



VAT revenues in 2008–2020: trends and challenges of Covid-19

RYTA DZIEMIANOWICZ

corresponding author

University of Białystok, Faculty of Economics and Finance, Department of Finance,
ul Warszawska 63, 15-062 Białystok, Poland


✉ r.dziemianowicz@uwb.edu.pl

 orcid.org/0000-0002-7755-9887

RENATA BUDLEWSKA

University of Białystok, Faculty of Economics and Finance, Department of Finance, Poland

✉ r.budlewska@uwb.edu.pl

 orcid.org/0000-0003-1830-7791

Abstract

Motivation: VAT revenues are particularly vulnerable to economic turbulence, especially if the crisis directly affects private consumption or changes its structure. Even when consumption levels are relatively high, VAT revenues may be lower due to a shift in consumer spending to the most essential goods or services or an increase in public sector consumption. Because of the reduction in operation and the closure of many businesses, the Covid-19 crisis is likely to have an even greater impact on consumption than the previous financial crisis of 2008.

Aim: The purpose of this article is to analyse VAT revenues in OECD countries over the period 2008–2020, identify general trends, and highlight similarities and differences in this regard between the 2008 financial crisis and the Covid-19 crisis.

Results: Consumption taxes account for about 33% of all taxes collected in OECD countries, of which 20% is VAT. Covid-19 could change that in an important manner. After the 2008 global financial crisis, tax revenues, including VAT, returned to pre-crisis levels after an average of eight years. VAT revenues in relation to GDP peaked in 2016, and have been stable since then. Due to reduced operation and closure of businesses, the Covid-19 epidemic not only changed the structure of private consumption, but also significantly affected its level. In addition, government actions reducing certain rates have contributed



to the decline in VAT revenues. As the survey results indicate, standard VAT rates between 2017 and 2020 were at record high levels, averaging 19.3%. With such high rates, in order to re-store VAT revenues after the crisis, governments may have to think about how to broaden the tax base (e.g., temporarily lower rates and stimulate consumption).

Keywords: tax policy; tax revenues; tax expenditures; VAT; Covid-19

JEL: H20; H21; H26; H30

1. Introduction

Taxation of consumption, in contrast to the mechanism of influence of automatic economic situation stabilizers, in classical terms does not affect the economic situation of economies affected by the crisis. Indirectly, however, including as a result of spending spurring the economy, the composition of the tax revenue raised by taxing consumption in times of crisis is changing. Revenues from consumption taxes, including VAT revenues, are particularly vulnerable to economic turbulence, especially if the crisis directly affects private consumption or changes its structure. Even when consumption levels are relatively high, VAT revenues may be lower due to a shift in consumer spending to the most essential goods or services or due to increase in public sector consumption.

The above correlations were observed, among others, during the crisis of 2007–2009, when the amount of tax revenues from consumption taxation in relation to GDP remained at a similar level compared to the years before the crisis. At the same time, their structure changed, i.e. there was a significant inflow of tax revenues collected as a result of increased consumption of primary products. Reasons for this include a reduction in the stream of income allocated to consumption by private entities. On the other hand, an important factor is the changes in the behaviour and volume of consumption occurring as a result of anti-crisis measures from public authorities. Because of the reduction in operation and the closure of many businesses over the long term, the crisis caused by Covid-19 is likely to have an even greater impact on consumption than the previous financial crisis. The question, then, is to what extent is the stability of tax revenues — relative to GDP — the result of government policy, in terms of inducing changes in the structure of consumption, and to what extent is it the result of changes in the effective tax rate on consumption?

The purpose of this article is to analyse consumption taxes, including VAT revenues, in OECD countries over the period 2008–2020, identify general trends, and highlight similarities and differences in this regard between the 2008 financial crisis and the Covid-19 crisis. The analysis covered OECD countries in 2008–2020. The study adopts the descriptive method with elements of statistical data analysis. The article was prepared on the basis of literature studies and OECD data.

2. VAT rate change versus consumption level: literature review

For many years, fiscal policy as a tool for stabilizing the economy was clearly overshadowed by monetary policy, focusing primarily on actions related to public debt service. The main concern was to keep the deficit as low as possible and the ratio of public debt to GDP as low as possible. Fiscal policy was thus clearly asymmetric with respect to monetary policy. It was believed that fiscal policy instruments were not as flexible as monetary policy instruments. This was undeniably changed by the financial crisis (2007–2009), which in a sense re-evaluated the role of fiscal policy. Monetary policy without fiscal stimulus has proven to be unsuccessful. It was measures within discretionary fiscal policy that was then the response of many governments to the problems of the economy (Ubide, 2016). Since then, the search for an answer to the question concerning the flexibility of fiscal instruments has been the subject of much research. It has been observed that monetary policy instruments used to stabilize the economy produce adequate results during a period that Correia et al. (2011, p. 3) refer to as the “great moderation”. However, they certainly do not apply to the financial crisis, the Japanese stagnation in the 1990s, i.e. in the case of a sustained economic downturn when aggregate demand and interest rates are low, which is also the case, for example, for the crisis caused by Covid-19. Under exceptional conditions, there is also a need to apply unconventional fiscal policy, to use its instruments to stimulate consumption by, for example, temporarily changing tax rates. As early as 2010, there were proposals by Woodford (2010) that suggested using temporary reductions in consumption tax rates to combat the crisis¹.

