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Abstract

This paper investigates the relationship between different institutions' GDP growth forecasts for the year 2020 and the actual realized growth levels in the same year. To this end, we use data from the IMF and World Bank's publications and show that on average, an economy has overperformed its expected growth rate when i) the sizes of announced fiscal and macro-financial stimulus measures are larger, ii) The extent of the government stringency measures is smaller, iii) the pre-pandemic level of GDP per capita is larger. Our results can be crucial for policy-makers when they design growth-oriented economic policies.

Keywords: COVID-19 pandemic, fiscal stimulus, macro-financial measures, economic policy

JEL Codes: E60, E62, O40

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1. Introduction

The Covid-19 pandemic has affected the world very negatively in many ways. Due to prolonged shutdowns, both businesses and employees faced economic difficulties. Although some countries have managed to overcome the epidemic to some extent, some countries are still struggling with the economic downturn. The International Monetary Fund (IMF), as well as some other international institutions, such as the World Bank (WB) and the Organization of Economic Cooperation and Development (OECD) has been traditionally making growth predictions for the world economy as well as for their member countries.

Traditionally, IMF has been publishing its forecasts in its flagship publication of World Economic Outlook twice a year, one in April and the second one in October. On the other hand, WB has the flagship publication of the Global Economic Prospects, in which it publishes its growth forecasts, again twice a year, one in June and yet another in December. They also published their growth forecasts in the middle of the pandemic in 2020. IMF published its growth forecasts in April 2020 (IMF, 2020a) and the WB in June 2020. (WB, 2020) Nevertheless, as also thoroughly explained in the existing literature on the predictive power of these forecasts and their deviations from the actual growth rates, in this paper, we examine the deviations of IMF's and WB's 2020 growth forecasts from the realized actual 2020 GDP growth rates.

Notably, we look at whether stimulus packages and pandemic measures taken by national governments towards mitigating the adverse impact of the pandemic played a role in these deviations. During the pandemic, national governments all around the world have announced

substantial stimulus packages. In certain countries, particularly the developed ones, such as the US, the EU members, and Japan, fiscal measures reached levels that are larger than 25% of GDP. Fiscal measures were also supplemented by various other macro-financial measures and monetary policy in the form of reductions in the policy interest rates and reserve requirement ratios. (Elgin, Basbug, and Yalaman. 2021) It goes without saying that these substantial packages that the world has never seen prior to the pandemic might have affected the actual growth performances of the economies. For example, labor market and credit measures that helped businesses not to go bankrupt and workers not to lose their jobs could have reduced the magnitude of the economic downturn and therefore lead the growth forecasts of the IMF and WB to deviate from the actual values.

There is also vast literature on measuring the nature and determinants of the accuracy of the forecasts of different international organizations.

In a somewhat technical paper by Pons (2000), the size of the errors in the growth estimates of the G7 countries is examined. While investigating the accuracy of the predictions, an evaluation was made based on several different features. Accepting the estimation as correct depends on two critical statistical properties: unbiasedness and efficiency. In addition, directional accuracy tests are one of the essential topics covered in this paper.

In another related paper, Batchelor (2001) compares the accuracy and usefulness of the economic forecasts made by the OECD and the IMF again for the G7 countries against the predictions made by a private sector company. The author finds that private sector estimates are more

accurate and unbiased, with few exceptions. The author then concludes that, in general, there is minimal information in the OECD and IMF forecasts that can be used to reduce the error in private sector predictions.

Next, Aldenhoff (2007) brings a political economy dimension to the forecasts of the IMF. In this paper, the author examines how the deviations in IMF predictions are affected. Based on the findings listed in the paper, the author argues that prediction errors were greater in wealthier countries. In short, forecasts have been adversely affected by the spirit of the times. As this article shows, the biased of the forecasts can vary across different country groups. Based on this, we can put forward that if the predictions made are affected by outside developments; pessimistic forecasts could have been made due to the demoralizing environment brought by the Covid-19 epidemic.

In two other related articles in the literature, first, Dreher, Marchesi, and Vreeland (2008) discuss the IMF's different macroeconomic forecasts for a set of 157 countries. They find estimation bias in inflation and GDP growth rates. The authors use these findings to justify that the IMF is generally making a ''defensive forecast''. Finally, in the second article, An et al. (2019) indicate that the internal consistency of the IMF's growth and unemployment forecasts is associated with the ''Okun's Law'', which associates GDP growth rates with unemployment. To summarize, in this paper, the evaluation of unemployment predictions has been made, which the IMF has not scrutinized before.

Closely related to the findings obtained in the earlier literature, as explained above, the primary contribution of this article is that it reveals the most important factors for the deviations in the estimates made for 165 countries due to the large stimulus packages announced in the Covid-19 pandemic. We find that the size of the announced fiscal and macro-financial policies, income per-capita, and government stringency measures taken during the pandemic are among the variables that were significantly correlated with the difference between the actual GDP growth and growth forecasts of the IMF made in the beginning of the pandemic. Accordingly, countries that announced less strict measures, that are richer, and that implemented larger fiscal and macro-financial packages have overall outperformed the forecasts made by the IMF in April 2020.

