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# DETERMINANTS OF BUDGET DEFICITS: THE EFFECTS OF THE COVID-19 CRISIS

**ABSTRACT:** *This paper revisits the discussion on the determinants of budget balances and investigates the change in their effect in the context of the COVID-19 crisis. The analysis uses data on 43 countries and a system generalised method of moments approach. The results show that the overall impact of the global pandemic has led to a disproportionate increase in the estimated effects of the macroeconomic determinants on the budget balance. We also find that more developed economies were able to implement higher stimulus packages for the same relative level of primary balance. We believe that one of the factors affecting this outcome is that more of their government debt is held in domestic currency.*

**KEY WORDS:** *budget deficits, economic determinants, COVID-19*

**JEL CLASSIFICATION:** H11, H62, I18

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## 1. INTRODUCTION

Governments around the world increased budget deficits in response to the sharp decline in global output that resulted from the extensive economic disruption caused by the COVID-19 pandemic. To reduce the impact of the pandemic, governments provided liquidity support and replaced lost household income, saving jobs and preventing large-scale bankruptcies. However, these measures were costly. Together with the drastic fall in tax revenue and the abrupt rise in government expenditure, the measures are expected to push global public debt to an all-time high. The International Monetary Fund (IMF) estimated that global public debt would increase by 16 percentage points in 2020, from 83% of GDP in 2019 to around 100% in 2020, the largest increase ever.

Pre-pandemic literature examined extensively the responsiveness of fiscal policy to the business cycle (for example, Alesina et al., 2008; and Frankel et al., 2013) and showed how political and institutional arrangements affect budget deficits (for example, Roubini and Sachs 1989; Perotti and Kontopoulos, 2002 and Agnello and Sousa, 2009). The focus of this paper is to review and revisit the determinants of budget balances and show how the COVID-19 pandemic has changed their impact. We attempt to answer several compelling questions: whether the effect of increased government expenditure on the budget balance changed in 2020, how the state of the labour market in 2020 affected the budget balance, whether budget balances in 2020 were constrained by the prevailing debt levels and current low, long-term interest rates, and whether the existence of previous vulnerabilities mattered for the change in the 2020 budget balance.

To provide the answers, we use a system-GMM estimation procedure where we introduce interaction terms for macroeconomic variables and a dummy variable for 2020 in an otherwise standard specification including macroeconomic, political/institutional, and demographic variables, as suggested by the literature (Alesina et al., 1998; Agnello and Sousa, 2009; Maltritz and Wuste, 2015). We use a dynamic panel dataset with data for 43 countries (all countries for which sufficient data is available) for 26 years, from 1995 to 2020. We use actual realisations of all the series from 1995 to 2019 and IMF WEO forecasts of the series for 2020. The system approach allows us to address and overcome the issue of endogeneity that arises among the independent variables and which is not accounted for in a standard least squares regression.

We contribute to the literature in several ways. First, the aim of a growing body of literature is to determine the size of the 2020 budget deficits and suggest policies to repay the increased debt sustainably (Makin and Layton, 2021). However, to the best of our knowledge, the literature has not investigated the effect of economic determinants on the size of the 2020 budget deficits. This is one of the first papers to quantify and analyse the difference in the effect of standard macroeconomic determinants on the budget balance prior to and during the COVID-19 pandemic. In addition, the paper discusses at length the implications of this change in terms of the long-term economic scarring that might result from the on-going crisis.

Our results indicate that the overall impact of the global pandemic has led to a disproportionate increase in the estimated effects of several macroeconomic determinants on the budget balance. In particular, the absolute effects of the rise in government debt and government expenditure on the budget balance were greater in 2020 than in the preceding period. In 2020, higher public debt implied even lower budget deficits, suggesting that higher debt during a severe economic downturn constrained additional government spending.

We also study the relationship between the size of the primary balance in 2020, the fiscal packages introduced to tackle the consequences of the COVID-19 pandemic, and the government debt position by currency denomination. We argue that more-developed economies were able to implement higher stimulus packages for the relatively same level of primary balance, and this was in part because they hold more government debt in domestic currency (as a percentage of GDP).

The remainder of the paper is organised as follows. Section 2 offers a brief overview of the related literature. Section 3 introduces in more detail the applied methodology and the data used. Section 4 provides the empirical results and studies the thereby induced implications. In Section 5 we discuss our findings.

