{\sum_{i=1}^{N} T_i C_i}{\tau_s \sum_{i=1}^{N} C_i}\right)\left(\frac{\sum_{i=1}^{N} T_i^* C_i}{\sum_{i=1}^{N} T_i C_i}\right) = \left(\frac{\sum_{i=1}^{N} T_i^* C_i}{\tau_s \sum_{i=1}^{N} C_i}\right)$$

Exemption Gap:

$$1 - P_E = \left(\frac{\sum_{i=1}^{N} T_i C_i}{\tau_s \sum_{i=1}^{N} C_i}\right)\left(\frac{\sum_{i=1}^{N} T_i^{*,E} C_i}{\sum_{i=1}^{N} T_i C_i}\right) = \left(\frac{\sum_{i=1}^{N} T_i^{*,E} C_i}{\tau_s \sum_{i=1}^{N} C_i}\right)$$

18 An alternative approach would be the exclusion of non-business GFCF from the NIR as applied by Keen (2013), However, such an assumption would be equivalent to believing that in the "ideal" world households and governments could both deduct their input VAT.

Rate Gap:

$$1 - P_R = \left(\frac{\sum_{i=1}^{N} T_i C_i}{\tau_s \sum_{i=1}^{N} C_i}\right)\left(\frac{\sum_{i=1}^{N} T_i^{*,R} C_i}{\sum_{i=1}^{N} T_i C_i}\right) = \left(\frac{\sum_{i=1}^{N} T_i^{*,R} C_i}{\tau_s \sum_{i=1}^{N} C_i}\right)$$

By definition we have:

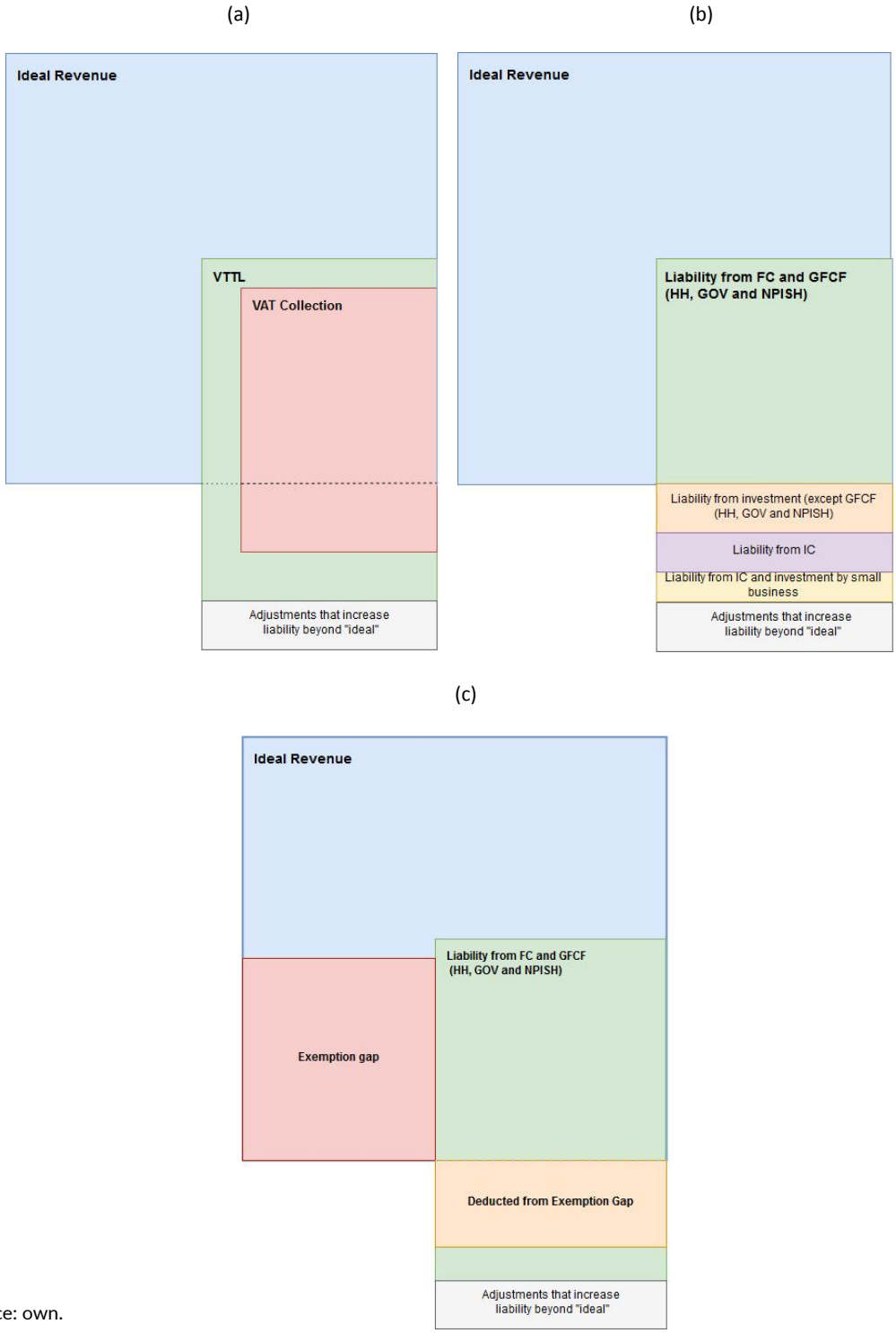
$$\tau_s \sum_{i=1}^{N} C_i = \sum_{i=1}^{N} T_i^* C_i + \left(\tau_s \sum_{i=1}^{N} C_i - \sum_{i=1}^{N} T_i^* C_i\right)$$
$$= \sum_{i=1}^{N} T_i^* C_i + \left(\tau_s \sum_{i=1}^{N} C_i - \sum_{i=1}^{N} T_i^{*,R} C_i\right) + \left(\tau_s \sum_{i=1}^{N} C_i - \sum_{i=1}^{N} T_i^{*,E} C_i\right)$$

