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Tax Revenues and External Shock. How Covid-19 Influenced Public Revenues in Poland and Czechia

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Abstract: The unprecedented driving force of economic events in 2020 was, paradoxically, an uneconomic phenomenon – the COVID-19 virus. In order to overcome the unfavorable period, public policies around the world have sought, and in fact continue to seek, various support schemes. On the one hand, such schemes include restrictions on economic activity to prevent the spread of the virus, on the other hand, they impose a burden in the form of a loss of public revenue and, at the same time, a burden in the form of an increase in public spending. Therefore, based on public revenue data this paper seeks to capture the nature and extent of the impact of pandemics on public revenues, especially taxes in a mid-term period 2017-2020 in Poland and the Czech Republic. Our analysis reveals that the rate of fulfillment of public revenues during the year in the crisis year 2020 does not differ much from the last years of the pre-crisis years. In terms of tax collection, pandemic affected the collection of personal and corporate income tax the most.

Keywords: public revenues; rescue measures; taxes; tax structure

JEL Classification: H20; H25

1. Introduction

Undoubtedly, the major event of the year 2020 was the pandemic shock caused by the virus COVID-19. Practically all countries in developed and other economies were forced to hastily create rescue schemes, which were to cover the necessary time for businesses to overcome the unfavorable period. On one hand, these public schemes bought some time in order to protect employment and entrepreneurial activity as such. On the other hand, the same schemes have an unprecedented impact on public budgets.

The last of the global crises of 2008 was the subject of many analyses. Some of those analyses concerned the impact of the crisis on the functioning of the public finance system (Darvas, 2010; Staehr, 2010), the impact of the crisis on the level of budget revenues (including mainly taxes) (Mara et al., 2009; Reichardt, 2011; Tvrdoň, 2010) and the resilience of the tax system (tax mix) to the phenomena of the crisis and changes under its influence (Borůvková, 2017; Kukalová et al., 2018). Possible solutions regarding changes in tax arrangements to reduce the occurrence of similar crises in the future were also considered (Hemmelgarn & Nicodème, 2010). In addition, it should be noted that the literature on changes in the structure of the tax mix during the 2008 financial crisis pointed to the possibility of fiscal devaluation (Keen & Mooij, 2012) aiming to offset these tax cuts by the increase of VAT. However, not only changes in the tax mix as a result of the crisis, but also the initial settings of the tax mix were taken into account by some authors. In the case of Ireland, one of the most affected countries, Keane (2015) demonstrates the importance of the issue of the tax mix. Excessive reliance on one sector of the economy (construction) and the move away from income-based taxes have proved to be crucial to the shortfall in tax revenues.

From another point of view, in times of crisis, some countries may take a targeted approach to reducing tax revenues through tax cuts in order to maintain household consumption and employment. According to Bouthevillain and Dufrénot (2011), tax cuts may not be very effective in order to support household consumption, while transfers are.

Naturally, some researchers and analysts have already tried to liken the current covid-crisis to the 2008 global financial crisis (Harding & Simon, April 29, 2020). However, it is important to note that the causes and nature of the crisis were different in 2008 than they are in 2020. In contrast, a number of articles have appeared in the early months of the covid-19 pandemic discussing, on the one hand, the measures taken by individual governments to support the economy (Dender et al., 2020; KPMG, 2020; OECD, 2020) and, on the other hand, the consequences of the pandemic for public finance systems (Andrew et al., 2020; Clemens & Veuger, 2020; Jaelani & Hanim, 2020).

From a short literature review, it is clear that for the study of similar events, the usual approach is in the form of analysis of partial economies. With our article, we want to contribute to the knowledge of the effects of the crisis on the tax revenues of the economies of Poland and the Czech Republic.