## 2. LITERATURE REVIEW

The existing literature studies the budget balance from two main perspectives: economic and political. Most studies that focus on the economic perspective analyse the response of fiscal policy to output (Gali and Perotti, 2003; Akitoby et

al., 2004; Talvi and Vegh, 2005; Frankel et al., 2013). Standard Keynesian models posit that fiscal policy should be countercyclical, allowing for budget deficits in recessions and saving for budget surpluses in booms; i.e., government spending (taxes) should rise (decrease) in recessions and vice versa in booms. The tax smoothing theory of Barro (1979) argues that the government should smooth both tax rates and government spending by borrowing during recessions and repaying during booms. However, the literature finds mixed evidence regarding the counter-cyclicality of fiscal policy. The consensus from the studies is that fiscal policy is counter-cyclical in most developed countries, while it is pro-cyclical in developing countries (Afonso et al., 2010).

Explanations of the cross-country variation in fiscal policy cyclicality cannot be solely economic. Governments' political characteristics, ideological motivation, electoral system, and institutional arrangements are also important determinants of fiscal policy. Much of the literature focused on political determinants finds that governments that are weaker in terms of tenure and political power create larger budget deficits. Roubini and Sachs (1989) show that countries where governments have short tenures tend to have higher deficits on average. Moreover, the paper shows that multi-party coalition governments have a greater tendency to develop large and persistent deficits than majority-party governments. Similarly, Lane (2003) argues that countries with dispersed political power are most likely to run pro-cyclical fiscal policies. Higher deficits are also found to be positively associated with the size of the government cabinet, measured as the number of spending ministers (Volkerink and De Haan, 2001; Perotti and Kontopoulos, 2002).

Although it is reasonable to expect that right-wing governments will practice tight fiscal policy and left-wing governments loose fiscal policy, the empirical literature finds mixed evidence for the influence of the government's ideological preferences on the budget balance (Alesina et al., 1997; Mulas-Granados, 2003). Opportunistic governments without ideological preferences that follow policies to maximize their probability of winning the next election tend to have higher budget deficits in election years (Franzese Jr, 2002; De Haan and Mink, 2005). Alesina and Perotti (1995) find that large deficits are more common in countries with proportional rather than majoritarian and presidential electoral systems. In

addition, Alesina et al. (2008) argue that most of the pro-cyclicality of fiscal policy in developing countries can be explained by high corruption levels.

Institutional factors are also positively associated with fiscal performance. Leachman et al. (2007) find that fiscal performance is better when fiscal budgeting institutions are strong. De Haan and Sturm (1997) find that a strong finance minister or a commitment to negotiated budget targets can be especially effective in keeping deficits down in countries where there is political instability. Henisz (2004) finds that checks and balances that limit the discretion of policymakers reduce the volatility of government expenditure and revenue.

Lastly, a relatively new but important strand of literature examines fiscal persistence: the degree to which current fiscal behaviour depends on its own past development. For instance, Afonso et al. (2010) find that countries with higher fiscal persistence tend to have lower discretion.

## 3. METHODOLOGY

### 3.1. Model

To construct the econometric model we follow the literature described in the previous section, and specify it as:

$$Balance_{it} = \beta_0 Balance_{it-1} + Y_{it}^{'}\beta_1 + X_{it}^{'}\beta_2 + Y_{it}^{'}D\delta_{\beta_1} + X_{it}^{'}D\delta_{\beta_2} + \varepsilon_{it},$$

where the dependent variable $Balance_{it}$ is the primary budget balance of country $i$ in time $t$. We assume that the primary budget balance is dependent on its previous value $Balance_{it-1}$, with $\beta_0$ being its marginal effect and two disjoint sets of explanatory variables $Y_{it}^{'}$ and $X_{it}^{'}$ and a random error $\varepsilon_{it}$. The first set of explanatory variables has a marginal effect $\beta_1$ and describes potential macroeconomic determinants of the primary budget balance, whereas the second set is constituted of political and institutional variables, and $\beta_2$ is their marginal effect. In addition, we include a country-specific effect in the equation to account for potentially omitted variables that are invariant over time.

Alesina et al. (1998), Agnello and Sousa (2009), and Maltritz and Wuste (2015) use similar model specifications to understand the critical factors that drive the magnitude and characteristics of budget deficits. The novelty in our specification is the presence of the interaction term between the independent variables and a dummy variable $D$ for 2020, used to quantify the potential different effect of the variables due to the coronavirus pandemic. Concretely, $\delta_{\beta_1}$ and $\delta_{\beta_2}$ represent a direct measure of the change in the effect of the macroeconomic and political and institutional variables respectively. A significant and negative value of $\delta_{\beta_1}$ ($\delta_{\beta_2}$) implies that the variables' contribution to the size of the budget deficit in 2020 was larger than usual.

