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Tracking the Characteristics of Economic Growth Vulnerability to COVID-19: A Preliminary Analysis

Rastreando las características de la vulnerabilidad del crecimiento económico al COVID-19: un análisis preliminar

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Abstract

In response to the global expansion of COVID-19, governments around the world have implemented social distancing measures resulting in an unprecedented fall in economic activity. Consequently, the economic growth forecasts for 2020 have been adjusted downward in most countries, yet the magnitude of the decline has been different. In this article, we examine the economic vulnerability to COVID-19 -measured as the change in GDP growth forecasts for 2020- and its determinants for a sample of 194 countries. We identify the characteristics of the external sector and macroeconomic policy stance that are associated with an increase in economic vulnerability during the pandemic.

Keywords: COVID-19; economic growth forecasts; macroeconomic policy; economic structure.

Resumen

Como respuesta a la expansión global de COVID-19, los gobiernos alrededor del mundo han implementado diversas medidas de aislamiento social generando una caída en la actividad económica sin precedentes recientes. Consecuentemente, los pronósticos de crecimiento económico para 2020 se han ajustado a la baja en la mayoría de los países, aunque la magnitud de la caída ha sido diferente. En este trabajo nos enfocamos en el análisis de la vulnerabilidad económica ante COVID-19, medida como el cambio en los pronósticos de crecimiento, y sus determinantes para una muestra de 194 países. Resaltamos las características del sector externo y de la política macroeconómica que se asocian a una mayor vulnerabilidad económica durante la pandemia.

Palabras clave: COVID-19; pronósticos de crecimiento económico; política macroeconómica; estructura económica.

JEL classification/ clasificación JEL: E17, F43, E63.

1. Introduction

The start of the COVID-19 outbreak and the origin of the first global-scale pandemic in decades have been dated in December 2019 (WHO 2020a; 2020b). The relative ease of contagion and the rapid spread of the disease around the world have forced the implementation of social distancing measures and the partial closure of borders to avoid the collapse of national health systems. This has led to an expected contraction of the world economy, even larger than that observed during the Great Recession (Carlsson-Szlezak, Reeves & Swartz, 2020; Stock, 2020).

The crisis caused by COVID-19 originates from an aggregate supply shock, with increasingly strong effects on aggregate demand. Consequently, economic growth forecasts for the world economy have been deteriorating. For instance, the International Monetary Fund (IMF) estimates for the 2020 growth of the world economy have gone from 3.4% in October 2019 to -3.0% in April 2020. If compared by development level, advanced economies have gone from 1.7% to -6.1% while emerging and developing economies from 4.6% to -1.0%. At regional level, euro area countries are the group of advanced economies expecting the largest fall in output from 1.3% to -7.5%, with Italy leading the expected fall in output (from 0.5% to -9.1%). Latin America is expected to be the most negatively affected among developing regions (from 1.8 to -5.2%), with Mexico ahead in the expected drop of output (from 1.3% to -6.6%).

In this context, we analyse which economic characteristics are more likely to increase economic growth vulnerability to COVID-19, as reflected in a drop in the IMF economic growth forecasts for 2020. Thus, we compare the change in the economic growth estimates of the World Economic Outlook (WEO-IMF) between October 2019 and April 2020, and we analyse the statistical significance of a series of covariates that allow characterizing the economic structure and the economic policy stance before the crisis. The analysis is performed using an econometric strategy with cross-sectional data for an initial sample of 194 countries.

Our aim is twofold. First, by using available information, we examine which factors related to the structure of the economy generate more economic vulnerability. Second, we analyse whether the pre-crisis economic policy stance in terms of fiscal and monetary policies relates to the change in economic growth forecast by making possible -or not- the implementation of expansionary policy measures.

As any first approach that aims to analyse a crisis that is still present, it is necessary to take the results with caution. The duration and rigidity of social distancing actions, as well as the economic policy measures carried out by economic authorities and international policy coordination will be a key to smooth the impact of the crisis. However, even with these limitations, we believe that it is necessary to carry out preliminary analyses that allow us to build an overview of the scope that the COVID-19 pandemic will have in the world economy.

The rest of the paper is structured as follows. Section 2 presents a descriptive analysis of the effects that the COVID-19 pandemic is having on the world economy. Section 3 describes the data set and the methodology to be implemented. Section 4 presents and discusses the main results. Finally, Section 5 discusses main conclusions.

2. FROM COVID-19 TO A WORLDWIDE ECONOMIC CRISIS

As COVID-19 contagion spread around the world, national economies were implementing containment measures with the main objective of managing the transmission rate and avoiding the collapse of national health systems. Thus, at different degrees and moments, countries restricted people's mobility through social distancing policies. According to UNICEF (2020), in the US the proportion of people going to work fell from 60% before to 35% after the implementation of social distancing policies; in the case of Tokyo, women experience the greatest reduction in movement and young adults the greatest reduction in mobility; while in Germany, mobility fell by around 40%, although there has been a recent increase associated with the public perception that the measures implemented have been very rigid.

From a developing countries' perspective, the implementation of social distancing measures has carried on a decrease in travel distance at different degrees. In the more restrictive moments of social distancing, Mozambique and Ukraine reduced travel distance about 40%, Cote d'Ivoire and Mexico about 50%, India, Indonesia, Myanmar, and Nigeria about 60%, and Colombia and Malaysia about 70% (UNICEF, 2020). In all cases, there were differences among administrative regions.

