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The Impact of COVID-19 Fiscal Policy on the Performance of Slovak State Budget in 2020 and 2021[1]

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Abstract

The contribution deals with the Slovak fiscal and budgetary policy as implemented and carried out during and immediately after the initial outburst of the COVID-19 pandemic. Its primary aim is to test the existence of the impact of the pandemic on fiscal developments and to quantify it using the estimate of the overall cash-based performance of the State budget of the Slovak Republic in 2020 and 2021. Next, the paper sets out to analyse the degree of disruption to the Slovak public finances due to the expansive fiscal policy measures aimed at mitigating the pandemic effects in 2020 and 2021 (i.e. stabilising macroeconomic variables). Deviances in the current performance of the Slovak State budget are assessed using the combination of actual values and own forecasts (point estimates), the latter being sourced from the authorial SARIMA-based econometric models applied on the 2010 – 2019 quarterly time series of the Slovak Republic's State budget cash revenues and expenditures. Particular attention is paid to the associated additional expenditures and/or reduced (missing) budgetary revenues.

Keywords: *Slovak Republic, COVID-19, fiscal policy, GDP, state budget, unemployment, econometric analysis, SARIMA*

JEL Classification: H25, H30, H50, H60

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Introduction

The rule of a balanced public administration budget with the State budget as its core component (Act no. 523/2004 Coll.) is both frequently discussed by the public and analysed by scholars. In 2020, the Slovak economy was apart from the numerous economic, political and other factors affected also by the COVID-19 pandemic. Unfortunately, its rapid spread has negatively impacted not only the general level of health of the Slovak population. The strict epidemiological measures implemented in Slovakia and abroad affected to a large extent also the overall economic development of the country. In response, large-scale expansionary fiscal policy measures were adopted in an attempt to stabilise the development of the main macroeconomic variables, such as GDP and unemployment. However, the associated budgetary effects have caused significant disruption to the long-term development of the Slovak public finances.

As its primary research goal, the presented paper sets to test the hypothesis that the COVID-19 pandemic had caused a deterioration of public finances in the Slovak Republic using the estimate of the total impact of the COVID-19 pandemic on the performance of the Slovak State budget. We hypothesise that this impact relates to the need to cover increased expenditures of the individual State budget‘s chapters and also to deal with the shortfall in tax revenues as a result of several country-wide lockdowns.

The structure of the paper is as follows. Section 1 presents a brief review of the literature dealing with the impacts of the COVID-19 pandemic on public budgets in selected EU countries (with a focus on Slovakia). Section 2 summarises the development of the COVID-19 pandemic in Slovakia, along with the main central government-level measures adopted to mitigate the adverse pandemic impacts; presented are also the main implemented fiscal policy measures along with their estimated impact on public finances. Section 3 introduces the adopted methodology, while Section 4 presents the actual econometric analysis. The next and key to the paper Section 5 focuses on the previously itemised analytical results and discusses implications to the current performance of the 2020 Slovak State budget. The final Section concludes and presents the critical authorial findings.

1. Literature Review

Although the issue of the COVID-19 pandemic and its effects on private and public finances of the concerned countries is highly topical, the research issue particular to the presented paper somehow eludes the attention of the researchers, at least judging from the review of the existing literature. As far as the authors are

aware, there has not been much research output on the budgetary impact related to the Slovak central government finances (the public administration budget and the State budget), and studies of the impact on debt financing and the gross national debt indicator are even less common. Nonetheless, there are important and inspirational papers that deal with the local governments and a wealth of international comparisons, respectively.

Čajková, Sindleryova and Garaj (2021) focus on the local level of Slovak public finances and conclude that the most important instrument in tackling the COVID-19-related shortfall in the local public finances represents the (local government) reserve funds.

Černěnko, Neubauerová and Zubaľová (2021) have focused on the same research area and suggested a list of specific measures for the Slovak local government budgets that may be of use should there arise a similar type of economic crisis in the future. The measures that the authors put forward include a more substantial fiscal involvement of the property taxes on the local government level – albeit admitting that the final effect is potentially limited due to local political reluctance.

Gdovcová and Maaytová (2024) focus on the degree of disruption to Slovak and Czech public finances due to expansionary budget policy measures. While assessing deviations in the implementation of the Slovak and Czech state budgets, the authors conclude that when compared to the situation in the Czech Republic, the expenditure side of the State budget of Slovakia deviated from the predicted development more intensively while addressing the ongoing pandemic situation.

On the level of international comparison, Adamišin, Šindleryová and Čajková (2021) have focused on the level of predictability of the COVID-19-related crisis in the conditions of the Slovak and German economies. The authors attempt to prove there was circumstantial evidence that the crisis in the case of Slovakia and many other European countries was predictable, irrespective of the COVID-19 issue. Moreover, they put forward the corresponding proofs (e.g. correlations in the predictors) and voice warnings against unsustainability in the wage growth department vis-à-vis the productivity of labour. Leonida and Cepoi (2022) view measures such as the suspension of fiscal-budgetary frameworks and the provision of EU funds through various programs aimed to combat both the spread of the virus and the negative economic and social effects favourably (ibid., p. 14). Using a threshold-augmented Global VAR model, the same (i.e. effectiveness of the fiscal policy to prevent a more severe COVID-19-related economic downturn) was established also by Chudik et al. (2021). On a similar note, Haroutunian et al. (2021) estimate that the EU-wide stabilisation gains from the short-time work schemes and guarantees have reduced the pandemic-related macroeconomic loss

by approx. 25% (and improved real GDP by over 4 percentage points). Nevertheless, these authors are also quick to point out that once the economic recovery is underway, the medium-term fiscal policies need to be reshaped to ensure public debt sustainability. This recommendation, although not unanimous,[2] is also shared by many other studies, e.g. Gourinchas et al. (2022), whose paper is also notable in that apart from the aforementioned generally accepted call to revise the fiscal impulse downwards once the affected economies re-open it also observes the generally poor targeting of the fiscal policy relief ("*most of the funds disbursed were spent on firms that did not need it*", ibid., p. 53). Despite deficiencies, the adopted fiscal policy measures have nevertheless managed to "*'get in all of the cracks' in the economy under COVID-19*" (ibid., p. 54). Far less optimistic are in this respect conclusions of Romer (2021) who focuses on the fiscal policy response to the COVID-19 pandemic in general and within the US economy in particular. Instead, her pragmatic observations "*if something like the nearly USD 1 trillion spent on stimulus payments that did little to help those most affected by the pandemic ends up precluding spending USD 1 trillion on infrastructure or climate change in the next few years, the United States will have made a very poor bargain indeed*" (ibid.) and "*more fiscal stimulus isn't always better*" (Romer, 2022, p. 181) corresponds rather well with the conclusions by Gourinchas et al. (2022). Using panel regression, Heimberger (2022) finds out that discretionary fiscal policy was, on average, more counter-cyclical during the COVID-19 crisis than in the past and confirms that "*automatic stabilisers, in general, operated counter-cyclically in all countries, but to a different extent*" (ibid., p. 23) with the Slovak Republic being no exception to this pattern (albeit with an insignificant interaction term). In 2022, Barišić and Kovač (2022) assessed the economic damage associated with the COVID-19 crisis by analysing the short-term effectiveness of the fiscal policy

