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SOVEREIGN DEBT DEFAULT RISK AND COVID-19

The impact of the COVID-19 pandemic on sovereign default risk and the relevance of fiscal space in developed and developing economies.

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Abstract – In the first months of the COVID-19 pandemic CDS spreads over the world ramped up. I study how market perception for sovereign debt default (represented by 5-year CDS spreads) evolved depending on the intensity of the economic shock caused by the spread of COVID-19, in developed and developing economies. Using a threshold model, I find a statistically significant relation between the increase in COVID-19 and the increase in CDS spreads for developed economies, with that impact being more than doubled when the country is fiscally constrained. For developing economies, I conclude that the shock in CDS spreads is mostly driven by global-risk factors.

Keywords – Sovereign Default, COVID-19, Fiscal Space, Threshold Estimation

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I – Introduction

The COVID-19 pandemic infected several hundred million people and was responsible for the death of several million. It disrupted our way of living and had a strong impact on almost every field of science including Economics. Governments worldwide, struck by uncertainty and the need to protect its citizens, decided to impose restrictions to the circulation of people and goods, not only with other countries, but also within borders. These events had a deep economic impact, with governments being quickly called to act, in order to reduce the economic pain caused by the health-driven measures taken in the first place. As the virus spread, economics was brought to the center of discussion. Often, we would hear on the news about the urgent need (only compared to past war efforts) to use debt to smooth the shock, ensure economic support to those most affected and to strengthen the health system. Nonetheless, many questions emerged about how prepared countries were to face this exogenous shock, with great discussions around the idea that a symmetric shock by nature, as was the case of the COVID-19 pandemic, could have very asymmetric effects depending on the health systems preparedness and on the demographic characteristics but also on economic pre-established conditions.

Given the temporary nature of the crisis and the exhorted need of "freezing" economic activity most governments were pressured to raise budget deficits, financed by debt, to unprecedent levels, while GDP all over the world contracted temporarily due to the imposed restrictions. This scenario created an immense pressure on sovereign debt, leading some, among which Blanchard (2020), to the question "When does the level of debt become unsafe?". Or posing it in a different way, are current debt dynamics, with the change in market conditions, sustainable?

In this context, this work project will analyze, in a general manner, how the COVID-19 shock affected the sovereign default probability, as measured by Credit Default Swaps

("CDS") spreads. I will also study how the pre-pandemic economic situation, more precisely concerning countries' fiscal space, impacted the market perception, and thus created pressure on sovereign debt default, in the presence of the economic shock caused by the COVID-19 crisis. Thus, one of the main goals of this paper is to analyze if there is evidence that supports the importance of maintaining fiscal space, or even to promote debt deleveraging in periods of growth and stability. Consequently, ensuring that countries' have enough fiscal space to deal with exogenous shocks that require significant economic interventions by governments, in order to avoid being more penalized by financial markets when under a different set of pre-established economic conditions.

This paper explores how market perception differs in developed and developing markets, in the COVID-19 context, and if for its nature, one group of countries tends to be more penalized for having lower fiscal space on the onset of an exogenous shock, as the one related to the COVID-19 pandemic. Another relevant question that is considered is how the impact of COVID-19 on CDS spreads varied when considering the pace and severity at which different countries were prompt to enact policies to restrict the spread of the virus and to control the health situation.

II – Literature review

There is ample debate, evidence, and research, on both the determinants of sovereign debt risk, and on how fiscal space affects the ability to respond to financial distress and exogenous shocks, in some cases with opposing points of view.

In a generic way, authors define the main determinants of sovereign debt risk, as those related to outside factors, justified by fluctuations in the World economy, normally classified as Global Factors (such as changes in S&P500, VIX, oil prices, etc.), and others related to specific country characteristics and changes in the local economy, classified as

Local Factors (such as changes in a national equity index, exchange rates, fiscal rules, local economic indicators, etc.). Some authors have found evidence for a dominance of global risk factors over local one's. For instance, Longstaff et al. (2011), Wang and Moore (2012) and Dooley and Hutchison (2009) show that for both developed and developing economies, during the 2008 financial crisis, characterized as an adverse and risk-off scenario in the global economy, that CDS markets in other countries were mainly driven by US-factors. Fender, Hayo, and Neuenkirch (2012) conclude that for a period between 2002-2011, for developing economies, CDS spreads were mostly justified by global and regional risk-premia. On a different tone, Heinemann, Osterloh, and Kalb (2014) and Sawadogo (2020) identify fiscal rules as a driver for sovereign bond spreads, while Balima, Combes, and Minea (2017) identify inflation rules as a driver for sovereign credit risk. Gennaioli, Martin, and Rossi (2014) and Acharya, Drechsler and Schnabl (2014) highlight the importance of local financial sectors in determining sovereign credit risk. While, Naifar (2020) and Turguttopbas (2015), find evidence for the relevance of both global and local risk factors. Finally, Augustin (2013) argues that local factors can have a significant effect when the term structure of the CDS spread curve becomes negative.

Regarding fiscal space, Romer and Romer (2017b) show that, for a set of OECD economies, the fall in GDP is several times higher in a country that has no fiscal space vis-à-vis countries with lower debt/GDP ratios. The authors also note that some of the countries with less fiscal space have to contract their public expenditure and enter in periods of fiscal consolidations, even if in recession, so that they are not penalized by financial markets, and can bear the cost of financing their debts. Reinhart and Rogoff (2010), and Cecchetti, Mohanty, and Zampolli (2010) find that in moments when countries hold a Debt/GDP ratio above a 90% or 85% threshold respectively, they experience lower growth than others below that threshold. Similarly, Fetai et al. (2020),

Zouhaier and Fatma (2014), Karadam (2018) and Alshammary et al. (2020), find significant Debt/GDP values for which economic growth is hampered, in different sets of developing countries. Contrary to this evidence, Chudik et al. (2013) seem to find no universal threshold for which Debt/GDP impacts growth negatively.

Finally, and focusing on work concerning specifically COVID-19 and its impact on CDS spreads, Cevik and Öztürkkal (2020) find no relation between the onset of several infectious-diseases outbreaks and CDS spreads, during the 21st century for developed and developing countries. However, when restricting it to the COVID-19 outbreak, the authors find a statistically significant impact of the disease spread on CDS spreads. They also find that the impact of the disease on CDS spreads seems to be larger in advanced economies than in developing countries.

Augustin et al. (2020), find a statistically significant relation between the spread of the pandemic and CDS spreads in a set of 30 developed economies, even when controlling for economic and financial global risk factors, and other country fixed effects. The authors use an endogenous threshold model to analyze the different effects in countries that are classified as fiscally constrained and find that the impact of the economic shock on CDS spreads is several times higher in those countries.

Daehler, Aizenman, and Jinjarak (2020) find that, for a set of developing countries, during the pandemic the different cross-country impacts on CDS spreads arise from traditional economic factors, such as fiscal space, rather than due to a different impact of the pandemic crisis. Similarly, Andrieș, Ongena, and Sprincean (2021) find that high values of Debt/GDP significantly increase CDS spreads.

III – Descriptive statistics and Methodology

I have collected data, based on its availability, for a total of 84 countries (**Table A1**), of those, 32 are classified as developed economies/countries, using the IMF definition of advanced economies, and the other 52 countries are classified as developing economies/countries. The choice of analyzing two different subsets of countries – developed and developing economies – intends to bring additional information to the analysis of the different impacts of COVID-19 on CDS spreads across the globe. Research suggests that emerging economies tend to be more penalized in sovereign debt markets during risk-off moments than advanced economies. As such, one expects that the increase in CDS spreads is higher during the pandemic in these countries than in the subset of developed economies. Nonetheless, it is also clear that advanced economies have, due to sociological and demographical reasons, been hit harder by the pandemic than emerging ones, at least, in the first wave of the pandemic. Thus, it is relevant to analyze not only how the CDS spreads evolved in the two subsets of countries during the period of analysis, but also if the impact on CDS spreads is mostly linked to the pandemic situation itself, or to macroeconomic global risk-factors which might result not directly from the pandemic but rather from spillover effects in the sovereign debt markets. Lastly, it is relevant to analyze if the pre-pandemic fiscal space is a relevant factor in explaining how differently COVID-19 impacted CDS spreads in both subsets of countries.

Regarding the time horizon used in this analysis, as suggested by Augustin et al. (2020), I will use the period of the first wave of the pandemic as my benchmark analysis period. As such, the period under analysis will be between 1st of January 2020, in which there were still no registered COVID-19 cases[1], and the 22nd of May 2020, when it started being

[1] For reference, the World Health Organization confirmed the human-to-human spread of the virus 22nd of January.

clear that the European Commission would issue a large proposal for a recovery fund and an updated EU long term budget. I choose to work with this period as benchmark since it was the one where the pandemic economic shock was most likely to be exogenous, as countries were caught by surprise, the pandemic responses at this phase were more homogeneous and less dependent on country specific characteristics. In this way, it is less likely that the economic impact portrayed by the number of COVID-19 cases is influenced by political decisions (both in economic and sanitary terms), increasing confidence in the causal link of my analysis.

My main explanatory variable, which works as an indicator for the magnitude of the economic shock, is the growth of COVID-19 cases, calculated using the first "Log-difference" of COVID-19 cases. I extracted data on COVID-19 from the Global Oxford Database. I use a log-growth variable for COVID-19, since for the first days with infections in each country, COVID-19's growth rates are very high, which would not clearly represent the impact of the spread of COVID-19 in my model. Furthermore, COVID-19 infections pose as a prime indicator for this analysis due to its daily frequency and comparability among countries. COVID-19 cases seem to be more likely exogenous in the first wave than any of the other alternatives (as NO2 emissions, or gas usage/traffic), also, the number of infections is likely a leading indicator of others, such as COVID-19 deaths, or any other indicator related to lockdown intensity and economic activity.

When analyzing the spread of COVID-19 in my dataset, it is easily observed that in the first two months of the dataset, there were almost no COVID cases, with the first cases being registered on the 22nd of January. Only almost one month later, by the end of February, did the number of new cases start to increase significantly. From that moment onwards COVID-19 spreads much wider affecting almost all countries, but at very

different growth rates in developed and developing countries, as represented in **Graph 1** and **Graph 2** (see appendix). At first COVID-19 cases grew much faster in developed than in developing economies, reaching its daily peak during the studied period, at 0.058 new cases per 1000 people, on April 2nd. From mid-late April onwards, an inversion of this tendency begins, with the COVID-19 spread accelerating significantly in developing countries and slowing down in developed economies. Nonetheless, in the last day of our period of analysis, total cases per 1000 people was still almost double in the subset of developed (2.03 per 1000) than in developing countries (1.03 per 1000). When looking at the same indicator for each country in our sample (**Graph 3**), we see that the maximum value is registered in Qatar (with almost 15 cases per 1000 people). Of the 10 countries with more cases per 1000 people out of the sample, 7 are developed economies, and 3 are developing economies (Qatar, Bahrain and Kuwait are very specific cases of developing economies[2]). On the other hand, the 17 countries with less cases per 1000 people are all developing economies.

To represent the sovereign default risk, I will use the 5-year, USD denominated, Credit Default Swap (CDS) Spreads, which are market-traded contracts that repay the owners in case the underlying asset of the CDS defaults. CDS contract spreads are closely intertwined with market perception of default risk. Furthermore, CDS contracts are traded daily. To try to dismiss part of the differences in the departure point, I will be using 5-year CDS spreads growth, instead of the levels. Data for 5-year, USD denominated, CDS spreads was extracted from Bloomberg.

In what concerns CDS spreads for our main period of analysis, the average CDS spread is close to 408 basis points ("bp"), with a standard deviation of close to 1600, which

[2] Countries with large GDP per capita and a greater number of international travelers.

reflects great volatility of CDS spreads for the period of analysis and for the unrestricted country set. With the minimum value of 7.42bp being registered in Denmark on the 19th of February and the maximum value of 28012.1bp being registered in Argentina on the 4th of May of 2020[3]. Argentina is the country with the highest average CDS spread in the period, with a value of around 9981bp, followed by Ecuador[4] with an average of 6029bp, being the two clear outliers, with the third highest CDS spread of 1466bp registered in Angola. When we restrict our sample to developed economies, the average CDS spread drops to 47.06 bp with a standard deviation of 46.46, the maximum value of 409.81bp is registered in Greece on the 18th of March of 2020. In fact, Greece is the developed economy with a larger CDS spread average over the period of analysis, around 192bp, larger than several developing economies (**Graph 5**). The lowest average CDS spread value is registered on the 18th of February, 32.21 bp, and around the 26th of February a rise on the average CDS spread starts being visible. As it happens with the overall group, the 9th of March marks a period of clear acceleration on CDS spreads, with the maximum of the series, 70.77 bp, having place on the 18th of March, with a significant drop in the following days, with CDS spreads stabilizing around the 55/60 bp from April onwards. Data for developing economies, expectedly portrays a scenario of higher default probabilities and larger volatility, with a CDS spread average of 630.11bp and a standard deviation of 1996.82, with the minimum CDS value of 20.46bp being registered in Thailand on the 20th of January. As seen in **Graph 4**, average CDS spreads were anchored at relatively low levels, with a 166.26 bp minimum on the 1st of January 2020, although with a slight increase CDS spreads remained relatively low until the beginning of March 2020, 9th of March, CDS spread values start rising abruptly, from 225.98 bp on that date, reaching its maximum on the 8th of April, with an average value across all countries of

[3] Argentina defaulted on its debt payments on the 22nd of May 2020.
[4] Also defaulted on its debt shortly after Argentina.

788.62. This different behavior of CDS spreads across time in different subset of countries highlights both that the pandemic saw a faster spread (or at least an acknowledgment of that spread) in developed economies than in developing one's, and that financial markets reacted faster in those countries, although being less exuberant in their reaction - note that in developed countries the CDS spread maximum/minimum ratio in the period was of about 2.2, and of about 4.74 in the developing economies subset. For the period of analysis (01/01/2022 – 22/05/2022), the effect also seems more persistent in developing economies, where the average CDS spreads increased around 260%, and "only" 52% in developed economies.

For my analysis, it is relevant to define a fiscal space variable to assess if countries were fiscally constrained on the onset of the crisis. Contrarily to the mentioned indicators that have daily frequency and are influenced by the economic shock, the fiscal space must be pre-determined. One of the most used indicators to assess fiscal space is a country's debt to GDP ratio. However, using debt to GDP ratio as a sole indicator of fiscal space can be misleading. Several authors and institutions have noted that broader measures of debt sustainability should be used when assessing fiscal space, such as Kose et al. (2017), International Monetary Fund (2018) and Cheng and Pitterle (2018). Thus, similarly to Augustin et al. (2020), I will be using a fiscal composite indicator that combines information from two World Bank data sources - Kose et al. (2017) and World Bank (2022b). I rank the countries in my sample according to the classification on each of the single variables, and then average those results and normalize them on a scale from 0 to1 (with 0 being the least fiscally constrained and 1 being the most fiscally constrained). I use the following 6 variables to compute the composite indicator – (1) General government gross debt, % of GDP; (2) Fiscal balance, % of GDP; (3) Central government debt maturing in 12 months or less, % of GDP; (4) Foreign currency long-term sovereign

debt ratings, index from 1-21; (5) GDP growth (annual %); (6) Interest payments (% of revenue). I use data for the year of 2019 for all of the 6 indicators, as I want to formulate a variable that is determined in the pre-pandemic period.