Thus:

$$P = 1 - \left(\frac{\sum_{i=1}^{N} T_i^* C_i}{\tau_s \sum_{i=1}^{N} C_i}\right) = \left(\frac{\tau_s \sum_{i=1}^{N} C_i - \sum_{i=1}^{N} T_i^* C_i}{\tau_s \sum_{i=1}^{N} C_i}\right) = \left(\frac{2\tau_s \sum_{i=1}^{N} C_i - \sum_{i=1}^{N} T_i^{*,E} C_i - \sum_{i=1}^{N} T_i^{*,R} C_i}{\tau_s \sum_{i=1}^{N} C_i}\right)$$
$$= P_R + P_E$$

Using the above convention, one can decompose the Rate Gap and the Exemption Gap into the components indicating loss of the Notional Ideal Revenue due to the implementation of reduced rates and exemptions on specific goods and services. Such additive decomposition is carried out for the computation of, as defined by Barbone et al. (2015), the Actionable Exempt Gap, which excludes services and notional values that are unlikely to be taxed even in an ideal world.

Figure A1. Components of Ideal Revenue, VTTL, and VAT Collection



Source: own.

Annex B. Statistical Appendix

Table B1. VTTL (EUR million)

	2013	2014	2015	2016	2017
Belgium	31212	30272	31316	32615	33759
Bulgaria	4659	4896	5052	5020	5289
Czechia	14491	13948	15047	15355	16803
Denmark	27687	27955	28610	29113	30166
Germany	223018	229624	235841	242441	251598
Estonia	1814	1911	1985	2101	2270
Ireland	11668	12467	13420	14767	15215
Greece	18807	17287	18545	20769	22041
Spain	69100	69543	71810	72729	75913
France	160630	165520	167521	169784	173962
Croatia		5959	6329	6519	6944
Italy	134345	136104	136859	139422	141530
Cyprus			1648	1750	1862
Latvia	2220	2244	2343	2342	2549
Lithuania	3706	3879	3875	4054	4429
Luxembourg	3545	3891	3541	3554	3492
Hungary	11497	11969	12736	12400	13617
Malta	808	906	724	783	823
Netherlands	47134	47199	49756	50755	52644
Austria	27744	27958	28733	29685	30748
Poland	37851	38802	39630	38599	42094
Portugal	16220	16982	17632	18069	18738
Romania	18901	19315	19830	17169	18063
Slovenia	3229	3490	3491	3555	3606
Slovakia	6844	7132	7630	7294	7708
Finland	20008	20125	20197	21293	22026
Sweden	40432	40137	41691	43484	44769
United Kingdom	157263	174232	198856	183224	180708
EU-26 (2013) EU-27 (2014) EU-28 (2015-2017)	1094833	1133746	1184649	1188647	1223369

Source: own calculations.