[2] In contrast, for Italy do not Posta et al. (2022) suggest any specific post-COVID-19 austerity measures; instead, "*public debt sustainability will depend [mainly, for some years in the next future] on a prolonged ECB "quasi-monetization" of the Italian public debt … the medium/long run the reduction of public debt over GDP should be achieved primarily through an increase of economic growth*" (ibid., p. 18). ECB notices this notion and coins in this context a rather fitting term "helicopter money": "*After a permanent monetisation of government debt previously held by the private sector, households may feel richer, assuming that only privately held government debt needs to be backed by future primary surpluses. This could lead to a constellation where the sum of money and bonds held by the private sector exceeds in present value the perceived tax burden, creating a wealth effect which stimulates spending and thereby the price level. The notion of helicopter money is similar to this, as it would also work through a permanent increase in perceived private wealth, engineered by the central bank through a direct and one-off transfer of base money to households that is not backed by future taxes*" (Debrun et al., 2021, p. 106). Nevertheless, this notion remains (at least seemingly) in minority; cf. Prammer (2021) and her recommendation for Austria: "*high deficit and debt levels should be reduced in the medium term to maintain the high confidence levels in Austrian public finances in a future-oriented as well as socially and environmentally sustainable way*" (ibid, p. 171).

assistance during 2020 and its possible long-term GDP impact through the labour market effects, concluding that the undertaken fiscal measures in Q2_2020 were in most of the EU-26 countries successful (the Slovak Republic is not among the exceptions). Murphy (2023) provides an interesting insight into the Australian experience with a cousin to the Slovak *First Aid* programme called "the JobKeeper program" which included different forms of compensation for COVID income losses, resulting in disincentive effects, windfall gains, and ultimately excessive fiscal expansion. The Australian and Slovak experiences concerning the effectiveness of such fiscal aid are rather similar: "*if there is a JobKeeper program in a future pandemic, its design should be changed. It should only be available to businesses that are not able to operate normally because of social distancing. Payments should not extend beyond the duration of social distancing. The payments should be redesigned to reduce the great unevenness in compensation for lost profits*" (ibid., p. 147).

Furthermore, Bökemeier and Wolski (2022) observe (in agreement with several other authors) that during the pandemic period, the EU Member States have demonstrated a significant switch in their fiscal policy. Before the crisis, their fiscal policy was on average pro-cyclical, while during the COVID-19 crisis period of 2020 – 2022, their fiscal policies turned sharply into counter-cyclical (ibid., p. 225).

2. Budgetary and Fiscal Development of the Slovak Republic under COVID-19

Based on the IFP (2019) assumptions and the main budgetary policy priorities (recovery of public finances, long-term sustainability), the National Council of the Slovak Republic (hereinafter "NC SR") approved the public administration budget for 2020 as follows (see Table 1).

T a b l e 1

Public Administration Budgetary Targets for the Period 2020 – 2022 (in % of GDP)

	2020	**2021**	**2022**
Budgetary target	–0.49	0.00	0.00

Source: MF SR (2019).

Already at the time of its compilation, the Council for Budget Responsibility (hereinafter "CBR") (2019) has voiced fundamental reservations against the 2020 deficit of the public administration budget, planned in the amount of EUR 480,409 thousand (MF SR, 2019), since the compiled budget did not correspond to the

goals set by the program statement of the current government (i.e. running a balanced budget by 2020; the presented proposal included an increase in the deficit). At the same time, the proposed budget has assumed that the budgetary targets of 2019 are met. In reality, at the time of the draft budget compilation, there were already negative deviations. CBR (2019), along with the National Bank of Slovakia (hereinafter "NBS") (NBS, 2019), has identified the shortcomings in terms of additional yet unspecified consolidation measures which were included in the budget targets for the upcoming years 2021 and 2022. Without them, it was not considered realistic to balance either public administration or the State budget.

2.1. COVID-19 Pandemic

At the beginning of 2020, Slovakia's economic situation did not indicate any significant problems. However, a fundamental change occurred on March 6, 2020, when the Public Health Authority of the Slovak Republic (hereinafter "PHA SR") (PHA SR, 2020) confirmed the first case of the infectious respiratory disease COVID-19 in the Slovak territory. With the number of infected people on the rise, the government within the following days declared an emergency (see Resolution of the Government of the Slovak Republic No. 111/2020), to be followed from March 16, 2020, by a state of emergency (see Resolution of the Government of the Slovak Republic No. 114/2020). To protect public health and limit personal contact, all the service- and retail-based businesses except those providing essential needs were shut down from this day (see Resolution of the Government of the Slovak Republic No. 113/2020).

These early strict measures, implemented in an attempt to slow down the spread of the new infectious disease, have deeply impacted the economic activity of many natural and legal persons. Analyses prepared by (NBS, 2020b) indicate that the sectors characterised by a high level of personal contact (including the service sector, especially accommodation and catering, tourism, education and healthcare) are responsible for 16.99% of the Slovak GDP and more than 25% of its total employment, respectively. The government's decision has resulted in a complete halt of activity of almost a fifth of the Slovak economy. Many other businesses became vulnerable as well, being exposed to the high risk of insolvency as a result of the (absolute or relative) decline in sales. NBS (2020a) drew particular attention to the financial situation of micro- and small enterprises, where the risk of insolvency was the highest.

Due to the sudden degradation of the economic situation and pessimistic macroeconomic forecasts, the Slovak government was forced to assume the role of the "visible hand of the market" to mitigate the effects of this unfavourable situation. Strongly counter-cyclical expansionary fiscal policy was implemented while

extensive measures were also taken in the domain of social policy. The main goal of the budget policy (regardless of the previously established principles) became the provision of these additional expenses (Ministry of Finance of the Slovak Republic, hereinafter "MF SR", 2021).

Based on Act no. 468/2019 Coll., the State budget for 2020 was approved with a deficit of EUR 2.768 billion. Over the year, its amount was adjusted upwards due to the deep slump on the income side and the simultaneous introduction of additional measures burdening the expenditure side of the budget – see Table 2.

T a b l e 2

Approved State Budget for 2020 (in EUR)

	Originally approved budget	**Amended budget**
Total revenues	15,792,695,566	14,366,446,802
Total expenditures	18,560,877,994	26,319,080,528
State budget deficit	**2,768,182,428**	**11,952,633,726**

Source: Act no. 468/2019 Coll., Act no. 217/2020 Coll.