For the upcoming analysis, I compute the fiscal composite indicator dividing the dataset into developed and developing economies. The fiscal indicator becomes more suitable since the countries' situation is more comparable. In the developing economies, (**Graph 7**), Argentina ranks the second worse (only behind Bahrain). As seen before, Argentina was the country that had the highest CDS spread value during the studied sample. Simultaneously, the countries that rank best in the fiscal indicator are Bulgaria and Poland which are some of the countries with lowest average CDS in the developing group. For the developed group (**Graph 8**), it should be highlighted that Italy, Greece, Spain, and Portugal, are among the worst ranked countries, and simultaneously account, in the group of developed economies, as 4 of the 5 countries with the highest average CDS. It should also be noted that Japan and the US, are presented in the bottom of the fiscal ranking, and, although these countries have indeed some debt indicators that are, when analyzed *per se*, quite restrictive, Japan and the US are generally seen by the markets as countries with low probability of debt default. This composite variable reflects a wide set of debt indicators that are generally relevant but might not fully incorporate institutional factors that are important for markets when determining a country's fiscal space. Having that in mind, I will also compute an alternative fiscal composite indicator that weighs more the sovereign rating variables, and as such, might better reflect other qualitative factors that the original indicator does not portray as strongly. Nonetheless, one can observe a positive correlation between the composite fiscal indicator and the average CDS per country (**Graph 9** and **Graph 10**).

As stated before, for all regressions in the analysis the dependent variable is the daily change of the 5-year USD denominated CDS spread and the main explanatory variable will be the daily-log growth in COVID-19 cases[5]. I will also introduce common control variables, to exclude global economic and financial factors, with dynamic daily variation, such as the change in the VIX index (also known as the market fear index – an indicator for financial market volatility), returns on the S&P500, and the change in oil prices. As country-specific controls, I use the daily returns on a major national equity index (selected indexes presented in **Table A2** and **Table A3**), and the daily returns on the USD to local currency exchange rate. Other controls are also casually used, to control for other factors that might influence the pre-established capacity to deal with a pandemic (e.g. the Global Health Security Index, Trade Openness and Institutional Quality)[6]. I also employ a model specification with interaction of the main explanatory variable with the Oxford COVID-19 stringency index - Hale et al. (2021), to analyze how the default probability was related to the evolution of the pandemic when I controlled for the enactment of the "lockdown style" policies that aim to restrict behavior and hamper the economy. In certain specifications I also introduce time and country fixed effects.

Finally, in terms of the fiscal threshold definition, although some papers suggest the choice of fiscal threshold levels (based on Debt/GDP ratio), for example the 60% or 90% threshold based on fiscal rules, as is the case of Reinhart and Rogoff (2010), or others that pre-assume a certain percentile to define the threshold value like Hosny and Pallara (2022). In this case, in order to define the threshold value, I will be using econometric methods as defined in Hansen (2000). Using this method, I can estimate an endogenous threshold level, which is pre-determined for each country and time-invariant, by

[5] For the observations with no variation in COVID-19a value of 0 is considered.
[6] Variable description in the Appendix.

searching for a threshold level that minimizes the sum of squared residuals of the regressions, and if that threshold exists, allowing one to test if the coefficients of the relevant variables are significantly different when above or below the defined threshold.

IV – Results

I start by estimating a Pooled OLS regression, for the full list of countries in my dataset, to analyze the relation between the main explanatory variable - log daily variation in COVID-19 cases ($\Delta COVID19_{it}$) - and the daily percentage change in 5-year CDS spreads (ΔCDS_{it}).[7]

$$(1)\ \Delta CDS_{it} = \beta_1 \Delta Covid19_{\ it} + \ \varepsilon_{it}, \qquad \text{where } \varepsilon_{it} \text{ represents the error term.}$$

	All	Developed	Developing	Developed	Developing	Developed	Developing	Developed	Developing
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	ΔCDS	ΔCDS	ΔCDS	ΔCDS	ΔCDS	ΔCDS	ΔCDS	ΔCDS	ΔCDS
ΔCovid	0.063***	0.057***	0.067***	0.050***	0.058***	0.041***	0.052***	0.012*	-0.006
	(9.58)	(6.92)	(6.95)	(6.76)	(7.10)	(6.91)	(5.28)	(1.82)	(-0.47)
VIX				0.008	0.051**	-0.006	0.061**		
				(0.73)	(2.59)	(-0.54)	(2.56)		
S&P500				-0.504***	-0.518***	-0.241***	-0.501***		
				(-5.92)	(-3.75)	(-3.14)	(-3.18)		
WTI_OIL				-0.006***	-0.001	-0.006***	-0.001		
				(-3.05)	(-0.30)	(-3.07)	(-0.37)		
Equity						-0.645***	-0.114**	-0.276***	-0.081*
						(-4.06)	(-2.14)	(-3.01)	(-1.95)
EXR						-0.346	1.925***	-0.735	1.480***
						(-1.24)	(4.43)	(-1.58)	(3.06)
Country_FE								Yes	Yes
Time_FE								Yes	Yes
r2	0.027	0.056	0.021	0.135	0.063	0.185	0.100	0.338	0.153
N	8464	3232	5232	3232	5232	3222	3991	3222	3991

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table 1 – COVID19 impact in CDS spreads, with global and local controls, for Developed and Developing countries.

As expected, the results show a positive and statistically significant relation between the two variables (**Table 1**, column (1)), with a coefficient of approximately 0.063, translating into an increase of 0.063% in CDS spreads for an approximate 1% daily increase in COVID-19 cases. These results have a significant economic impact when we consider that the average COVID-19 log-growth, from the moment each country detected

[7] Since none of the variables are presented in levels, I opt to use a specification with no constant.

its first COVID-19 case, is approximately 13.6%, which would represent an average daily increase in CDS spreads of around 0.86%. It is also relevant to note that in 10% of the observations, from the moment each country detected its first COVID-19 case, COVID-19 log-growth was larger than 34.8%, representing a daily increase in CDS spreads of at least 2.2%. Thus, even if the coefficient does not seem impressively large at first, if we consider the outstanding growth of COVID-19 cases in the period of analysis, the overall effect over the period is large enough to be considered economically relevant.

I then proceed to divide the sample into developed and developing economies, with the results in both subsamples being similar to those in the overall sample, (columns (2) and (3) in **Table 1**). The coefficients are statistically significant in both cases, with the point estimate being slightly larger in the developing economies' regression, 0.067 versus 0.057 for developed economies. Nonetheless, the coefficients are not statistically different from each other. The R^2 is larger in the developed economies' subset, around 5.7% versus 2.1% for developing economies, which might reflect a larger volatility and noise in the data reporting, both for CDS spreads and COVID-19 cases for developing economies, resulting in a worse model fit.

To control for global determinants of sovereign risk in financial markets, I add to the specification detailed above, the daily growth of VIX, S&P500 and WTI Oil. The introduction of these controls will aid to prevent that the impact on CDS spreads stated above is driven by a mere omitted relation between COVID-19 growth and the variation in these global financial indicators. Specifically,

$$(2)\ \Delta CDS_{it} = \beta_1 \Delta Covid19_{\ it} + \gamma^T GC_{\ t} + \sigma^T LC_{\ it} + \ \varepsilon_{it}$$

where GCt represents the set of global controls and LCit represents the set of local risk factors. The estimates of equation (2) in columns (4) and (5) in **Table 1**, for both

developed and developing subsets maintain a significant, although slightly lower relation between the log-growth of COVID-19 cases and the daily change in CDS spreads. Regarding the added controls, the daily change in the VIX, has a positive and statistically significant impact in the developing countries subset, indicating that an increase in volatility in overall financial markets, and potential decrease in risk-appetite, seems to generate an increase in the CDS spread, and thus, in the implied debt default risk, in developing economies. Simultaneously, the daily variation of the S&P500 seems to have a relevant negative impact on the CDS spread in both subsets of countries, with a 1% drop in S&P500 originating a 0.5% increase in CDS spreads, in line with the findings of Longstaff et al. (2011) that sovereign spreads are driven primarily by U.S. equity. Finally, oil price changes seem not to have a statistically significant impact on the CDS spreads in developing economies, and in the developed countries' subset, the impact, although statistically significant, is economically negligible.

As seen in the literature review section, besides global risk factors, local and regional risk factors might also explain CDS spread changes, with Augustin (2013) arguing that local factors can have a larger effect when the term structure of CDS inverts, which is likely to be the case in the COVID-19 pandemic setting. Thus, I use both the daily growth in a major local equity index, and the daily variation in the pair - USD to country's local currency[8]. As expected, the coefficient of the local equity index is negative and statistically significant (**Table 1**, columns (6) and (7)); however, the local equity index has a stronger overall effect in the developed economies' subset than in developing economies. Simultaneously, the impact of the S&P500 daily variation is stronger in developing economies than in developed ones, pointing towards the fact that developing economies might be more affected by global equity returns, whereas developed one's are

[8] When the growth of the exchange rate variable is positive, the local currency depreciated against the USD.

more affected by local equity returns. The relation between daily variation of USD to local currency is not statistically significant in the developed economies subset but has a clear impact on the developing subset, (**Table 1** column (7)). This highlights the fact that the depreciation of local currencies against the USD, might signal times of global risk episodes, as stated by De Bock and de Carvalho Filho (2013) and Avdjiev et al. (2019), which pressure CDS spreads, mainly in developing economies. But also, that currency devaluation, more common in developing economies where monetary discipline is low, can be used to lower the "real" debt burden (when debt is held in local currency), likely increasing the perception of a potential sovereign debt default and thus pressure USD denominated CDS spreads to increase. Thus, although I initially classify this variable as a local risk-factor, since it varies from country to country, it is likely that its overall and significant behavior is also driven by changes in the US/Global market.

$$(3)\ \Delta CDS_{it} = \beta_1 \Delta Covid19_{\ it} + \sigma^T LC_{\ it} + \alpha_{\ i} + \delta_{\ t} + \varepsilon_{it}$$

Where α_i represents country fixed effects and δ_t represents time fixed effects. Using country fixed effects does not change the results presented above, neither in developed economies, nor in developing ones. However, when we include both country and time fixed effects, the main explanatory variable has its coefficient more than halved and is only statistically significant at the 10% significance level for developed economies, while it becomes not statistically significant for the developing subset. The fact that the addition of time fixed effects deems the impact of COVID-19 in CDS spreads to be not significant for developing countries, points towards the idea that the CDS markets in these countries might be mostly affected by global effects (constant across all countries), as the time

variation in global financial markets[9], potentially instigated by the pandemic evolution across the globe, rather than its local evolution.

Impact of pre-pandemic fiscal space in CDS variation

Besides the already mentioned local and global risk factors that might impact CDS spreads, the existing fiscal space, before an exogenous shock as COVID-19, is a strong candidate to influence the impact of the variation in COVID-19 on CDS spreads. If a country presents "adverse" indicators of debt sustainability and low fiscal space, it is expected that financial markets will punish these countries more strongly, when compared to others with a rather stable debt situation. In the COVID-19 context, this effect could be felt via an inversion of the "debt path", triggered by an abrupt decrease in GDP growth, and an increase in interest rates and government expenditure, but also via the perception of financial markets of the incapacity to take the needed measures to tackle the pandemic growth, due to a fragile pre-pandemic debt situation. The latter effect would create a self-reinforcing relation where countries, with low pre-pandemic fiscal space, cannot take the needed measures to tackle the pandemic, thus having stronger negative economic effects that will further worsen the existing fiscal space. As stated before, fiscal space is hard to measure, and no single economic or financial variable is expected to perfectly portray it. Thus, I re-estimate the regressions previously presented in the last section, by introducing individually 6 economic variables, considered to influence a country's fiscal space, but also a single fiscal composite indicator, as defined in section III. All fiscal space variables (either single, or composite) are interacted with the log daily growth in COVID-19, to estimate if the COVID-19 shock is amplified by these variables, rather than simply

[9] When using time fixed effects in the model, global variables that are used in other specifications, and that are sometimes statistically significant, such as the variation in the S&P500, VIX, and WTI Oil, are dropped.

understand the effect of the COVID-19 shock on CDS spreads conditional on those variables. The model is now,

$$(4)\ \Delta CDS_{it} = \beta_1 \Delta Covid19_{\ it} + \beta_2 \Delta Covid19_{\ it} * FiscalSpaceIndicator_{\ i} + \sigma^T LC_{\ it} + \alpha_{\ i} + \delta_{\ t} + \varepsilon_{it}$$

For the developed countries' subset, the results of the interaction variables are statistically significant for all cases, except for the one that uses Sovereign rating as an interaction term (**Table A4** see appendix). Furthermore, all statistically significant coefficients for the interaction terms have the expected sign, positive for the regressions with the composite indicator, Debt/GDP ratio, Debt percentage maturing in the next 12 months, and sovereign debt interest as a percentage of government revenue (columns (1), (2), (3), (6) and (7), respectively, **Table A4**), and negative for the regressions that use the fiscal balance as percentage of GDP, and GDP growth, as the interaction term (columns (4) and (8)). If we take as an example the Debt/GDP ratio, we observe that in a country with a Debt/GDP ratio of 50%, a 13.6% approximate increase in COVID-19 cases leads to a 0.08% increase in CDS spreads, while in a country with a Debt/GDP ratio of 150%, the daily increase would be of approximately 0.63% (almost 8 times larger). Using the fiscal composite indicator, in **Table A4** column (1), for the most fiscally constrained country in the developed economies subset, a 13.6% daily increase in COVID-19 cases, generates a 0.95% increase in CDS spreads, while for the least fiscally constrained country the same increase in daily infections leads only to a 0.26% increase in CDS spreads. These results seem to point towards the conclusion that countries that had less fiscal space, before the COVID-19 shock, were significantly more penalized by financial markets in terms of the market implied default probability, as measured by the CDS spreads. As expected, this conclusion is in line with the results from Augustin et. al (2021), but also with previous findings not related to the COVID-19 pandemic.

To ensure the results are not biased due to the omission of relevant variables such as a country's preparedness to deal with a pandemic, to pandemic mitigation policy decisions, openness to the international economy, or other institutional factors, I run new regressions, with these variables as interaction terms with the log COVID-19 growth. As seen in **Table 2** below, in all specifications, the fiscal space composite indicator maintains its statistical significance and changes not significantly in magnitude, thus increasing the robustness of the previously taken conclusions.

	Developed (1) ΔCDS	Developed (2) ΔCDS	Developed (3) ΔCDS	Developed (4) ΔCDS	Developed (5) ΔCDS
ΔCovid	-0.015	-0.031**	-0.002	-0.112	-0.003
	(-1.53)	(-2.46)	(-0.10)	(-1.68)	(-0.21)
Equity	-0.266***	-0.386***	-0.299**	-0.256***	-0.267***
	(-3.04)	(-2.92)	(-2.66)	(-2.92)	(-3.07)
EXR	-0.724	-0.810*	-0.786*	-0.727	-0.732
	(-1.57)	(-1.78)	(-1.72)	(-1.55)	(-1.62)
Fiscal*ΔC19	0.064***	0.065***	0.057***	0.070***	0.059***
	(4.18)	(3.46)	(3.30)	(4.39)	(3.60)
health_index		0.034*			
		(1.70)			
trade_index			-0.007		
			(-0.66)		
ghsscore_i~x				0.159	
				(1.45)	
gIQ_index					-0.818
					(-1.13)
Country_FE	Yes	Yes	Yes	Yes	Yes
Time_FE	Yes	Yes	Yes	Yes	Yes
r2	0.343	0.375	0.351	0.355	0.343
N	3222	2286	3126	3121	3222

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table 2 - COVID19 impact in CDS spreads, with fiscal space as an interaction variable, for Developed countries.