The choice of the Czech Republic and Poland for comparison is driven by several important factors. Among others, geographical proximity, similar GDP structure by sector (Eurostat, 2021), similar tax system (but with different rates (Olejniczak, 2015, p. 60)), similar level of cross-country tax revenue diversification index (RDI) (Compaoré et al., 2020, pp. 30–36), similar characteristics attributed to tax systems (high income country, Europe and Asia region and not small, fragile or resource rich country) (Compaoré et al., 2020, pp. 30–36)) as well as international economic linkages (strong links with the German economy (main trading partner), and between the two economies (Eurostat, 2021)). Also, Covid-19 in both countries emerged during the same period. On the other hand, each country has developed its own anti-crisis strategy, which is reflected in the amount of revenue obtained from individual taxes.

Based on the above stated, the aim of this article is to summarize, what rescue measures have been taken in two neighboring economies of the CEE area, specifically in Poland and the Czech Republic, and to reveal differences in public revenue development compared to the recent past. In addition, we want to assess which traditionally the most important components of tax revenue items were hit the hardest and which were the least affected.

The article continues as follows. The second chapter introduces Polish and Czech tax systems. The third chapter presents the research methodology, data, and research questions. The fourth chapter comprises research results. The last section is devoted to discussion and conclusions.

2. Tax System Features of Poland and the Czech Republic

In this chapter, there are introduced Polish and Czech tax systems, their main features, the structure of tax revenues, and the most important tax sources. Both the Polish and Czech tax systems are affected by harmonization at the level of the European Union, of which both countries have been members since 2004.

The structure of the economy is also presented in the basic points, with a view to assessing the possible effects of coronavirus on tax collection.

2.1. Poland

The existing system of general government revenue in Poland, and within it the tax system, results from the evolution of solutions introduced at the beginning of the 1990s during the system transformation. The literature indicates that the tax system in Poland is structurally similar to the trends in OECD countries (predominance of indirect taxes over direct taxes (Compaoré et al., 2020, p. 7)) but still requires improvement (Owsiak, 2016, p. 24). It should be noted that the most significant role within this system is played precisely by various taxes, of which the most efficient ones (VAT, PIT, CIT, excise duties) constitute state budget revenue. Tax revenues also include (according to the OECD methodology) social security contributions, but these do not constitute state (central) budget revenues in Poland. Indirect taxes account for 14.3% of GDP, direct taxes 7.8% of GDP and social contributions 13.3% of GDP. On the other hand, taking into account the structure by the government sector's level collects 49.5% of total tax revenue, local government 12.7% and social security funds 37.2% (European Commission, 2020, p. 126). When we look at the four main aggregate expenditures that go into calculating GDP, we can notice 57.5% share households' consumption, next 19.7% investment by businesses, then 18% government spending on goods and services, and 3% net exports of goods and services (exports 55.2%, imports 52.2%). Main tax rates are relatively high in Poland. VAT standard rate is 23% (with reduced rates 8% – e.g. recreational and cultural services and 5%) while average VAT rate in EU-28 is 21.5% (2017-2019). PIT base rate is 17% (progressive taxation), and CIT base rate is 19%.

2.2. The Czech Republic

The tax system of the Czech Republic bears the hallmarks of other, especially European, advanced tax systems. Therefore, as, for example, Vančurová, Láchová, and Zídková (2020, p. 3) states the Czech tax system can be considered standard.

Tax revenues come from direct and indirect taxes and, for example, the OECD ranks social contributions among Czech tax revenues. The latest European Commission publication Taxation Trends in the EU, i.e. for 2020, shows the following shares of these public revenues as a percentage of GDP for the year 2018: indirect taxes 12.5%, direct taxes 8.0%, and social contributions 15.6%. Thanks to the Czech budget setting of taxes, the largest share of public revenues is managed by the central government (68.4%), followed by local governments (15.2) and social security funds (16.0) (European Commission, 2020, p. 58).