The rest of the paper is organized as follows: In the next section, we present our dataset and discuss the statistical methodology we will use in our analysis. In the third section, we will present our results. Finally, in section 4, we provide some concluding remarks.

2. Data and Methodology

In the empirical analysis that will be presented in the next section, we use the following variables: First, we compare and contrast the findings vis-à-vis the difference between the actual 2020 GDP growth rates and the three forecasts made by the IMF and the WB. The two forecasts of the IMF were made in April and October 2020, in two subsequent editions of the World Economic Outlook (IMF, 2020a and IMF, 2020b), and the WB's 2020 GDP growth forecast is obtained from the Global Economic Prospects of the published in June 2020. (WB, 2020) We

primarily look at the difference between the actual growth rates obtained from the April 2021 edition of the World Economic Outlook (IMF, 2021) and the three predictions listed above.

To see which variables these forecast errors are correlated with, we use three policy variables. These are the fiscal and macro-financial stimulus packages (both denoted in % GDP) that were announced towards mitigating the adverse economic impacts of the pandemic as well as the policy rate cuts (in %) that the central banks decided. All three variables come from Elgin, Basbug, and Yalaman (2020).

We also look at the correlation between three more variables and forecasts errors. These variables are 2020 GDP per-capita levels (from WEO, 2021), the ratio of Covid-19 infections to the population (from Worldometers, 2020), and an index of government stringency measures taken during the pandemic. The source for this last variable is Hale et al. (2020).

Table 1 presents descriptive summary statistics of all variables used in the empirical analysis. Remarkably, the Table shows the mean, median, standard deviation, maximum, and minimum values of all variables, along with the number of observations for each variable. Our methodology will rely on simple correlation analysis. We observe from the Table that all variables exhibit enough variation that allows them to be used in a correlation analysis. We will simply present the statistical correlations between the forecast errors and the variables that were explained above.

From Table 1, we also observe that the best estimate of GDP growth the IMF based on average is the one it made in fall 2020. It is also possible to see that the forecasts made in the fall are more pessimistic. This could reflect the pessimism created by the second wave of the pandemic that was observed in fall 2020. In line with this, the IMF's best estimate based on the median is also in the spring

Table 1. Descriptive Summary Statistics

Variable	**Mean**	**Standard Deviation**	**Median**	**Minimum**	**Maximum**	**Number of Countries**
Fiscal Policy (% GDP)	6.79	7.58	4.04	-5.00	54.90	167
Rate Cut (%)	23.58	29.65	15.56	-105.56	100.00	167
Macrofinancial (% GDP)	6.93	10.00	2.99	0.00	64.64	167
IMF Spring 20 Growth Forecast (%)	-3.45	3.63	-3.74	-12.17	4.52	162
IMF Fall 20 Growth Forecast (%	-5.31	4.63	-5.00	-25.00	3.80	162
WB June 20 Growth Forecast (%	-2.63	6.12	-3.20	-13.50	51.10	120
Actual Growth Rate in 2020 (%)	-4.63	5.32	-3.89	-32.24	6.06	164

GDP per-capita (000 USD)	14.28	19.74	5.21	0.25	116.92	166
Cases to Population Ratio (%)	3.27	18.28	0.54	0.003	198.39	157
Stringency Index (0-100 index)	65.89	13.81	68.102	14.32	94.38	160

In addition, this forecast is the closest to actual growth. When we compare the predictions made by the WB with the predictions made by the IMF, we see that the WB makes forecasts for fewer countries. (42 countries less) The difference may also affect the forecasts. Compared to the IMF's estimates, the variation of the forecasts by the WB is also very high, and the means and medians are farther away from the actual values. That is why we primarily use IMF's estimates in our analysis presented in the next section. Moreover, since we want to compare the actual values and forecasts made at the beginning of the pandemic, we primarily rely on the IMF's forecasts in spring 2020.

3. Results

In this section, we present our correlation analysis with several different figures, as illustrated below.

Figure 1 shows the relationship between the difference in the actual and predicted growth (in Spring by IMF) and fiscal stimulus packages (as % GDP) announced during the pandemic. There

is a positive correlation of 0.30 between the two variables. The gap between forecasts and actual growth grew as governments intervened and announced larger packages. In other words, it would be appropriate to say that, as observed in Figure 1, the large packages announced and the deviation rates in the forecasts increase in direct proportion to each other, and this contributes positively to the growth prospects for many countries during the pandemic.