During the crisis-marked 2020, the State budget ultimately ended up with a total deficit of EUR 7.7 billion (MF SR, 2021), resulting in an almost 200% overrun of the expected balance. This sharp decrease in performance was primarily due to the growth of total expenditures, which have reported the highest absolute deviation to the tune of more than EUR 4.9 billion (see Table 3). We attribute this increase mainly to the growth of current expenditures although the relative increase in capital expenditures is also evident and significant (see Table 3). A much less pronounced decrease is evident in the total income of the State budget (–0.27%), mainly due to the more widespread use of grants and transfers (which have risen slightly over 50% vis-à-vis the originally approved budget). Tax revenues recorded a significant shortfall (EUR –0.9 billion), while the slump in non-tax revenues may be considered negligible.

T a b l e 3

Analysis of Deviations in the Performance of the State Budget (in EUR thousand)

	Approved budget	**Reality**	**Deviation (abs.)**	**Deviation (rel.)**
Total revenues	**15,792,695**	**15,750,635**	**–42,060**	**–0.27%**
Tax revenues	12,817,470	11,872,170	–945,300	–7.38%
Non-tax revenue	1,258,764	1,289,885	31,121	2.47%
Grants and transfers	1,716,461	2,588,580	872,119	50.81%
Total expenditures	**18,560,878**	**23,509,055**	**4,948,177**	**–26.66%**
Balance of the State budget	**–2,768,182**	**–7,758,420**	**–4,990,238**	**–180.27%**

Source: MF SR (2021), own calculations.

Although the primary factor behind the negative economy of the State budget in 2020 was the COVID-19 pandemic, it was not the only factor. Before we come

to the analytical and data modelling part itself, let us first attempt to separate the other budgetary impacts that the Slovak public finances would have to face even if there was no pandemic crisis.

2.2. Budgetary Impacts Outside of COVID-19

The primary factor to which CBR (2019) drew attention already in 2019 was the compilation of the budget itself, as it was based on incorrect figures and its budgeted amount was overestimated. Meeting the budget target at the level of 0.49% of GDP was therefore not realistic for objective reasons. Even with no additional crippling factors, within the economic policy set at the time, the Slovak Republic was according to CBR (2021) fit to achieve a deficit at the level of 2.5% of GDP (assuming no additional budgetary measures were adopted). Even without the impact of COVID-19 itself, this value was dangerously close to the limit of the Maastricht debt criterion (3% of GDP). CBR (2021) also criticised the inappropriately set pro-cyclical budget policy, which even during the last "good years" and under historically low unemployment rates did not manage to reduce the structural deficit indicator in the desired direction. On the contrary; in recent years (2018 and 2019) its value has slightly grown up. The Slovak public finances were thus not sufficiently prepared for cyclical economic fluctuations or an outbreak of another crisis.

The secondary significant and from the perspective of the public finances negative factor was the political cycle. With the elections approaching, a new transfer in the form of the 13th pension was approved at the beginning of 2020 (see Act No. 46/2020 Coll.) regardless of the already negative balance of the pension insurance account. Since it was impossible to cover these expenditures neither by the social security nor by the State budget, the later legislative changes (see Act No. 296/2020 Coll.) modified the conditions for paying out this new benefit and thus partially reduced the associated negative budgetary impact.

2.3. The COVID-19 Fiscal Policy Measures Implemented in 2020

Within the fiscal policy of the Central government, the adopted measures have focused mainly on stabilisation. The criterion for linking fiscal policy with individual measures had an immediate impact on maintaining a stable unemployment rate (partial payment of the wage costs, compensation for the drop in revenues of self-employed) and the support of the GDP path following the end of the crisis (preserving the potential of the economy through the support of the most affected sectors, participating in the payment of their non-covered fixed costs).

2.3.1. Employment Support

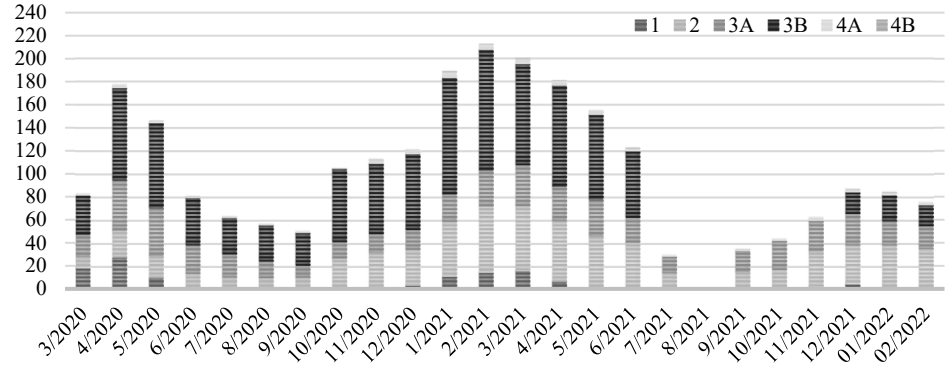
Within the scope of employment support, the Ministry of Labour, Social Affairs and Family of the Slovak Republic (hereinafter "MLSAF SR") has worked out the *First Aid* project aimed to "*mitigate the effects of the declared emergency [...] through financial support for employers and the self-employed, respectively, who will keep their jobs despite the obligation to interrupt or limit their operational activities [...], or due to the health protection of their employees, a decrease in sales, or the failure of subcontractors*" (MLSAF SR, 2020).

According to the set criteria, the project was functionally divided into measures 1 through 4. Following the classifying of the subjects impacted by the adverse pandemic situation into the respective groups, the amount of the financial contribution was determined as a partial compensation of the wage costs or as compensation for the loss of income caused by the COVID-19 pandemic or measures taken by the government.

In 2020, the *First Aid* project was implemented for the period from March through December (the financial contributions were also provided during the calendar year 2021 and they may be drawn also during the current year 2022, albeit their extent has been cut down).

F i g u r e 1

Development of the Volume and Structure of Paid-Out Financial Contributions
(in EUR millions)



Source: Own processing, based on ISP (2022).

The trend of the charted paid-out financial contributions copies the pandemic situation and anti-pandemic measures effective in Slovakia during the period. Although during the first wave of the pandemic, there were daily increases in the number of infected persons from single cases to dozens, the initial shock caused by the declaration of a state of emergency and the closure of many businesses was accompanied by a sharp increase in requests for financial assistance. In the summer

months, when the situation has slightly stabilised, there is evident a desirable decrease (see Figure 1). With the arrival of the second COVID-19 wave and the re-introduction of the state of emergency (and yet another widespread business closure), the provision of financial contributions was extended until the end of the calendar year under the terms of the new *First Aid Plus (+)* project. Finally, during the third wave of the pandemic in autumn 2021 (observed in Figure 1), the support period was extended straight until February 2022 through the project *First Aid Plus-Plus (++)* (ISP, 2022).

2.3.2. Other (Expenditure) Measures

Another part of the economy significantly impacted by the COVID-19 pandemic represented the aforementioned sectors affected by an unfavourable situation in the form of the closure (or suspension) of their activities as a result of the decision by PHA SR (i.e. the sectors of tourism, accommodation and catering services, transport, culture, art, etc.). Financial aid in the form of partial reimbursement of uncovered fixed costs of these sectors was provided in the form of a *de minimis* (minimum aid) scheme.