With the inclusion of the basic macroeconomic indicator, i.e. GDP, it can be concluded for the years 2010-2019 that the growth of nominal GDP by 1 percentage point means an increase in public revenues by approximately CZK 13 billion or 10 billion tax revenues (own calculation according to data from the Czech Statistical Office and the Czech National Bank – nominal GDP and tax revenues – and the Ministry of Finance of the Czech Republic – public revenues). As for the structure of GDP, a significant part consists of household consumption (long-term about 48%), government spending about 20%, investment about 27%, and net exports about 6% (of which exports add about 77%, imports, on the other hand, take about 71%). As for household consumption itself, the part that is mainly targeted by existing restrictions (i.e. recreation, culture, and sports; catering, accommodation services) represents some 15.5% of household consumption, which is about 7.3% of total GDP (own computations based on the data from Czech Statistical Office, 2021).

Finally, the statutory rates of taxation of the most important taxes according to the share of tax revenues are given: VAT (standard rate 21%, first reduced rate 15% and second 10%); personal income tax (PIT = 15%; 23%); corporate income tax (CIT = 19%). The environment of excise duties is more complex and therefore not mentioned here. Here it is probably possible to add that, for example, household consumption, which is strongly limited by restrictions (see above-mentioned recreation, culture, sports, catering, and accommodation services plus e.g. land public regular transport, hairdressing and barber services), very often falls within the second reduced VAT rate (i.e. a 10% rate).

3. Methodology

In order to reach our main goal, we used secondary data for the midterm period which is commonly stated as three to five years. In our case we considered the years 2017-2020; presented are the data for 2019 and 2020. Data from the following databases were used. As for the data for Poland, there were used data from the Central Statistical Office (CSO) and the Ministry of Finance. In case of the Czech Republic, data from the Ministry of Finance of the Czech Republic (MFCR), the Czech Financial Administration (Finanční správa), and from the Czech National Bank (CNB) were involved. Specifically, we used data on the monthly fulfillment of public revenues and data on traditionally the most significant tax revenues (i.e. VAT, excise duties, corporate income tax, personal income tax, and toll). In fact, toll does not belong to the most important tax revenues, but according to some authors (e.g. Askitas & Zimmermann, 2011), its collection makes it possible to infer the level of economic activity. On the contrary, with a more detailed look at tax collection, we do not work with social contributions. Therefore, we distinguish between public revenues, where social contributions are included, and tax revenues, where we work only with direct and indirect taxes.

Within the research, methods of descriptive statistics are used the most. Especially percentage analysis is applied. Such an analysis makes it possible to capture the basic features of changes, differences, and trends.

In particular, we consider the following research questions (RQ):

- *RQ1: Did the pandemic affect the rate of fulfillment of the public treasury revenues during the year?*
- *RQ2: Which public tax revenues were hit by the pandemic the most?*

Regarding the RQ1, our assumption is that the first parts of the year will not be affected by a pandemic, while the remaining parts of the year will. Therefore, we expect a higher share of public revenues in total revenues in the first part of the year.

Regarding RQ2, here, according to preliminary observations, we expect a lower decline in VAT collection (support measures aimed at maintaining the cash flow of economic entities, although data on the increase in bank deposits play in favor of a decline in VAT collection). However, due to the nature of support measures, a decline in income taxes is more likely to be expected.

4. Results of the Study

In this chapter, we firstly present and analyze the data for Poland and the Czech Republic separately. Secondly, approaches and impacts are finally compared within a common subchapter. The purpose of this chapter is to answer the research questions posed in Methodology and thus at the same time fulfill the research goal defined in Chapter 1.

4.1. Rescue Measures and Public Revenues in Poland

As part of its efforts to counteract the economic and social impact of the pandemic, the Polish government has been implementing packages of solutions called the Crisis Shield (rev. 1.0 to rev. 6.0) in the following months of 2020. These solutions covered many areas - directly and indirectly, related to supporting the activities of economic entities and protecting the health and lives of citizens. It should be noted that these measures were implemented both directly by the central government, local governments and by a specially established fund. As part of the activities undertaken, the following can be listed:

- New (postponed) deadlines for tax reporting (CIT, PIT, VAT).
- Tax rebates – at the request of the taxpayer after meeting the criteria for a decrease in income.
- Possibility of the retroactive settlement of tax losses in PIT and CIT (from 2020 in the settlement for 2019, for entities whose revenues achieved in 2020 fall by at least 50% in relation to the revenues achieved in 2019).
- Bad debt relief for creditor and debtor.
- Possibility to resign from paying simplified advance payments of income tax in 2020 and switch to settling advance payments on actual income.
- Suspension of proceedings under the Tax Ordinance Act and customs and fiscal inspections.
- Deduction of donations made for "the fight" against COVID-19.
- Real estate tax – municipalities have been authorized to take certain measures concerning real estate tax such as the introduction of exemptions from real estate tax for part of the year 2020 or postponement of property tax instalments.
- Temporary abolition of the prolongation fee for ZUS (social security fund) contributions and taxes when making use of the possibility of deferment or payment in instalments.

- Exemption of micro-companies (entities employing up to 9 persons) from ZUS contributions.
- Deferral of the payment of ZUS contributions.

The central government's 2020 budget was to be the first "balanced" budget in decades This was due to the high one-off revenues planned for the 2020 year. Among other things, from the planned reform of the social security system and the sale of 5G frequencies. At the same time, the government assumed high GDP growth (3.7%), significant reduction of tax gaps in VAT, CIT and social security contributions. The effects of the pandemic on the planned balance of the state budget appeared both on the revenue and expenditure side (Figure 1), although here it can be noted that part of the expenditure was realized without the state budget (by local governments and specially established funds).

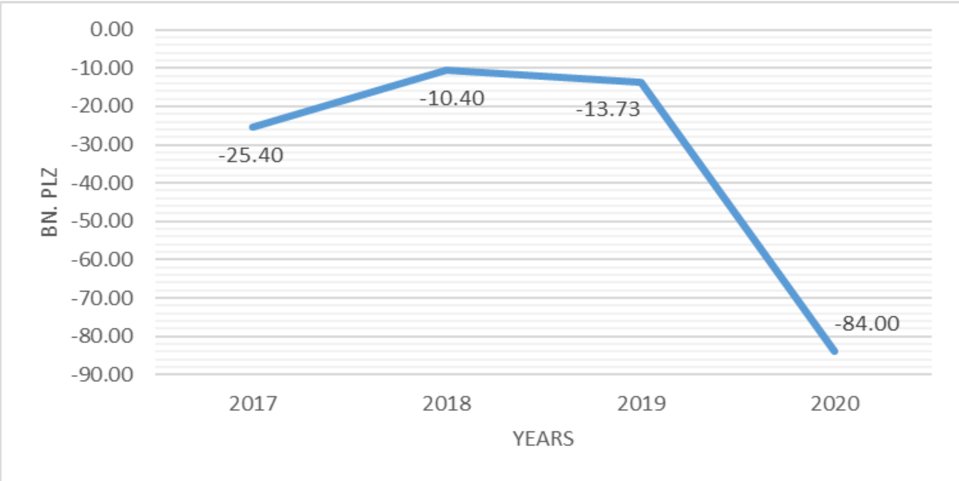

Figure 1. Medium-term development of the Polish central government balance (2017-2020). (Source: MF, February 12, 2021)

In the autumn of 2020, the government presented an update to the state budget in which it indicated that revenues would fall by PLN 37 billion compared to the original assumptions, and expenditures would rise by PLN 72 billion. The biggest drop in revenue was expected in VAT (15%, or PLN 26.5bn) and excise duties (8.9%, or PLN 6.6bn). At the same time, non-tax revenue was forecast to rise by 4 billion zlotys. The main reason for the decline in VAT revenue (as the most efficient tax) indicated by the government was the expected economic slowdown at −4.6% of GDP. However, according to estimates in January 2021, the budget deficit could amount to PLN 84 billion with revenues close to the level in the budget law update.

Preliminary data from the Ministry of Finance for December 2020 indicate that the revenue projections for the last quarter of 2020, included in the amendment to the Budget Law, were too pessimistic. This was mainly due to higher VAT revenues (a decrease of only 5% compared to the original plan). In addition, revenues from excise duty and CIT were higher than expected. Nevertheless, in relation to 2019, the total level of tax revenue was similar (see Table 1).