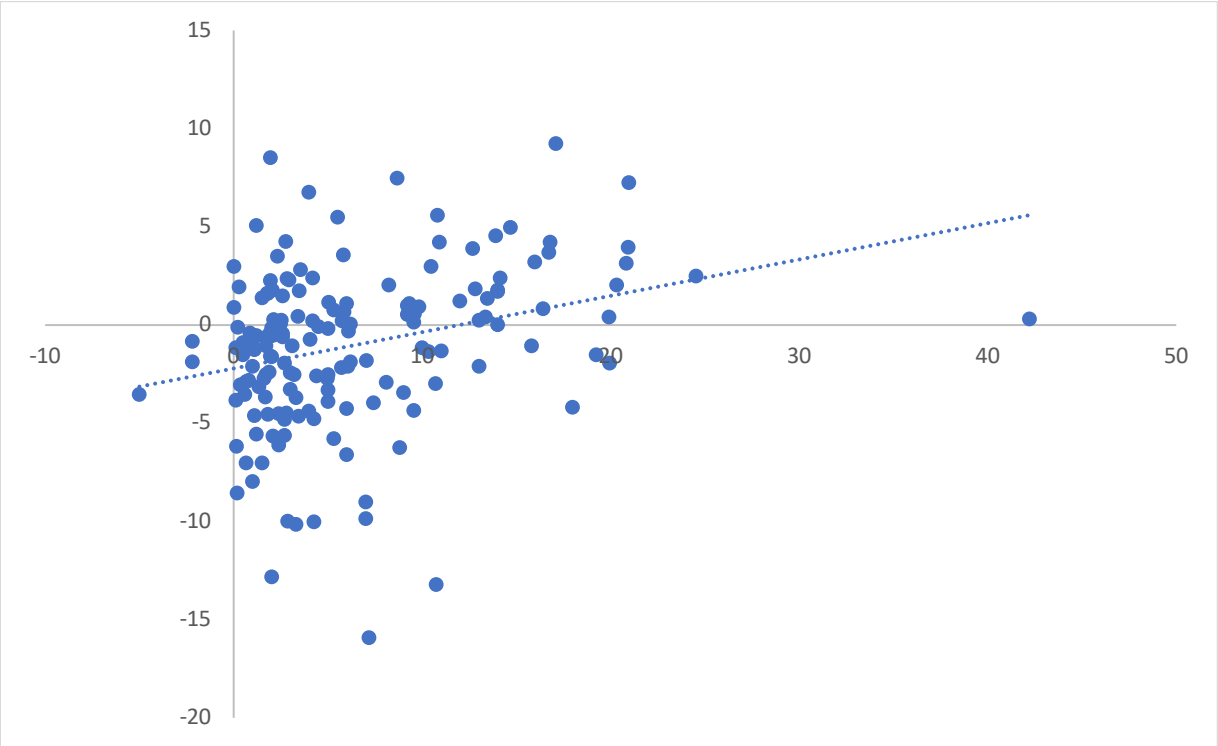

Figure 1. Growth Realization vs. IMF's Spring Forecast: The Role of the Fiscal Policy