The economic consequences of COVID-19 are the result of aggregate supply and demand shocks. From the aggregate supply-side, to avoid contagion and the collapse of national health systems, non-essential economic activities have stopped or moved to teleworking. Recent evidence shows the existence of a relationship between the type of occupations and the possibility of teleworking (Monroy-Gómez-Franco, 2020; Dingel & Neiman, 2020). For instance, less developed countries/regions or those with a higher share of labour-intensive activities have the lowest percentage of people with the possibility of doing their work at home. In addition, the closure of schools and kindergartens has become a generalized social distancing measure, forcing another part of the

workers to remain at home doing care work. The combination of moving to home office while doing care work could be expected to have a negative impact on aggregate productivity, with differentiated effects by gender.

Furthermore, the partial closure of non-essential economic activities and policy restrictions on the international trade flow have reduced the functioning of global value chains (GVC) by disrupting input supply. This is an especially important in those countries and regions more integrated into the dynamics of the world economy.

From the aggregate demand side, the closure of firms has reduced aggregate income, leading to a drop in consumption. Uncertainty about the duration and depth of the economic activity contraction has generated a collapse in private investment. Moreover, the fall in world income is reflected in a lower demand for exports of domestic goods. In this context, government spending plays a key role smoothing the negative impact of the other aggregate demand components on output. However, the final effect of government spending will depend on the response of aggregate supply to COVID-19 shock, the fiscal space, and the willingness to implement an expansionary fiscal policy.

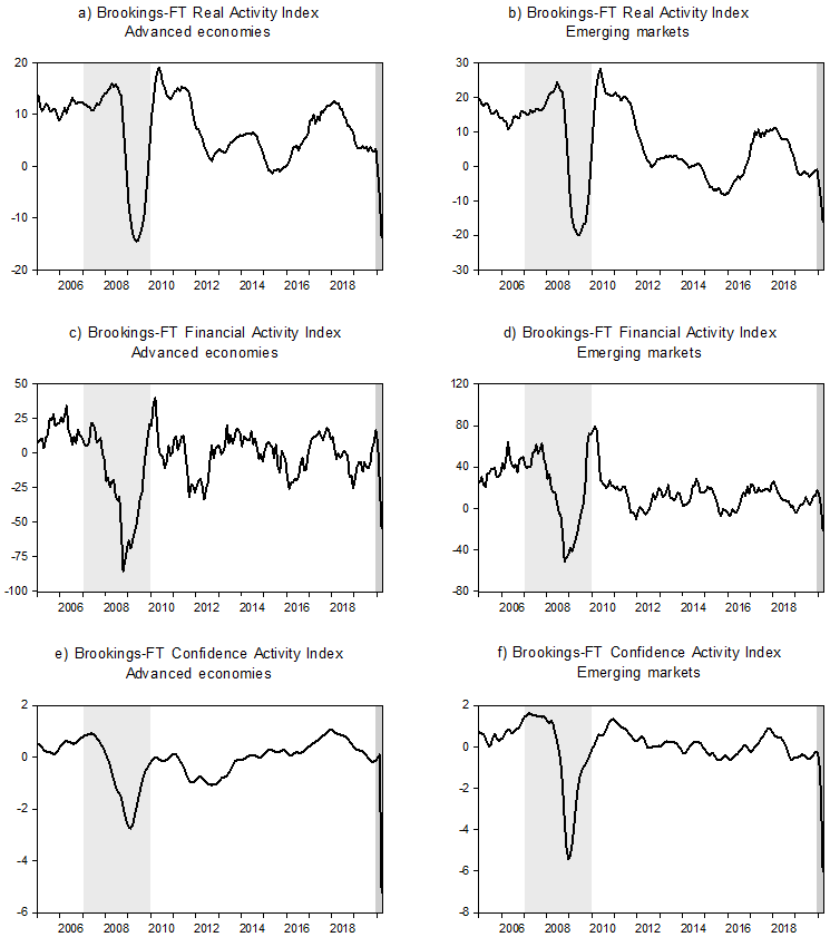
Due to the nature of the pandemic, there is uncertainty about the duration and depth of the crisis. Figure 1 presents data from the Brookings-FT TIGER indices (Prasad & Wu, 2020a, 2020b). The data in Figure 1 includes estimates up to March 2020, that is, when COVID-19 had already spread globally. Regarding the real economy, Figure 1 shows that the advanced economies index had already fallen to near the lowest point of the 2007-2009 financial crisis. However, in terms of the financial sector, the drop would not have still exceeded (in March 2020) to the depth of the 2007-2009 global financial crisis.

Finally, in terms of confidence, the index shows an already much greater fall both in advanced economies and in emerging markets than those observed during the Great Recession. The lowest point in the confidence index during the Great Recession was -2.7 in February 2009 in advanced economies and -5.4 in December 2008 in emerging markets, while by March 2020 the same index would reach -5.2 in advanced economies and -6.0 in emerging markets. The drop in the confidence index is evidence of the generalised uncertainty in the economic environment.