Only the interaction between the Oxford Stringency Index and the log COVID-19 growth results in a statistically significant coefficient (and only at the 90% confidence level), the signal of the coefficient indicates that higher values of the Stringency Index, portraying the need of imposing more restrictions to "regular" economic activity, would result in a larger increase in CDS spreads for the same daily increase in COVID-19 cases. Interestingly, the results of regression (2) in **Table 2**, seem to indicate that the driver of CDS spreads growth, is not the growth in daily COVID-19 infection (since the coefficient

on the individual variable is statistically significant and negative), but rather the combined effect of the daily growth in COVID-19 cases, and its interaction with both the pre-existing fiscal space and the country's policy reaction to the pandemic.

When applying a similar analysis for the developing economies' subset, the conclusions are less clear. The interaction variables between the indicators for pre-pandemic fiscal space and COVID-19 growth are not statistically significant for all the computed regressions, as seen in **Table A5** in the appendix. Nonetheless, in regression (1), with global controls, both the global variables and the local financial market variables are statistically significant and maintain the expected sign. Furthermore, in all regressions with fixed effects, the daily change in the exchange rate (USD to local currency) maintains its statistical significance and the sign and magnitude of its coefficient, which as stated before, might signal that the devaluation of local currencies to the USD signals a global risk-off episode, pressuring CDS spreads in developing economies to increase.

	Developing (1) ΔCDS	Developing (2) ΔCDS	Developing (3) ΔCDS	Developing (4) ΔCDS	Developing (5) ΔCDS
ΔCovid	-0.012	-0.009	0.029	-0.110	-0.014
	(-0.47)	(-0.25)	(0.87)	(-1.29)	(-0.57)
Equity	-0.081*	-0.548***	-0.082*	-0.080*	-0.080*
	(-1.95)	(-3.12)	(-1.95)	(-1.95)	(-1.95)
EXR	1.480***	1.417***	1.470***	1.478***	1.485***
	(3.07)	(2.82)	(2.91)	(3.10)	(3.08)
Fiscal*ΔC19	0.011	0.006	0.018	0.033	0.015
	(0.24)	(0.11)	(0.42)	(0.62)	(0.33)
health_index		-0.013			
		(-0.25)			
trade_index			-0.057*		
			(-1.92)		
ghsscore_i~x				0.197	
				(1.30)	
gIQ_index					0.805
					(0.40)
Country_FE	Yes	Yes	Yes	Yes	Yes
Time_FE	Yes	Yes	Yes	Yes	Yes
r2	0.153	0.162	0.151	0.154	0.153
N	3991	2599	3688	3991	3991

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table 3 - COVID19 impact in CDS spreads, with fiscal space as an interaction variable, for Developing countries.

When adding other controls, as in **Table 3** above, to the fixed-effects regressions the coefficient of the interaction term between the fiscal composite indicator and COVID-19 growth, remains not statistically significant.

Impact of pre-pandemic fiscal space in CDS variation, threshold regression

Until this point, I analyzed if the interaction between a country's pre-pandemic fiscal space and COVID-19 impacted linearly CDS spreads variation. Nonetheless, as mentioned in section II, it is plausible that fiscal space might have non-linear effects on CDS spreads. As such, in this setting it is important to analyze if, after controlling for other local and global financial indicators, countries that were more fiscally constrained before the pandemic hit, were, for a similar COVID-19 shock, disproportionately more penalized by financial markets. In that sense, we use an endogenous threshold model, as defined in Hansen (2000), and similarly to Augustin et al. (2020), we apply it to our dataset, using the defined fiscal composite indicator, as the threshold variable. The threshold model is,

$$(5)\ \Delta CDS_{it} = \beta_A(Fs_i > T)\Delta Covid19_{\ it} + \beta_L(Fs_i < T)\Delta Covid19_{\ it} + \gamma^T GC_{\ t} + \sigma^T LC_{\ it} + \varepsilon_{it}$$

where Fs_i represents the used fiscal space indicator for a country, and T the estimated threshold level. I apply the methodology above separately for the two main subsets of data (developed and developing economies), and once more obtain quite different conclusions. For developed economies, when using the composite indicator for fiscal space as a fiscal threshold, I find evidence for the existence of a fiscal threshold, that I estimate to be of 0.633. In light of this analysis, such results indicate that 9 countries would be classified as fiscally constrained. As seen in **Table 4** below, the coefficient for the COVID-19 daily growth, is estimated to be 0.063 when above the threshold, and of

0.029 when below the threshold, thus being about 2.2 times larger in countries that were fiscally constrained, with the coefficients being statistically different from each other (at the 95% significance level). The countries are Belgium, France, the UK, Portugal, the US, Greece, Spain, Italy and Japan. It is also interesting to note that the mean COVID-19 daily growth, after the first case is detected, is quite similar in the countries below and above the threshold, around 14.2% in the countries above the threshold versus 13% in those below. Thus, if we assume the average COVID-19 growth, all else equal, countries above the threshold would see their 5-year CDS spreads increase by around 0.89%, while it would only increase approximately by around 0.38% in those below the threshold.

Threshold		Beta High (ΔCovid)	Beta Low (ΔCovid)	Z-stat for the difference in Betas	Country Split	
					High	Low
Fiscal space - Developed	0.633***	0.063*** (4.099)	0.029*** (3.707)	1.988**	9	23
Fiscal space - Developing	0.548***	0.038* (1.925)	0.045*** (3.212)	-0.265	17	24
(excluding Argentina and Ecuador)	0.548***	0.025 (1.549)	0.045*** (3.212)	-0.938	15	24
%Debt/GDP developed	91.08***	0.061*** (3.733)	0.029*** (3.838)	1.751*	8	24
%Debt/GDP developing	86.8***	0.054 (1.192)	0.039*** (3.515)	0.308	3	38
(excluding Argentina and Ecuador)	62.09***	0.021 (1.239)	0.041*** (3.057)	-0.900	26	12
Sovreign rating - Developed	14.76***	0.038*** (4.72)	0.034* (1.67)	0.161	27	5
Sovreign rating - Developing	12.58***	0.06*** (3.028)	0.029** (2.136)	1.302	14	27
(excluding Argentina and Ecuador)	12.58***	0.06*** (3.028)	0.019 (1.832)	1.826*	14	25

Table 4 – COVID19 impact in CDS spreads - Threshold regressions

When using the Debt/GDP ratio instead, the conclusions are quite similar, with the threshold being defined at a value of around 91.08% of Debt/GDP, with a split of 8/24 countries, above/below the defined threshold, aligned with the Debt/GDP threshold level used by (Reinhart, Reinhart, and Rogoff 2012).

Also, to use an indicator that might better reflect market perception for fiscal space, and that might weigh in other "qualitative" aspects of this concept, I run the threshold with the Sovereign rating (as defined in section II) as the threshold variable. In this case, although the countries with a better sovereign rating (above the threshold), and thus expected to have more fiscal space, present a larger coefficient on the main explanatory variable (which is contrary to the conclusions taken in the cases presented above), the coefficients are, in practice, very identical above/below the threshold, and statistically not different from each other. The differences in the coefficients, above/below the threshold remain non-significant when I change the fiscal composite indicator to weigh the sovereign rating variable at 50% instead of the original $1/6^{th}$ (**Table 4**, complete results in the appendix). Indicating that a market perception indicator, based on sovereign ratings from rating agencies, creates a split of the developed countries' sample where the impact of COVID-19 on CDS spreads, does not change whether countries are above or below that rating value.

When applying the methodology presented above to the developing economies, I am able to estimate a statistically significant threshold for the regression, using the fiscal composite indicator as the threshold variable. However, although, the impact of COVID-19 on the CDS spreads remains positive and statistically significant, whether below or above the estimated threshold, the results of the threshold regression (**Table 4**) suggest that the coefficients on the main explanatory variable are not statistically different from each other. The country split resulting from the threshold regression is 24/17 (countries below/above the threshold). Furthermore, the estimated coefficient, is higher for the countries with a value of the fiscal composite indicator above the threshold. This would imply, if the coefficients were statistically different from each other, that countries we

consider as being more fiscally constrained, would have its CDS spreads less affected, by a similar shock in COVID-19 cases, than those who are not as fiscally constrained.

When using the Debt/GDP ratio, as the threshold, although the coefficient on the main explanatory variable is 0.054 when Debt/GDP is above 86.8% (threshold value), and only 0.039 when Debt/GDP is below the threshold, the difference between the coefficients is not statistically significant, and the coefficient for the countries above the threshold (although larger than for those below) is not statistically significant. This happens since using the Debt/GDP ratio results in a 38/3 split, with only three countries above the threshold (Brazil, Argentina, and Bahrain), and thus very large standard errors. None of the other thresholds specified in **Table 4** result in statistically different coefficients for the main explanatory variable, conditional on the threshold value.

To expurgate the effect of outlier cases affecting my data, I drop information for Argentina and Ecuador, two countries that defaulted during the period of analysis and so, for which data on CDS spreads is highly volatile and might be misleading due to lack of liquidity in CDS markets for these two countries during this period. This change in the data, results in no meaningful change for the case where the composite fiscal threshold is used. Using Debt/GDP as a threshold variable now yields a larger coefficient for the main explanatory variable in countries with Debt/GDP lower than 62%, than for those above, which is counterintuitive; nonetheless, the coefficients are not statistically different from each other.

Finally, when using Sovereign rating as the threshold variable, both coefficients associated to the impact of COVID-19 growth, are significantly different from 0, and statistically different from each other. However, the coefficient above the threshold is of 0.060, and the coefficient below the threshold is of 0.019, which implies that the countries with a better sovereign rating would have experienced a higher increase in CDS spreads,

for a similar shock in COVID-19 growth. Although this relation is at first unexpected, one can theorize that developing countries with a better sovereign rating score (above 12.58), since departing from a lower CDS spread level, were proportionately more punished, due to the global nature of the shock, and its global risk-off effects, with developing countries being affected altogether by the COVID shock, resulting in a proportionately bigger change in CDS spreads (for a similar shock on the daily COVID-19 cases registered in a specific country) for countries that had better sovereign ratings.

The results for the subset of developing countries, when including interactions with fiscal space variables, fixed effects, or threshold models, seem to indicate that developing economies were mostly affected by global risk factors, and by a global risk-off movement, that drove CDS spreads higher, and substantially increased its volatility. In the appendix, I introduce further **Robustness Analysis for Developing Economies,** with the only relevant conclusion being that, when I split the subset per continent/region, results for Asian developing economies become statistically significant for regressions with fixed effects (but not for the threshold regressions), which might happen because Asia was generally more affected by COVID-19 than the rest of the developing countries.

V. Conclusions

In the set of developed countries, the model predictions were consistent with existing literature. My analysis generally highlights that the increase in COVID-19 cases led to an increase in 5-year, USD denominated, CDS spreads, but also that this increase was dependent on the pre-pandemic fiscal space. I find that, in a fixed effects model, regardless of the controls used, the interaction term between COVID-19 log growth and a fiscal space variable, always shows that countries with less fiscal space before the pandemic were more punished by sovereign debt markets than those that departure with a larger fiscal space. Interestingly, my analysis also suggests that countries imposing

stricter lockdowns have suffered a larger increase in its perceived debt default probability than those with less strict lockdown policies (for a similar COVID-19 impact). Thus, resulting in the fueling of the feedback relation between COVID-19 and CDS spreads that could hamper and restrain government decisions in this specific setting, in line with the conclusions of Benmelech and Tzur-Ilan (2020). Finally, the threshold model used suggests that there exists a threshold value, for the fiscal space composite indicator, for which the relation between COVID-19 log growth and CDS spreads evolves non-linearly. The threshold model results imply that for countries that were more fiscally constrained the impact of COVID-19 on CDS spreads was more than double of that in countries below the threshold. The conclusions are similar, if using Debt/GDP ratio as the threshold variable, with a threshold being defined at around 91% Debt/GDP.

These conclusions might help enlightening policy decisions by pointing out that fiscal consolidation, and debt-deleveraging should be considered in developed economies, so that countries can be prepared to deal with exogenous and unpredictable shocks to the economy, as the one resulting from COVID-19, in line with what has been suggested in previous research, such as Cecchetti, Mohanty, and Zampolli (2010). Consequently, governments and supranational institutions, should vouch for policies that promote debt stabilization to prepare countries for potential future exogenous shocks. It should also be considered that, when the shock occurs, countries that were more debt constrained might need extraordinary help, through solidarity mechanisms, as a way of better mitigating shocks that might have systemic impacts in the rest of the world (in the case of COVID-19, through both the spread of the disease, and the contamination in financial markets).

Differently in developing economies, I conclude that although there seems to be evidence that the increase in COVID-19 cases led to an increase in 5-year, USD denominated, CDS spreads, these results are highly dependent on the model specification, and on the non-

inclusion of time fixed effects. Thus, the conclusions for this subset of countries, seem to be highly influenced by global risk factors, and by the evolution, throughout the period of analysis, of the pandemic worldwide, rather than in the country. The fact that the coefficient on the exchange rate variable, but also the mean value of the variable, seems to be positive and significant throughout the analysis, highlights the idea that the depreciation of local currencies against the USD, might signal times of global risk-off episodes, which would pressure upwards CDS spreads, in less stable economies. I also conclude, that for the analyzed dataset, there is no evidence that pre-pandemic fiscal space, either in linear or threshold specifications, had a significant impact in amplifying the COVID-19 impact in CDS spreads in the wider set of developing countries. Robustness analysis confirms these results, with exception for when I restrict the analysis to countries in Asia, where results become more similar to those of the developed countries set.

The highlighted differences in the results for developing economies, seem to portray that due to its nature, local policy decisions might come up short in controlling the impact of an exogenous shock in CDS markets, with global-risk factors strongly driving the market perception and widely penalizing developing economies. Thus, for overall emerging economies, it seems that the watchful eye and support of international institutions must take a central role, in helping governments coping with exogenous shocks, in this case, financing health related policies, to avoid harsher repercussions from financial markets, as a sovereign debt market freeze or a sudden stop, that could have catastrophic effects in the "real" economy. Finally, for future research, including monetary policy controls', mainly for developing economies, might add interesting insights to the analysis. Also, as this work focuses on the immediate response of sovereign debt markets to the COVID-19 shock, for further analysis, it seems relevant to explore the real economic and health

impacts of the changes in sovereign default risk. Thus, it would be interesting to try to quantify how the impact on sovereign default risk, hampered both fiscal and monetary pandemic-mitigation policy packages (for a longer analysis period), and analyze its impact, for example, on both economic growth and excess mortality during the period.