A separate aid scheme (regardless of the sector) represented the provision of financial contributions in the form of partial payments of rent for subjects who were prevented from using the object of the lease (leased premises) for their usual economic activity. The rent payment subsidy was provided under the purview of the Ministry of Economy of the Slovak Republic, according to Section 13c of Act no. 71/2013 Coll., as amended. The compensation was provided directly by the lessor in the amount of the provided discount (capped at 50% of the rent).

2.3.3. Tax and Levy Measures

Last but not least, within fiscal policy, there were adopted also various measures (related to the income side of public budgets) in the area of taxes and levies, regulated by Act no. 67/2020 Coll. or other Regulations of the Government. These measures, both with and without impact on the accrual balance of the public administration, are discussed below.

The measures without impact on the balance of the public administration include mostly deferrals of obligations towards the tax authority and financial administration (extension to the deadline for submitting income tax returns, motor vehicle tax, annual settlements, postponement of public disclosures of financial statements, etc.). Maturities of tax advances and tax obligations were also postponed. As part of the restriction of social contact, tax inspections and other tax procedures requiring physical presence were also suspended during the state of emergency (see Act no. 67/2020 Coll.).

Within the domain of social insurance, these were primarily postponements of the payment of insurance premia (for employers and the self-employed whose income has dropped by more than 40%) for March, May, June, and July 2020. With the second and third waves of the pandemic, the postponement of contributions has been extended.

All the measures without impact on the balance of the public administration were implemented to ensure the liquidity of the business sector (MF SR, 2021).

We observe a much narrower range of measures with an impact on the balance of public administration. In addition to the adjusted due dates of social contributions, these measures were also accompanied by the exemption from the payment of the social contribution (in April 2020). Based on Section 293ex of Act no. 461/2003 Coll., entitled to this treatment were employers and the compulsory pension and sickness benefit insured self-employed, whose operations were closed for more than 15 days by the decision of the PHA SR. According to ISP (2022), exemptions from social contributions were sought by over 33,000 persons while the total monetary volume of this assistance amounted to EUR 57 million (MF SR, 2021).

The final part of the package which comprises the tax and levy measures is the possibility to deduct unused tax losses reported in the period 2015 – 2018 in the maximum value of EUR 1 million. To this measure were entitled to tax subjects (natural and legal entities) according to Section 24b of Act no. 67/2020 Coll.

2.3.4. Social Security Measures

In this text, separate attention is paid to the area of social policy, where measures were primarily taken in the form of temporary changes to the social system (extending the period of provision of various social insurance benefits or changes to the way they are calculated). Introduced were also several new but temporary transfers. From our perspective, the secondary impact of social measures is their redistributive nature and the stabilising fiscal impulse (stabilisation of the household final consumption as one of the components of GDP).

In 2020, SIC recorded a clear increase in the number of recipients of the sickness benefit (by 24%) and a more than two-fold increase in the number of recipients of the nursing benefit (by 227%, see Table 4) related to the COVID-19 disease.

T a b l e 4

Number of Recipients of Sickness and Nursing Benefits

	2019	2020	Difference (abs.)	Difference (rel.)
Sickness	123,968	153,772	29,804	24%
Nursing	14,831	48,558	33,727	227%

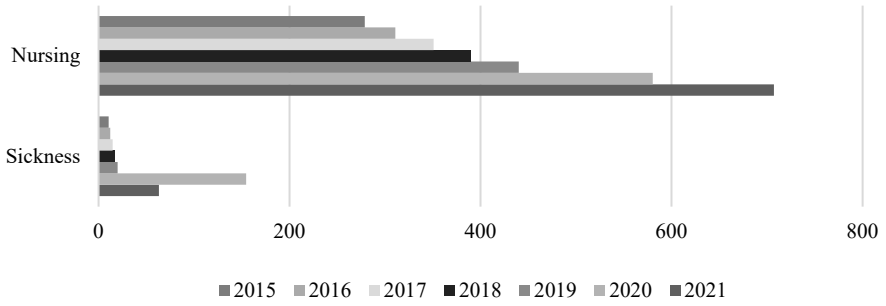
Source: Own processing, based on SIC (2022b).

Act no. 63/2020 Coll. has adjusted the calculation of the sickness benefit which from the first day represented 55% of the daily assessment base and its payment was for the entire duration of work incapacity covered by SIC. The Act has also introduced the new "*pandemic nursing benefit*" associated with the need to nurse or care for a child up to 11 years of age due to the quarantine measures or the interruption of face-to-face classes. The amount of this benefit was determined in the same way as the nursing benefit (55% of the daily assessment base) (see Act No. 63/2020 Coll.).

The impact of the increased number of beneficiaries along with the changes in the calculation and payment of these benefits is shown in Figure 2 below.

F i g u r e 2

Volume of Paid Sickness and Nursing Benefits during the Period 2015 – 2021
(in EUR million)



Source: SIC (2022a).

The provision of unemployment benefits was extended, where the standard support period (6 months) set for the duration of the emergency was extended first by one month (see Regulation of the Government of the Slovak Republic No. 101/2020 Coll.) and later by another month (see Regulation of the Government of the Slovak Republic No. 137/2020 Coll.). For the period of the state of emergency, Regulation no. 102/2020 Coll. has also extended the duration of the parental allowance. The Regulation has also modified the conditions regarding the benefits in material needs.

Natural persons who for the duration of emergency (or the state of emergency, respectively) lost their job or stopped performing business or other self-employment activities (i.e. had no income from the above-mentioned activities and at the same time were not recipients of any other social insurance benefits) were based on the Regulation no. 103/2020 Coll. entitled to the provision of the financial "*SOS contribution*" amounting to EUR 300 per month. The grant period was limited to 6 months (maximum EUR 1,800). The allowance was provided for the period from March to August 2020 and from November 2020 until the end of the calendar year.

The Ministry of Finance of the Slovak Republic (2021) values the total amount of one-off impacts affecting the public finance balance in 2020 at EUR 1.434 billion. The CBR (2021) estimates the overall budgetary impact of the COVID-19 pandemic at EUR 3.4 billion, with the following breakdown:

- budgetary impact outside the measures of the Slovak government (including the decrease in the income budget chapters or the increase in expenditures without direct link to the adopted measures, respectively) amounts to EUR 1.77 billion;
- budgetary impact of the measures of the Slovak government alone which aimed at mitigating the negative pandemic effects (i.e. the focus of our research) is estimated at EUR 1.6 billion.

Building on these two authorities and their calculations of the accrual-based impact of COVID-19 on the public administration as a whole, we carry on with a subsequent analysis of the development of the cash-based position of public finances at the level of the State budget. The outcome of this analysis will be the observation of deviations in the management of the State budget from its modelled trajectory.