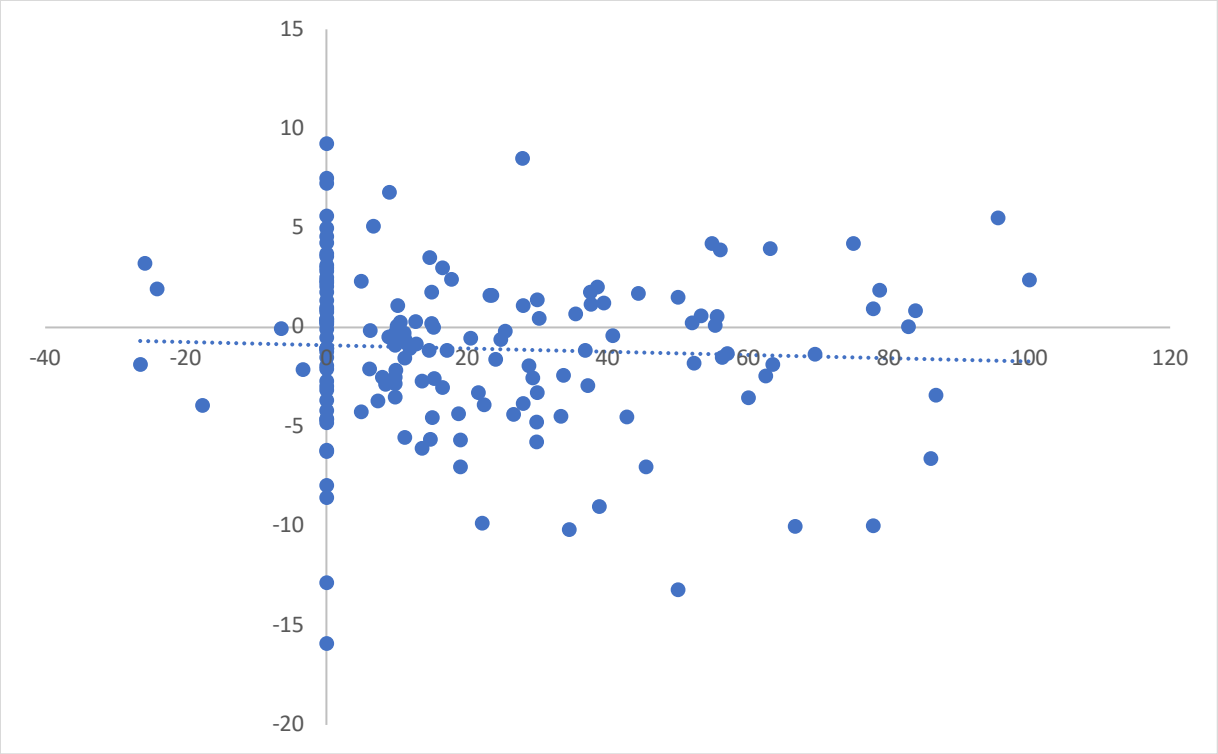

Figure 2. Growth Realization vs. IMF's Spring Forecast: The Role of the Monetary Policy

Figure 2 illustrates the relationship between the difference in the actual and predicted growth (in Spring by IMF) and percentage cut in the policy rate (in %) announced during the pandemic.

Looking at the figure, there is a slight negative correlation of -0.05 between the two variables. However, it would be misleading to say that there is a significant correlation. From this, we can conclude that the interest rate cut alone did not significantly affect the difference between the actual growth rates and the prediction. Accordingly, monetary policy and lowered interest rates did not play a significant role.

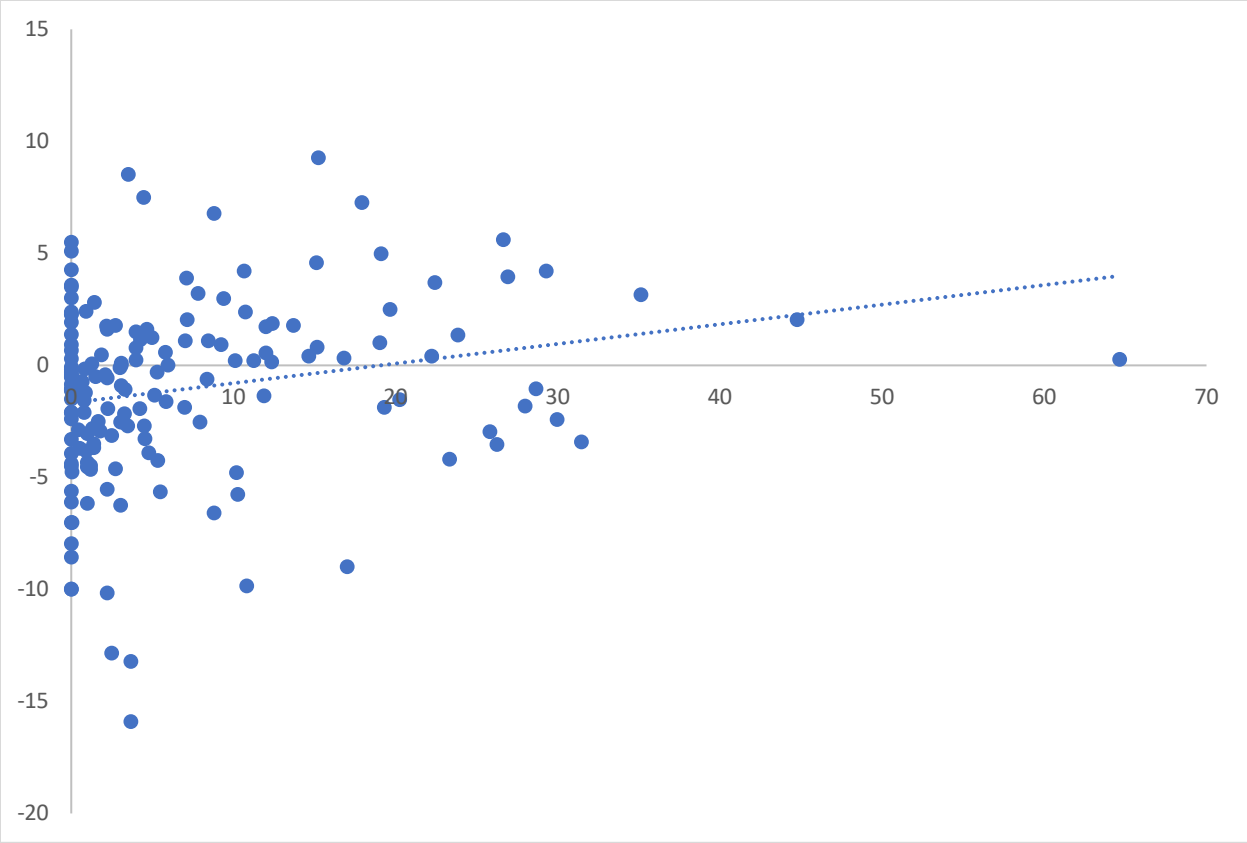

Figure 3. Growth Realization vs. IMF's Spring Forecast: The Role of the Macro-Financial Policy

Figure 3 presents the relationship between the difference in the actual and predicted growth (in Spring by IMF) and macro-financial stimulus packages (as % GDP) announced during the pandemic. In this figure, there is a 0.22 significant positive correlation between the two variables. Here, we can conclude that there is a directly proportional relationship between the extent of macro-financial policies and the growth prospects over the forecasts. The larger the macro-financial stimulus package, the larger the deviation in the IMF's forecasts is.