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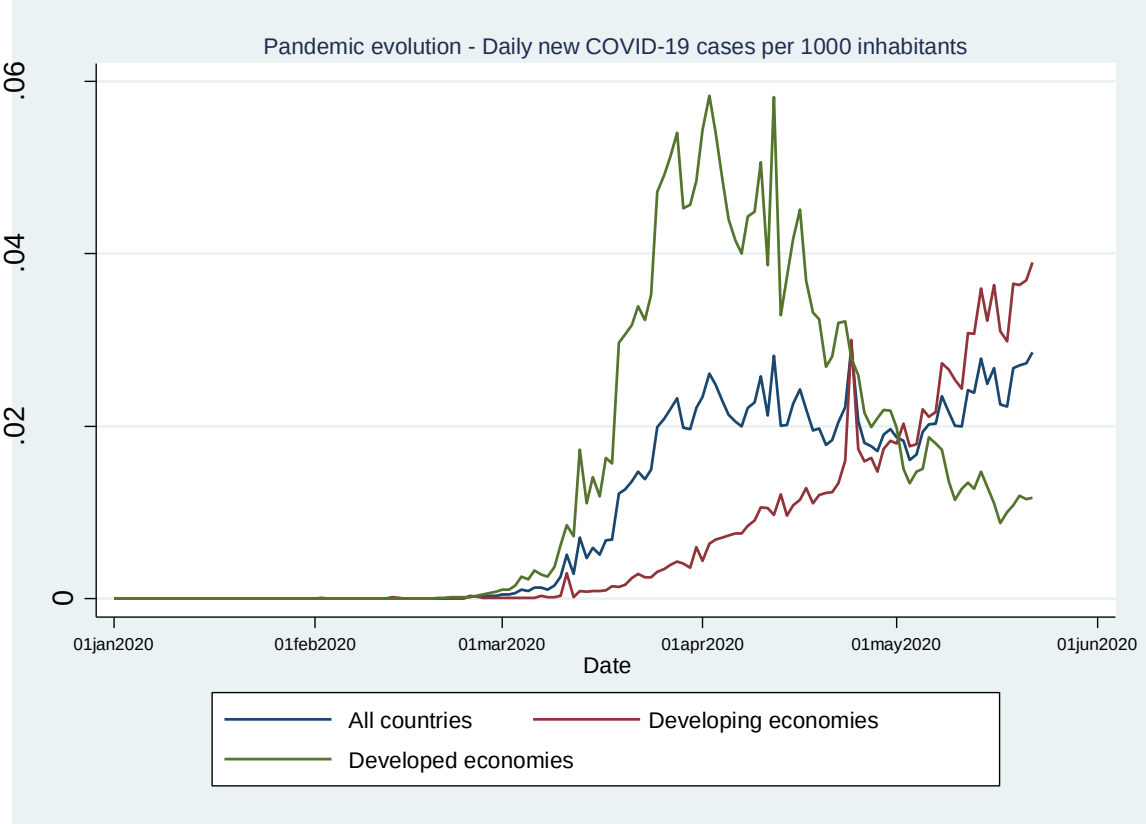
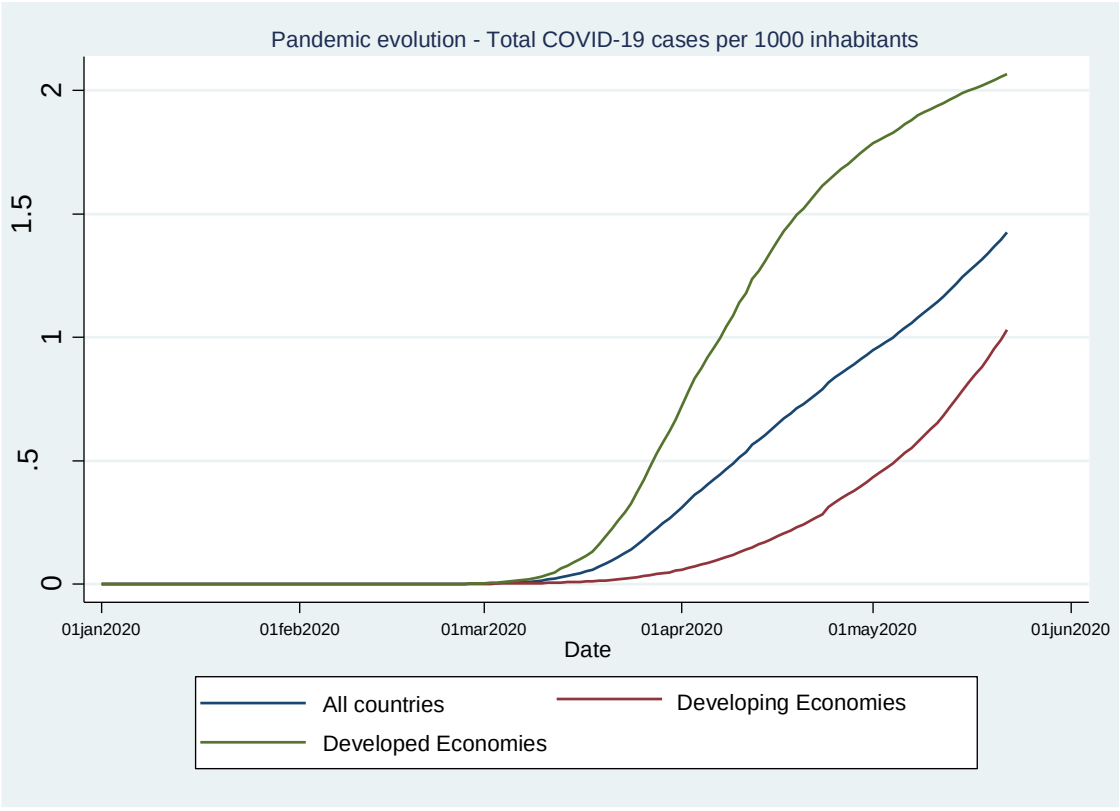
Appendix