3. Methodology

Considering the data at hand and information presently known, we carry out the analysis of disruptions to the management of the State budget during 2020 and due to the advanced time also in 2021. Using the Seasonal Autoregressive Integrated Moving Average (SARIMA) time series analysis (allowing us to analyse and understand the seasonal and non-seasonal characteristics of a given time series based on which forecasts can be made) as part of the inquiry into the cash-based performance of the Slovak State budget, we will work out individual econometric models for both the revenue and expenditure side of the State budget. Both models will be examined separately.

To compile the SARIMA model of the revenues and expenditures of the State budget, we have adopted data on the current performance of the State budget as published by MF SR (2022b) for the period from 2010 to 2019. All the data were examined in their absolute values as we did not consider the log transformation necessary. When deciding on the time horizon we have reflected the date of the Slovak entry into the European Monetary Union (hereinafter "EMU") in 2009; the values are in EUR. Another and at the same time key criterion was an ongoing positive economic phase over the period 2010 – 2019 (adjusted for the fiscal impacts of the 2008 – 2009 financial crisis) that was expected to continue even into the fiscal year 2020.

Since these are daily accumulated (momentary) data, for purposes of the analysis they were converted into intervals (individual quarters). The sample set contains 40 observations (values). The resulting models (representing the average development over the period 2010 – 2019) will be further used to calculate the predictions for 2020 and 2021 (excluding the impact of COVID-19, i.e. assuming the positive economic phase continues along its trend). The predicted *ex-ante* values for 2020 and 2021 will be subsequently used to observe the degree of disruption of the performance of the State budget within the individual quarters.

4. Econometric Analysis

We started the analysis of the state budget revenues by tests for the stationarity of the time series, based on which the next course of action was decided. Adopted were two tests: the Canova-Hansen test, based on which we do not reject the null hypothesis (of the absence of the unit root at specified frequencies) at a significance level of 5% (t-statistics = 0.6989; significance level = 1.010), and the ADF test applied to seasonally adjusted data, according to which the time series is stationary at the significance level of 10% (the higher than standard significance level was accepted due to the shortness of times series) even for a model with a constant (with no trend and no need for differentiation). The best model was chosen by analysing the correlogram of time series and residual series, comparing the following criteria: adjusted R-squared, information criteria, and forecasting the stability (Chow) test (performed on 2019 data). Table 5 presents only the final (usable) models that meet the basic diagnostic tests (G-M assumptions). To make both models maximally accurate, the effect of the accelerated draw of the EU funds at the end of the 2015 programme period was filtered out by adding the dummy variable *EU_15*.

T a b l e 5

Comparison of the Competing Models of the State Budget Revenues

Model	Adj. R-squared	Akaike info criterion	Chow test
SARIMA (0,0,0)(1,0,0)c + EU_15	**0.7519**	**28.9559**	**0.9829**
SARIMA (0,0,0)(0,0,1)c + EU_15	0.6493	29.1895	0.9052

Source: Own processing using *EViews* software.

After evaluating the predetermined criteria, finally chosen was the model SARIMA (0,0,0)(1,0,0) shown in Table 6. Endogenous variables are examined in absolute values.

T a b l e 6

Model of the State Budget Revenues, Adopted Observations 2010:1 – 2019:4

Dependent variable: REVENUES				
	Coefficient	**Std. error**	**t-statistic**	**p-value**
Constant	4,428,785	1,191,832	3.715948	0.0007
AR(4)	0.890578	0.092368	9.641665	0.0000
EU 15	1,617,635	319,938.7	5.056079	0.0000
R-squared			0.764702	
Adjusted R-Squared			0.751983	
F-statistics			60.12356	
P-value (F)			0.00000	
DW statistics			2.177593	
ARCH test			0.7360	
Breusch – Godfrey test			0.5480	
Jarque-Bera test (3,386)			0.1839	

Source: Own processing using *EViews* software.

To get the best possible predictions, we find it necessary to focus on evaluating the underlying diagnostic tests. Regarding the explanatory variables of the aforementioned model, the Student's t-distribution statistics exhibit highly favourable p-values, based on which we reject the hypothesis of the statistical insignificance of all three variables. Similarly, using the F-test, we declare the model as a whole to be statistically significant.

Satisfaction of the 2nd G-M assumption was verified based on the outputs of the ARCH test, which rejects the presence of heteroskedasticity in the assembled model. The presence of autocorrelation was examined using the Durbin-Watson statistic, whose value does not confirm it to be present. The same result was obtained from the Breusch-Godfrey test, which also rejected the presence of serial autocorrelation at the 0.05 significance level. Verification of the 1st G-M assumption was carried out by observing the residuals; their fluctuation around the value of 0 indicates the meeting of the requirement of a mean of the random component equal to zero. Finally, we examined the normality of the random component to verify the fulfilment of the 4th G-M assumption. Given the p-value is higher than 0.05, we conclude that this requirement was also met within the analysis of the State budget revenues.

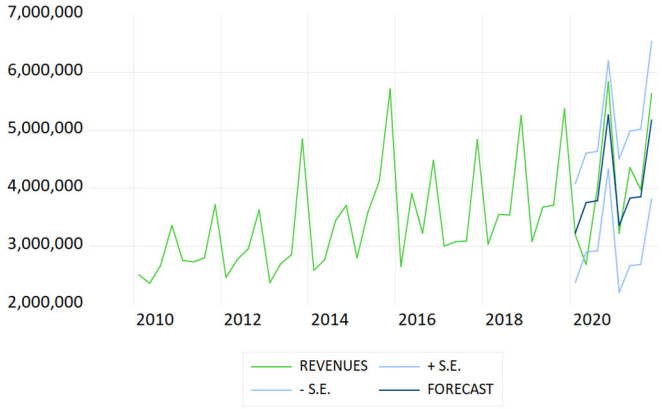
The model constructed in this way satisfies the complete (the so-called "strong") set of Gauss-Markov assumptions. We conclude that the State budget revenues are significantly seasonally influenced by the AR(4) process, which was slightly disrupted in 2015 by the accelerated withdrawal of contributions from EU funds.

Within the concluding phase of the analysis, considering the macro prediction of IFP (2019) (where we expect a slow in the continuous growth phase) and the high predictive ability of the model (tested through the Chow test), we have designed the model intending to (*ex-ante*) forecast the values for the 2020 and 2021

State budget period (see Figure 3). Along with the prediction of expenditures, the resulting estimates are presented in Table 9.

F i g u r e 3

Actual and Balanced Values of the State Budget Revenues (2010 – 2021)



Source: Own processing using *EViews* software.

4.1. Model of the Expenditure Side of the State Budget

For the time series of state budget expenditures, based on the Canova-Hansen test we do not reject the null hypothesis about the stationarity of this seasonal time series (t-statistics = 0.6142; 5% significance level = 1.010). The ADF test applied to seasonally adjusted data indicates the stationarity of the time series at the 5% significance level only after the first difference (for the model without deterministic terms). Both options for differences, seasonal and non-seasonal, were considered. The resulting model was selected based on the same criteria as was the case with state budget revenues. The selection process and considered variants of the final models meeting the G-M assumptions and all diagnostic tests are presented in Table 7. Due to the ambiguity of the resulting characteristics of the individual models, the highest weight in choosing the best model was in this case given to its predictive ability (measured by Adj. R-squared). The model no. 3 was thus the winner.