The subject of research in this paper is one of the taxes included in the category of consumption taxes — the value added tax (VAT). The idea of VAT dates back to the 1920s, when German entrepreneur Carl Friedrich von Siemens first introduced the concept. At the same time, similar solutions were advocated by Thomas Adams (1921), who proposed the invoice-credit method. However, Maurice Lauré (1953, 1957) was particularly influential in the development of this concept. In practice, VAT was first applied in France and Japan (1948 and 1949). Initially, France applied VAT only to the production stage, without full deductibility for investment goods. Then in 1954 it was replaced with a consumption VAT (Ebrill et al., 2001, p. 5).

VAT is a modern consumption tax, in force in 36 out of 37 OECD countries. Its key feature is a built-in mechanism that allows businesses to offset the tax they have paid on their own procurement of goods and services needed in the production process (the invoice-credit method). This eliminates the cascading problem that is typical of the sales tax. If this tax is properly designed and implemented, i.e., at each stage it is effectively levied on the pure value added produced at that stage, it can be seen as the equivalent of a uniform retail sales tax. Compared to alternative solutions in the field of indirect tax,

¹ Previously, Feldstein (2003) made similar suggestions for the Japanese government.

VAT has more potential to raise revenue. This is undoubtedly related to the invoice-credit method (the most common method of accounting), which “helps” in tax compliance and enforcement of the law while introducing a mechanism of self-control for taxpayers (Heady, 2002, p. 5). VAT, however, due to its complex structure, is a difficult tax to administrate, not only for the taxpayer but also for the tax authorities.

VAT, as a consumption tax, is an effective tool for collecting public revenue and thus affects macroeconomic stability and development. At the same time, however, empirical studies point to interrelationships between VAT revenues and a country’s level of development. Higher incomes due to this are found in economies with higher levels of per capita income, lower shares of agriculture, and higher levels of literacy (Ebrill et al., 2001, p. 9). This indirectly confirms the complex nature of this tax.

Both theory and practice indicate that VAT is effective when it has a broad base and is applied to all phases of trade, from production to the retail stage. At the same time, as a consumption tax, it does not have a discriminatory effect on savings and investments because they are generally excluded from its tax base. VAT revenue is determined by two basic elements — the tax base, i.e. taxable goods and services (also understood as the sum of private consumption, public consumption, public investment and household fixed capital formation) and the effective tax rate, i.e. the percentage of the tax base that goes to the state budget. The effective VAT rate is a procyclical variable, meaning that it increases with GDP dynamics and society’s income. According to analysts, this is “associated with an increase in the share of spending on luxury goods in the household basket and a smaller extent of the grey area at the upper end of the economic situation cycle” (Credit Agricole, 2021). It means that in a recession, a decrease in the effective VAT rate should have the effect of reducing VAT revenue to the budget. It should be noted, however, that the tax base, understood as the sum of consumption and intake, can nevertheless grow even during a period of recorded GDP decline. One way, for example, is to generate demand for certain goods by lowering the tax rate, which can also lead to a change in the structure of spending (e.g. by increasing public consumption and public investment). As indicated by D’Acunto et al. (2016), this type of unconventional fiscal policy aims to temporarily lower prices and stimulate consumption through inflation expectations. But for this to work, companies must lower prices and pass the tax cut on to consumers. D’Acunto et. al. (2016) additionally rely on the experience of an earlier VAT rate increase from 16% to 19% that was announced in Germany in 2005 and implemented in 2007, which raised inflation expectations and permanent spending at the time².

² It was observed that the propensity to buy started to increase from the moment the plans to increase the VAT rate were announced in late 2005. This growth continued in the first half of 2006, then weakened somewhat. After the tax increase went into effect in early 2007, the propensity to buy dropped sharply. In the second half of 2006, demand strengthened especially for consumer durable goods (including private residential invest-

It is important to note that the impact of changes in VAT rates on the prices of goods and services tends to be asymmetric, with reductions in VAT rates being passed on to consumers to an extent lesser than increases³ (Benzarti et al., 2020). The effectiveness of the VAT reductions applied depends on several issues. First, the economic impact depends on the extent to which the reduction in VAT rates will be passed on to consumers, increasing their real incomes. Hitherto research on the extent to which the VAT rate reduction is passed on to consumers is inconclusive in this regard. The literature provides evidence of insufficient transfer of the increase (e.g., Benzarti & Carloni, 2019), full transfer but at the same time gradual (e.g., Benedek et al., 2020), as well as full and rapid (e.g., Buettner & Madzharova, 2021) or excessive (e.g., Besley & Rosen, 1999). At the same time, relatively little is known about the factors that determine this (Funke & Terasa, 2020). This is because the related research to date is selective in nature.

Research on the impact of the recent VAT rate reduction⁴ in Germany was conducted on the fuel market by Montag et al. (2020a). Based on econometric models, the authors found that, depending on the type of fuel and the degree of competition, VAT reductions through price reductions were passed on to consumers in the range of 40% to 80%. Although fuel markets are not the primary target of unconventional fiscal policy, this analysis provides insight into the transmission mechanisms of tax rate reductions (Montag et al., 2020b). Fuest et al. (2020, pp. 1–5) observed an average price decrease of about 2% in German supermarkets after a temporary reduction in VAT rates. The results of these studies indicate that the reduction in VAT rates in Germany have been almost entirely passed on to consumers. Both of the above examples involved selected consumer goods. The first assessment of all goods and services in the consumer goods basket was presented in 2020 by Deutsche Bundesbank (2020, pp.

ment), which decreased in 2007, after the introduction of the VAT rate increase from 16 to 19% (Deutsche Bundesbank, 2008, pp. 41–44).