A general problem of this model specification is the presence of endogeneity due to potential interdependence between the explanatory variables and the budget balance (Agnello and Sousa 2009), which may lead to biased and inefficient parameter estimates. To account for this problem, we resort to a system GMM parameter estimation. The system GMM solves the endogeneity problem in two steps. In the first step, each variable is first-differenced, thus removing the potential endogeneity due to correlation between the country-specific effects and the explanatory variables (Arellano and Bond 1991). In the second step, the endogeneity between the dependent and explanatory variables is removed by instrumenting the differenced variables with their available lags in levels: the levels of the dependent variable lagged for two or more periods and the levels of the explanatory variables lagged for one or more periods (Blundell and Bond 1998). Another advantage that system GMM has over other estimation procedures is that it efficiently accounts for the potential problem of the lagged dependent variables being weak instruments. Weak instruments cannot be used to solve the endogeneity problem. They usually appear in situations when there is high heterogeneity in the cross-sectional sample or when the time series for each cross-section has a large variance. For example, we are looking at all available country data and do not restrict our sample to specific countries. Hence, there might be high heterogeneity in the cross-sectional sample. Unlike other estimation procedures, system GMM resolves this issue by simply adding additional restrictions to the moment conditions. (See Roodman (2009) for a more detailed explanation of the properties of system GMM.)

### 3.2. Data

For our analysis we construct an unbalanced panel annual dataset with macroeconomic, political, and institutional variables for 43 countries, with yearly data covering the period 1995 to 2020. Macroeconomic data comes from the IMF World Economic Outlook (WEO) October 2020 database, and political and institutional data from Databanks International's Cross-National Time-Series Data Archive and Polity IV Database. Our starting point was all of the countries included in the WEO database, but some of the countries were removed from the initial sample due to lack of sufficient data availability in other databases.

For the period 1995 to 2019 we use the actual realisations of the chosen variables. However, for 2020 we use forecasts for the macroeconomic variables (IMF) and assume that no change has taken place for the institutional and political variables (i.e., $\delta_{\beta_2} \approx 0$)) . Although this is a rather strong assumption, our rationale is that changes in these variables require a multitude of legislative and political actions that can rarely be achieved in the span of a year. A detailed analysis of all the countries showed that it took at least two years for their polity score to change, and it remained at the same value during the last few years of our sample. Furthermore, for the entire dataset, the type-of-regime variable had little or no variation over the years, and across the majority of countries the size of the cabinet in the last period changed by only one or two ministers.

In all specifications, the dependent variable is the general government primary budget balance as a percentage of GDP. We use this measure because it better matches the discretionary decisions of the fiscal authorities than the overall budget balance. It does not include interest payments for outstanding debt piled up from the previous period, which is not relevant to our study (Maltritz and Wuste, 2015).

The two sets of explanatory variables are based on the relevant literature, described in the previous section. We use a standard set of macroeconomic variables in the first set: lagged primary budget balance, government expenditure (log), gross debt (log), interest rate of government debt securities, unemployment rate, GDP growth rate, and population (log).

For the second set of political and institutional explanatory variables we use polity scale, type of regime, and cabinet size. Polity scale is a variable that evaluates how democratic a country is on a scale from –10 to 10, where the two extremes imply that the country is either fully autocratic (–10) or fully democratic (10). Type of regime is a categorical variable that provides an estimate for the type of government regime in the country: 1) civilian, 2) military-civilian, and 3) military. Size of cabinet quantifies the number of ministers in a government. The list of all used variables, their transformation and data sources are presented in Table A1 in the Appendix.

Table 1 summarizes the descriptive statistics for all of the variables included in our empirical analysis for 2019 and 2020. These statistics suggest that the primary budget deficit across all countries increased by 6.1 percentage points on average between 2019 (–0.32% of GDP) and 2020 (–6.4% of GDP), while gross government debt increased by 12.8 percentage points on average between 2019 (69.3% of GDP) and 2020 (82.1% of GDP). This extraordinary increase in global public debt happened at a time of an almost 1pp decrease in the average interest rates of government securities between 2019 (3.4%) and 2020 (2.5%). During the 2020 crisis, as expected, the loose fiscal policy led to an average increase in government expenditure of 8.7 percentage points, whereas the average increase in the unemployment rate was 2.5 percentage points and the average decrease in the GDP growth rate was 8.6 percentage points across the entire sample. These numbers reflect the current economic conditions and the economic support packages implemented by policymakers around the world as a response to the global pandemic.

The polity scale variable shows that there is more democracy in advanced than in emerging economies (9.1 and 5.3 respectively). The average number of ministers in the governments of both country groups is almost the same (around 21). Most governments in our sample are classified as civilian, with a few exceptions – Algeria, Egypt, Fiji, Sudan, and Thailand are classified as military-civilian, and Pakistan and Thailand have had a military regime for a relatively short period of time.