The economic impact of COVID-19 has been reflected in a significant and generalised decline in economic growth forecasts for 2020. The change in growth forecasts can be seen in the World Economic Outlook (WEO-IMF, IMF, 2019, 2020) of the International Monetary Fund (IMF). Figure 2 plots a map of the change in growth forecasts for 2020 of most of the 194 countries covered in the WEO-IMF, contrasting the estimates of September 2019 (before the COVID-19 outbreak) and those of April 2020 (after the COVID-19 outbreak). The map only includes change in the GDP forecast between -20 and 0, to exclude seven outliers. There is an average drop of 6.50 percentage points, a median drop of 6.30 and a standard deviation of 3.03.

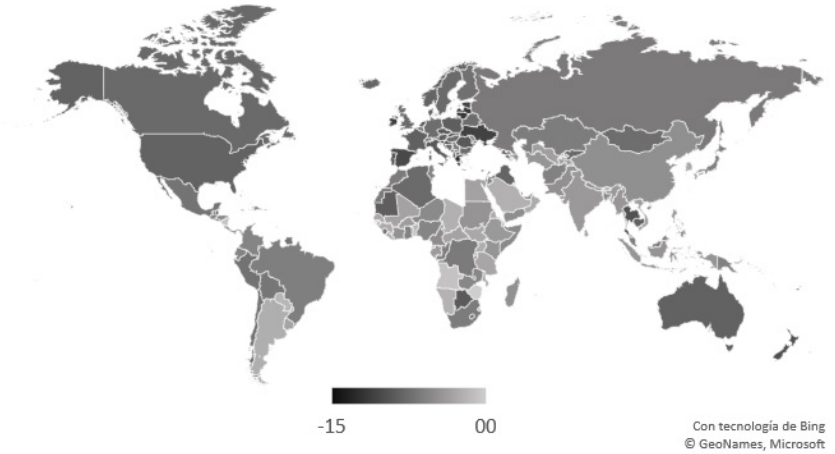
The magnitude of the COVID-19 economic impact has been significantly different among countries. Excluding the particularities of Venezuela and Guyana, the only economies that have improved growth forecasts from September 2019 to April 2020 are Iran and Mozambique. Beyond these countries, the decrease in growth estimates range between –.31 in Zimbabwe and -39.6 in Libya. For the world's largest economies, the falls in growth forecast are -8.30 in the United States, -4.96 in China, -6.05 in Japan, -7.50 in Germany, -8.43 in France, -7.74 in the United Kingdom, -4.25 in India, -6.18 in Brazil, -9.15 in Italy and -7.77 in Canada.

FIGURE 1. BROOKINGS-FT TIGER INDICES



Source: (Prasad & Wu, 2020a, 2020b).

Figure 2. Mapping the change in WEO-IMF GDP growth forecasts for 2020

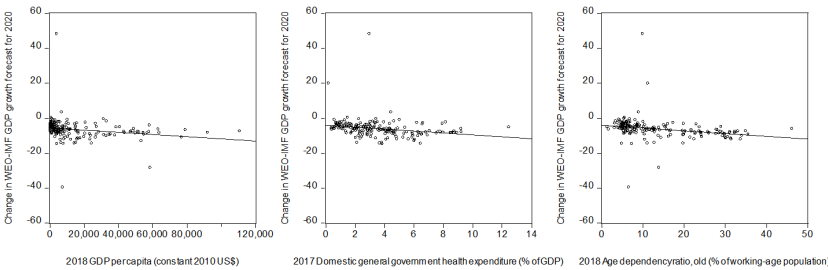


Source: Own estimations based on IMF (2019, 2020).

What factors explain the magnitude of the drop in GDP growth forecasts for the group of countries covered by WEO-IMF? Figure 3 contrasts the change in GDP growth forecast and domestic characteristics such as GDP per capita, health expenditure and old-age dependency ratio. As a first approach, we focus on these three variables for several reasons. First, we include GDP per capita to examine whether the change in GDP growth forecasts depends on the income level. Second, we include government health expenditure considering that the current disturbance stems from a public health problem, thus countries with higher health spending can better cope with the pandemic. Finally, we include the old-age dependency ratio since elderly population is the population most vulnerable to the effects of COVID-19 and countries with higher old-age dependency ratio could face a greater challenge in containing the virus.

The relationship between the change in GDP growth forecast and GDP per capita is not clear, especially in low- and middle-income countries. However, there is a negative association between GDP per capita and change in GDP growth forecast in high-income economies. Moreover, a negative relationship is also observed between the change in GDP growth forecast and health expenditure and between the change in GDP growth forecast and the old-age dependency ratio. After the COVID-19 outbreak originated in China, the epicentre of contagion moved to European countries and, later, to the US. These countries are characterized by high levels of income, with a higher share of health expenditure and, especially in European countries and Japan, a high old-age dependency ratio. In this regard, when including domestic government

FIGURE 3. CHANGE IN GDP GROWTH FORECAST AND DOMESTIC FACTORS



Source: IMF (2019, 2020); World Development Indicators.

health expenditure, we are indirectly accounting for institutions and social preference on social security. Institutions constraint our economic behaviour and provide the incentives for guiding economic performance (North, 1991), affecting economic growth (Haini, 2019).

The second group of variables is related to the external sector. As showed in Figure 1, unlike the global crisis of 2007-2009, the real economy is having the greater impact during the pandemic crisis. Therefore, we focus on variables that allow us to reflect at least partially the structure of the real external sector: trade openness, total exports, international tourism, manufacturing exports, medium- and high-tech exports, and fuel exports.