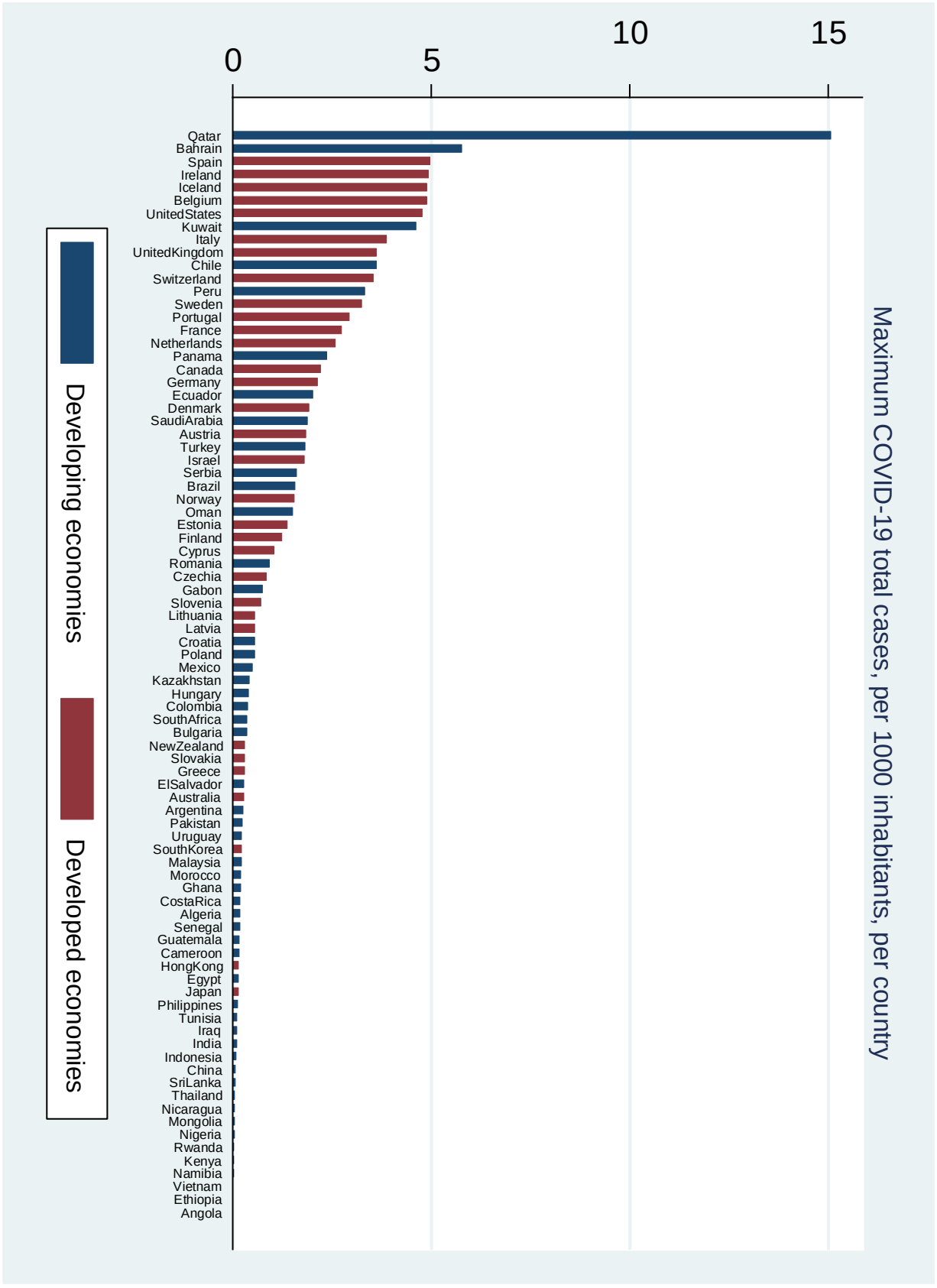
Graph 1



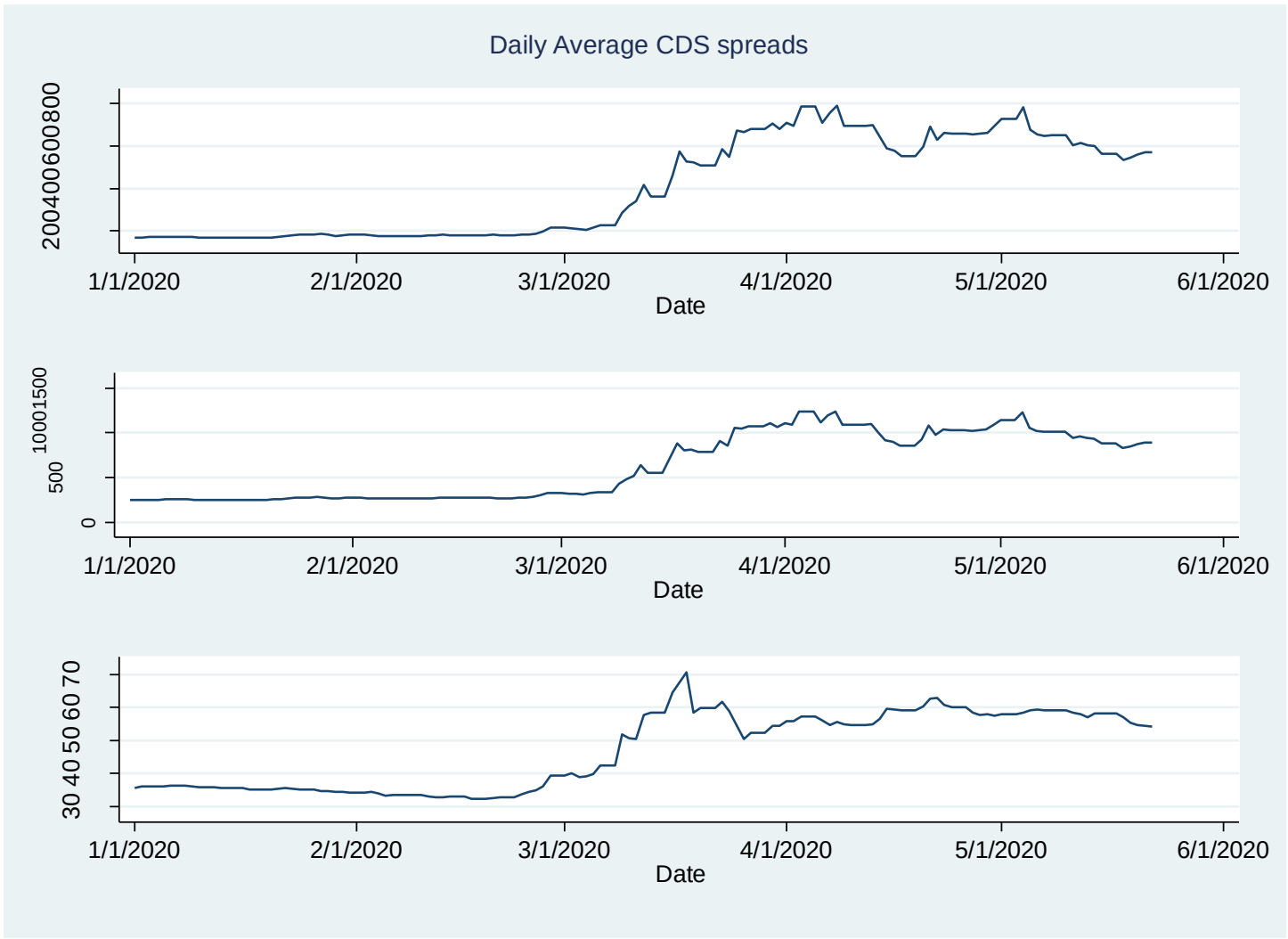
Graph 2



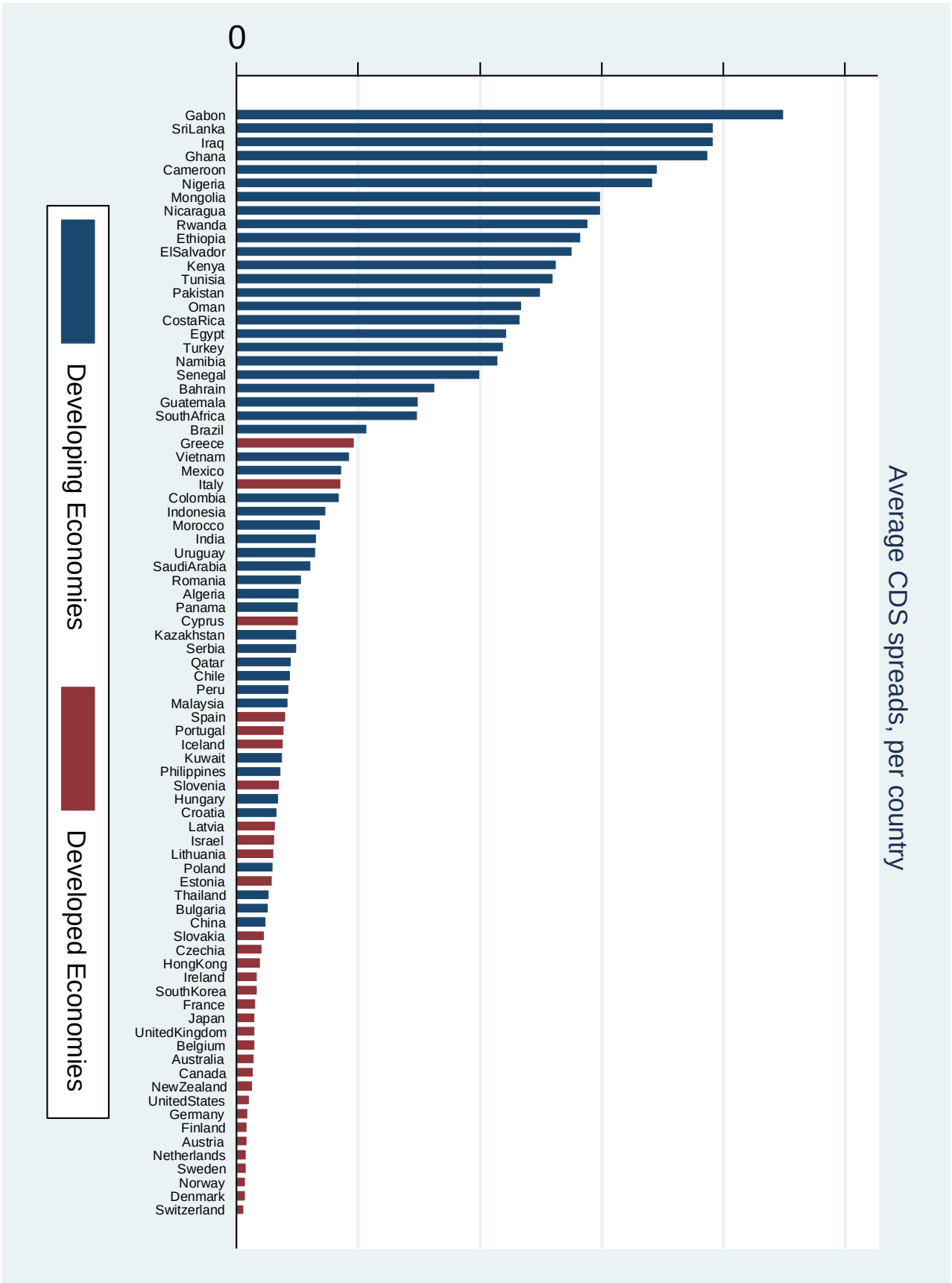
Graph 3


0
5
10
15
Qatar
Bahrain
Spain
Ireland
Iceland
Belgium
UnitedStates
Kuwait
Italy
UnitedKingdom
Chile
Switzerland
Peru
Sweden
Portugal
France
Netherlands
Panama
Canada
Germany
Ecuador
Denmark
SaudiArabia
Austria
Turkey
Israel
Serbia
Brazil
Norway
Oman
Estonia
Finland
Cyprus
Romania
Czechia
Gabon
Slovenia
Lithuania
Latvia
Croatia
Poland
Mexico
Kazakhstan
Hungary
Colombia
SouthAfrica
Bulgaria
NewZealand
Slovakia
Greece
ElSalvador
Australia
Argentina
Pakistan
Uruguay
SouthKorea
Malaysia
Morocco
Ghana
CostaRica
Algeria
Senegal
Guatemala
Cameroon
HongKong
Egypt
Japan
Philippines
Tunisia
Iraq
India
Indonesia
China
SriLanka
Thailand
Nicaragua
Mongolia
Nigeria
Rwanda
Kenya
Namibia
Vietnam
Ethiopia
Angola
Developing economies
Developed economies
Maximum COVID-19 total cases, per 1000 inhabitants, per country

Graph 4


Daily Average CDS spreads
200400600800
1/1/2020
2/1/2020
3/1/2020
4/1/2020
5/1/2020
6/1/2020
Date
10001500
500
0
1/1/2020
2/1/2020
3/1/2020
4/1/2020
5/1/2020
6/1/2020
Date
30 40 50 60 70
1/1/2020
2/1/2020
3/1/2020
4/1/2020
5/1/2020
6/1/2020
Date

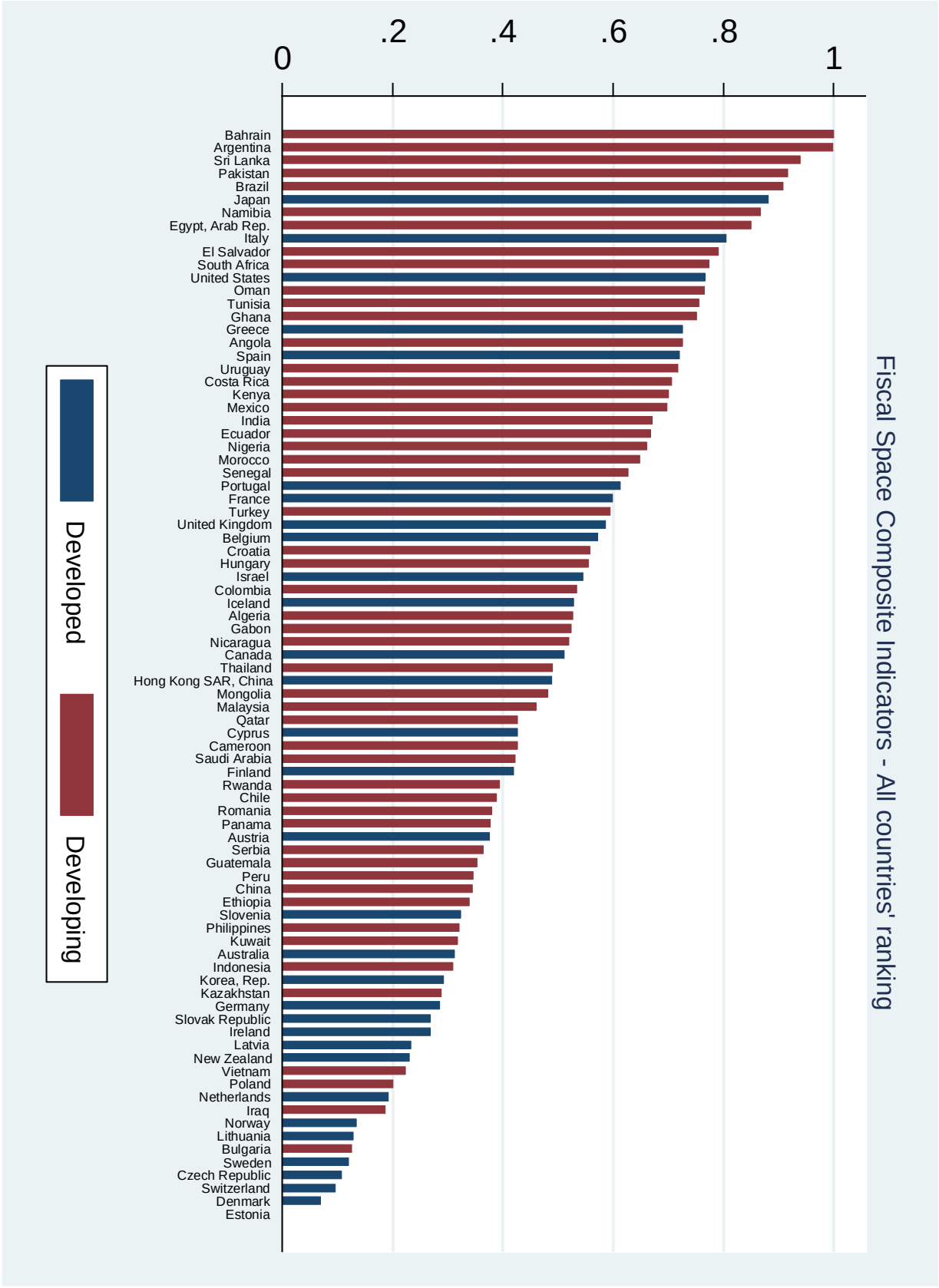
Graph 5



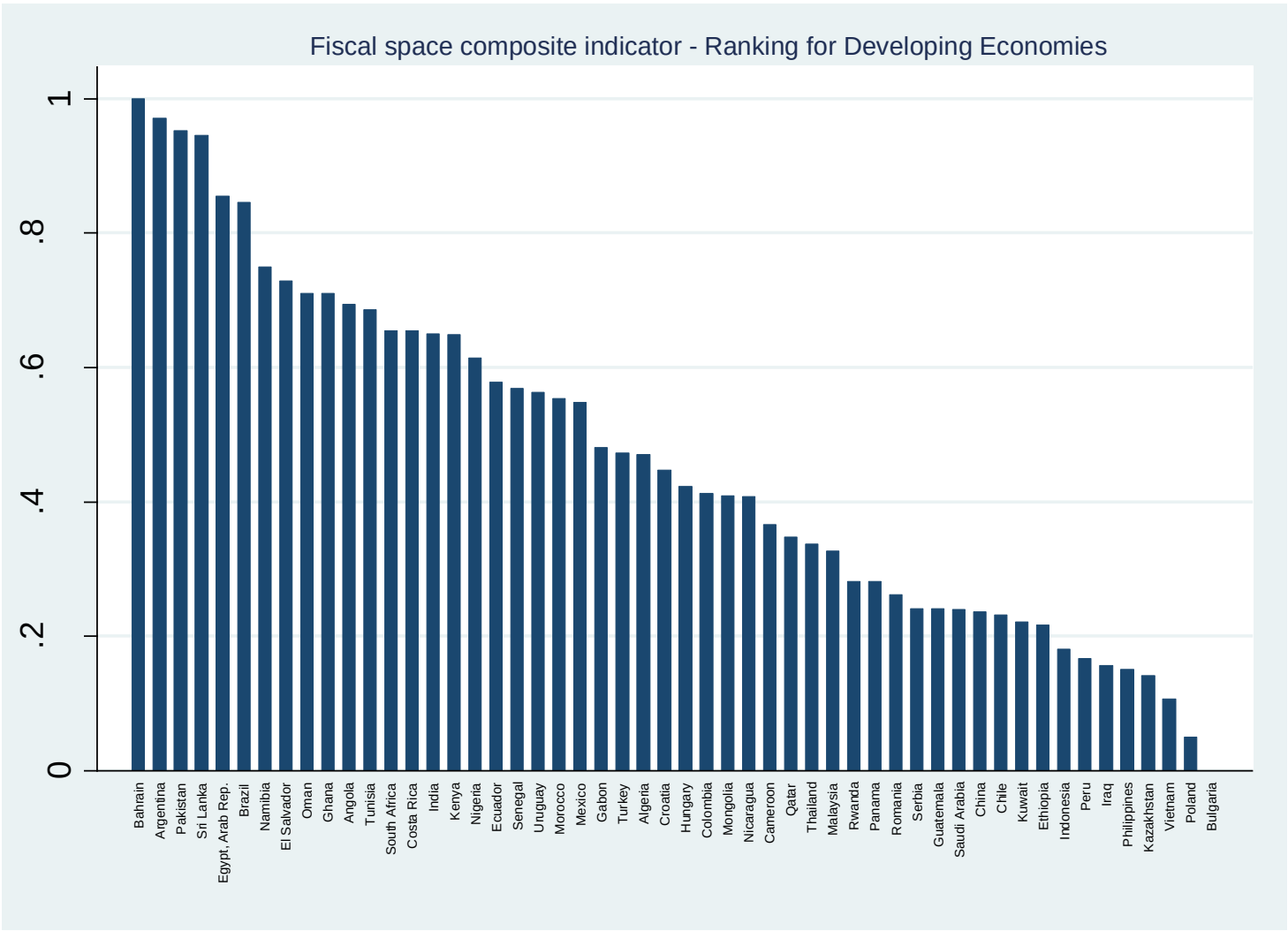
For reasons of scale, this graph omits data for Angola, Argentina, and Ecuador.

Graph 6

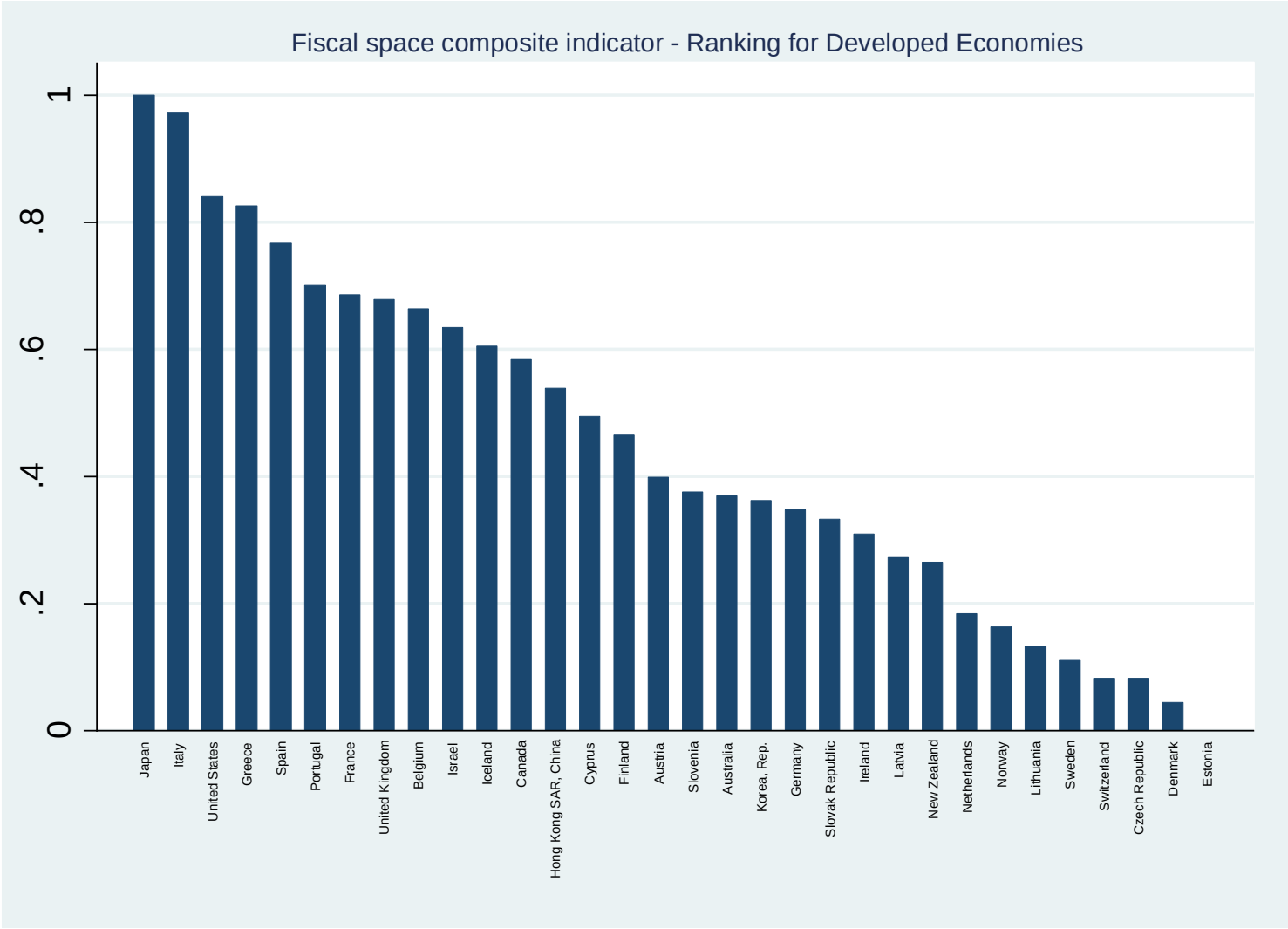
For methodological reasons, I don't use the Fiscal Space Composite Indicator for all countries, since as this indicator is an average of several rank variable (which compare all countries), it makes more sense to calculate each rank variable only for the respective subset of countries.