**Table 1:** Summary statistics.

| | All countries | |
|---|---|---|
| **Variable** | 2019 | 2020 |
| **Dependent variable** | | |
| Primary balance | –0.32 | –6.44 |
| | (2.85) | (4.24) |
| **Macroeconomic and demographic variables** | | |
| Gov. gross debt | 69.27 | 82.14 |
| | (38.48) | (46.78) |
| Population | 46.42 | 47.2 |
| | (73.33) | (77.73) |
| Unemployment rate | 6.78 | 9.24 |
| | (6.37) | (8.31) |
| Interest rate | 3.41 | 2.52 |
| | (3.43) | (3.3) |
| Gov. exp. (% of GDP) | 34.77 | 42.88 |
| | (9.82) | (11.45) |
| GDP growth rate | 2.47 | –6.11 |
| | (1.68) | (2.80) |
| **Political and institutional variables** | | |
| Polity | 7.57 | 7.4 |
| | (4.08) | (4.37) |
| Size of cabinet | 19.57 | 19 |
| | (5.51) | (5.47) |
| Civilian regime | 25 | 21 |
| Military-civilian regime | 1 | 1 |
| Military regime | 0 | 0 |

**Note:** Mean values per country group for 2019 and 2020. Standard deviations in brackets. Regime statistics refer to number of countries.

Spending and revenue discretionary budget measures taken to combat the virus by emerging and developing economies account for more than 3.5% of GDP, and more than 9% of GDP in advanced economies (IMF WEO October 2020). Given the specific nature of this shock, the severe weakening of aggregate demand and continuous disruptions of aggregate supply are expected to lead to the deepest global recession since World War II (World Bank Global Economic Prospects

2020). As a result, governments across the globe stepped in with extensive fiscal packages along with complimentary institutions to help the ailing economies, including wage subsidies, tax deferrals, easing of regulatory burdens, transfers to businesses and households, postponement of loan repayments, and government guarantees. Although the economic support offered by all countries is unprecedented and higher than that offered during the global financial crisis in 2009 (World Bank Global Economic Prospects), the state of the economies prior to the pandemic was also a crucial determinant of the magnitude of the response.

## 4. EMPIRICAL RESULTS

In this section we discuss the empirical results obtained using the Blundell and Bond (1998) methods of implementing a dynamic linear GMM estimation. A summary of our main findings can be found in Table 2. In column 1 we present the results from our model with the primary budget balance and the set of macroeconomic variables. We add additional explanatory variables that have been used in the literature, which include a demographic effect (column 2) and a potential effect resulting from political/institutional variables (column 3). Finally, in column 4 we present results that include interaction terms with the variables that we consider to have been affected by the Covid-19 crisis and a dummy variable for 2020. The last two rows of Table 2 report the results of two statistical tests that evaluate whether our regressions satisfy the baseline regression specification assumption. The first is the AR(2) test, which under the null hypothesis assumes that there is no autocorrelation in the random errors. The second is the Sargan test for overidentification of the instruments used for estimation under the null hypothesis that the over-identifying restrictions are valid. In each case, the statistical tests do not reject the null hypotheses, suggesting that our models are correctly specified.

In all of the regressions we estimated, most of the macroeconomic variables are significant and have the expected sign, as typically found in the literature (Roubini and Sachs, 1989; Bayar and Smeets, 2009; Maltritz and Wste, 2015). In every regression the effect of the lagged primary budget balance is positive and significant. This persistence in the effect of the primary budget balance corresponds to a well-documented inertia in the budgetary process found in the literature. Similarly, the effect of the GDP growth rate is positive and significant – as expected, because when the economy has a higher growth rate the primary

budgetary balance improves in the short run. The estimated coefficient of the unemployment rate is negative and significant in every case, except in the model in column 4 of Table 2 where it loses significance. This implies that an increase in the unemployment rate worsens the primary budgetary balance. It can be argued that this is a result of the additional government expenditure incurred to support the labour market. The stock of debt and the long-term interest rate have a significant and positive relationship with the primary budgetary balance. The fact that gross government debt has a positive effect on the primary budget balance confirms a previous finding in the empirical literature that higher debt improves the primary budget balance and reduces deficits. Maltritz and Wuste (2015) argue that high debt implies less fiscal space to encourage additional spending, while low debt levels enable countries to run higher deficits. We emphasize that higher interest payments from debt do not affect the primary balance, which by definition excludes interest payments. However, higher long-term interest rates on debt instruments also implies less fiscal space and leads to improved budgetary balances.

Next, we observe that government expenditure has a significant and negative impact on the primary budgetary balance, as higher government expenditure raises the primary budget deficit in the short run. Similarly, population size, as a demographic variable, has a negative relationship with primary budget balance in one regression (column 3). In this context, Furceri and Poplawski (2008) argue that a larger pool of taxpayers can be insurance against idiosyncratic shocks, which leads to lower budget deficits. Indeed, this result suggests that the larger countries have greater fiscal space for discretionary actions in a global crisis.