Table 1. Polish cash performance – public revenues in 2020 and 2019 (own based on MF (February 12, 2021)

Month	Cumulative revenues (bn. PLN); 2020	Monthly change (bn. PLN / %)		Percentage of total revenues of the given year	Cumulative revenues (bn. PLN); 2019	Monthly change (bn. PLN / %)		Percentage of total revenues of the given year
		abs.	rel.			abs.	rel.	
January	40.27	40.27		10%	38.74	38.74		10%
February	69.93	29.66	-26%	17%	64.78	26.04	-33%	16%
March	96.20	26.27	-11%	23%	90.29	25.51	-2%	23%
April	129.64	33.44	27%	31%	129.97	39.68	56%	32%
May	157.07	27.43	-18%	**37%**	162.87	32.90	-17%	**41%**
June	197.39	40.32	47%	47%	192.18	29.31	-11%	48%
July	235.81	38.41	-5%	56%	228.77	36.59	25%	57%
August	268.91	33.10	-14%	64%	262.84	34.08	-7%	66%
September	304.51	35.60	8%	73%	296.03	33.18	-3%	74%
October	343.97	39.46	11%	82%	332.89	36.86	11%	83%
November	382.49	38.52	-2%	91%	367.11	34.22	-7%	92%
December	419.84	37.35	-3%	100%	400.54	33.43	-2%	100%

[1]The data for the whole period considered (i.e. 2017–2020) are available on request from the authors.

Table 2. Collection of taxes during the year (cumulatively) (own based on MF, February 12, 2021)

	2020 (bn. PLN)						**2019 (bn. PLN)**					
Month	**VAT**	**Excise duties**	**CIT**	**PIT**	**Financ. Instit.**	**Total tax rev.**	**VAT**	**Excise duties**	**CIT**	**PIT**	**Financ. Inst.**	**Total tax rev.**
Jan	21.83	5.25	3.15	6.28	0.51	37.36	20.58	5.20	3.20	6.52	0.39	36.18
Feb	35.18	10.53	6.28	10.90	0.81	64.40	32.06	10.18	6.03	10.76	0.78	60.40
Mar	44.71	16.51	9.62	13.44	1.16	86.50	42.38	15.51	10.31	13.59	1.15	83.83
Apr	56.09	21.66	12.87	17.78	1.52	111.23	57.03	22.04	18.10	19.95	1.54	119.94
May	66.72	26.26	16.62	23.24	1.93	136.30	73.03	27.97	20.58	25.42	1.93	150.54
Jun	78.42	32.38	22.12	28.50	2.34	165.55	86.61	33.54	22.05	30.79	2.33	177.26
Jul	97.34	38.54	25.64	33.94	2.75	200.31	103.87	40.54	24.95	36.38	2.72	210.75
Aug	115.12	45.07	27.84	39.56	3.17	233.21	118.81	46.66	27.63	42.17	3.12	240.97
Sept	131.06	51.92	30.46	45.03	3.58	264.85	132.71	52.86	30.45	47.87	3.49	270.27
Oct	150.02	58.39	34.07	51.33	4.00	300.99	150.12	59.33	34.02	53.97	3.90	304.55
Nov	168.24	64.76	37.73	57.20	4.42	335.94	166.49	65.25	37.14	59.49	4.34	336.24
Dec	184.59	71.80	38.68	63.84	4.60	370.29	180.89	72.40	39.98	65.44	4.70	367.29
Dec y/y	2.05%	-0.83%	-3.25%	-2.44%	-2.13%	0.82%	3.40%	0.40%	15.43%	9.88%	4.28%	5.13%

[1] CIT = corporate income tax; PIT = personal income tax.

[2] The data for the whole period considered (i.e. 2017–2020) are available on request from the authors.

Fluctuations caused by restrictions introduced by the Polish government and support programs in the following months are visible in Table 1. It can be also seen in Table 1 that until March 2020 (before the pandemic), tax revenues were realized at a higher level than in 2019, while with the introduction of restrictions, there was a sharp decline in tax revenues.