We depart from the hypothesis that a more open economy and with a higher share of exports is more vulnerable to the economic effects of the pandemic. Trade and particularly exports have been linked to economic growth, and more recently the composition of exports and the GVC have been gaining explanatory power (Chamberlain & Kalaitzi, 2020; Hagemejer & Mućk, 2019). There is evidence of positive links between economic growth and manufactures exports (Calderón, Chong, & Zanforlin, 2001; Levin & Raut, 1997; Carrasco & Tovar, 2020), medium- and high-tech exports (Burciu, Kicsi, Bostan, Condratov, & Hapenciuc, 2020; Canbay, 2020), fuel exports (Chamberlain & Kalaitzi, 2020; Shafiullah, Selvanathan, & Naranpanawa, 2017), and international tourism (Castro-Nuño, Molina-Toucedo, & Pablo-Romero, 2013; De Vita & Kyaw, 2016). Accordingly, it is expected to observe significant associations between these variables and the change of the growth forecast.

International tourism has decreased at historically low levels. Consequently, we include the international tourism expenditure. Although not only international tourism is affected by the pandemic, however, the variable we use allows international comparisons with availability for most of the countries in the sample. Finally, we consider export specialization by including data on fuel exports, total manufacturing exports, and medium- and high-tech exports.

Figure 4 contrasts the change in GDP growth forecast and different variables accounting for the real external sector. As we can expect, the more open is a

country, the more severe is the fall in the GDP growth forecasts. Additionally, international tourism and the change in GDP growth forecasts present a negative relationship, although it is not as clear as in the case of trade openness. In this regard, the effects may be clearer when differentiating countries by income levels. Boosting international tourism requires a minimum of infrastructure that low-income countries may not have. Furthermore, for high-income countries the share of tourism is relatively low. Therefore, it is possible to expect tourism to be especially important in middle-income economies.

The bottom of Figure 4 contrasts the change in the GDP growth forecasts and export specialisation-related variables. For the share of manufacturing exports, the relationship is negative, although the slope is not as steep as in the case of trade openness. Regarding medium- and high-tech exports, it is not evident that there is any relationship. This contradicts the idea that countries with a higher share of medium- and high-tech exports -and, therefore, with a greater participation in GVC- are more vulnerable to the effects of the COVID-19 pandemic.

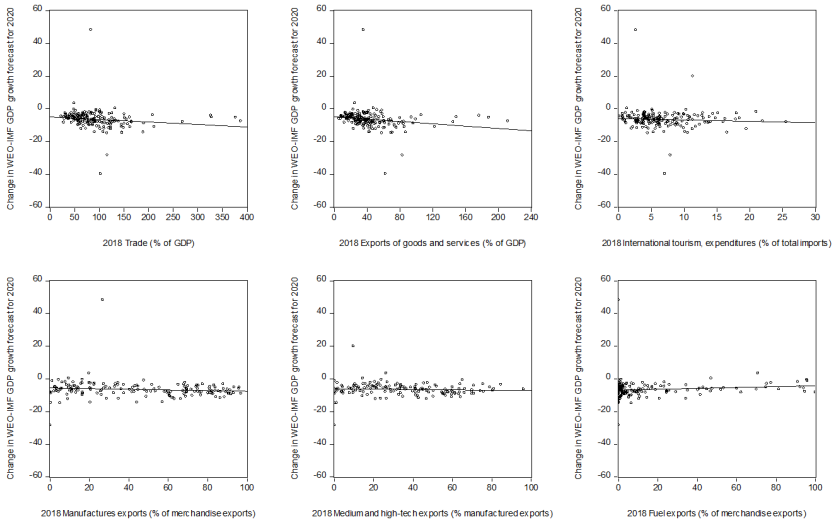
Finally, in the case of fuel exports, the relationship seems to be positive, that is, the higher the share of fuel exports, the lower is the drop in GDP growth forecasts. In this regard, we would like to highlight three points that can explain the behaviour of the relationship. First, fuel exports have less backward participation in GVC, so the disruption in the global supply does not directly affect this kind of exports. Second, countries specialized in the export of commodities, including gas and oil, tend to hedge by saving exports income when prices are relatively high, allowing to smooth the effect of declining global demand (Bems and de Carvalho Filho, 2011; Kilian, Rebucci and Spatafora, 2009). Finally, the fall in global demand has caused a decrease in the international prices of fuels. Therefore, if the fall in global demand continues for a long time, the negative effects will become more severe in these countries.

Finally, the last group of variables is related to the existing space for the implementation of expansionary macroeconomic policies. To do this, we use variables related to fiscal policy (public debt, public expenditure, general government surplus) and monetary policy (interest rates). It is worth noticing that tax policy could play a relevant role, particularly given the empirical evidence suggesting that tax structure affects economic growth (Widmalm, 2001). However, no country today has suggested the possibility of important changes in its tax structure or rates.

Thus, regarding fiscal policy, the first feature to highlight is public expenditure, being the government's instrument directly influencing aggregate demand, and the only aggregate demand component, under current conditions, that can offset the drop in other components of aggregate demand.

Note that the size of the public sector has been negatively associated with economic growth (Bandrês Moliné & Gadea Rivas, 2019), yet this nexus is affected by the composition of spending (Balaev, 2019). Moreover, the economic literature has studied the role of public spending as a buffer against

FIGURE 4. CHANGE IN GDP GROWTH FORECAST AND EXTERNAL SECTOR



Source: IMF (2019, 2020); World Development Indicators.

external shocks especially through automatic stabilizers (Fatás & Mihov, 2001; McKay & Reis, 2016). Furthermore, we do not expect a strong crowding out effect (Buiter, 1977), because private investors are following risk avoidance strategies due to the specificities of the pandemic crisis.