T a b l e 7

Comparison of the Competing Models of the State Budget Expenditures

SARIMA model	Adj. R-squared	Akaike info criterion	Chow Test
(0,1,0) (1,0,1) + EU_15	0.9206	28.4605	0.5590
(1,0,0) (0,1,0) + EU_15	0.5127	28.5426	0.7347
(0,1,0) (2,0,0) + EU_15	**0.8736**	**28.9869**	**0.8893**

Source: Own processing using *EViews* software.

After carefully considering all options, modelling of the cash expenditures of the State budget was performed using the SARIMA (0,1,0) (2,0,0) model. The effect of increased utilisation of subsidies from the EU sources was in this case filtered out as well, again by using the dummy variable EU_15. Endogenous variables were examined in absolute values.

T a b l e 8

Model of the State Budget Expenditures, Adopted Were Observations 2010:1 – 2019:4

Dependent variable: D(EXPENDITURES)				
	Coefficient	**Std. error**	**t-statistic**	**p-value**
EU_15	870,629.6	372,924.7	2.334599	0.0270
AR(4)	0.435091	0.164658	2.642401	0.0133
AR(8)	0.561143	0.171521	3.271566	0.0028
R-squared			0.882034	
Adjusted R-Squared			0.873608	
DW statistics			2.188428	
ARCH test			0.6279	
Breusch – Godfrey test			0.8319	
Jarque-Bera test			0.0000	

Source: Own processing using *EViews* software.

Concerning the individual parameters, based on their corresponding p-values in t-tests we again reject the null hypothesis of their statistical insignificance. Therefore, both selected parameters are considered significantly different from zero.

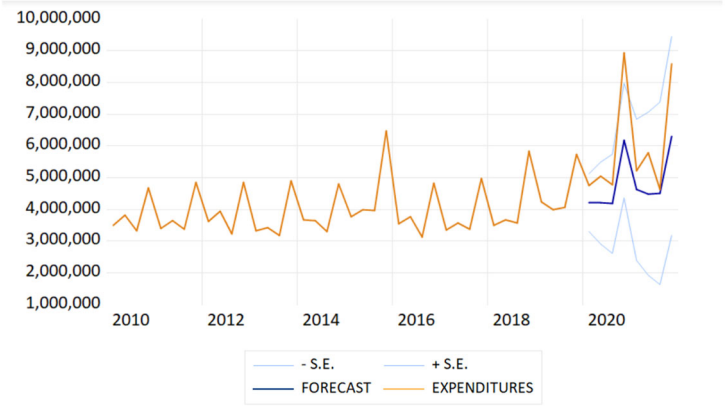
As in the case of the second model, the diagnostic test checking the meeting of the 2nd G-M assumption does not indicate the presence of heteroskedasticity. Therefore, we examine the model residuals at the significance level of 0.05 under the assumption of homoskedasticity.

Similarly, we reject the presence of autocorrelation based on the value of the Durbin-Watson statistic, and also, using the Breusch-Godfrey test, we reject the presence of serial autocorrelation. The fluctuation of the residual component around zero is considered to satisfy the 1st Gauss-Markov assumption about the mean of the random component being zero. However, unlike in the case of the previous model, this time we cannot demonstrate the satisfaction of the 4th G-M assumption regarding the normal distribution of the random component. According to the evaluated criteria, the estimated model thus satisfies the so-called "weak" set of Gauss-Markov assumptions.

Therefore, the expenditure model is finally examined as the non-seasonal first difference, which is significantly influenced by the seasonal AR(4) and AR(8) processes. We also filter out the accelerated withdrawal of funds. The output of our analysis in the form of forecasts for quarterly expenditure values for the budget year 2020 is presented in Figure 4.

F i g u r e 4

Actual and Balanced Values of the State Budget Revenues (2010 – 2021)



Source: Own processing using *EViews* software.

Together with the income side of the state budget, we attach the numerical values of the resulting predictions (Table 9).

T a b l e 9

Predicted Values of the State Budget in 2020 and 2021 (in EUR thousand)

	Revenues	**Expenditures**
2020/Q1	3,225,437	4,211,341
2020/Q2	3,756,392	4,206,195
2020/Q3	3,783,413	4,180,884
2020/Q4	5,267,055	6,170,075
2021/Q1	3,357,110	4,621,036
2021/Q2	3,829,967	4,482,230
2021/Q3	3,854,031	4,501,254
2021/Q4	5,175,331	6,307,964

Source: Own calculations.

The output of this analysis is an estimate of the 2020 State budget deficit at the level of EUR 1,877 billion (for comparison, the approved budgeted deficit at the level of EUR 2.7 billion was EUR 0.9 billion higher), confirming the concerns of MF SR and NBS regarding the inconsistency of the pre-determined fiscal targets (and thus the achievement of fiscal sustainability). At this moment, we consider the authorities' criticisms pointing to extravagant spending of public finances during the best years, when restrictive measures were expected to lead to deficit reduction and improvement in debt management, to be justified. However, the budgeted deficit of EUR 2.7 billion on the other hand also indicates a certain margin of manoeuvre in case of unfavourable situations. Since the redistribution of public finances and a change in their ultimate purpose are not a subject of our review, we consider this difference as an influence falling outside the scope of the COVID-19 pandemic.

We estimated the deficit of the state budget for 2021 at the level of EUR 1.681 billion. This figure contrasts both with the originally budgeted value of EUR 8.058 billion and its subsequent upward revision to EUR 11.797 billion (Act No. 425/2020 Coll.). Because of the ongoing pandemic, this revised value already reflected the state of significant uncertainty regarding further economic development and possible additional disruptions due to the outbreak of further waves of the COVID-19 disease (which in fact occurred).