**Table 2:** Blundell–Bond linear dynamic panel-data estimation

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| VARIABLE | Macroeconomic | Demographic | Political/Institutional | 2020 |
| Primary balance (t-1) | 0.404*** | 0.399*** | 0.374*** | 0.356*** |
| | (0.018) | (0.026) | (0.020) | (0.043) |
| GDP growth rate | 0.244*** | 0.251*** | 0.223*** | 0.169*** |
| | (0.013) | (0.011) | (0.015) | (0.018) |
| Unemployment rate | –0.064*** | –0.067*** | –0.081*** | –0.012 |
| | (0.022) | (0.019) | (0.030) | (0.046) |
| Government debt | 2.828*** | 2.513*** | 2.830*** | 3.520*** |
| | (0.376) | (0.319) | (0.337) | (0.527) |
| Government expenditure | –17.267*** | –17.070*** | –19.745*** | –20.122*** |

| | | | | |
|---|---|---|---|---|
| | (0.839) | (1.074) | (1.709) | (2.732) |
| Interest rate | 0.263*** | 0.243*** | 0.198*** | 0.191*** |
| | (0.025) | (0.019) | (0.026) | (0.051) |
| Population | | –0.219 | –6.323** | –1.031 |
| | | (1.707) | (2.994) | (3.836) |
| Polity | | | 1.052*** | 0.673*** |
| | | | (0.250) | (0.230) |
| Size of cabinet | | | –0.032 | 0.048 |
| | | | (0.031) | (0.037) |
| Type of regime (2) | | | 8.901*** | 8.914** |
| | | | (1.318) | (4.142) |
| Type of regime (3) | | | –5.435*** | 1.464 |
| | | | (3.139) | (2.690) |
| GDP*2020 | | | | 0.795 |
| | | | | (0.685) |
| Unemployment*2020 | | | | 0.741 |
| | | | | (0.682) |
| Government expenditure*2020 | | | | –6.814*** |
| | | | | (1.898) |
| Debt*2020 | | | | 6.781*** |
| | | | | (2.515) |
| Population*2020 | | | | –0.618 |
| | | | | (0.537) |
| Interest rate*2020 | | | | –0.213 |
| | | | | (0.586) |
| Constant | 49.516*** | 50.961*** | 67.588*** | 53.406*** |
| | (2.655) | (5.614) | (10.078) | (11.963) |
| Observations | 854 | 854 | 854 | 854 |
| Number of countries | 43 | 43 | 43 | 43 |
| Arellano-Bond test (H0: no autocorrelation of order 2) | p = 0.5358 | p = 0.5066 | p = 0.2522 | p = 0.565 |
| Sargan-Hansen test (H0: overidentifying restrictions are valid) | p = 1.000 | p = 1.000 | p = 1.000 | p = 1.000 |

**Note:** Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Some of the results for the set of political/institutional variables agree with empirical findings in the literature. The coefficient in front of the polity scale variable is significant and positive, implying that a more democratic regime tends to have stronger institutions and functional checks and balances that limit policymakers' discretion to increase the budget deficit. This finding is in line with

the literature (for example, Henisz 2004 and Leachman et al. 2007). The effect of the cabinet size is negative but insignificant. A negative impact fits the stylized fact in the literature that a higher number of spending ministers is associated with a lower primary balance (for example, Volkerink and De Haan 2001 and Perotti and Kontopoulos 2002). Finally, in terms of the type of regime, the results show that countries that have a military-civilian or civilian regime tend to have higher primary budget deficits on average.

The last column shows the change in the effect of the macroeconomic variables on the primary budget balance in the first year of the global pandemic. It appears that the pandemic increased in absolute values the magnitude of the estimated effects of all of the variables, except the unemployment rate, where the direction of the relationship is reversed. However, the change of the effect in some of the variables is statistically insignificant. This is the case for the GDP, unemployment, population, and interest rate variables. On the other hand, the sharp decline in economic activity led to increased government expenditure, which in turn resulted in higher budget deficits. This is as expected, since all of the countries in our sample implemented some form of economic support package to mitigate the economic cost of the crisis, resulting in a deterioration in their fiscal health. In addition, the resulting increase in public debt leads to a larger positive effect of gross debt on the primary balance in 2020. This can be an indication that higher debt during a severe economic downturn enhances incentives against spending.

The robustness of our results is confirmed by re-estimating the model when the interest rate is removed from the list of explanatory variables. We explicitly choose this variable since, when excluded, the sample size increases by the largest margin. The results are given in Table A2 in the Appendix, which shows that the estimated coefficients are not much different from those presented in Table 2. Therefore, it can be argued that our results are robust.