³ E.g. on January 1, 2012, the VAT rate for restaurant and catering services in Sweden was reduced from 25 percent to 12 percent. The Swedish National Institute of Economic Research found that the associated “pass-through” to prices was about 50 percent (Falkenhall et al., 2020, pp. 824–850).

⁴ To counteract the consequences of the Covid-19 pandemic, the German government presented an unprecedented EUR130 billion stimulus package on June 3, 2020, which includes, among other things, a temporary reduction in the goods and services tax rates between July and December 2020. The policy aims to temporarily lower prices and stimulate consumption through higher inflation expectations. The standard VAT rate was reduced from 19% to 16% and the reduced rate from 7% to 5%, at an estimated cost of 20 billion euros or 0.6% of GDP (Funke & Terasa, 2020).

57–59). His report found a 60% effect of passing on temporarily reduced VAT rates to consumers⁵.

Secondly, the effectiveness of a temporary VAT rate reduction also depends on the strength of the substitution effect (Funke & Terasa, 2020, p. 2). If the consumer finds the temporary measure used plausible and expects prices to rise, for example in the following year after the reduction, they may accelerate decisions to purchase certain goods (Christofzik et. al., 2020; Feldstein, 2002). In this case, a larger effect can be expected for durable consumer goods (D'Acunto et al., 2016). However, the effect of such an incentive may be temporary, as shown by empirical studies of the 2008–2009 VAT rate reduction in the UK (Blundell, 2009; Crossley et. al., 2014).

To sum up, as past research indicates, unconventional fiscal policy that uses announcements of future increases in consumption tax rates to induce inflation expectations can accelerate consumer spending. Therefore, as stated by D'Acunto et. al. (2016), it may also be a viable alternative to unconventional monetary policy and conventional fiscal policy to stimulate aggregate demand and may consequently lead to at least stabilization of consumption tax revenues, even during recessions. Undoubtedly, research to date on the impact of VAT rate changes on consumption does not address the entire market — it is selective in nature and should be continued.

3. Methods

In order to determine the methodology of the study, the research objectives were first operationalized and specific research questions were selected, that is:

1. Will the trends in consumption tax revenue levels be repeated in the times of crisis affecting economies as a result of the Sars-CoV-2 pandemic, and to what extent?
2. Will the Covid-19 crisis affect VAT revenues and how?
3. What changes in consumption tax revenues should be expected as a result of Covid-19?

The study was conducted in a group of OECD countries monitoring data on their tax policies, including consumption taxation. Data were taken from publicly available reports on tax trends in OECD countries downloaded from the OECD website. Ancillary data on the tax policy of the European Union member states, reported annually by the European Commission, were also used.

For the purposes of the study, when describing the trends in consumption taxation, authors used such indicators relating to the level of taxation as:

⁵ It should be noted that the standard VAT rate applies in Germany only to slightly less than two-thirds of the goods in the basket. About 15% of goods and services are subject to a reduced VAT rate

- tax revenue as a percent of Gross Domestic Product;
- implicit tax rate (ITR), defined by European Commission (2020, p. 272) as the ratio of total consumption tax revenues divided by a proxy of the potential tax base⁶;
- VAT revenue ratio, defined by OECD (2020a, p. 50) as the ratio of the VAT revenue actually collected to what would theoretically be raised if VAT was uniformly applied at the standard rate to the potential tax base⁷ and all revenue was collected.

Unless otherwise noted, data on financial aggregates according to ESA methodology were used, in current prices. The assumption was made that the trends of the indicators presented in relation to GDP refer to the nominal value of GDP.

The description of consumption taxation trends adopts the tax classification symbols used in tax reporting of OECD countries, i.e. consumption taxes (category 5100), including:

- general taxes on goods and services (5110), which include value added taxes (5111), sales taxes (5112) and other general taxes on goods and services (5113);
- taxes on specific goods and services (5120) consisting mainly of excise taxes (5121), customs and import duties (5123) and taxes on specific services (5126, e.g. taxes on insurance premiums and financial services).

The research objectives were accomplished using statistical methods, particularly descriptive statistics and individual case studies. Due to differences in the specifics of tax policies implemented in the different countries included in the analysis, conclusions were not generalized to the entire research population and statistical inference was not applied.

4. Results

Over the past few decades, the composition of tax revenues in OECD countries has changed significantly. In addition to taxing personal and corporate income — which generate a relatively constant percentage of tax revenue, about one-third — consumption taxes are becoming increasingly important to state budgets (Chart 1). In 2018, 30.8% of total tax revenue was consumption taxes. The most significant is VAT, which on the eve of the financial crisis of 2007–2009 reached a stable level of about 20% of total tax revenues and 60.1% of consumption tax revenues at the same time. The unweighted average of VAT tax revenue as a proportion of gross domestic product in OECD countries in 2005 was 6.5% (Chart 2) and in subsequent years has remained on relatively similar

⁶ Consumption tax base is defined as the sum of final consumption expenditure of households on the economic territory, non-profit institutions serving households, general government, excluding compensation of government employees.

⁷ Potential tax base is based on the Final Consumption Expenditure (P3 in the System of National Accounts (SNA 2008)), which is the sum of household final consumption expenditure, final consumption of non-profit institutions serving households, and general government final consumption expenditure, excluding VAT.

level. In 2018, before the Sars-CoV-2 pandemic crisis, VAT revenues amounted to 6.8% of GDP and were higher by 0.2 percentage points from the level recorded in 2007.