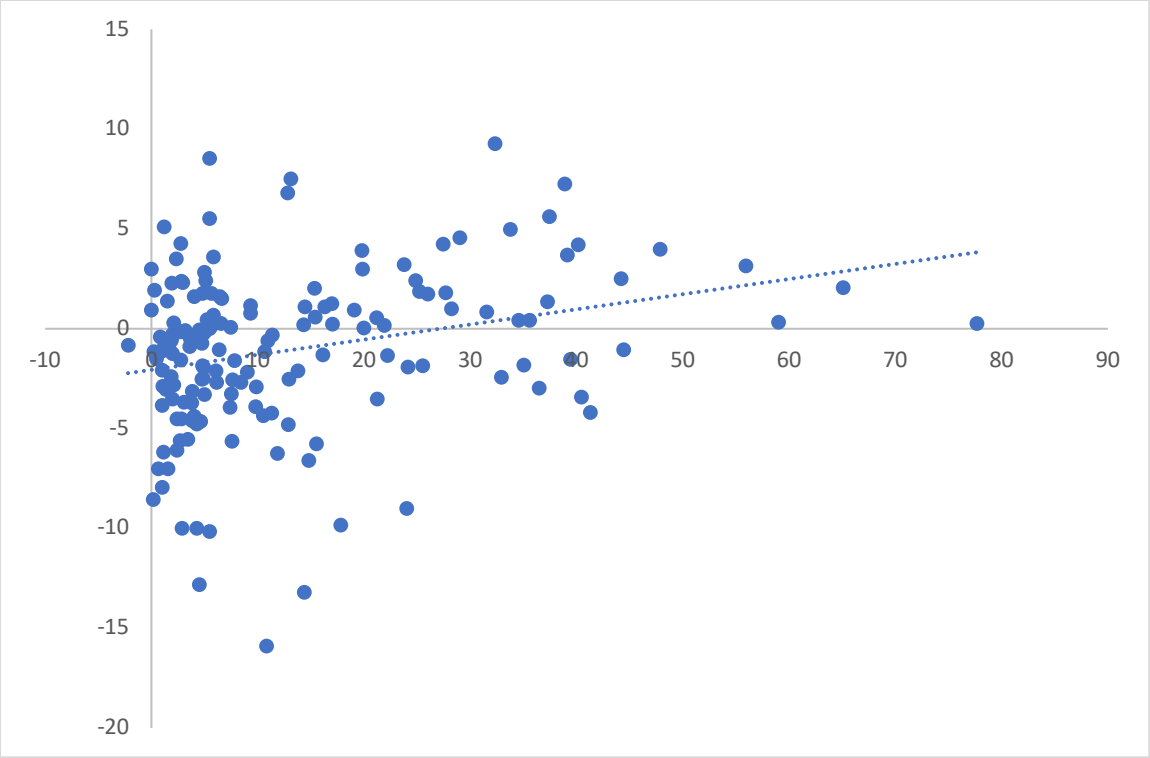

Figure 4. Growth Realization vs. IMF's Spring Forecast: The Role of the Fiscal and Macro-Financial (sum of both) Policy

Figure 4 depicts the relationship between the difference in the actual and predicted growth (in Spring by IMF) and the sum of the macro-financial and fiscal stimulus packages (as % GDP) announced during the pandemic. The relationships with the fiscal and the macro-financial packages alone are already presented in Figure 1 and Figure 3. Considering the fourth figure, it is seen that there is a positive 0.27 significant correlation between the two variables. On top of figures 1 and 3, Figure 4 indicates that the positive correlation even persists when we consider the combined fiscal and macro-financial stimulus packages and that this sum is crucial for the growth prospects during the pandemic.