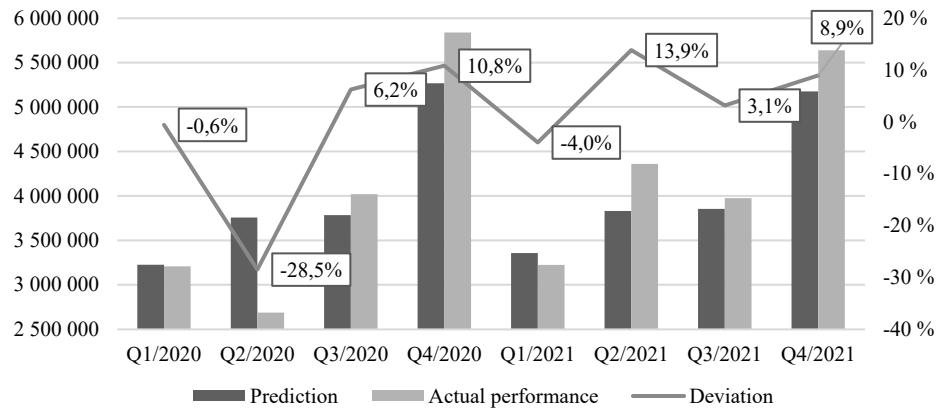
5. Results and Discussion

5.1. Performance of the State Budget in 2020 and 2021

As already mentioned, the cash-based data on the current performance of the State budget, published by MF SR (2022b), makes it possible to monitor the development of the State budget performance not only in the long run but there is also valuable information on its development in the horizon of one budgetary year. Within Section 5 we have compiled an econometric model based on which the values for 2020 were predicted along with the expected development of the performance of the State budget (excluding the impact of COVID-19). Within the following analysis of the current implementation of the State budget, these predictions will serve as a reference for assessing the deviations from their model development. Given the advance in time and the ongoing pandemic of COVID-19 which continued in 2021 and partly also in 2022, the predictions were extended to 2021 and therefore this conclusion also deals with the performance of the budget year 2021.

F i g u r e 5

Current Development of the State Budget Revenues in 2020 and 2021
(in EUR thousand)

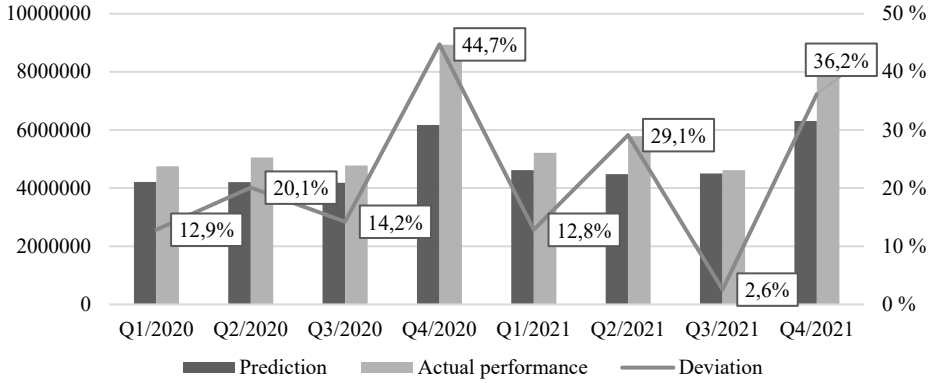


Source: MF SR (2022b), own calculations.

At the beginning of 2020, the performance of the revenue side of the State budget has developed within acceptable limits. Despite the declared state of emergency (as of March 16, 2020), the deviation from the expected development was only –0.6%. However, a significant drop of 28.5% occurred in the second quarter, when the revenue collection fell even below the level of the first quarter (while disturbing also the seasonal component). The reason for this significant decrease can also be found in the newly introduced tax and levy measures, which postponed (not just administratively, but also payment-related) many obligations towards the tax administrators and the Social Insurance Agency (hereinafter "SIC") and also jump-increased the level of unemployment, resulting in a significant impact on the cash flow of taxes and levies. While the pandemic situation has reasonably stabilised during the summer months (and the supportive measures on the labour market remained in place), the volume of collected revenues of the State budget has reached the value of the forecast excluding the impact of the COVID-19 pandemic. Moderate growth (higher than usual) occurred at the end of the budgetary year (see Figure 6). We attribute this positive impact mainly to the increased use of grants and transfers, primarily from the EU sources (judging from the exceeded budgeted value of received grants and transfers; see Table 3) while not excluding the impact of other changes and factors (the shift in tax revenues as the basic component of total state budget revenues will be addressed in Subsection 6.2). The total negative deviation from the estimated values is almost EUR 282 million.

F i g u r e 6

Current Development of the State Budget Expenditures in 2020 and 2021
(in EUR thousand)



Source: MF SR (2022b), own calculations.

Similar to 2020, in the first quarter of 2021 there can be observed a moderate (albeit somewhat higher) decline in income. In contrast, the revenues of the state budget showed from the second quarter a moderate growth when compared to the

model development until the end of the year. In our opinion, there may already be observed the impact of improved crisis management as well as satisfactory work of tax and levy measures (while a significant part of the deferred levy obligations became due at the end of the budget year and was thus already repaid at the end of 2020 and during 2021). We also do not rule out the influence of other factors unrelated to COVID-19.

In contrast to revenues, the State budget expenditures have shown an increase of 13% already during the first quarter. Over the whole year, this growth increased gradually, although an increase of more than 44% was recorded in expenses outlaid during the fourth quarter (see Figure 6). From the perspective of the adopted measures, the increased expenditures from March until the end of the calendar year have largely involved expenditures aimed at employment support (*First Aid* project) and other measures necessary to protect public health.

According to MF SR (2021), the 2020 cash deficit of the State budget has reached EUR 7.7 billion, almost doubling the originally budgeted amount of EUR 2.768 billion. Fortunately, the revised deficit of almost EUR 12 billion has not been met. The total (negative) deviation of the actual performance from the prediction is EUR 5 billion. The State budget deficit was covered by the sale of state bonds (EUR 6.6 billion) and accepted bank loans (EUR 1.1 billion) (MF SR, 2021).

In 2021, there is a significant negative deviation already from the beginning of the budget year, while this deviation is during the summer months almost nonexistent and increases sharply again at the end of the year. Therefore, we consider the development in both years to be almost identical except for corresponding to the pandemic situation and its perception by the society and, last but not least, by the Slovak government. The state budget deficit reached EUR 7 billion in 2021, while the deviation from our estimated state budget management (EUR –3.7 billion) amounted to negative EUR 3.3 billion. The budgeted deficit of 11.7 billion (Act No. 425/2020 Coll., On the state budget for 2021) was not achieved.

5.2. Analysis of the Impact of the Decline in Mobility and Fiscal Measures on the Development of State Budget Revenues

As part of the analysis, we would like to draw attention to two specific factors we consider key given the development of the income side of the State budget: the decrease in mobility due to the COVID-19 pandemic (and the multiple curfews imposed) and the most extensive stabilisation measure: the *First aid* project. Its main goal was to preserve employment, which was also supposed to stabilise the income side of the State budget corresponding to the payment of taxes and levies and thanks to the preservation of a stable household income ultimately related also to consumption taxes, especially the VAT.

We decided to investigate the existence of both these factors using a simple correlation analysis, where we were interested in the dependence of data on the development of mobility in different areas (such as public transport, retail and food, residential areas, or parks). The source of the mobility data was Google (2022). The second of the investigated factors was spending on the *First aid* project, data for which were drawn from ISP (2022).