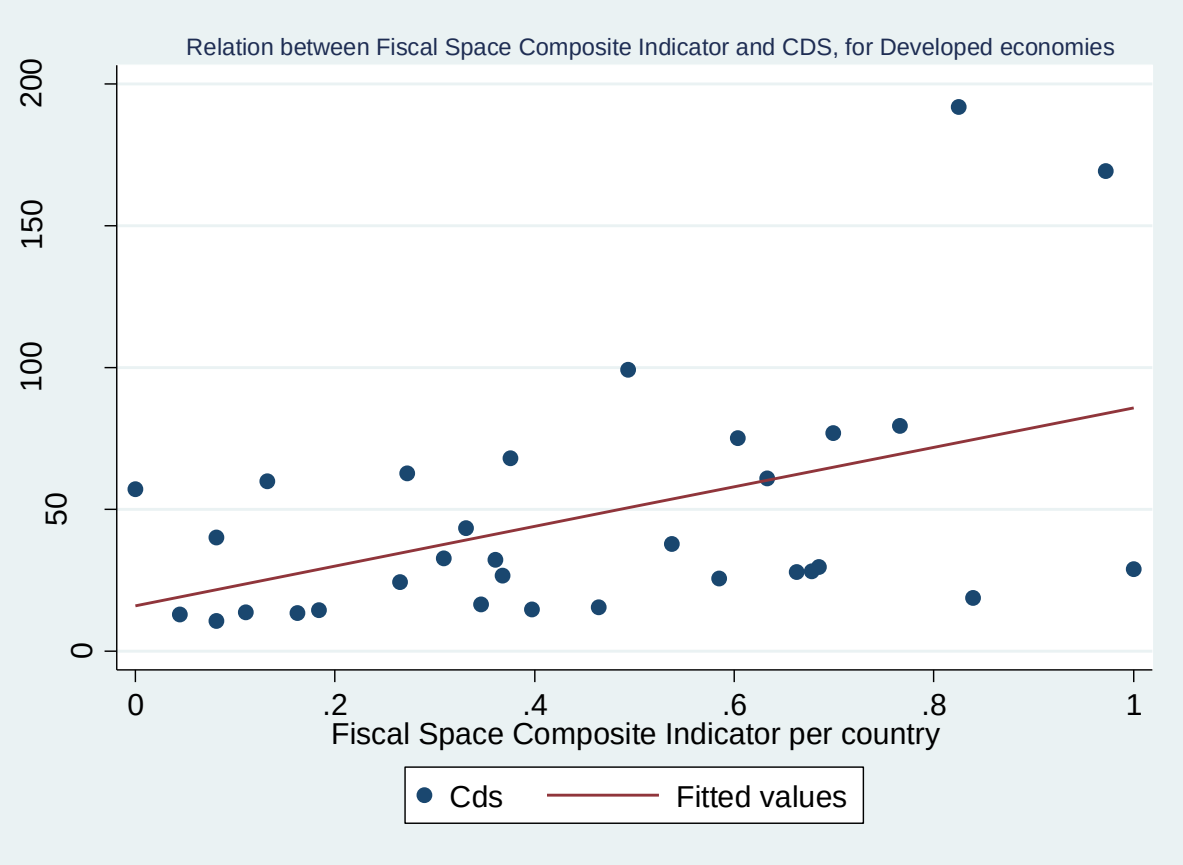
Graph 7


Fiscal space composite indicator - Ranking for Developing Economies
0
.2
.4
.6
.8
1
Bahrain
Argentina
Pakistan
Sri Lanka
Egypt, Arab Rep.
Brazil
Namibia
El Salvador
Oman
Ghana
Angola
Tunisia
South Africa
Costa Rica
India
Kenya
Nigeria
Ecuador
Senegal
Uruguay
Morocco
Mexico
Gabon
Turkey
Algeria
Croatia
Hungary
Colombia
Mongolia
Nicaragua
Cameroon
Qatar
Thailand
Malaysia
Rwanda
Panama
Romania
Serbia
Guatemala
Saudi Arabia
China
Chile
Kuwait
Ethiopia
Indonesia
Peru
Iraq
Philippines
Kazakhstan
Vietnam
Poland
Bulgaria

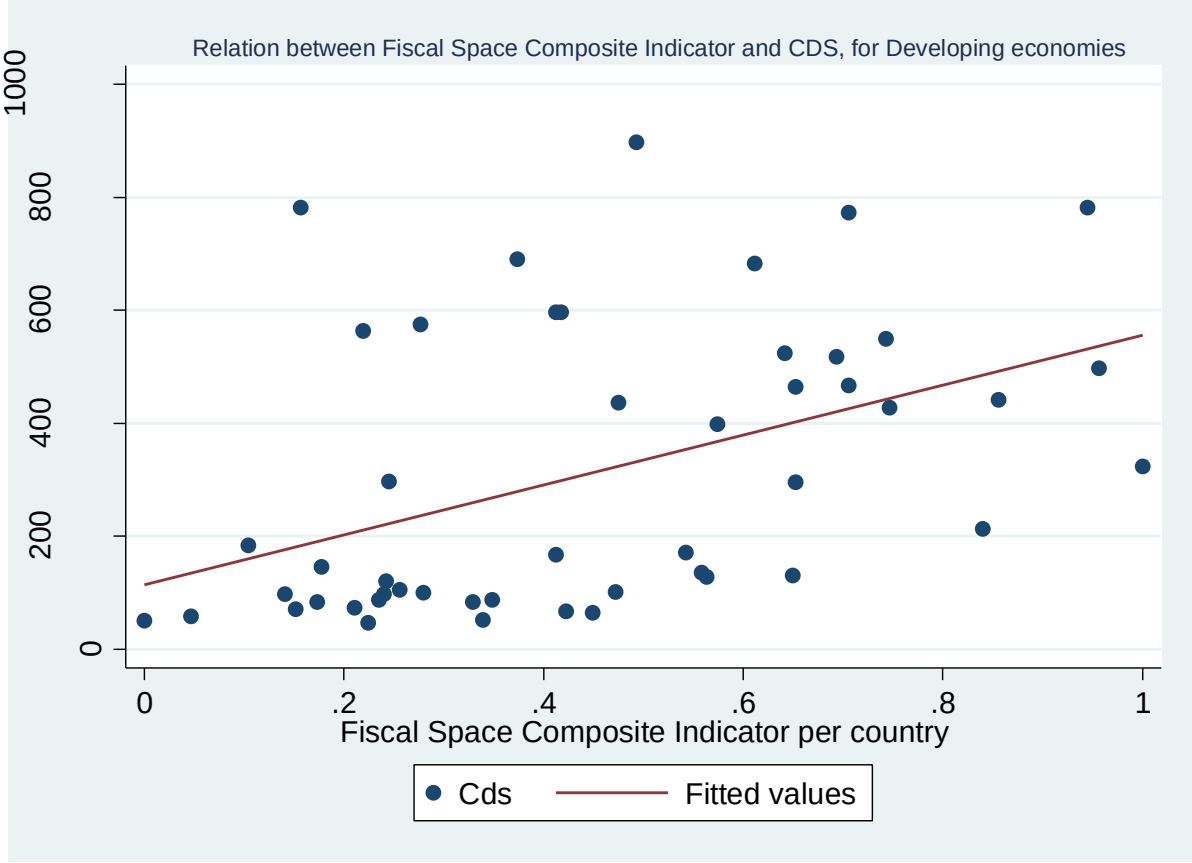
Graph 8


Fiscal space composite indicator - Ranking for Developed Economies
0
.2
.4
.6
.8
1
Japan
Italy
United States
Greece
Spain
Portugal
France
United Kingdom
Belgium
Israel
Iceland
Canada
Hong Kong SAR, China
Cyprus
Finland
Austria
Slovenia
Australia
Korea, Rep.
Germany
Slovak Republic
Ireland
Latvia
New Zealand
Netherlands
Norway
Lithuania
Sweden
Switzerland
Czech Republic
Denmark
Estonia

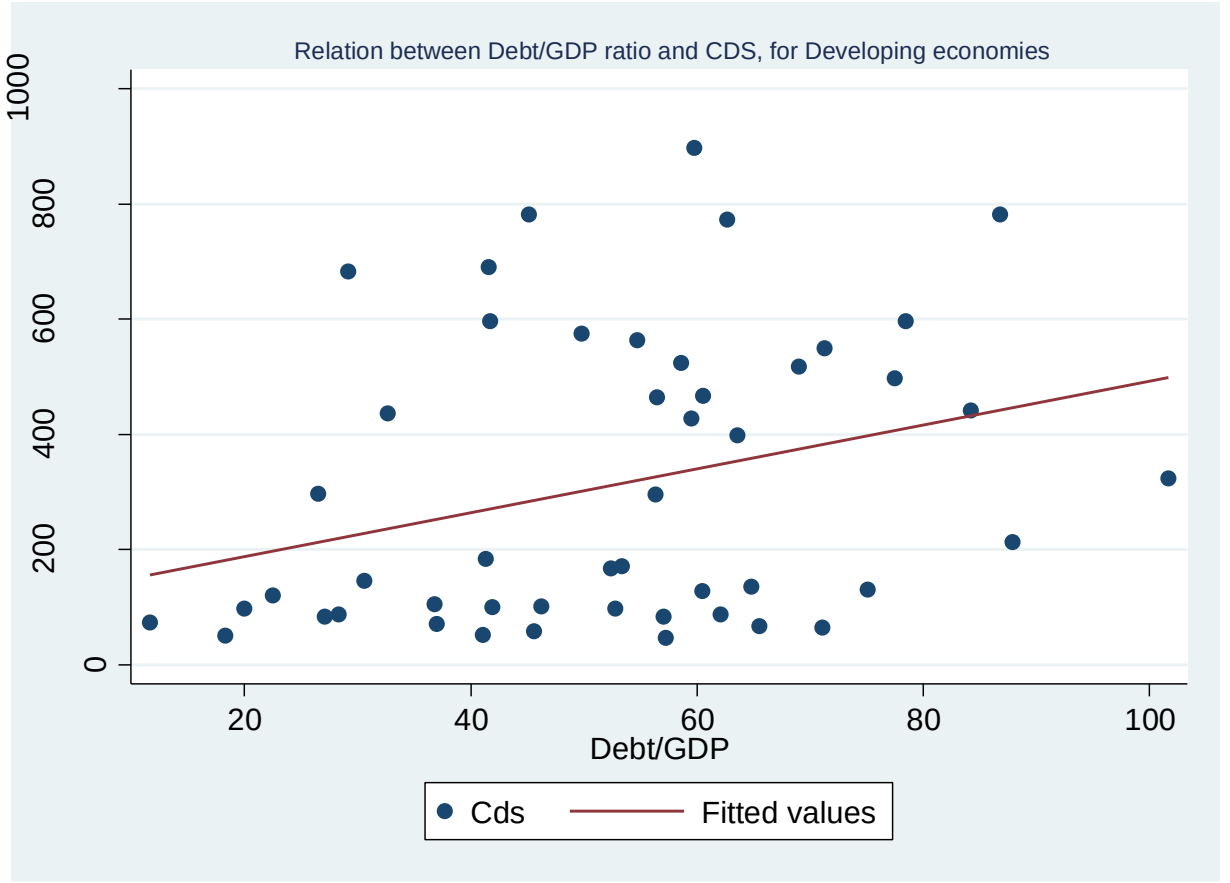
Graph 9



Graph 10



Graph 11



Graph 12

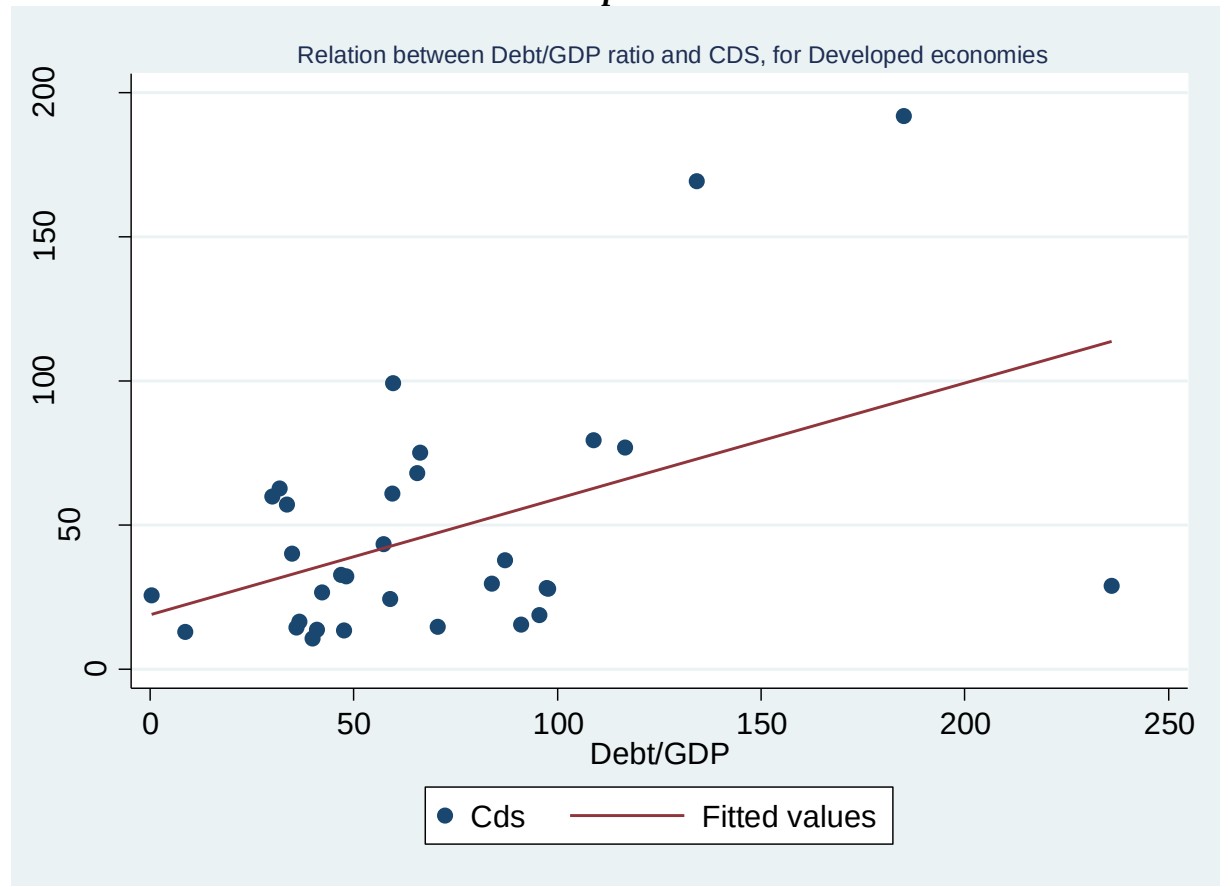


Table 1

All regressions from Table 1 onwards use cluster-robust standard errors, with clusters by country, with exception of threshold regressions that use a bootstrapping procedure to test for the existence of a threshold, and robust standard errors for the regressions (White-correction for heteroskedasticity), as defined in Hansen (2000).