After 2007, national policies on VAT standard rates varied across OECD countries. In 2008–2010, most OECD countries left the standard VAT rate unchanged as in 2007. The exception in this context is the United Kingdom, which temporarily, i.e. in the financial year 2008/2009, reduced the standard rate by 2.5 pp. Hungary and Iceland (increase by 5 pp), Lithuania and Latvia (by 3 pp) and Estonia (2 pp) decided to increase the rate permanently. In subsequent years, significant increases in the base rate occurred primarily in Greece (4 pp), but also in Spain and Portugal (2 and 3 pp, respectively). Hungary's public authorities have also decided on another increase, setting the final rate at 27%. It was also the highest VAT rate in OECD countries. As a result of changes in standard tax rates introduced during the financial crisis years, the average VAT rate increased by 1.2 pp to 18.8%. This compares to a half percentage point increase in rates over the next ten years or so. At the beginning of 2020, the standard VAT rate in most OECD countries was equal or higher than 20%. In 9 countries, only in the Member States of the European Union, it was equal or higher than 23%.

The diversification of the standard VAT rates is accompanied by a significant diversification of the structure of VAT taxation, particularly in reduced rates and tax exemptions. Most OECD countries applied special schemes to a variety of products such as necessities, pharmaceuticals and health care, education, cultural events and financial services. Therefore, the level of standard rates does not reflect the actual structure of VAT taxation and its effectiveness.

To assess efficiency of a VAT system, the OECD uses the VAT-Revenue-Ratio (VRR). It assesses a country's ability to tax the conceptual VAT base by measuring the effect of exemptions and reduced rates as well as non-compliance through fraud, evasion and tax planning on VAT revenues⁸ (Simon & Harding, 2020, p. 16).

Across the OECD, the unweighted average VRR since 2010 has remained relatively stable (at 0.56 in 2018), after it had declined during the GFC (from 0.59 in 2007 to 0.53 in 2009) (see the right axe on the Chart 3). The estimate suggests that, on average, 44% of the theoretical potential VAT revenue is not collected (Simon & Harding, 2020, pp. 51–52).

The European Commission, on the other hand, assesses the effectiveness of consumption taxation in the Member States of the European Union using the implicit tax rate (ITR) on consumption, which demonstrates the relationship between income from consumption taxes and consumption expenditure, i.e. the potential consumption tax base. The EC decomposes the indicator by distinguishing VAT, energy taxation, excise duties on alcohol and tobacco

⁸ Some studies have decomposed VRR by using tax expenditure approach (“bottom-up”), i.e. costs of departure from applying the standard rate to conceptual tax base, to calculate the policy gap.

and residual taxation. The results of the decomposition prove the VAT subcomponent accounts for two-thirds of the ITR on consumption index in the EU–28 countries (European Commission, 2020). Moreover, it is assumed the concepts of the VAT and consumption taxes bases are similar, which makes it possible to relate the conclusions of the ITR assessment to VAT.

ITRs, like standard VAT rates, have been increasing systematically in 2008–2018 to reach 17.0% in 2019. In 2008 and 2009, however, the ITR was a more sensitive indicator of the financial and economic crisis, both in comparison to the standard VAT rates and VAT revenues as a share of GDP. While the VAT-to-GDP ratio in OECD countries was 0.31 lower than in 2007, ITR decreased by 1 percentage point (compare Chart 3 and Chart 4)⁹.

In 2020, in the period of the Covid-19 crisis, Japan was the only OECD country decided to change the VAT rate (from 8 to 10%). The OECD's questionnaire survey of planned tax policy changes in response to Covid-19 shows that nearly 40% of OECD countries have introduced or expect to introduce temporary reductions in VAT rates — both the standard and reduced rates. A temporary reduction in the VAT standard rate was introduced in Ireland (reduction from 23% to 21% on a temporary basis from September 1, 2020 to February 28, 2021) and in Germany (the standard VAT rate was cut from 19% to 16%, and the reduced VAT rate was cut from 7% to 5% for a six-month period from 1 July to 31 December 2020) (OECD, 2021b). In addition, a number of adjustments were made to the reduced VAT rates in 2020 (see Table 1 and Table 2). The rate cuts mainly affected those industries particularly affected by the lockdown, health care and medical products. According to the surveyed representatives of public authorities, tax incentives, such as deferred payments and accelerated refunds of input VAT, are supposed to stimulate the economy (OECD, 2021b, pp. 28–29).

5. Discussion

The analysis of indicators illustrating tax revenues and tax policy in the field of taxation of consumption, in particular VAT, leads to ambiguous conclusions. Considering tax revenues as a share of GDP and as a share of total tax revenues in isolation may lead to wrong conclusions (European Commission, 2020). An indicator's increase or decrease does not always mean an increase or decrease in the tax base. Moreover, it may result from changes in structure of other tax revenues or changes in the GDP, and thus also factors driving its level. In order to understand the impact of individual factors on the tax revenues in relation to GDP, the European Commission proposed a decomposition of the consumption tax revenues as a share of GDP using a corresponding conceptual tax base into two components (Simon & Harding, 2020, p. 18):

⁹ E.g. ITR on consumption in OECD countries calculated by the OECD on the EU data basis (see more: *The drivers of consumption tax revenues in OECD countries and Annex 2.A. — Data on Implicit Tax Rates (ITRs) on consumption*, in: OECD, 2020b).