Furthermore, the economic literature has explored the relationship between public debt and economic growth where the complexity of the relationship has been highlighted. For instance, there is no evidence of a universal common threshold from which the relationship turns negative (Chudik et al. 2017) because the public debt-economic growth nexus vary across countries (Eberhardt & Presbitero 2015) and results are extremely sensitive to the estimation setup, data coverage, data frequency and the definition of public debt (Égert 2015). However, countries with higher public debt to GDP ratio are more likely to see a negative effect on output performance (Eberhardt & Presbitero 2015) where thresholds for developed countries are higher than for developing countries (Reinhart, Rogoff, & Savastano 2003; Checherita-Westphal & Rother 2012).

Regarding monetary policy, we included in the analysis the instrumental interest rate of national central banks with the intention of analyse whether countries that are over or close to the zero lower bound show a greater drop in growth forecasts because they are less able to stimulate aggregate demand by traditional channels (Bernanke & Reinhart, 2004; Gust, López-Salido & Meyer, 2017).

It is necessary to clarify several points. First, some developed countries have long set negative interest rates (e.g. the deposit facility of ECB), and the zero limit has not prevented the implementation of more aggressive monetary policies (Rodrīguez and Carrasco, 2016; Kuttner, 2018). Second, negative interest rate strategies have not yet been observed in developing countries that still have greater scope for action. However, in developing countries there may be an intrinsic restriction on the use of more aggressive nonconventional monetary policies. This is due to the differences in the development of the capital market and the financial system between developed and developing countries, and to the ongoing process of building credibility in which developing countries continue to be immersed. Finally, there has been recently an openness to the possibility of implementing a money-financed fiscal stimulus (Galī, 2020) although in practice it does not seem plausible soon.

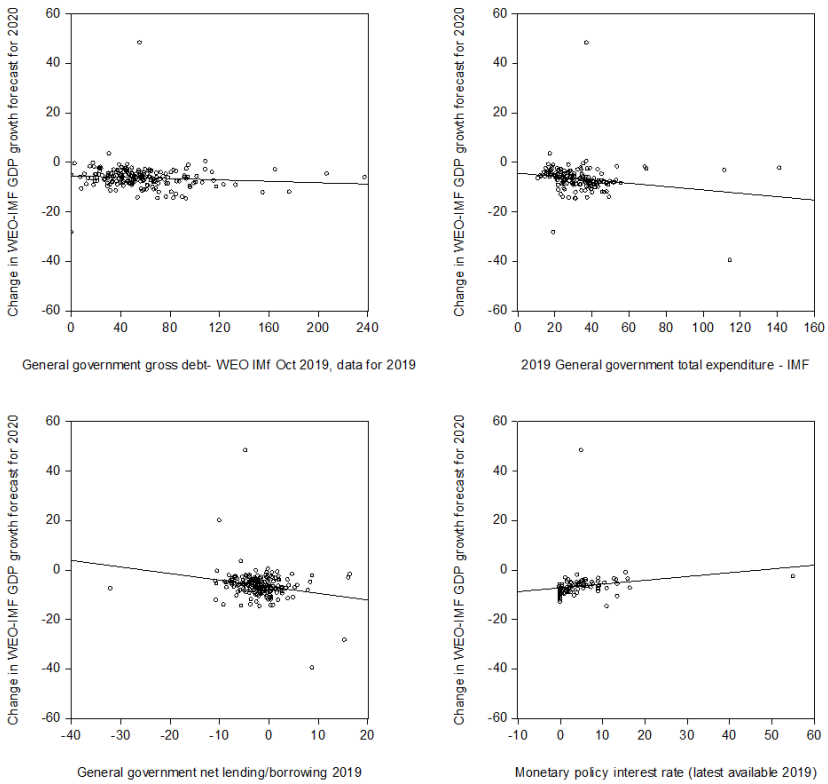
Figure 5 contrasts the change in GDP growth forecast and different variables accounting for the pre-COVID-19 outbreak macroeconomic policy stance. For the case of fiscal variables, the relationship seems to be negative. First, the lower the general government gross debt, the lower the drop in the GDP growth forecast for 2020. Also, countries with government surplus present lower drops in GDP growth forecast. In this regard, a relatively low public debt burden and government surpluses imply the possibility of implement a more aggressive fiscal stimulus plan without jeopardising long-term fiscal stability. Moreover, a higher share of government expenditure is associated with greater falls in GDP growth forecast contradicting the hypothesis of government size as a buffer against the impact of external shocks while reinforces the idea of the need of a fiscal policy intervention space as a countercyclical element. Finally, higher monetary policy rates are positively associated with lower drops in GDP growth forecasts, which could be explained as result of greater policy space to stimulate aggregate demand.

3. Methodology and data

Our initial sample involves 194 countries included in the WEO-IMF database, but Guyana, Libya, Macao, Syria, and Venezuela were removed from the analysis because their figures are outliers. In addition, the sample size decreases in the regression analysis because of the lack of data for key independent variables.