ΔCovid – is defined as the difference in the logarithms of total Covid-19 cases in day t, and in day t-1. **VIX** - is defined as the daily percentage change in the Volatility Index. **S&P500** - is defined has the daily percentage change in the S&P500 index. **WTI-Oil** – is defined as the daily percentage change in the West Texas Intermediate (WTI) oil prices. **Equity** – is defined as the daily percentage change in the selected equity index, for each country. In all the regressions using **Equity**, some countries of the original sample for developing economies are dropped since it was not possible to define this variable. The list of all used country equity indexes can be found in – table 2. **EXR** is defined as the daily percentage change in the USD to country's local currency exchange rate.

	All	Developed	Developing	Developed	Developing	Developed	Developing	Developed	Developing
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	ΔCDS	ΔCDS	ΔCDS	ΔCDS	ΔCDS	ΔCDS	ΔCDS	ΔCDS	ΔCDS
ΔCovid	0.063***	0.057***	0.067***	0.050***	0.058***	0.041***	0.052***	0.012*	-0.006
	(9.58)	(6.92)	(6.95)	(6.76)	(7.10)	(6.91)	(5.28)	(1.82)	(-0.47)
VIX				0.008	0.051**	-0.006	0.061**		
				(0.73)	(2.59)	(-0.54)	(2.56)		
S&P500				-0.504***	-0.518***	-0.241***	-0.501***		
				(-5.92)	(-3.75)	(-3.14)	(-3.18)		
WTI_OIL				-0.006***	-0.001	-0.006***	-0.001		
				(-3.05)	(-0.30)	(-3.07)	(-0.37)		
Equity						-0.645***	-0.114**	-0.276***	-0.081*
						(-4.06)	(-2.14)	(-3.01)	(-1.95)
EXR						-0.346	1.925***	-0.735	1.480***
						(-1.24)	(4.43)	(-1.58)	(3.06)
Country_FE								Yes	Yes
Time_FE								Yes	Yes
r2	0.027	0.056	0.021	0.135	0.063	0.185	0.100	0.338	0.153
N	8464	3232	5232	3232	5232	3222	3991	3222	3991

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table 2

Health_index – represents an interaction term between **COVID-19 Oxford Stringency Index** representing the intensity of lockdown policies, and **ΔCovid.**
Trade_index – represents an interaction term between **Trade Openness** measured as trade as % of GDP in 2019, and **ΔCovid.**
Ghsscore_i~x – represents an interaction term between **Global Health Security Index** that represents a country preparedness to deal with a pandemic, which accounts for a multitude of factors related to prevention, detection and reporting, rapid response, health system capacity and risk environment, in 2019, and **ΔCovid.**
gIQ_index – represents an interaction term between **Institutional Quality** based on World Bank Worldwide Governance Indicators in 2019, and **ΔCovid.**

	Developed (1) ΔCDS	Developed (2) ΔCDS	Developed (3) ΔCDS	Developed (4) ΔCDS	Developed (5) ΔCDS
ΔCovid	-0.015	-0.031**	-0.002	-0.112	-0.003
	(-1.53)	(-2.46)	(-0.10)	(-1.68)	(-0.21)
Equity	-0.266***	-0.386***	-0.299**	-0.256***	-0.267***
	(-3.04)	(-2.92)	(-2.66)	(-2.92)	(-3.07)
EXR	-0.724	-0.810*	-0.786*	-0.727	-0.732
	(-1.57)	(-1.78)	(-1.72)	(-1.55)	(-1.62)
Fiscal*ΔC19	0.064***	0.065***	0.057***	0.070***	0.059***
	(4.18)	(3.46)	(3.30)	(4.39)	(3.60)
health_index		0.034*			
		(1.70)			
trade_index			-0.007		
			(-0.66)		
ghsscore_i~x				0.159	
				(1.45)	
gIQ_index					-0.818
					(-1.13)
Country_FE	Yes	Yes	Yes	Yes	Yes
Time_FE	Yes	Yes	Yes	Yes	Yes
r2	0.343	0.375	0.351	0.355	0.343
N	3222	2286	3126	3121	3222

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table 3

	Developing (1) ΔCDS	Developing (2) ΔCDS	Developing (3) ΔCDS	Developing (4) ΔCDS	Developing (5) ΔCDS
ΔCovid	-0.012	-0.009	0.029	-0.110	-0.014
	(-0.47)	(-0.25)	(0.87)	(-1.29)	(-0.57)
Equity	-0.081*	-0.548***	-0.082*	-0.080*	-0.080*
	(-1.95)	(-3.12)	(-1.95)	(-1.95)	(-1.95)
EXR	1.480***	1.417***	1.470***	1.478***	1.485***
	(3.07)	(2.82)	(2.91)	(3.10)	(3.08)
Fiscal*ΔCl9	0.011	0.006	0.018	0.033	0.015
	(0.24)	(0.11)	(0.42)	(0.62)	(0.33)
health_index		-0.013			
		(-0.25)			
trade_index			-0.057*		
			(-1.92)		
ghsscore_i~x				0.197	
				(1.30)	
gIQ_index					0.805
					(0.40)
Country_FE	Yes	Yes	Yes	Yes	Yes
Time_FE	Yes	Yes	Yes	Yes	Yes
r2	0.153	0.162	0.151	0.154	0.153
N	3991	2599	3688	3991	3991

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table 4

The variable **50/50 Composite/Sovereign** represents a fiscal composite indicator that uses the 6 fiscal space variables defined in section III, but that weighs sovereign rating at 50%, instead of the original simple average between the ranking of the 6 variables.

Threshold		Beta High (ΔCovid)	Beta Low (ΔCovid)	Z-stat for the difference in Betas	Country Split	
					High	Low
Fiscal space - Developed	0.633***	0.063*** (4.099)	0.029*** (3.707)	1.988**	9	23
Fiscal space - Developing	0.548***	0.038* (1.925)	0.045*** (3.212)	-0.265	17	24
(excluding Argentina and Ecuador)	0.548***	0.025 (1.549)	0.045*** (3.212)	-0.938	15	24
%Debt/GDP developed	91.08***	0.061*** (3.733)	0.029*** (3.838)	1.751*	8	24
%Debt/GDP developing	86.8***	0.054 (1.192)	0.039*** (3.515)	0.308	3	38
(excluding Argentina and Ecuador)	62.09***	0.021 (1.239)	0.041*** (3.057)	-0.900	26	12
Sovreign rating - Developed	14.76***	0.038*** (4.72)	0.034* (1.67)	0.161	27	5
Sovreign rating - Developing	12.58***	0.06*** (3.028)	0.029** (2.136)	1.302	14	27
(excluding Argentina and Ecuador)	12.58***	0.06*** (3.028)	0.019 (1.832)	1.826*	14	25
50/50 Composite/Sovereign Developed	0.75**	0.049** (2.471)	0.036*** (4.485)	0.597	28	4
50/50 Composite/Sovereign Developing	0.372***	0.031** (2.121)	0.055*** (3.041)	-1.048	24	17

Table A1

List of countries			
Algeria	ElSalvador	Kenya	Qatar
Angola	Estonia	Kuwait	Romania
Argentina	Ethiopia	Latvia	Rwanda
Australia	Finland	Lithuania	SaudiArabia
Austria	France	Malaysia	Senegal
Bahrain	Gabon	Mexico	Serbia
Belgium	Germany	Mongolia	Slovakia
Brazil	Ghana	Morocco	Slovenia
Bulgaria	Greece	Namibia	SouthAfrica
Cameroon	Guatemala	Netherlands	SouthKorea
Canada	HongKong	NewZealand	Spain
Chile	Hungary	Nicaragua	SriLanka
China	Iceland	Nigeria	Sweden
Colombia	India	Norway	Switzerland
CostaRica	Indonesia	Oman	Thailand
Croatia	Iraq	Pakistan	Tunisia
Cyprus	Ireland	Panama	Turkey
Czechia	Israel	Peru	UnitedKingdom
Denmark	Italy	Philippines	UnitedStates
Ecuador	Japan	Poland	Uruguay
Egypt	Kazakhstan	Portugal	Vietnam

Table A2

Equity Indexes for Developing economies									
America Latina		**Europe**		**Africa**		**Asia**		**Middle East**	
Argentina	Merval Index	Bulgaria	SOFIX Index	Egypt	EGPT US Equity	China	HSCEI Index	Bahrain	BHSEASI Index
Brazil	IBOV Index	Croatia	CRO Index	Ghana	GGSECI Index	Indonesia	JCI Index	Iraq	ISX MAIN 60 Index
Chile	IPSA Index	Hungary	BUX Index	Kenya	ZKEQTK Index	Malaysia	FRSE KLCI Index	Kuwait	BK Main 50 Index
Colombia	IGBC Index	Poland	WIG20 Index	Morocco	MOSENEW Index	Philippines	PCOMP Index	Oman	MSM30 Index
Peru	S&P/BVL Index	Romania	BET Index	Namibia	FTSE NSX Index	India	NIFTY Index	Qatar	QE General Index
Costa Rica	CRSMBCT Index	Serbia	BELEX15 Index	Nigeria	NGE US Equity	Thailand	SET50 Index	Saudi Arabia	SASEIDX Index
Ecuador	ECUINDEX Index			Rwanda	RSEASI Index	Vietnam	VN30 Index	Turkey	XU100 Index
Mexico	Mexbol Index			South Africa	TOP40 Index	Pakistan	KSE100 Index		
				Tunisia	TUSISE Index	Sri Lanka	CSEALL Index		
						Mongolia	MSETOP Index		
						Kazakhstan	KZKAK Index		

Table A3

Equity Indexes for Developed economies					
Europe		**America**		**Asia Pacific**	
United Kingdom	UKX Index	United States	SPX Index	Japan	NKY Index
France	CAC Index	Canada	SPTSX Index	Australia	AS51 Index
Germany	DAX Index			New Zealand	NZSE50FF Index
Italy	FTSEMIB Index			South Korea	KOSPI Index
Spain	IBEX Index			Hong Kong	HSI Index
Portugal	PSI20 Index				
Sweden	OMX Index				
Netherlands	AEX Index				
Switzerland	SMI Index				
Greece	ASE Index				
Austria	ATX Index				
Czech	PX Index				
Ireland	ISEQ Index				
Finland	HEX25 Index				
Norway	OSEBX Index				
Slovenia	SBITOP Index				
Denmark	KFX Index				
Slovakia	SAX Index				
Lithuania	VILSE Index				
Iceland	ICEXI Index				
Latvia	RIGSE Index				
Estonia	TALSE Index				
Cyprus	CYSMMAPA Index				
Belgium	BEL20 Index				
Israel	EIS US Equity				

Table A4

Fiscal – represents the fiscal space composite indicator defined in Section III, normalized from 0 to 1.
Fiscal*ΔC19 – represents an interaction term between the already defined variables **Fiscal** and **ΔCovid.**
All indicators below are obtained from World Bank data sources - A Cross-Country Database of Fiscal Space (Kose et al. 2017) and World Development Indicators (World Bank 2022b).
DebtGDP*ΔC19 – represents an interaction term between **DebtGDP** defined as General government gross debt % of GDP in 2019, and **ΔCovid.**
FBal*ΔC19 – represents an interaction term between **FBal** Fiscal balance, % of GDP in 2019, and **ΔCovid.**
Rating*ΔC19 – represents an interaction term between **Rating** defined as Foreign currency long-term sovereign debt ratings, index from 1-21, in 2019, this index is calculated by averaging sovereign ratings from different rating agencies and **ΔCovid.**
Debt12M *ΔC19 – represents an interaction term between **Debt12M** defined as Central government debt maturing in 12 months or less, % of GDP in 2019, and **ΔCovid.**
Int%Rev*ΔC19 – represents an interaction term between **Int%Rev** defined as Interest payments (% of revenue) in 2019, and **ΔCovid.**
GDPgwth*ΔC19 – represents an interaction term between **GDPgwth** defined GDP growth (annual %) in 2019, and **ΔCovid.**

	Developed (1) ΔCDS	Developed (2) ΔCDS	Developed (3) ΔCDS	Developed (4) ΔCDS	Developed (5) ΔCDS	Developed (6) ΔCDS	Developed (7) ΔCDS	Developed (8) ΔCDS
ΔCovid	0.019*	-0.015	-0.015	0.012*	0.023	-0.004	0.008	0.037***
	(1.98)	(-1.53)	(-1.28)	(1.83)	(0.50)	(-0.39)	(1.09)	(3.16)
VIX	-0.008							
	(-0.74)							
S&P500	-0.248***							
	(-3.25)							
WTI_OIL	-0.006***							
	(-3.04)							
Equity	-0.639***	-0.266***	-0.263***	-0.274***	-0.275***	-0.272***	-0.274***	-0.273***
	(-4.04)	(-3.04)	(-3.06)	(-3.01)	(-3.06)	(-2.97)	(-3.03)	(-3.01)
EXR	-0.343	-0.724	-0.699	-0.742	-0.732	-0.727	-0.879*	-0.716
	(-1.23)	(-1.57)	(-1.53)	(-1.60)	(-1.60)	(-1.57)	(-1.79)	(-1.55)
Fiscal	0.001							
	(0.59)							
Fiscal*ΔC19	0.051**	0.064***						
	(2.30)	(4.18)						
DebtGDP*ΔC19			0.040***					
			(2.98)					
FBalGDP*ΔC19				-0.411*				
				(-1.92)				
Rating*ΔC19					-0.001			
					(-0.25)			
Debt12M*ΔC19						0.180**		
						(2.26)		
Int%Rev*ΔC19							0.159**	
							(2.07)	
GDPgwth*ΔC19								-1.042**
								(-2.48)
Country_FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time_FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes
r2	0.189	0.343	0.342	0.339	0.338	0.340	0.350	0.341
N	3222	3222	3222	3222	3222	3222	3020	3222

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A5

	Developing (1) ΔCDS	Developing (2) ΔCDS	Developing (3) ΔCDS	Developing (4) ΔCDS	Developing (5) ΔCDS	Developing (6) ΔCDS	Developing (7) ΔCDS	Developing (8) ΔCDS
ΔCovid	0.052**	-0.012	-0.017	-0.001	-0.035	-0.007	-0.022	0.014
	(2.23)	(-0.47)	(-0.48)	(-0.08)	(-0.76)	(-0.32)	(-1.28)	(0.60)
VIX	0.054**							
	(2.39)							
S&P500	-0.529***							
	(-3.47)							
WTI_OIL	-0.000							
	(-0.09)							
Equity	-0.115**	-0.081*	-0.081*	-0.080*	-0.080*	-0.070*	-0.153*	-0.080*
	(-2.15)	(-1.95)	(-1.95)	(-1.94)	(-1.92)	(-1.83)	(-1.71)	(-1.93)
EXR	1.883***	1.480***	1.484***	1.479***	1.479***	1.533***	1.630***	1.486***
	(4.32)	(3.07)	(3.10)	(3.06)	(3.08)	(2.90)	(2.93)	(3.11)
Fiscal	0.010***							
	(3.73)							
Fiscal*ΔC19	-0.015	0.011						
	(-0.31)	(0.24)						
DebtGDP*ΔC19			0.018					
			(0.33)					
FBalGDP*ΔC19				0.126				
				(0.45)				
Rating*ΔC19					0.003			
					(0.73)			
Debt12M*ΔC19						-0.036		
						(-0.28)		
Int%Rev*ΔC19							0.152	
							(1.39)	
GDPgwth*ΔC19								-0.714
								(-1.13)
Country_FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time_FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes
r2	0.102	0.153	0.153	0.153	0.154	0.145	0.161	0.154
N	3991	3991	3991	3991	3991	3590	3050	3991

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A6

Table A6 represents the same analysis as in table A5, but dropping the observations for Argentina and Ecuador, for reasons identified in section IV.