1. Consumption tax revenues as a share of the corresponding conceptual tax base (the ITR on consumption), and
2. The conceptual tax base as a share of GDP.

Consumption expenditures trends in OECD countries, as well as other main GDP aggregates, i.e. investment and net exports, do not confirm the conclusions reached so far. In 2007–2009, the share of consumption in GDP increase was rather the result of changes in the level of other GDP components (see Chart 5 and Chart 6). Between 2004 and 2007, higher growth in investment than in consumption in the majority of countries caused consumption as a share of GDP to decrease. During the GFC, investment as a share of GDP decreased by 5.4 percentage points on average, while government consumption raised total consumption to a temporary high of 76.2 of GDP in 2009. In fact, total consumption as a share of GDP has remained stable over time in most OECD countries (OECD, 2021b, p. 44).

On the other hand, the shares of both government consumption and private consumption of necessities in total consumption have remained elevated after the GFC. As a result, increases in standard rates do not translate fully into increases in the average implicit VAT rate, causing VAT revenues as a share of GDP to remain close to their long-run average, despite standard VAT rates in OECD countries being significantly higher now than prior to the GFC (OECD, 2021b, p. 48). At the same time, the share of consumption expenditures in GDP, both private and government, during the 2007 economic and financial crisis, remained at the same level, not corresponding with the decrease of ITRs on consumption as well as VRRs.

The policy decisions, mainly affecting the tax base and the range of reduced VAT rates and exemptions, seem to explain it partly. Further increase of total tax revenue both in OECD countries and Poland after the GFC (see Chart 7) is presumably resulted in changes of economic factors affecting the GDP, rather than change of tax and consumption composition. Changes of consumption tax mix during and after the GFC have strongly confirmed measures to support consumption are not and effective way of achieving objectives of anti-crisis fiscal policy.

6. Conclusion

The analysis of consumption tax revenues in OECD countries in 2008–2020 proves the assessment of the fiscal consequences of the financial and economic crisis of 2007–2009 formulated so far have been incomplete. The research conducted by the OECD and the European Commission on the decomposition of factors determining the taxation of consumption shows theoretical assumptions, including the impact of the economic cycle on the consumption tax revenues, in a new light. Therefore, it is not possible to predict the trend of VAT and consumption revenues during the pandemic based on the conclusions drawn from the analysis of the financial crisis of 2007–2009. In order to formulate explicit

conclusions, it is crucial to conduct further research on the effects of changes in the structure of VAT, on reduced rates and objective exemptions in particular. Furthermore, non-fiscal factors driving consumption tax revenues should be considered as a significant part of future research.

References

- Benedek, D., Mooij, R.D., Keen, M., & Wingender, P. (2020). Varieties of VAT pass through. *International Tax and Public Finance*, 27(4), 890–930. <https://doi.org/10.1007/s10797-019-09566-5>.
- Benzarti, Y., & Carloni, D. (2019). Who really benefits from consumption tax cuts: evidence from a large VAT reform in France. *American Economic Journal: Economic Policy*, 11(1), 38–63. <https://doi.org/10.1257/pol.20170504>.
- Benzarti, Y., Carloni, D., Harju, J., & Kosonen, T. (2020). What goes up may not come down: asymmetric incidence of value-added taxes. *Journal of Political Economy*, 128(12), 4438–4474. <https://doi.org/10.1086/710558>.
- Besley, T.J., & Rosen, H.S. (1999). Sales taxes and prices: an empirical analysis. *National Tax Journal*, 52(2), 157–178. <https://doi.org/10.1086/ntj41789387>.
- Blundell, R. (2009). Assessing the temporary VAT cut policy in the UK. *Fiscal Studies*, 30(1), 31–38. <https://doi.org/10.1111/j.1475-5890.2009.00088.x>.
- Buettner, T., & Madzharova, B. (2021). Unit sales and price effects of pre-announced consumption tax reforms: micro-level evidence from European VAT. *American Economic Journal: Economic Policy*, 13(3), 103–134. <https://doi.org/10.1257/pol.20170708>.
- Christofzik, D.I., Fuest, A., & Jessen, R. (2020). Macroeconomic effects of the anticipation and implementation of tax changes in Germany: evidence from a narrative account. *Ruhr Economic Paper*, 852, 1–37. <http://dx.doi.org/10.4419/86788988>.
- Correia, I., Farhi, E., Nicolini, J.P., & Teles, P. (2011). Unconventional fiscal policy at the zero bound. *NBER Working Paper*, 16758. <https://doi.org/10.3386/w16758>.
- Credit Agricole. (2021). *Dlaczego dochody z VAT wzrosły w 2020 r.* Retrieved 21.04.2021 from https://static.credit-agricole.pl/asset/m/a/k/makro-mapa-20210315_20887.pdf.
- Crossley, T.F., Low, H.W., & Sleeman, C. (2014). Using a temporary indirect tax cut as a fiscal stimulus: evidence from the UK. *Institute for Fiscal Studies Working Paper*, 14/16, 1–34. <https://doi.org/10.1920/wp.ifs.2014.1416>.
- D’Acunto, F., Hoang, D., & Weber, M. (2016). The effect of unconventional fiscal policy on consumption expenditure. *Becker Friedman Institute for Research in Economics Working Paper*, 2018–17, 1–83. <https://doi.org/10.2139/ssrn.2826084>.
- Deutsche Bundesbank. (2008). *Price and volume effects of VAT increase on 1 January 2007.* Retrieved 21.04.2021 from <https://www.bundesbank.de>.