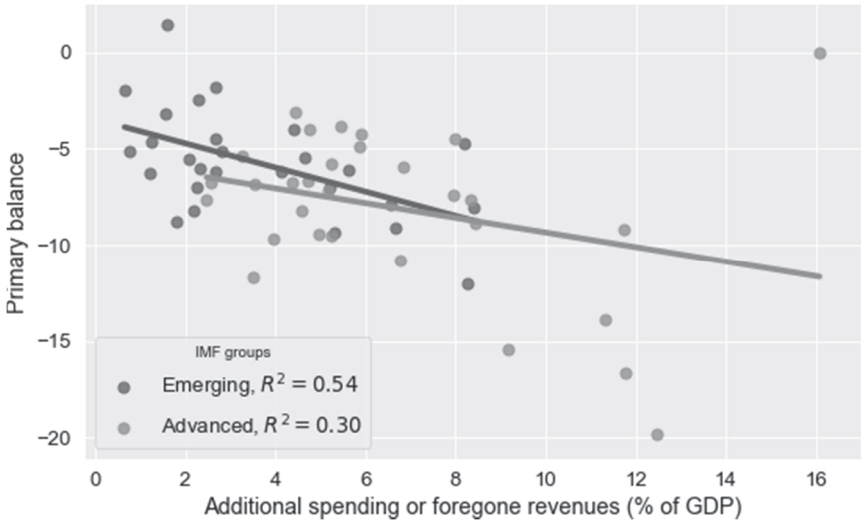
### 4.1. Implications

In the period ahead, economies globally are expected to experience unprecedented economic and social costs resulting from the COVID-19 pandemic. Returning to pre-crisis levels of economic activity is a daunting task for countries all over the world and the path to recovery will not be smooth, even, or certain.

To begin with, the fiscal stimulus packages implemented by governments in response to the pandemic put a significant strain on public finances. The unparalleled fiscal response to the demand slumps and supply interruptions that followed the crisis was largely implemented in advanced and some large emerging market economies, because they could rely on more favourable financing conditions prior to the crisis and retained the ability to borrow at lower interest rates (IMF, WEO 2020, and IMF Fiscal Monitor 2020).

To better understand the relationship between the fiscal stimulus packages introduced by governments and 2020 budget deficits, in Figure 1 we plot the primary balance in 2020 as a function of the additional spending or foregone revenues in response to COVID-19. The source of data for countries' fiscal measures in response to pandemic is the IMF Fiscal Monitor database. We divide the countries into emerging and advanced based on the IMF's classification.

**Figure 1:** IMF country groups: Explained variation in budget deficits due to additional spending or foregone revenues in response to COVID-19 pandemic

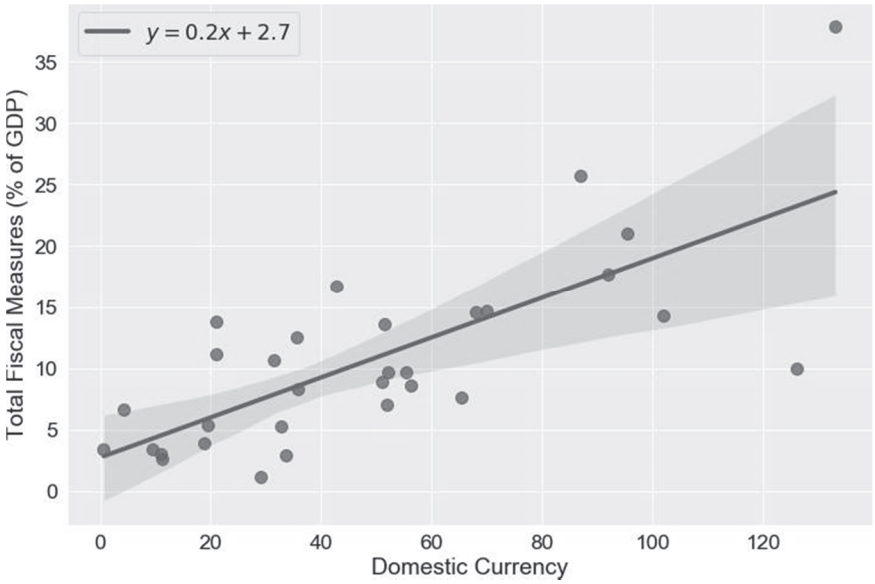



**Source:** Fiscal Monitor, Database of Country Fiscal Measures in Response to the COVID-19 Pandemic, IMF.

The figure shows that some advanced economies were able to implement higher stimulus packages for the relatively same level of primary balance. The conclusion

is similar when looking at the total fiscal measures undertaken, which include liquidity support in the form of equity injection, loans for asset purchase, and debt assumption. The figure highlights that the total fiscal measures were in general higher in advanced economies than in emerging market economies.