F i g u r e 7

Correlation Analysis of Tax Revenues and Selected Factors (2020:1 – 2021:12)

Correlation Probability	FIRST_AID	GROCERY	PARKS	RESIDENTAL	RETAIL	TAX_REV	TRANSIT	WORKPLACE
FIRST_AID	1.000000 -----							
GROCERY	-0.512666 0.0104	1.000000 -----						
PARKS	-0.456147 0.0251	0.563189 0.0042	1.000000 -----					
RESIDENTAL	0.738253 0.0000	-0.697993 0.0001	-0.714939 0.0001	1.000000 -----				
RETAIL	-0.809151 0.0000	0.798318 0.0000	0.738838 0.0000	-0.969786 0.0000	1.000000 -----			
TAX_REV	-0.255381 0.2284	0.596746 0.0021	0.171971 0.4217	-0.280466 0.1844	0.371288 0.0740	1.000000 -----		
TRANSIT	-0.832437 0.0000	0.759347 0.0000	0.634245 0.0009	-0.965472 0.0000	0.982387 0.0000	0.328682 0.1168	1.000000 -----	
WORKPLACE	-0.644063 0.0007	0.640705 0.0007	0.366335 0.0783	-0.896208 0.0000	0.842086 0.0000	0.271123 0.2000	0.893904 0.0000	1.000000 -----

Source: MF SR (2022b), Google (2022), and own processing using *EViews* software.

Apart from the analysis above, we conclude that the strongest impact on tax revenues regarding the mobility of the Slovak population was demonstrated for the *grocery* variable. Mildly significant dependence (P-value of 0.074) can also be observed for mobility in *retail*. Looking at the correlation coefficient for the *first_aid* variable, we, unfortunately, did not manage to verify any significant relationship using this simple analysis.

Assisted by the results of the correlation analysis, we in turn attempted to build an ADL model representing the short-term dependence between the explanatory variable *tax revenues* and the explanatory variables *grocery* and *retail*, respectively (all variables are stationary at the 10% significance level, chosen to correspond with the short sample of the time series). Due to its non-stationary character, the *first_aid* variable was neither included in the model nor further investigated. The resulting model representing the impact of the drop in mobility within *grocery* and *retail* (after testing the residuals of the model and meeting the G-M assumptions) brings Table 10.

T a b l e 10

ADL Model of the Impact of the Decline in Mobility on the Tax Revenue Collection in 2020 and 2021

Dependent variable: tax_revenues				
	Coefficient	**Std. error**	**t-statistic**	**p-value**
Constant	342,248.2	222,898.3	1.5354	0.1486
Tax_revenues(–1)	0.8339	0.2221	3.7521	0.0024
Retail	–759,051.8	293,094.0	–2.5897	0.0224
Retail(–2)	1,482,412	387,513.7	3.8254	0.0021
Retail(–4)	340,443.7	155,491.4	2.1894	0.0474
Grocery	3,737,604.0	711,363.2	5.2541	0.0002
Grocery(–2)	–4,318,122.0	912,059.6	–4.7344	0.0004
R-squared			0.7856	
Adjusted R-Squared			0.6867	
DW statistics			2.0142	

Source: Own calculations using *EViews* software.

As part of our future research, we consider undertaking a more detailed co-integration analysis which separates the long-term and short-term dependence of these time series and focuses on additional fiscal measures; at present, it, unfortunately, falls outside the space and intended scope of the work.

Conclusions

In 2020, the COVID-19 pandemic has affected the economic development of the Slovak Republic in almost all aspects. As a small and open economy, Slovakia has suffered due to the negative development of nearly all of its GDP components (primarily foreign trade and gross fixed capital formation) and as a result recorded a year-on-year drop of 5.6% GDP in 2020 (Eurostat, 2022a). A more moderate decline has been recorded in the labour market, where the unemployment rate increased by 1.1 p.p. (Eurostat, 2022b). Our initial hypothesis that the COVID-19 pandemic had caused a deterioration of public finances in the Slovak Republic has thus been proven correct. In both cases, the unfavourable development of the macroeconomic variables was nevertheless dampened by extensive fiscal measures which continued also in 20021. The presented paper took as its aim to focus on their budgetary impact and to analyse the degree of the related disruption of the performance of public budgets.

Within the framework of fiscal policy measures, significant were those aimed at promoting employment, maintaining jobs, and supporting the self-employed (*First Aid* project). Sectors and selected companies affected by the pandemic were supported (to protect the potential of the economy) by the governmental participation in the payment of their non-covered fixed costs while introduced were also

amended tax and modified levy measures. An additional stabilising (and redistributive) impulse aimed at households as the final consumers was also observed within social policy measures (stabilising the final consumption as one of the components of GDP).

By analysing the degree of disruption of the current performance of the State budget (compared to our model forecasts), we have identified that due to the worsening of the epidemiological situation which was further exacerbated by the adopted tax and levy measures, the second quarter of the budgetary year 2020 has recorded the most significant drop in the State budget revenue cash flows. This drop was subsequently successfully mitigated during the following period. Due to the boosted expenditures of numerous State budget chapters and also because of the measures adopted during the entire budget period, the total expenditures of the Slovak State budget have also recorded a significant shift. The highest deviation of the actual against estimated State budget performance (exceeding 44%) was associated with the onset of the second wave of the pandemic and observed at the end of the budget year. In 2020, the State budget deviated negatively from its model development by over EUR 5 billion. In contrast, negative deviation in 2021 was EUR 3.3 billion.

The main contribution of our research is the analysis of deviations in the execution of the State budget during the COVID-19 pandemic from the model development. Against the increase in State budget expenditures, our analysis also points to stabilising of the State budget revenues throughout the second half of the 2020 budget period (where a significant role played the increased drawing of transfers from the EU funds compared to their budgeted value) and during almost the entire year 2021 (when a much stronger second and third wave of COVID-19 hit Slovakia). Although in no way ruling out the stabilisation effect of the adopted measures, we were nevertheless unsuccessful in proving the significant impact of the First Aid measure. Given the danger of the growth in unemployment, we have assumed its important role as a factor in tax revenue stabilisation. Nevertheless, our analysis came short of verifying this role. On the contrary, we provide a valuable estimate of the impact of the decline in mobility in groceries and retail on the development of tax revenues in 2020 and 2021, which we assess as significant. We consider a more detailed analysis of the impact of fiscal measures aimed at the overall shift or stabilisation of revenues of the Slovak state budget to be a challenge and a topic for further research.

In light of the alarming growth of the Slovak public debt (exceeding the Maastricht debt criterion) and the persistently elevated expenditures of the public administration in 2021 and 2022, we agree with the call for the adoption of the necessary steps to restore the health of the Slovak public finances. In the context of the issue

of population ageing, we also consider the current steps aimed at improving the configuration of the pension system, where the contributor at this moment is also the State budget itself. The challenge for the current government thus remains to carry out a consolidation process aimed at restoring the public finances (especially within the domain of the pension system as the fundamental weakness) even at times of uncertain conditions which presently face all world economies. We do not identify with the current adjustments in terms of the reduced allocation to the 2nd pillar or the increased 13th pensions, as in our view these only increase the future pressure on mandatory expenditures resulting from the demographic development.

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