Table B2. Household VAT Liability (EUR million)

	2013	2014	2015	2016	2017
Belgium	17586	17326	17642	18459	19005
Bulgaria	3451	3533	3626	3704	3964
Czechia	9303	8917	9333	9707	10683
Denmark	15992	16165	16604	17126	17717
Germany	139672	142430	145749	148921	153903
Estonia	1273	1338	1374	1441	1532
Ireland	7243	7471	7842	8378	8588
Greece	13498	12750	13695	15785	16486
Spain	50150	50920	52864	53873	56165
France	94591	98441	98826	100515	102158
Croatia		4390	4555	4702	5007
Italy	95797	97232	99615	101477	102676
Cyprus			1046	1084	1135
Latvia	1729	1745	1801	1837	1978
Lithuania	3063	3168	3173	3363	3632
Luxembourg	1129	1240	1320	1374	1344
Hungary	8221	8297	8643	8919	9362
Malta	437	457	485	502	524
Netherlands	25882	25363	25953	26320	27207
Austria	18984	18998	19200	19869	20524
Poland	26146	26878	27341	27192	29574
Portugal	12210	12788	13190	13358	14055
Romania	11171	11677	12086	10705	11551
Slovenia	2284	2442	2448	2535	2629
Slovakia	5101	5303	5369	5330	5611
Finland	11041	11074	11135	11450	11745
Sweden	21100	20669	21100	21652	22177
United Kingdom	102731	115526	131360	122635	120401
EU-26 (2013) EU-27 (2014) EU-28 (2015-2017)	699783	726536	757373	762214	781332

Source: own calculations.

Table B3. Intermediate Consumption and Government VAT Liability (EUR million)

	2013	2014	2015	2016	2017
Belgium	7826	7528	8041	8411	8784
Bulgaria	635	722	705	729	789
Czechia	3501	3312	3535	3702	3986
Denmark	7793	7795	7872	7613	7857
Germany	45877	48657	50825	52283	54388
Estonia	254	266	279	323	346
Ireland	3235	3389	3755	4152	4329
Greece	2351	2183	2461	2636	2775
Spain	11206	10938	10884	11183	11371
France	29293	28782	31790	31715	32268
Croatia		948	1095	1163	1256
Italy	20882	21775	20598	21073	21775
Cyprus			464	500	525
Latvia	344	336	360	372	398
Lithuania	373	415	436	438	444
Luxembourg	851	905	1102	1156	1247
Hungary	1853	1977	2058	2114	2274
Malta	318	384	141	184	203
Netherlands	13565	13409	14313	14260	14583
Austria	4778	5060	5201	5292	5414
Poland	7060	7182	7655	7661	8180
Portugal	2787	2843	2899	3212	3063
Romania	2573	3136	3012	2663	2763
Slovenia	510	560	544	617	553
Slovakia	1006	976	1065	1080	1138
Finland	4799	4951	5118	5408	5550
Sweden	12164	11973	12390	12740	12891
United Kingdom	37415	41037	47207	42050	41643
EU-26 (2013) EU-27 (2014) EU-28 (2015-2017)	223249	231438	245805	244731	250793

Source: own calculations.

Table B4. GFCF VAT Liability (EUR million)

	2013	2014	2015	2016	2017
Belgium	4725	4739	4957	5055	5246
Bulgaria	521	600	679	580	529
Czechia	1690	1744	2192	1958	2158
Denmark	3179	3276	3402	3639	3826
Germany	36084	37176	37843	39792	41794
Estonia	278	298	323	327	379
Ireland	1031	1443	1649	2046	2085
Greece	2691	2114	2143	2067	2489
Spain	7353	7311	7637	7239	7922
France	31814	32852	31667	32356	34300
Croatia		587	592	623	653
Italy	13564	13305	13345	13550	13797
Cyprus			108	148	179
Latvia	186	211	238	194	238
Lithuania	398	442	461	454	494
Luxembourg	306	348	411	440	516
Hungary	1222	1506	1860	1212	1789
Malta	50	63	82	74	81
Netherlands	7205	7867	8962	9642	10342
Austria	2545	2585	2890	3060	3232
Poland	3647	4033	4072	3181	3753
Portugal	887	1017	1170	1103	1249
Romania	4740	3821	4193	3330	3281
Slovenia	334	401	419	328	355
Slovakia	725	869	1206	893	963
Finland	3622	3498	3316	3745	3969
Sweden	6562	6861	7521	8406	9002
United Kingdom	13466	15202	18555	16792	16788
EU-26 (2013) EU-27 (2014) EU-28 (2015-2017)	148824	154170	161895	162233	171408

Source: own calculations.