**Figure 2:** Explained variation in total fiscal measures due to government debt position denominated in domestic currency (as a percentage of GDP)




While country income per capita is an important determinant of the size of total fiscal measures during the pandemic, we want to emphasize that government debt position denominated in domestic currency was also a determinant during the COVID-19 crisis. We could not include this variable in our regression model due to lack of data availability for a lot of the countries in our sample. However, Table A3 in the Appendix presents all of the countries for which data is available in the Fiscal Monitor of the IMF database and the Quarterly Public Sector Debt database of the World Bank on gross central government debt position by currency denomination (as a percentage of GDP) in the first quarter of 2020. We illustrate the relationship using these countries in Figure 2. The figure shows that countries with a higher government debt position denominated in domestic currency (as a percentage of GDP) were able to execute higher total fiscal measures (as a percentage of GDP) during the pandemic. For example, 4 of the 5 countries with

the highest total fiscal measures as a percentage of GDP are Italy, the United Kingdom, France, and Spain, whose debt position in domestic currency is higher than 80%. Also, we note that the correlation coefficient between debt position denominated in domestic currency and size of total fiscal measures is fairly high, 0.737, and significant at the 1% level.

## 5. CONCLUSION AND DISCUSSION

Fiscal packages to stimulate the economy during the COVID-19 pandemic led to unprecedented growth in budget deficits in almost every country in the world. We analysed whether this growth was also affected by changes in the economic determinants. Using System GMM and data for 43 countries over a period of 26 years, we provided evidence that the growth in budget deficits may have been accelerated by these changes. We found that in the first year of the pandemic the marginal negative impact of government expenditures increased, and the positive impact of budget deficits increased.

We then postulated that these changes resulted from more-developed economies implementing higher stimulus packages for the same level of budget deficit, mainly because of the advantage of servicing their debt in their national currency. While the fiscal packages played a vital role in the governments' efforts to combat the consequences of the pandemic, we also believe that future fiscal space will be limited because of these efforts. One limitation of our analysis is that the study was based on data that captures the impact of the first year of the pandemic. The increase in the global debt-to-GDP ratio will certainly pose additional challenges for debt sustainability of all economies globally in the medium to long run. Equally relevant is the potential risk on the horizon for debt financing conditions. Moreover, some of the vulnerabilities that existed prior to the crisis, such as population ageing, are likely to further contribute negatively to the outlook for the stock of sovereign debt. For instance, in their empirical study of OECD economies, Honda and Miyamoto (2020) find that population ageing weakens fiscal spending effects, and in order to support the economy in a downturn, countries will need to revert to larger fiscal support packages. Finally, the build-up of debt is also expected to constrain future government spending on growth and development, as a large part of government revenues will be consumed by debt service. We argue that in the absence of more refined data, the analysis performed here provides a starting point for the development of a more

comprehensive understanding on how the economic determinants of the budget balance are changing because of the pandemic. We believe that the insights provided by this analysis and an improved understanding of economies' fiscal behaviour during the coronavirus pandemic will aid the development of studies on the long-term impact of COVID-19 on the budget balance, as soon as such data is available.

Last but not least, the size, distribution, and adjustment of the 2020 budget balance will determine both the general social prospects and the economic capabilities of every country in the aftermath of the pandemic (Stojkoski et al., 2020a, b; Tevdovski et al., 2021). It is expected that the structural changes imposed on economies by health authority constraints (social distancing, teleworking, movement restrictions, capacity restrictions) will redistribute societal resources from highly inflexible sectors of the economy to highly adaptive sectors. As a result, welfare losses from labour market distortions (jobs at the lower quantiles of the wage distribution, in informal employment, with temporary working arrangements) and human capital accumulation disruptions (schooling interruptions and transformation) will probably worsen the level of poverty and income inequality worldwide. We believe that in order to tackle the challenges induced by COVID-19, vital mechanisms for restoring the fiscal health of governments will have to be developed. This is the subject of our ongoing research.