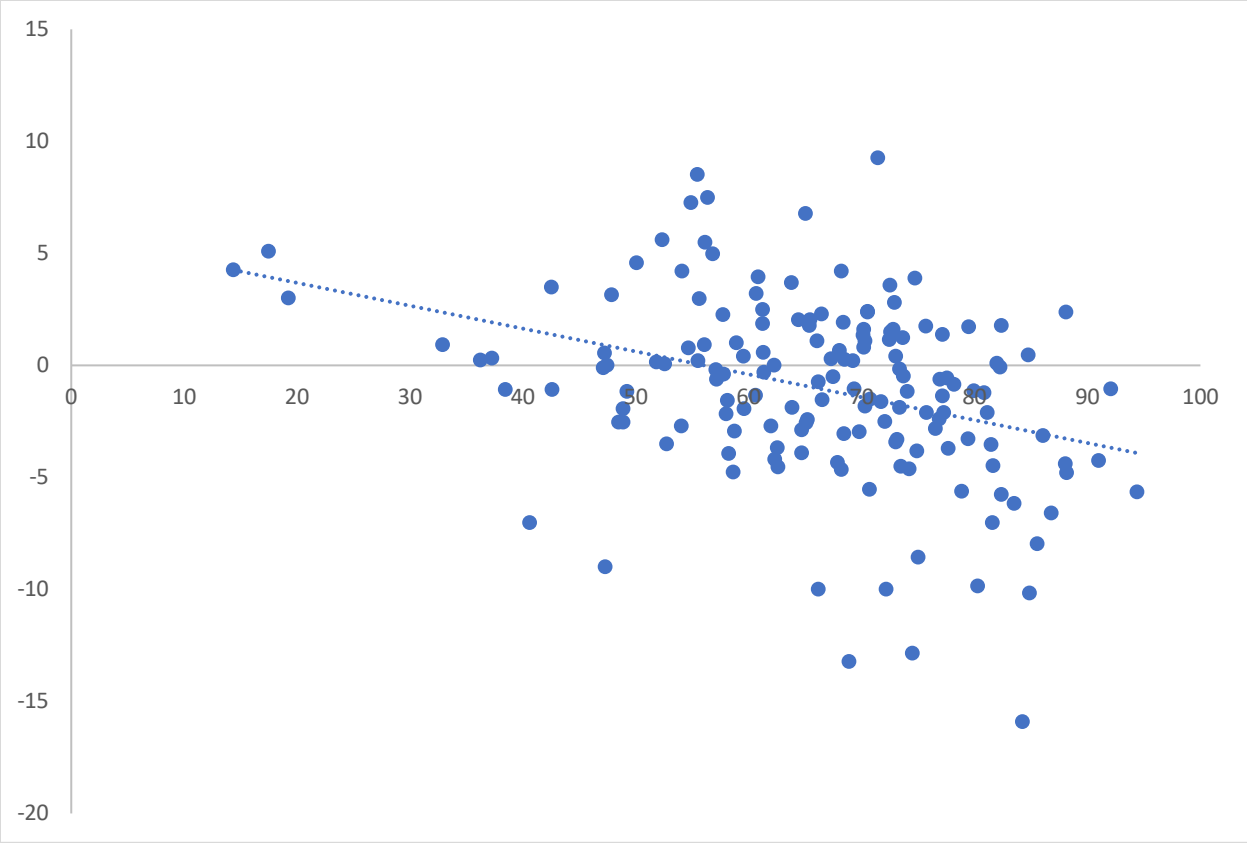

Figure 5. Growth Realization vs. IMF's Spring Forecast: The Role of the Government Stringency

Figure 5 shows the relationship between the difference in the actual and predicted growth (in Spring by IMF) and the strictness of government stringency measures taken during the pandemic. According to Figure 5, a significant negative 0.35 correlation stands out between the two variables. Furthermore, the growth in the countries that decided to implement tighter lockdown measures was below the expectations. As the severity of the lockdown measures increased, the gap between forecasts and actual growth grew.