Data was retrieved from different sources: real GDP per capita, trade openness, domestic general government health expenditure, gross fixed capital formation, total population, old age dependency ratio, international tourism expenditures, fuel exports, manufactures exports and medium- and high-tech exports from World Development Indicators (WDI); economic growth forecast, general government net lending/borrowing, general government gross debt and general government total expenditure from October 2019 and April

FIGURE 5. CHANGE IN GDP GROWTH FORECAST AND MACROECONOMIC POLICY



Source: IMF (2019, 2020); World Development Indicators; International Financial Statistics (IFS-IMF).

2020 WEO-IMF; finally, the interest rate variable is the end-of-year monetary policy interest rate retrieved from the International Financial Statistics and domestic central banks.

For the empirical analysis, we use the most recent data available. However, in some cases data used are estimates of those observed that have not yet been published. For the variables with cyclical behaviour or drastic short-term changes, we use the 2019 estimated data. These data correspond to those extracted from the WEO-IMF. However, there are some variables whose behaviour changes slowly and, in this case, it is possible to resort observed data from 2018 or the most recent data for which there is availability. The variables of the latter case are those extracted from the WDI.

Given the descriptive analysis in the previous section, the correlation coefficients amongst the variables of interest and collinearity concerns,

the regression analysis was divided in three models. The first one, given by Equation (1), is the baseline model including only the variables that most likely are affecting the change in the economic growth forecast. Next, the first augmented model includes variables on the external sector, namely, international tourism, manufactures exports, medium- and high-tech exports, and fuel exports, see Equation (2). Finally, to explore the associations with fiscal and monetary policy, the Equation (3) presents the most sophisticated model.

$$ForecastChangei = \alpha + \beta_1 lnGDP_i \text{ or } HealthExpenditure_i + \beta_2 Growth_i + \beta_3 CapitalFormation_i + \beta_4 lnPopulation_i + \beta_5 Trade_i + u_i \quad (1)$$

$$ForecastChange_i = \alpha + \beta_1 lnGDP_i \text{ or } HealthExpenditure_i + \beta_2 Growth_i + \beta_3 CapitalFormation_i + \beta_4 lnPopulation_i + \beta_5 Trade_i + ExternalStructure'_i \psi + u_i \quad (2)$$

$$ForecastChange_i = \alpha + \beta_1 lnGDP_i \text{ or } HealthExpenditure_i + \beta_2 Growthi + \beta_3 CapitalFormation_i + \beta_4 lnPopulation_i + \beta_5 Trade_i + ExternalStructure'_i \psi + EconomicPolicy'_i \lambda + u_i \quad (3)$$

4. Results

Table 1 presents the major results of the baseline model. Note that the analysis is replicated by subsamples of high, middle, and low-income countries. Given the high correlation between GDP per capita and health expenditure, to avoid multicollinearity concerns, the regressions are replicated including one or the other. Thus, Columns (1-4) enter the logarithm of GDP per capita and Columns (5-8) enter health expenditure.

The results are in line with expectations, but they differ by subsamples of countries, as expected because the determinants of economic growth also differ among countries with different levels of economic development. Thus, any standard model of economic growth includes factors of production as explanatory variables, so the present research includes population and gross capital formation. However, population is statistically insignificant in several regressions, and gross fixed capital formation has positive and significant coefficients only in the case of high-income countries. For rich countries, this result suggests that higher levels of investment are positively associated with the change in WEO-IMF economic growth forecast. For low-income countries, the results suggest that trade may weaken the reductions of the forecast. However, any result in the regression analysis for low-income countries should be taken with caution because of the small sample size.

In general, the key predictors of the model are GDP per capita and economic growth, presenting negative and statistically significant associations.

In other words, countries with the higher levels of GDP and growth rates are also associated with the greater losses in the forecast. Note that, usually, high-income countries show economic growth rates that are below the rates presented by middle-income countries, many of them are emerging economies with the highest growth rates (Bayraktar-Sağlam, 2018), in line with the economic growth convergence hypothesis. However, middle-income countries also present higher fluctuations and are less prepared to confront economic shocks (Cai, 2012). Consequently, it is expected a negative relationship between economic growth and the change of the forecast. The negative association between GDP per capita and the change in the forecast is explained by the large impact of COVID-19 in several developed and emerging countries in Europe, Asia, and America.

Health and education are also key explanatory variables of economic growth (Mankiw, Romer, & Weil, 1992; Monterubbianesi, Grandes, & Dabús, 2017), yet education will not significantly play a role in the change of the growth forecast. For its part, health expenditure should be a key predictor. Accordingly, the results suggest greater losses in the forecasts of countries with high levels of health expenditure.

The results for the first augmented model, Equation (2), exploring the associations with the external structure, are reported in Table 2. Given the high correlation between manufactures exports and medium- and high-tech exports, the latter is part of the former, so the regressions do not enter both at the same time. Thus, Columns (1-4) include manufactures exports and Columns (5-8) include medium- and high-tech exports.

The general performance of the regression models is better in the case of high-income countries, more variables present statistical significance, including trade and fuel exports with positive and significant coefficients. This last finding suggests that among rich countries, those exporting fuels also present smaller reductions in their economic growth forecasts. By contrast, the exports of manufactures and medium- and high-tech goods seem to be irrelevant. Finally, note that international tourism presents a negative and significant coefficient in the case of middle-income countries.