- Deutsche Bundesbank. (2020). *Impact of the temporary VAT cut on consumer prices*. Retrieved 21.04.2021 from <https://www.bundesbank.de>.
- Ebrill, L.P., Keen, M., & Perry, V.J. (2001). *The modern VAT*. International Monetary Fund. <https://doi.org/10.5089/9781589060265.071>.
- European Commission. (2020). *Taxation trends in the European Union*. <https://doi.org/10.2778/49030>.
- Falkenhall, B., Mansson, J., & Tano, S. (2020). Impact of VAT reform on Swedish restaurants: a synthetic control group approach. *The Scandinavian Journal of Economics*, 122(2), 824–850. <https://doi.org/10.1111/sjoe.12340>.
- Feldstein, M. (2002). The role for discretionary fiscal policy in a low interest rate environment. *NBER Working Paper*, 9203, 1–14. <https://doi.org/10.3386/w9203>.
- Feldstein, M. (2003). *Commentary: is there a role for discretionary fiscal policy*. Proceedings: Economic Policy Symposium, Jackson Hole, Federal Reserve Bank of Kansas City, 151–162.
- Fuest, C., Neumeier F., & Stöhlker, D. (2020). Die Preiseffekte der Mehrwert-steuersenkung in deutschen Supermärkten: Eine Analyse für mehr als 60 000 Produkte. *Ifo Schnelldienst*, 13, 1–7.
- Funke, M., & Terasa, R. (2020). Will Germany's temporary VAT tax rates cut as part of the Covid-19 fiscal stimulus package boost consumption and growth. *CESifo Working Papers*, 8765, 1–31.
- Heady, Ch. (2002). *Tax policy in developing countries: what can be learned from OECD experience*. Retrieved 27.01.2018 from <http://www2.ids.ac.uk/gdr/cfs/pdfs/Heady.pdf>.
- Montag, F., Sagimuldina, A., & Schnitzer, M. (2020a). Are temporary value-added tax reductions passed on to consumers: evidence from Germany's stimulus. *CEPR Discussion Paper*, 15189, 1–27.
- Montag, F., Sagimuldina, A., & Schnitzer, M. (2020b). *VAT reduction as unconventional fiscal policy in Germany: fast but heterogeneous pass-through in the fuel market*. Retrieved 21.04.2021 from <https://voxeu.org>.
- OECD. (2020a). *Consumption tax trends 2020: VAT/GST and excise rates, trends and policy issues*. <https://doi.org/10.1787/152def2d-en>.
- OECD. (2020b). *Revenue Statistics 2020*. <https://doi.org/10.1787/8625f8e5-en>.
- OECD. (2021a). *Country tax measures during the Covid-19 pandemic*. Retrieved 21.04.2021 from <https://www.oecd.org>.
- OECD. (2021b). *Tax policy reforms 2021: special edition on tax policy during the Covid-19 Pandemic*. <https://doi.org/10.1787/427d2616-en>.
- Simon, H., & Harding, M. (2020). What drives consumption tax revenues: disentangling policy and macroeconomic drivers. *OECD Taxation Working Papers*, 47, 1–71. <https://dx.doi.org/10.1787/94ed8187-en>.
- Statistics Poland. (2021), *Annual macroeconomic indicators*. Database (updated 20.04.2021). Retrieved 21.04.2021 from <https://stat.gov.pl/en/poland-macroeconomic-indicators>.



- Ubide, A. (2016). *The case for an active fiscal policy*. Retrieved 27.01.2018 from <https://voxeu.org>.
- Woodford, M. (2010). Simple analytics of the government spending multiplier. *American Economic Journal: Macroeconomics*, 3(1), 1–35. <https://doi.org/10.1257/mac.3.1.1>.

Acknowledgements

Author contributions: authors have given an approval to the final version of the article. Authors contributed to this work equally.

Funding: this research was fully funded by National Science Centre, Poland (grant no. 2014/13/N/HS4/02870).

Note: the results of this study were presented at *11th International Conference on Applied Economics Contemporary Issues in Economy* (June 17–18, 2021, online, Poland).

Appendix

Table 1.
Tax measures in response to Covid-19 in OECD and G–20

Standard rate	General reduced rates	Restaurant meals and beverages	Tourism and hospitality
Germany, Ireland	China, Germany, Norway	Austria, Belgium, China, Colombia, Germany, Hungary, United Kingdom	Argentina, Austria, Belgium, China, Colombia, Czech Republic, Greece, Hungary, Indonesia, Ireland, Norway, Turkey, United Kingdom
Cultural and sporting services		Specific healthcare supplies	Other
Argentina, Austria, Colombia, Czech Republic, Greece, Netherlands, Portugal, Turkey, United Kingdom		Argentina, Austria, Belgium, Brazil, Canada, China, Colombia, Czech Republic, Finland, France, Greece, Ireland, Italy, Lithuania, Netherlands, Poland, Portugal, Russia, Slovak Republic, Slovenia, Spain, Switzerland, United Kingdom	Brazil, Colombia, Greece, Hungary, Korea, Russia, Turkey, Saudi Arabia

Source: Own preparation based on OECD (2021b, pp. 52–53).