This means that under the conditions of the economic slowdown and the two lockdowns, the tax system has not suffered a significant shock. Of course, the extent to which the economy and the tax system have withstood the pandemic in the long term cannot be determined at this point. In the first quarter of 2020, total tax revenues were higher than in 2019, but in the following months the cumulative revenue amounts were lower than in 2019 (Table 2). This fact was mainly influenced by the permanent reduction in PIT and excise tax revenues.

A month-by-month analysis of the data in relation to 2019 shows that in the case of VAT, April-July recorded lower monthly revenues than in 2019. At the same time, it was only in November and December that the sum of tax revenues reached and exceeded 2019 values.

The available general data on the implementation of tax revenues show that the most resistant to the impact of the pandemic (in terms of relation to the previous year) were the VAT, although as a result of the economic slowdown it deviated to the greatest extent in the level of revenues received from the originally assumed value.

4.2. Rescue or Support Measures and Public Revenues in the Czech Republic

The state apparatus of the Czech Republic – especially through the Ministry of Finance and the Ministry of Industry and Trade, but also of lower territorial units – has taken a number of measures in response to the pandemic situation. The measures were aimed, in particular, not only not to worsen the cash flow of the companies and individuals affected by the shock, but also to delay and spread the filling of tax returns over time.

Given the overall scope, at least selected support measures are briefly listed below (sources: Ministry of Finance of the Czech Republic (MFCR, 2021) and Financial Administration (2021)). Most of them were valid for the year 2020. However, due to the persisting unfavorable situation, some of them are likely to be refreshed and applied for 2021 as well.

- Deadline for filing *personal and corporate income tax returns postponed* by three months (i.e., not 1st May 2020 but 1st July 2020); further postponed until 18th August;
- individually *forgiven tax-related fines* if the reason for the fine was coronavirus;
- *liberation package* – all payments of VAT, income taxes, and road tax which were due in the period of emergency are deferred to those entrepreneurs who are explicitly targeted by state restrictions;
- *loss carryback* – the entrepreneur can claim the tax loss from the current year (2020) up to two years back; by means of a corrective tax return, this can additionally reduce the tax liability for previous years and thus he entrepreneur can recover part of the taxes already paid;

- *compensatory bonus* in the amount of CZK 500 per day for self-employed and partners of small limited liability companies directly or, in certain circumstances, indirectly affected by the crisis (business prohibited or restricted due to government restrictions; namely hospitality, culture, sports, accommodation, retail or services);
- support programs: COVID, COVID II, COVID III, COVID Plus, COVID – Rental, COVID – Gastro, COVID – Accommodation, COVID – Culture and others; these programs provide state guarantee for loans (both operational and investment), or direct financial support, e.g. to pay rent;
- employment protection programs: Antivirus A, Antivirus B, and Antivirus C; closed companies up to 100% wage compensation; up to 80% wage compensation due to quarantine;
- etc.

To sum it up, some measures have a direct impact on reducing public revenues (e.g. the liberation package, carry loss), some measures help maintain economic activity and are more reflected on the side of public expenditure.

In other words, on the one hand, the above-mentioned measures improve or improved cash flow in the private sector, on the other hand, they naturally worsen the cash flow, respectively the budget and thus the debt burden of the public sector. In any case, public finances thus fulfill their main role for crisis periods, i.e. the stabilizing role. See the central government balance for the years 2017 to 2020 in Figure 2.

Figure 2. Medium-term development of the Czech central government balance (2017-2020). (Source: MFCR, January 3, 2020; January 5, 2021)

It is obvious from Figure 2 that the Czech state budget was hit hard by the pandemic situation. The year-on-year deterioration amounts to approximately CZK 339 billion. Now, let's have a look for a closer analysis of the revenues themselves.