The regressions in Table 2 are replicated using health expenditure instead of GDP per capita (not reported in tables to save space). The coefficients of health expenditure are negative and statistically significant in most regressions, as it was found in the baseline model. Again, the model works better in the case of high-income countries, but now tourism presents robust results in the case of middle-income countries with a negative sign. In other words, middle-income countries with higher levels of international tourism present higher losses in their forecasts. This finding is not a surprise given the implementation of social distancing measures and the partial closure of borders. Note that even when tourism is an important activity in many high-income countries, this is not an important share of the external structure. By contrast, for many middle-income countries, tourism is highly relevant for the complete internal and external economy.

Table 1. Regression results: Baseline models

	(1) FS	(2) HI	(3) MI	(4) LI	(5) FS	(6) HI	(7) MI	(8) LI
GDP per capita 2018	-0.98***	-0.36	-0.93***	1.46				
Economic growth 2019	-0.28***	-0.80***	-0.29*	0.05	-0.25**	-0.98***	-0.29*	0.16***
Capital formation	0.03	0.19*	-0.01	0.02	0.03	0.25***	0.002	0.04
Population	0.30*	0.26	0.19	0.26	0.20	0.49**	0.10	0.14
Trade	0.001	0.01	-0.02	0.04***	-0.01	0.01	-0.01	0.05***
Health expenditure					-0.63***	-0.49***	-0.42**	-0.04
Constant	-2.63	-11.60	1.06	-21.34**	-6.82**	-17.21***	-5.04	-11.45*
Observations	158	50	82	26	155	48	81	26
r-squared	0.28	0.29	0.24	0.52	0.29	0.49	0.16	0.46

Notes: FS = Full sample; HI = High-income; MI = Middle-income; LI = Low-income
Robust standard errors are used.
(*) [**] and {***} indicate statistical significance at the (10%) [5%] and {1%} levels.

In the short run, government spending is a key variable to stimulate economic growth when the economy is distant from full employment. However, this nexus also is affected by the kind of expenditure, productive versus non-productive, and it is conditioned by the quality of institutions and corruption, both with undesirable characteristics in many middle and low-income countries (Bayraktar, 2019; Muinelo-Gallo & Roca-Sagalés, 2011). If crowding-out is present, it could be expected that countries already with a large amount of spending will also have little room for manoeuvre to influence the economy. In addition, government debt has been negatively linked to economic growth (Ghourchian & Yilmazkuday, 2020). Nevertheless, first, there is a potential nonlinear relationship between debt and growth (Checherita-Westphal & Rother, 2012), and second, debt is an option to restore and stimulate the economy in the current crisis conditions. Therefore, the expected sign of government debt is not clear even when countries with low levels of debt also present a larger capacity to borrow.

The results for the third augmented model, Equation (3), exploring the associations with economic policy, specifically with government debt and expenditure, are reported in Table 3. Note that Columns (1-4) include manufactures exports and Columns (5-8) include medium- and high-tech exports. In general, for the full sample of countries, government expenditure presents a negative coefficient and statistical significance. That is, countries with the higher levels of government expenditure also present higher losses in the economic growth forecast. In the case of middle-income countries,

TABLE 2. REGRESSION RESULTS: EXTERNAL

	(1) FS	(2) HI	(3) MI	(4) LI	(5) FS	(6) HI	(7) MI	(8) LI
GDP per capita 2018	-0.89***	-0.46	-1.03***	1.32	-1.10***	-0.89	-1.08***	0.44
Economic growth 2019	-0.20	-0.62***	-0.16	0.11	-0.21	-0.86***	-0.11	0.23
Capital formation	0.06	0.26***	-0.04	-0.01	0.05	0.23***	-0.06	-0.05
Population	0.43**	0.67***	0.38*	0.63*	0.29	0.31	0.33	0.42
Trade	0.004	0.01***	-0.02	0.05	0.00	0.01**	-0.02	0.04
International tourism	-0.06	0.08	-0.12*	-0.12	-0.03	0.13	-0.11	-0.04
Fuel exports	0.02	0.04**	0.004	0.01	0.02**	0.04***	0.01	0.05
Manufactures exports	-0.01	-0.01	-0.002	0.01				
Medium and high-tech exports					0.02	0.02	0.02	0.04
Constant	-6.30	-20.52**	-0.39	-26.45**	-3.23	-10.92	0.53	-17.26
Observations	136	47	71	18	123	46	64	13
r-squared	0.35	0.61	0.33	0.70	0.34	0.63	0.35	0.88

Notes: FS = Full sample; HI = High-income; MI = Middle-income; LI = Low-income
Robust standard errors are used.
(*) [**] and {***} indicate statistical significance at the (10%) [5%] and {1%} levels.

government debt presents a negative sign, see Column (3). In addition, in the case of high-income countries, the results again suggest that fuel exports are positively associated with the change of economic growth forecast.

The regressions in Table 3 are replicated using health expenditure instead of GDP per capita, and excluding government expenditure due to collinearity concerns (not reported in tables). The coefficients of health expenditure are negative and statistically significant in the majority of regressions. By contrast, government debt is insignificant. Now, the coefficients of tourism are negative and statistically significant in the case of middle-income countries, supporting previous results.

The regressions in Table 4 include the monetary policy interest rate, thus, the higher the interest rate at the end of 2019, the greater the possible implementation of expansionary monetary policies addressing the economic effects of COVID-19. However, the sample size considerably decreases because this variable is not available for many low and middle-income countries. In general, the results suggest that the interest rate is positively associated with the change of the economic growth forecast. That is, countries with higher interest rates present smaller reductions in their forecasts. Again, for the full sample, government expenditure presents negative signs and significance. By contrast, the variable on the external structure lack significance, most probably due to the decrease of the sample size.