Table 2.
Tax measures affecting consumption in OECD and G–20

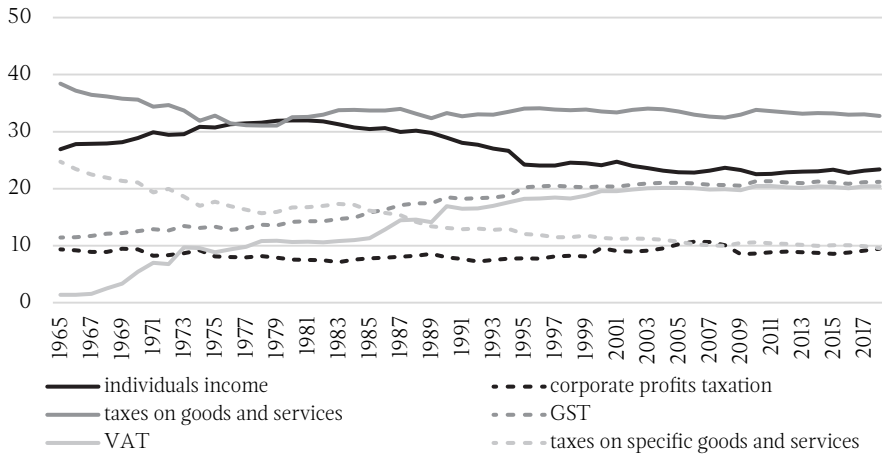
Country	Change to the tax rate	Change to the tax base	Type of measure	Date of entry into force	Revenue impact
Belgium	decrease	neutral	tax rate reduction	08.06.2020	decrease
Chile	neutral	neutral	–	13.04.2020	neutral
Chile	neutral	neutral	–	01.01.2020	neutral
Chile	neutral	neutral	–	01.06.2020	neutral
Czech Republic	decrease	neutral	tax rate reduction	01.07.2020	decrease
Germany	decrease	unknown	tax rate reduction	01.07.2020	decrease
Germany	decrease	unknown	tax rate reduction	01.07.2020	decrease
Germany	decrease	decrease	tax rate reduction	18.03.2021	–
Greece	decrease	neutral	tax rate reduction	01.09.2020	–
Greece	decrease	neutral	tax rate reduction	01.06.2020	–
Greece	decrease	neutral	–	26.10.2020	–
Norway	decrease	neutral	tax rate reduction	21.03.2020	decrease
Spain	decrease	neutral	tax rate reduction	23.04.2020	decrease
China	neutral	decrease	tax waiver	01.01.2020	decrease
Croatia	unknown	unknown	–	09.01.2021	decrease
Macao (China)	neutral	decrease	tax waiver	18.04.2020	decrease
North Macedonia	neutral	neutral	tax payment deferral	07.12.2020	neutral
North Macedonia	decrease	decrease	increased benefits	10.10.2020	decrease
Paraguay	decrease	decrease	tax rate reduction	17.10.2020	–
Thailand	–	unknown	accelerated tax refund	–	neutral
Thailand	decrease	–	tax rate reduction	01.10.2020	neutral
Uruguay	decrease	neutral	tax rate reduction	16.11.2020	decrease

Source: Own preparation based on OECD (2021b).



Chart 1.

Tax revenue in OECD countries as % of total tax revenue, 1965–2018



Source: Own preparation based on OECD (2021a).

Chart 2.

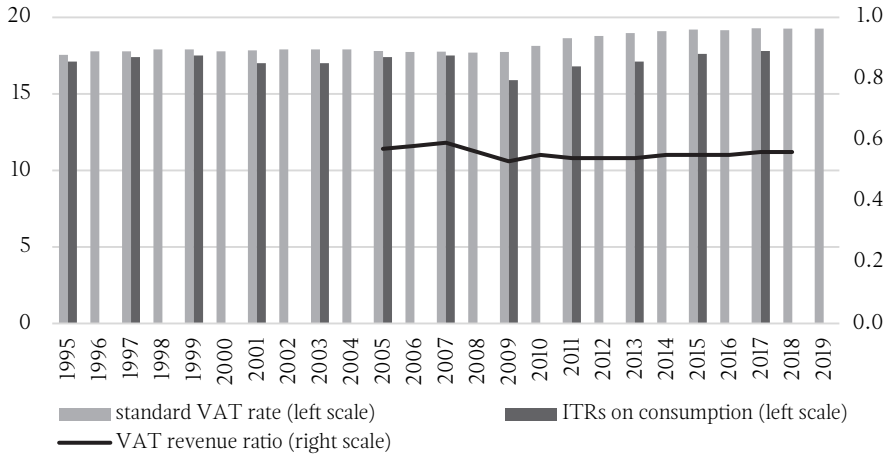
Value added taxes and taxes on specific goods and services as % of GDP, 1965–2018



Source: Own preparation based on OECD (2021a).

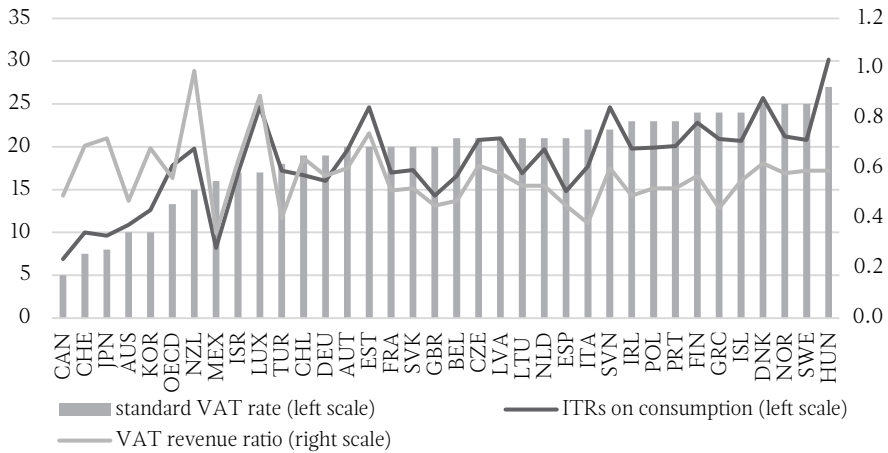


Chart 3.
Unweighted average of standard VAT rate, ITR and VRR in OECD countries, 1995–2020 (in %)