Table 3 below shows Czech monthly cash performance. At first glance, there is a noticeable annual decrease in public revenues (not only tax revenues) by almost CZK 48 billion (−3.13%). Looking more closely, it is clear that in the course of 2020, the percentage of fulfillment does not differ much compared to previous years (i.e. the years 2017 to 2019; data for the years 17 and 18 are data are available on request from the authors). That means a difference of max. 1 percentage point. However, the exceptions are June and July, when this difference is always at least 2 percentage points compared to previous years. This decline can be explained by the waiver of income tax advances. The rational assumption of faster revenue fulfillment in the first half of the year, and the subsequent slowdown in the second half of the year, where the pandemic would already have a significant effect, were not considerably reflected in the figures presented by Table 3 (the difference in the months of the first half is about 1 percentage point compared to 2019).

Table 3. Czech cash performance – public revenues in 2020 and 2019 (own based on MFCR, February 2, 2021)

Month	Cumulative revenues (bn. CZK); 2020	Monthly change (CZK / %)		Percentage of total revenues of the given year	Cumulative revenues (bn. CZK); 2019	Monthly change (CZK / %)		Percentage of total revenues of the given year
		abs.	rel.			abs.	rel.	
January	124.1	124.1		8%	121.76	121.76		8%
February	229.2	105.1	-15.31%	16%	217.38	95.62	-21.47%	14%
March	377.3	148.1	40.91%	26%	364.30	146.92	53.65%	24%
April	467.9	90.6	-38.83%	32%	470.93	106.63	-27.42%	31%
May	571.6	103.7	14.46%	39%	584.21	113.28	6.24%	38%
June	699.7	**128.1**	***23.53%***	**47%**	743.88	**159.67**	***40.95%***	**49%**
July	817.1	117.4	-8.35%	**55%**	863.30	119.42	-25.21%	**57%**
August	929.4	112.3	-4.34%	63%	969.80	106.50	-10.82%	64%
September	1,058.3	**128.9**	***14.78%***	72%	1,103.26	**133.46**	***25.31%***	72%
October	1,178.8	120.5	-6.52%	80%	1,221.07	117.81	-11.73%	80%
November	1,313.6	134.8	11.87%	89%	1,351.52	130.45	10.73%	89%
December	**1,475.5**	**161.9**	***20.10%***	**100%**	**1,523.23**	**171.71**	***31.63%***	**100%**

[1]The data for the whole period considered (i.e. 2017–2020) are available on request from the authors.

In any case, the year-on-year figures (see line for December of Table 4 below) show that the effect of coronavirus had little effect on VAT and toll collection. From the point of view of VAT, it seems that households have not reduced their consumption too much (y/y = −1.2%). Or it might be possible that households have shifted their consumption from the items affected by restrictions – often subject to a 10% VAT rate – to other available items often subject to a 15% or 21% VAT rate. There is also a very small impact on toll (−0.5%). However, there is a lot more tolled kilometers compared to 2019 (+868 km; a toll was collected on about 1,100 km of 1st class roads and 1,300 km of highways in 2020). In contrast, the effect of coronavirus on corporate and personal income tax collection had the greatest impact (CIT −12.2%, PIT −6.0%). For these taxes, the anti-crisis measure in the form of a waiver of income tax advances in the second quarter of the year have the greatest effect (see June and July of 2020 in comparison to June and July 2019, especially for CIT in Table 4).

In conclusion, given that the total tax revenues for 2020 decreased by approximately CZK 60 billion, it is possible to deduce from the relationship derived in the introduction an approximate 6% decline in the Czech economy in 2020.

Table 4. Collection of taxes during the year (cumulatively) (own based on CNB, 2021)