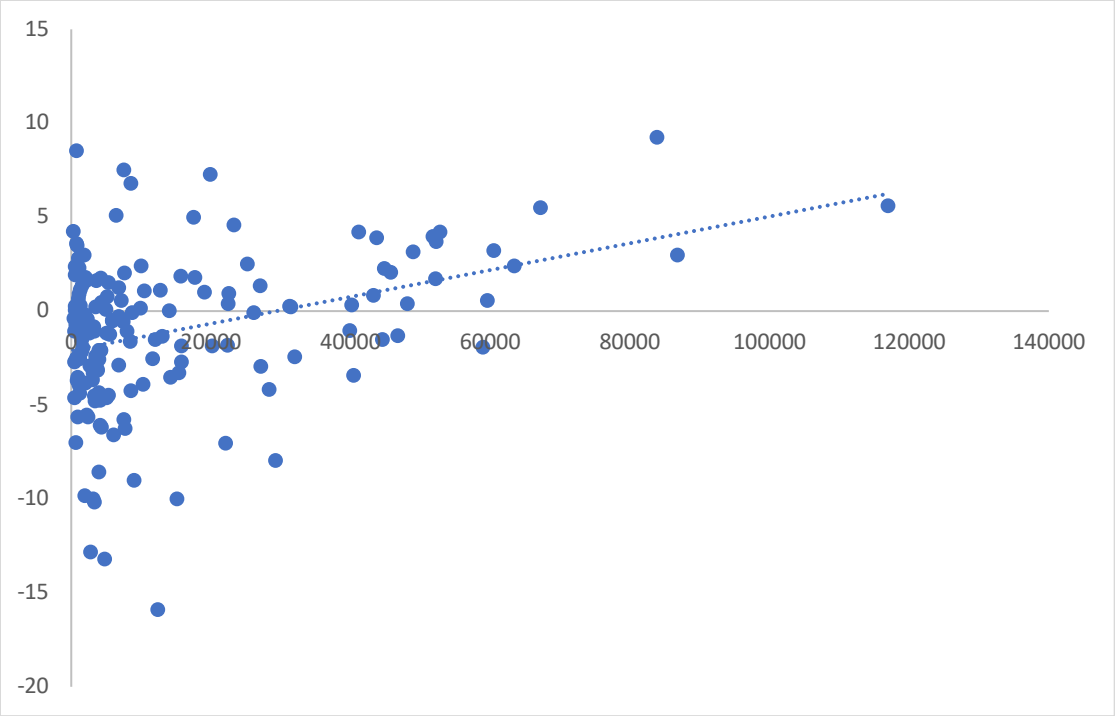

Figure 6. Growth Realization vs. IMF's Spring Forecast: The Role of the GDP per-capita

Figure 6 plots the relationship between the difference in the actual and predicted growth (in Spring by IMF) and the real GDP per capita (in 2020 USD). This suggests that in richer countries, the actual growth rated overperformed the forecasts. This is because rich countries have access to more resources. Having more resources is also one of the most critical factors leading to the implementation of larger packages. In addition, rich countries mobilized more quickly than others. We observe that there is a positive relationship between wealth and the margin of deviation in the forecasts.

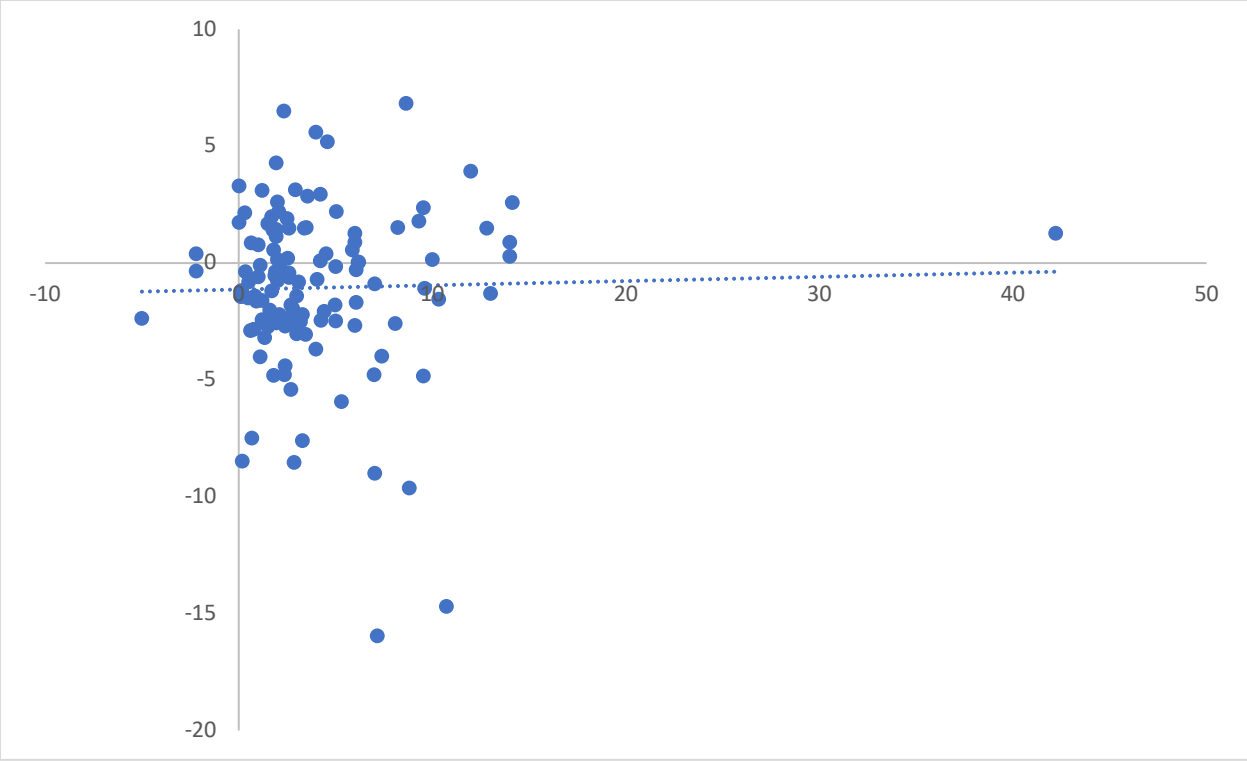

Figure 7. Growth Realization vs. WB' June Forecast: The Role of the Fiscal Policy

Figure 7 shows the relationship between the difference in the actual and predicted growth (in June by the WB) and fiscal stimulus packages (as % GDP) announced during the pandemic. When we look at the figure, we encounter the version of the first figure prepared for the predictions made by the World Bank. However, contrary to the IMF's forecasts, there is no significant relationship (correlation=0.03) between the variables. One of the reasons for this lack of significance could be the differences between the number of countries and the high standard deviation exhibited by the WB forecasts, as explained in the previous section.