Table B5. VAT Revenues (EUR million)

	2013	2014	2015	2016	2017
Belgium	27250	27518	27594	28750	29763
Bulgaria	3898	3810	4059	4417	4664
Czechia	11694	11602	12382	13091	14721
Denmark	24320	24950	25672	26735	27931
Germany	197005	203081	211616	218779	226582
Estonia	1558	1711	1873	1974	2148
Ireland	10372	11521	11955	12826	13278
Greece	12593	12676	12885	14333	14642
Spain	60951	63643	68601	70705	74107
France	144490	148454	151680	154490	161932
Croatia		5455	5690	6016	6485
Italy	93921	97071	100692	102378	107901
Cyprus			1517	1664	1851
Latvia	1690	1787	1876	2032	2164
Lithuania	2611	2764	2888	3026	3310
Luxembourg	3438	3762	3435	3436	3469
Hungary	9073	9754	10669	10587	11725
Malta	582	642	673	712	810
Netherlands	42408	42951	44746	47849	49900
Austria	24895	25386	26247	27301	28304
Poland	27780	29317	30075	30838	36330
Portugal	13710	14682	15368	15767	16809
Romania	11710	11496	12939	10968	11650
Slovenia	3046	3155	3218	3316	3479
Slovakia	4696	5021	5420	5420	5917
Finland	18888	18948	18974	19694	20404
Sweden	39048	38846	40501	42770	44115
United Kingdom	139220	154085	178176	163344	161509
EU-26 (2013) EU-27 (2014) EU-28 (2015-2017)	930847	974088	1031422	1043219	1085899

Source: Eurostat.

Table B6. VAT Gap (EUR million)

	2013	2014	2015	2016	2017
Belgium	3962	2755	3722	3865	3996
Bulgaria	761	1086	992	603	625
Czechia	2796	2345	2665	2264	2082
Denmark	3367	3006	2938	2378	2235
Germany	26013	26543	24225	23662	25016
Estonia	256	200	113	126	122
Ireland	1296	946	1464	1941	1938
Greece	6214	4611	5660	6436	7399
Spain	8149	5900	3209	2024	1806
France	16140	17066	15841	15294	12030
Croatia		504	639	503	459
Italy	40424	39033	36167	37044	33629
Cyprus			132	87	11
Latvia	530	456	467	310	385
Lithuania	1095	1115	987	1027	1119
Luxembourg	107	129	107	119	23
Hungary	2424	2215	2067	1813	1893
Malta	226	264	51	71	13
Netherlands	4726	4248	5010	2906	2744
Austria	2849	2572	2486	2384	2444
Poland	10071	9485	9555	7761	5764
Portugal	2511	2300	2264	2301	1929
Romania	7192	7818	6890	6201	6413
Slovenia	183	335	272	239	128
Slovakia	2147	2111	2209	1874	1791
Finland	1120	1177	1223	1599	1622
Sweden	1384	1291	1189	714	654
United Kingdom	18043	20147	20680	19880	19199
EU-26 (2013) EU-27 (2014) EU-28 (2015-2017)	163986	159658	153227	145428	137470

Source: own calculations.

Table B7. VAT Gap (percent of VTTL)

	2013	2014	2015	2016	2017
Belgium	13%	9%	12%	12%	12%
Bulgaria	16%	22%	20%	12%	12%
Czechia	19%	17%	18%	15%	12%
Denmark	12%	11%	10%	8%	7%
Germany	12%	12%	10%	10%	10%
Estonia	14%	10%	6%	6%	5%
Ireland	11%	8%	11%	13%	13%
Greece	33%	27%	31%	31%	34%
Spain	12%	8%	4%	3%	2%
France	10%	10%	9%	9%	7%
Croatia		8%	10%	8%	7%
Italy	30%	29%	26%	27%	24%
Cyprus			8%	5%	1%
Latvia	24%	20%	20%	13%	15%
Lithuania	30%	29%	25%	25%	25%
Luxembourg	3%	3%	3%	3%	1%
Hungary	21%	19%	16%	15%	14%
Malta	28%	29%	7%	9%	2%
Netherlands	10%	9%	10%	6%	5%
Austria	10%	9%	9%	8%	8%
Poland	27%	24%	24%	20%	14%
Portugal	15%	14%	13%	13%	10%
Romania	38%	40%	35%	36%	36%
Slovenia	6%	10%	8%	7%	4%
Slovakia	31%	30%	29%	26%	23%
Finland	6%	6%	6%	8%	7%
Sweden	3%	3%	3%	2%	1%
United Kingdom	11%	12%	10%	11%	11%
EU-26 (2013) EU-27 (2014) EU-28 (2015-2017)	15%	14%	13%	12%	11%

Source: own calculations.

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