	2020 (bn. CZK)						**2019 (bn. CZK)**					
Month	**VAT**	**Excise duties**	**CIT**	**PIT**	**Toll**	**Total tax rev.**	**VAT**	**Excise duties**	**CIT**	**PIT**	**Toll**	**Total tax rev.**
Jan	47.39	13.33	1.53	23.04	0.86	89.11	44.88	14.08	0.86	20.73	0.86	84.14
Feb	72.19	26.10	2.97	43.58	3.02	155.07	65.74	25.05	2.25	39.25	2.86	142.01
Mar	97.78	39.16	41.35	65.13	4.30	256.49	92.49	36.54	40.55	62.00	5.11	245.23
Apr	132.97	50.02	41.23	61.38	6.85	303.60	135.04	49.01	43.97	67.38	6.46	313.83
May	155.99	63.40	40.86	73.45	8.01	360.47	167.52	64.50	45.94	86.59	7.59	393.47
Jun	187.98	74.54	*74.39*	*93.38*	9.11	460.15	200.15	79.85	*99.07*	*112.80*	9.02	524.36
Jul	234.21	87.89	*74.47*	*114.33*	10.25	543.26	244.02	93.72	*104.88*	*135.27*	10.28	614.40
Aug	268.63	102.77	81.30	138.85	11.37	627.07	276.3	106.83	104.16	156.13	11.26	683.98
Sept	301.17	117.89	116.74	161.11	13.03	734.86	307.15	121.08	145.19	178.28	12.40	795.18
Oct	350.11	133.27	119.82	182.53	13.78	824.35	354.88	136.36	146.95	198.35	13.61	884.10
Nov	387.91	145.80	120.69	204.39	14.90	90;2.15	393.46	152.05	146.55	218.84	14.74	964.46
Dec	**426.45**	**162.49**	**160.55**	**231.72**	**15.75**	**1,026.91**	**431.58**	**167.14**	**182.90**	**246.64**	**15.83**	**1,086.18**
Dec y/y	**-1.2%**	**-2.8%**	**-12.2%**	**-6.0%**	**-0.5%**	**-5.5%**	**4.4%**	**-0.2%**	**5.1%**	**12.2%**	**2.3%**	**5.4%**

[1] CIT = corporate income tax; PIT = personal income tax.

[2] The data for 2017 and 2018 are a part of the Appendix.

5. Discussion and Conclusions

At the beginning of this research, we expected that it would be possible to observe a significant decline across public revenues (e.g. deferral of income tax payments, deferral of consumption and overall economic activity and the related decline in VAT collection). This general assumption has only been partially confirmed. In fact, the basic expectations were actually inaccurate due to measures to save jobs and support the consumption of households.

A comparative analysis of the Czech Republic and Poland's tax revenues in 2019 and 2020 indicates that there are differences in the resilience of their tax systems to the effects of a pandemic. The data show a relatively greater sensitivity of the Czech tax system to the effects of the pandemic. The Czech Republic recorded a decrease in central government tax revenue in relation to 2019, while Poland slightly exceeded its 2019 level. The performance of VAT in Poland and the extensive loss of PIT and CIT revenues in the Czech Republic were of great importance here.

Thus, answering RQ1, we can conclude that indeed the pandemic had a negative impact on budget revenues in both countries but a much more substantial impact on the Czech tax system's efficiency. Indication of this situation's reasons is currently not possible due to lack of detailed financial and macroeconomic data. In addition, in order to get a complete picture, it would be necessary to analyze the impact of subsequent lockdowns, as in each country the process occurred at a different time and on a different scale.

In response to RQ2, it can be pointed out that in both countries it was direct taxes PIT and CIT that proved to be the least revenue-efficient during the pandemic. However, when analyzing the scale of y/y revenue decreases from PIT and CIT, it should be remembered that it was in the area of these taxes that both countries introduced tax preferences. Therefore, at the moment it is impossible to estimate what part of the decrease in these incomes is caused by taxpayers taking advantage of tax preferences and what part is caused by the decrease in their activity in the economy.

During the Great Recession, society gained knowledge on how to proceed with regulatory measures to the financial sector. A possible benefit of the Covid Crisis may be some permanent changes in tax legislation. As Tax Foundation, respectively Bunn (March 18, 2020) or Asen (February 13, 2020) points out, for example, loss carryover provisions (i.e. in the form of carryforward and carryback) enable businesses to smooth their risk and income throughout cycles. Therefore, especially the loss carryback, which is not so commonly implemented, should have a stronger place in the tax code.

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