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## APPENDIX

**Table A1:** List of variables and data sources

| Variable | Source |
|---|---|
| Primary balance | IMF, WEO; General government primary net lending/borrowing % of GDP |
| Debt | IMF, WEO; General government gross debt % of GDP |
| Unemployment rate | IMF, WEO; % of total labour force |
| GDP | IMF, WEO; Gross domestic product at constant prices |
| Population | IMF, WEO in raw numbers |
| Government expenditure | IMF, WEO; % of GDP |
| Size of cabinet | CNTS (polit10) |
| Type of regime | CNTS (polit02) |

**Table A2:** Results without the interest rate: Blundell–Bond linear dynamic panel-data estimation

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| VARIABLE | Macroeconomic | Demographic | Political/Institutional | 2020 |
| Primary balance (t-1) | 0.591*** | 0.570*** | 0.550*** | 0.578*** |
| | (0.025) | (0.031) | (0.058) | (0.041) |
| GDP growth rate | 0.398*** | 0.371*** | 0.366*** | 0.213*** |
| | (0.018) | (0.019) | (0.019) | (0.018) |
| Unemployment rate | 0.001 | –0.008 | –0.076 | –0.170*** |
| | (0.062) | (0.056) | (0.086) | (0.064) |
| Government debt | 1.212 | 1.046 | 1.736 | 3.466* |
| | (0.774) | (0.742) | (1.196) | (1.773) |
| Government expenditure | –7.595*** | –10.035*** | –10.189*** | –8.294*** |
| | (1.213) | (1.380) | (1.302) | (1.988) |
| Population | | –3.275*** | –1.707* | –2.776* |
| | | (0.732) | (1.036) | (1.531) |
| Polity | | | 0.492* | 0.583* |
| | | | (0.295) | (0.342) |
| Size of cabinet | | | –0.049*** | –0.030** |
| | | | (0.015) | (0.015) |

| | | | | |
|---|---|---|---|---|
| Type of regime (2) | | | 2.876 | 7.737** |
| | | | (4.128) | (3.508) |
| Type of regime (3) | | | 6.080 | 9.799 |
| | | | (9.925) | (10.018) |
| GDP*2020 | | | | –0.209 |
| | | | | (0.296) |
| Unemployment*2020 | | | | 0.551*** |
| | | | | (0.161) |
| Government expenditure*2020 | | | | –2.387* |
| | | | | (1.358) |
| Debt*2020 | | | | 0.180 |
| | | | | (1.686) |
| Population*2020 | | | | 0.218 |
| | | | | (0.504) |
| Constant | 21.170*** | 39.878*** | 30.732*** | 19.763* |
| | (4.319) | (8.096) | (7.065) | (10.754) |
| Observations | 1,002 | 1,002 | 1,002 | 1,002 |
| Number of countries | 43 | 43 | 43 | 43 |
| Arellano-Bond test | p = 0.747 | p = 0.705 | p = 0.582 | p = 0.736 |
| Sargan test (H0: over-identifying restrictions are valid) | p = 1.000 | p = 1.000 | p = 1.000 | p = 1.000 |

**Note:** Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

**Table A3**: List of countries and their fiscal measures, primary budget balance, and gross central government debt in domestic currency denomination, as a percentage of GDP

| Country | Fiscal measures | Primary balance | Debt in domestic currency |
|---|---|---|---|
| Albania | 2.87 | –8.42 | 33.53 |
| Armenia | 2.98 | –5.82 | 10.90 |
| Australia | 13.53 | –10.06 | 51.55 |
| Brazil | 14.61 | –16.78 | 69.90 |
| Bulgaria | 6.66 | –2.00 | 4.20 |
| Canada | 16.73 | –19.92 | 42.69 |
| Colombia | 5.27 | –9.48 | 32.79 |
| France | 20.98 | –10.77 | 95.47 |
| Hungary | 8.55 | –8.28 | 56.17 |
| Indonesia | 3.83 | –6.32 | 18.92 |
| Ireland | 7.59 | –6.00 | 65.48 |
| Israel | 9.67 | –12.94 | 52.12 |
| Italy | 37.93 | –12.98 | 133.14 |
| Lithuania | 8.28 | –6.72 | 35.78 |
| Luxembourg | 11.16 | –6.98 | 20.89 |
| Mexico | 1.10 | –5.8 | 28.97 |
| Moldova | 2.63 | –8.00 | 11.21 |
| Netherlands | 8.85 | –8.76 | 51.10 |
| Philippines | 3.37 | –8.06 | 0.63 |
| Portugal | 9.95 | –8.35 | 126.24 |
| Romania | 5.38 | –9.59 | 19.51 |
| Russia | 3.41 | –5.29 | 9.36 |
| Slovak Republic | 6.97 | –8.84 | 51.82 |
| Slovenia | 14.56 | –8.82 | 68.01 |
| South Africa | 9.61 | –14.04 | 55.45 |
| Spain | 17.66 | –14.09 | 92.06 |
| Sweden | 10.63 | –5.90 | 31.48 |
| Thailand | 12.46 | –5.21 | 35.58 |
| Turkey | 13.75 | –7.88 | 21.10 |
| United Kingdom | 25.72 | –16.46 | 86.99 |
| United States | 14.22 | –18.72 | 101.88 |