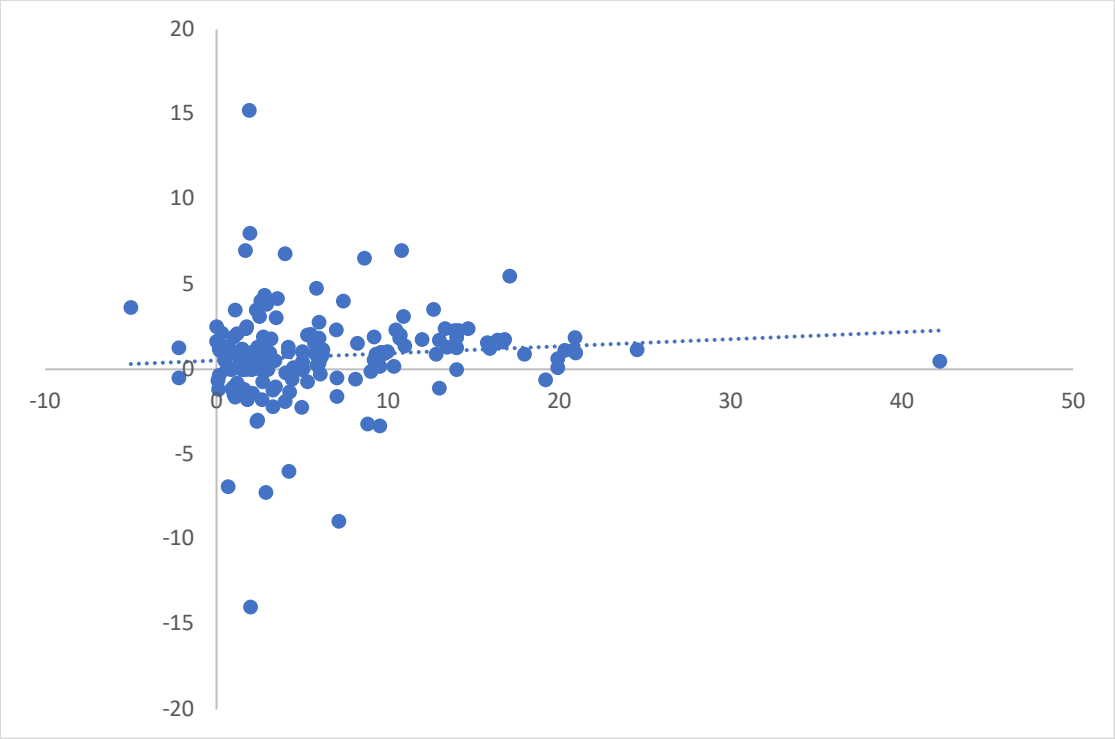

Figure 8. Growth Realization vs. IMF's Fall Forecast: The Role of the Fiscal Policy

Finally**,** Figure 8 illustrates the relationship between the difference in the actual and predicted growth (in Fall by IMF) and fiscal stimulus packages (as % GDP) announced during the pandemic. Unlike the other figures, the IMF's autumn forecasts, not the spring ones, are used herein our eighth and last figure. Moreover, unlike Figure 1, where the IMF's spring forecasts were used, there is not much of a significant correlation here. One explanation for this could be that a certain amount of time is needed for the fiscal packages to affect growth. Other predictions were made at the beginning of the year (in April 2020) and have not yet had enough time to take effect. By October, it is almost the end of the year, and the packages are starting to exhibit their effects.

Conclusion

To conclude, in this paper, we investigated the relationship between IMF's and WB's GDP growth forecasts and the actual realized growth levels in 2020. We used data from the IMF and WB's flagship publications and showed that on average, an economy had overperformed its expected growth rate (compared to the expectations formed in April 2020 by the IMF) when i) the sizes of announced fiscal and macro-financial stimulus measures (denominated as a percent of GDP) are larger, ii) The extent of the government stringency measures towards restricting public life is smaller, iii) the pre-pandemic level of GDP per capita is larger.

However, these differences between actual growth rates and the forecasts are not exhibited when we use the forecasts from later periods such as June or October 2020. One reason for this could be that the packages described need a certain time, i.e., come with a lag to show their effects on the economy. Another reason that may lead to such difference could be that the WB's June forecasts include significantly lower number (42, to be exact) of countries than the IMF's forecasts.

We wrote this article at the beginning of 2021, but we cannot say that the pandemic has been concluded yet. Many economies are expected to recover from the downturn brought by the pandemic sharply; however, there is still significant uncertainty. In the future, when the pandemic ends, new research should be conducted, particularly focusing on different paths of recoveries and also use data for the vaccination rate. Vaccination rate, which drastically differs across countries, is an essential variable and can change growth rates for countries in a significant way.

Moreover, our simple statistical analysis should also be complemented by a deeper econometric analysis or through economic-theoretical models to identify the economic mechanism behind the observations we made throughout the paper.

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