Table 3. Regression results: Fiscal policy

	(1) FS	(2) HI	(3) MI	(4) LI	(5) FS	(6) HI	(7) MI
GDP per capita 2018	-0.52***	-0.07	-0.85**	4.39	-0.75***	-0.32	-1.02***
Economic growth 2019	-0.21	-0.72***	-0.29**	-0.71	-0.16	-0.75***	-0.17
Capital formation	0.06	0.25***	-0.07	0.10	0.03	0.22***	-0.08*
Population	0.47**	0.57**	0.51**	0.72	0.27	0.50**	0.13
Trade	0.01	0.01***	-0.01	0.01	-0.001	0.01***	-0.03***
International tourism	-0.05	0.04	-0.09	0.13	-0.04	0.08	-0.08
Fuel exports	0.01	0.05***	-0.01	-0.06	0.03**	0.05***	0.01
Manufactures exports	-0.02	0.003	-0.01	-0.02			
Medium and high-tech exports					0.02	0.03**	0.03*
Government debt	-0.01	-0.01	-0.03*	0.06	-0.01	-0.01	-0.03
Government expenditure	-0.07***	-0.04	-0.04	0.003	-0.07***	-0.04*	-0.02
Constant	-7.19*	-21.43***	-0.39	-46.43	-3.33	-18.22***	6.33
Observations	118	44	59	15	110	44	56
r-squared	0.41	0.74	0.44	0.82	0.40	0.77	0.45

Notes: FS = Full sample; HI = High-income; MI = Middle-income; LI = Low-income.
n.a. not available.
Robust standard errors are used.
(*) [**] and {***} indicate statistical significance at the (10%) [5%] and {1%} levels.

The regressions in Table 4 are also replicated using health expenditure in place of GDP per capita, and excluding government expenditure due to collinearity concerns. Again, the interest rate presents positive and statistically significant coefficients. Finally, as additional robustness checks, the regression analysis was replicated using other independent variables such as domestic credit provided by financial sector, old age dependency ratio, inflation, current account balance, and government net lending/borrowing. The inclusion of these variables increases multicollinearity concerns, yet the major findings remain practically unchanged (not reported in tables).

5. Conclusions

The global expansion of COVID-19 has caused a contraction in economic activity without recent precedents. The magnitude of the fall in GDP growth forecasts is related both to the economic structure, especially external sector specialisation, and to the existing space of action to implement expansionary macroeconomic policies.

TABLE 4. REGRESSION RESULTS: FISCAL AND MONETARY POLICY

	(1) FS	(2) HI	(3) MI	(4) FS	(5) HI	(6) MI
GDP per capita 2018	-0.34	-0.05	-0.62	-0.56**	-0.07	-0.87
Economic growth 2019	-0.21	-0.57**	-0.18	-0.23	-0.58**	-0.17
Capital formation	0.08	0.25***	-0.02	0.06	0.24***	-0.01
Population	0.64***	0.65***	0.41	0.56***	0.64***	0.29
Trade	0.01	0.01***	-0.02	0.01	0.01***	-0.02
International tourism	0.03	0.13	-0.03	0.04	0.13	-0.02
Fuel exports	0.005	-0.01	0.02	0.01	-0.01	0.02
Manufactures exports	-0.004	0.0002	0.01			
Medium and high-tech exports				0.01	0.01	0.03
Government debt	-0.004	0.002	-0.01	-0.005	0.001	-0.003
Government expenditure	-0.07***	-0.02	-0.04	-0.07***	-0.02	-0.05
Interest rate	0.07***	0.36	0.06**	0.06***	0.35	0.04
Constant	-14.25***	-24.84***	-5.13	-11.20**	-24.27***	-1.44
Observations	77	37	36	75	37	35
r-squared	0.54	0.71	0.49	0.54	0.71	0.51

Notes: FS = Full sample; HI = High-income; MI = Middle-income.
n.a. not available.
Robust standard errors are used.
(*) [**] and {***} indicate statistical significance at the (10%) [5%] and {1%} levels.

As a first approach, our investigation should be interpreted with caution. Our results indicate that economic vulnerability to COVID-19 is associated with previous GDP per capita and GDP growth rate. For high-income countries, a higher share of fuel exports is associated with lower economic vulnerability. In the case of middle-income economies, the weight of international tourism is especially relevant in increasing growth vulnerability. In regard of economic policy, government expenditure, including health expenditure, is associated with higher losses in the economic growth forecast. By contrast, a higher interest rate seems to favour the forecast. Both results support the idea of the positive effects of the existence of macroeconomic policy space to implement expansionary economic policy measures.

Mechanisms to protect the economy from crises, like the current one, must be a priority. To this aim, it is necessary to identify the factors behind the vulnerability to shocks such as COVID-19. As our results show, covariables vary depending on the level of economic development and the structure of the external sector.

Beyond these preliminary results, it is necessary in future research to deepen the analysis of the factors associated with the vulnerability of the economy. The effects of COVID-19 have been different among countries, regions, and even among household members. Identifying these differences

will allow the design of policies to avoid an economic impact as great as the current one while protecting the most vulnerable population.

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