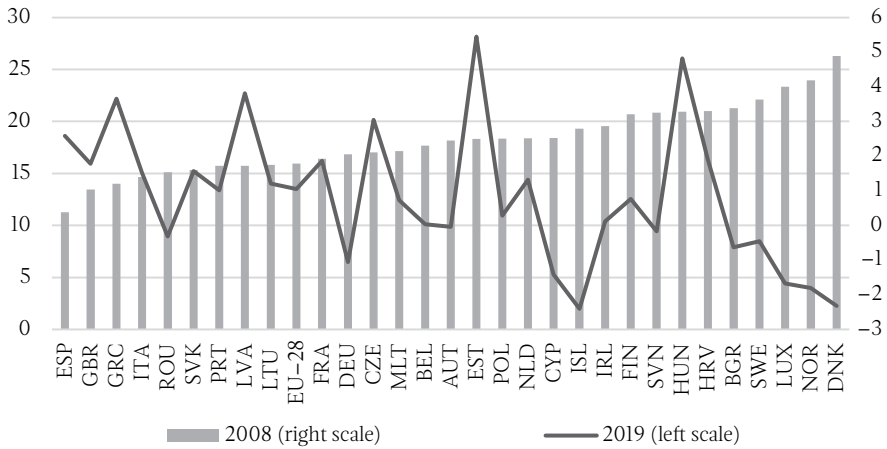


Source: Own preparation based on OECD (2020a, 2021).

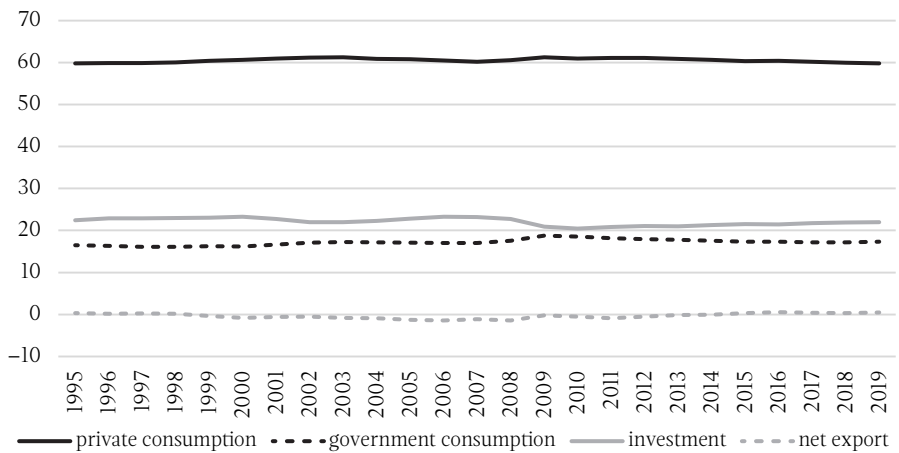
Chart 4.
Standard VAT rate, ITR and VRR in OECD countries, 2018 (in %)



Source: Own preparation based on OECD (2020a, 2020b, 2021b).

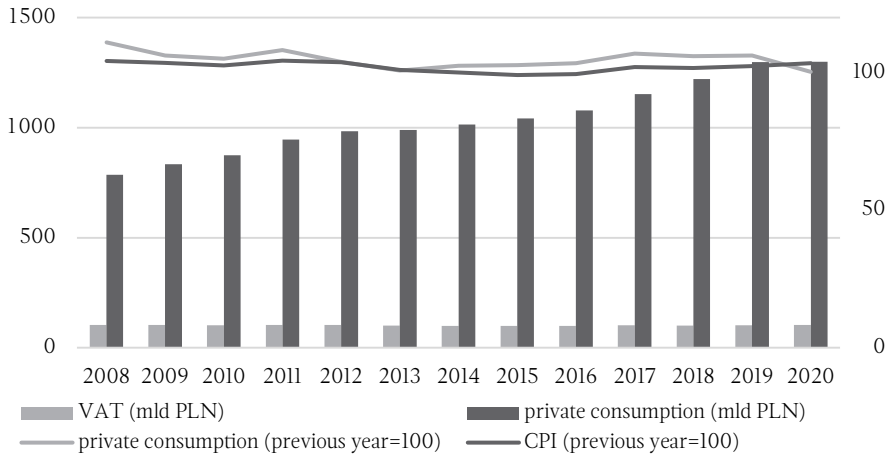
Chart 5.
Implicit tax rate on consumption in EU–28, 2008 and 2019 (in %)


Source: Own preparation based on European Commission (2020).

Chart 6.
Major expenditure aggregates as a share of GDP in OECD countries


Source: Own preparation based on OECD (2021a).

Chart 7.
Major expenditure aggregates as a share of GDP in Poland, 2008–2020



Source: Own preparation based on Statistics Poland (2021).