	Developing (1) ΔCDS	Developing (2) ΔCDS	Developing (3) ΔCDS	Developing (4) ΔCDS	Developing (5) ΔCDS	Developing (6) ΔCDS	Developing (7) ΔCDS	Developing (8) ΔCDS
ΔCovid	0.065***	0.003	0.006	-0.002	-0.059*	-0.007	-0.017	-0.001
	(3.21)	(0.13)	(0.21)	(-0.11)	(-1.76)	(-0.34)	(-0.99)	(-0.03)
VIX	0.030**							
	(2.66)							
S&P500	-0.604***							
	(-5.40)							
WTI_OIL	0.002							
	(0.91)							
Equity	-0.103**	-0.065*	-0.065*	-0.065*	-0.063*	-0.054*	-0.117	-0.065*
	(-2.12)	(-1.91)	(-1.91)	(-1.91)	(-1.87)	(-1.78)	(-1.63)	(-1.91)
EXR	1.902***	1.386***	1.381***	1.385***	1.392***	1.393***	1.494***	1.385***
	(4.39)	(3.15)	(3.14)	(3.16)	(3.20)	(3.04)	(3.13)	(3.17)
Fiscal	0.008***							
	(4.80)							
Fiscal*ΔC19	-0.054	-0.021						
	(-1.53)	(-0.58)						
DebtGDP*ΔC19			-0.024					
			(-0.56)					
FBalGDP*ΔC19				0.159				
				(0.59)				
Rating*ΔC19					0.005*			
					(1.74)			
Debt12M*ΔC19						-0.066		
						(-0.54)		
Int%Rev*ΔC19							0.112	
							(1.26)	
GDPgwth*ΔC19								-0.237
								(-0.56)
Country_FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time_FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes
r2	0.178	0.294	0.294	0.294	0.296	0.294	0.357	0.294
N	3809	3809	3809	3809	3809	3408	2868	3809

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A7

Table A7 represents the same analysis as in table 3, but dropping the observations for Argentina and Ecuador, for reasons identified in section IV.

	Developing (1) ΔCDS	Developing (2) ΔCDS	Developing (3) ΔCDS	Developing (4) ΔCDS	Developing (5) ΔCDS
ΔCovid	0.003	-0.015	0.033	-0.024	0.001
	(0.13)	(-0.47)	(0.98)	(-0.52)	(0.05)
Equity	-0.065*	-0.446***	-0.067*	-0.065*	-0.065*
	(-1.91)	(-2.86)	(-1.92)	(-1.91)	(-1.91)
EXR	1.386***	1.325***	1.367***	1.384***	1.390***
	(3.15)	(2.82)	(2.99)	(3.16)	(3.16)
Fiscal*ΔC19	-0.021	-0.017	-0.011	-0.014	-0.019
	(-0.58)	(-0.41)	(-0.31)	(-0.39)	(-0.53)
health_index		0.038			
		(1.05)			
trade_index			-0.044		
			(-1.63)		
ghsscore_i~x				0.053	
				(0.60)	
gIQ_index					0.591
					(0.30)
Country_FE	Yes	Yes	Yes	Yes	Yes
Time_FE	Yes	Yes	Yes	Yes	Yes
r2	0.294	0.324	0.292	0.295	0.294
N	3809	2459	3506	3809	3809

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Robustness Analysis for Developing Economies

The results for the subset of Developing Economies, when including interactions with fiscal space variables, and fixed effects, seem to point towards the idea that Developing Economies, contrary to Developed one's, were mostly affected by global risk factors, and by a global risk-off movement, that drove CDS spreads higher, and substantially increased its volatility in this set of countries. Nonetheless, to increase the robustness of this conclusion, I try to mitigate the noisiness of 2 main factors, (1) the heterogeneity of the countries in this subset, which range from small countries in America Latina, to countries with a major play in the global economy as China, which might introduce a degree of heterogeneity in the sample that is difficult to expurgate even with a wide choice of controls; (2) the registration of COVID-19 cases is known to have been imprecise in many Developing economies, which would lead to biased coefficients. Nonetheless, regarding point (2), it matters to state that since I am using the growth in COVID-19 cases, the underreporting of cases loses relevance, since it is expected that the underreporting happens consistently overtime, thus, making the growth of COVID-19 cases a more robust indicator to analyze the changes in gravity of the pandemic.

To tackle the difficulty in 1, I split the sample, both in the simple fixed effects regressions and in the threshold model, in subgroups of economies based on their continent. And, separately, on subgroups based on their Human Development Index (HDI), for a threshold regression.

Results are similar to the general specification for developing economies when I split the sample into continents (**Table A8** to **Table A12**). The coefficient on COVID-19 log growth is positive, and statistically significant for all continents, being particularly high in Asia. Although, when controlling for time fixed effects, the coefficients on almost all continents (except for Asia) lose its significance. Also, introducing interaction terms to

control for pre-pandemic fiscal space (**Table A13** to **Table A18**), and other indicators that might influence the capacity of countries to tackle the pandemic (**Table A19** to **Table A24**), seems to have similar results to the general specification, with the great majority of coefficients not being statistically significant or economically meaningful, for all continents except Asia. In the model specification for Asia with pre-pandemic fiscal variables as interaction term, **Table A15** regression (7), the interaction between interest payments as a percentage of revenue, and COVID-19 growth, is the only indicator with a statistically significant impact on CDS spreads. However, that seems to be the case because for that variable there is no data for India, Pakistan, and Vietnam. Thus, in table 16.1., we drop data for India and Pakistan (dropping data for Vietnam had no statistically meaningful impact on results), the results change significantly with most interaction terms between COVID-19 and fiscal space variables, including the fiscal composite indicator, now having a statistically significant coefficient and economic meaningful result, even when controlling for other factors, as in **Table A22**.

In a generic way, threshold regressions by continent do not seem to generate meaningful results (**Table A25**), either because results for the COVID-19 impact in CDS spreads, conditional on fiscal space, are not statistically significant, or because the calculated threshold is not considered to be statistically significant. Thus, the split by continent does not seem to change results drastically, with the most relevant change happening in the results for Asia, where COVID-19 seems to have had an overall greater impact in CDS spreads, and where pre-pandemic fiscal space might have played a role on this impact, although, with no statistically significant impacts resulting from the threshold estimation.

Finally, I also ran a double-threshold regression, **Table A32**, where I first split countries according to HDI, and then drop those below the threshold (since due to its development status, data for these countries might be less precise). Secondly, I run a "regular" threshold

regression, using the fiscal space composite indicator as the threshold variable, and find that the coefficients remain not statistically different from each other.

For point (2), in the simple fixed effects regressions, I control for the positivity rate, defined as the ratio of total cases to total tests calculated for the last day of the dataset (thus, time-invariant), and use COVID-19 deaths as an alternative variable to quantify the impact of the pandemic in developing economies.

The utilization of the positivity rate, in the fixed effects regressions, as an interaction variable with COVID-19 cases, for developing economies, does not have an impact in the results from the general specification, with the coefficients of interest remaining broadly insignificant – **Table A26** and **Table A27**. Finally, replacing the main variable of interest COVID-19 cases, with COVID-19 deaths, also seems not to result in significant differences from the overall specification for developing economies – **Table A28** and **Table A29**.

Table A8

	Africa (1) ΔCDS	Africa (2) ΔCDS	Africa (3) ΔCDS	Africa (4) ΔCDS	Africa (5) ΔCDS
ΔCovid	0.039***	0.040***	0.034***	0.019*	-0.026
	(4.08)	(4.17)	(3.57)	(1.93)	(-1.14)
VIX		-0.005	-0.008	-0.022	
		(-0.29)	(-0.44)	(-1.20)	
S&P500		0.091	0.083	0.034	
		(0.59)	(0.62)	(0.25)	
WTI_OIL		0.001	-0.000	0.002	
		(0.43)	(-0.07)	(0.74)	
Equity			-0.147	-0.148	-0.132
			(-1.17)	(-1.13)	(-1.24)
EXR			0.835	0.820	0.864
			(1.39)	(1.34)	(1.24)
Country_FE				Yes	Yes
Time_FE					Yes
r2	0.007	0.009	0.017	0.011	0.331
N	1616	1616	1414	1414	1414

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A9

	Am. Latina (1) ΔCDS	Am. Latina (2) ΔCDS	Am. Latina (3) ΔCDS	Am. Latina (4) ΔCDS	Am. Latina (5) ΔCDS
ΔCovid	0.088***	0.066***	0.054***	0.039*	-0.036
	(3.96)	(3.48)	(3.19)	(2.16)	(-1.38)
VIX		0.153**	0.141*	0.124*	
		(2.21)	(2.05)	(2.01)	
S&P500		-0.894*	-0.498	-0.550	
		(-1.91)	(-1.10)	(-1.27)	
WTI_OIL		-0.012	-0.011	-0.008	
		(-1.14)	(-0.99)	(-0.72)	
Equity			-0.817***	-0.833***	-0.776*
			(-3.31)	(-3.34)	(-1.87)
EXR			2.548***	2.548***	1.914*
			(3.49)	(3.37)	(2.17)
Country_FE				Yes	Yes
Time_FE					Yes
r2	0.018	0.097	0.128	0.120	0.197
N	1192	1192	1192	1192	1192

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A10

	Asia	Asia	Asia	Asia	Asia
	(1)	(2)	(3)	(4)	(5)
	ΔCDS	ΔCDS	ΔCDS	ΔCDS	ΔCDS
ΔCovid	0.108***	0.090***	0.079***	0.073***	0.050**
	(4.09)	(4.65)	(4.86)	(3.87)	(2.90)
VIX		0.074**	0.068**	0.062*	
		(2.98)	(2.44)	(2.22)	
S&P500		-0.899***	-0.855***	-0.872***	
		(-4.80)	(-4.84)	(-4.95)	
WTI_OIL		0.008	0.007	0.008	
		(1.59)	(1.46)	(1.68)	
Equity			-0.206	-0.213	-0.096
			(-1.17)	(-1.21)	(-1.02)
EXR			1.327	1.315	0.583
			(1.12)	(1.12)	(0.59)
Country_FE				Yes	Yes
Time_FE					Yes
r2	0.072	0.246	0.266	0.255	0.461
N	1111	1111	1111	1111	1111

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A11

	Middle East	Middle East	Middle East	Middle East	Middle East
	(1)	(2)	(3)	(4)	(5)
	ΔCDS	ΔCDS	ΔCDS	ΔCDS	ΔCDS
ΔCovid	0.050**	0.042**	0.039*	0.030	0.003
	(2.59)	(2.71)	(2.33)	(1.69)	(0.14)
VIX		0.053**	0.054***	0.045**	
		(3.50)	(4.01)	(2.95)	
S&P500		-0.718**	-0.657**	-0.685**	
		(-2.92)	(-2.51)	(-2.67)	
WTI_OIL		-0.002	-0.002	-0.001	
		(-0.30)	(-0.32)	(-0.09)	
Equity			-0.047	-0.050	-0.036
			(-1.53)	(-1.67)	(-1.88)
EXR			2.944**	3.027**	1.806
			(3.35)	(3.53)	(1.44)
Country_FE				Yes	Yes
Time_FE					Yes
r2	0.034	0.169	0.184	0.175	0.427
N	707	707	707	707	707

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A12

	Europe (1) ΔCDS	Europe (2) ΔCDS	Europe (3) ΔCDS	Europe (4) ΔCDS	Europe (5) ΔCDS
ΔCovid	0.038***	0.035**	0.032**	0.031**	-0.005
	(4.86)	(3.80)	(2.96)	(2.66)	(-0.61)
VIX		-0.053***	-0.044**	-0.044**	
		(-5.07)	(-4.02)	(-3.54)	
S&P500		-0.393***	-0.361***	-0.362***	
		(-4.82)	(-5.62)	(-5.27)	
WTI_OIL		-0.001	-0.001	-0.001	
		(-0.43)	(-0.63)	(-0.57)	
Equity			-0.024	-0.028	-0.135
			(-0.13)	(-0.15)	(-0.73)
EXR			0.662*	0.668*	-0.155
			(2.41)	(2.33)	(-0.36)
Country_FE				Yes	Yes
Time_FE					Yes
r2	0.042	0.090	0.102	0.098	0.495
N	606	606	606	606	606

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A13

	Africa (1) ΔCDS	Africa (2) ΔCDS	Africa (3) ΔCDS	Africa (4) ΔCDS	Africa (5) ΔCDS	Africa (6) ΔCDS	Africa (7) ΔCDS	Africa (8) ΔCDS
ΔCovid	0.028	-0.118**	-0.104*	-0.200*	-0.082	-0.106*	-0.048	-0.091
	(1.62)	(-2.89)	(-2.08)	(-2.16)	(-0.89)	(-1.91)	(-1.62)	(-1.83)
VIX	0.001							
	(0.06)							
S&P500	0.140							
	(0.86)							
WTI_OIL	0.000							
	(0.07)							
Equity	-0.146	-0.122	-0.122	-0.121	-0.121	-0.109	-0.094	-0.121
	(-1.03)	(-1.06)	(-1.06)	(-1.05)	(-1.06)	(-1.00)	(-0.86)	(-1.05)
EXR	1.111	1.179	1.188	1.199	1.164	1.160	1.582	1.180
	(1.69)	(1.53)	(1.52)	(1.54)	(1.52)	(1.47)	(1.77)	(1.52)
Fiscal	0.011***							
	(4.22)							
Fiscal*ΔC19	-0.028	0.076						
	(-0.97)	(1.75)						
DebtGDP*ΔC19			0.056					
			(0.55)					
FBalGDP*ΔC19				-2.238				
				(-1.84)				
Rating*ΔC19					0.002			
					(0.20)			
Debt12M*ΔC19						0.305		
						(1.60)		
Int%Rev*ΔC19							-0.029	
							(-0.22)	
GDPgwth*ΔC19								0.617
								(0.83)
Country_FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time_FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes
r2	0.033	0.332	0.331	0.337	0.330	0.298	0.419	0.332
N	904	904	904	904	904	803	601	904

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A14

	Am. Latina (1) ΔCDS	Am. Latina (2) ΔCDS	Am. Latina (3) ΔCDS	Am. Latina (4) ΔCDS	Am. Latina (5) ΔCDS	Am. Latina (6) ΔCDS	Am. Latina (7) ΔCDS	Am. Latina (8) ΔCDS
ΔCovid	0.032	-0.063	-0.097	0.007	-0.052	-0.160	-0.047	-0.018
	(0.81)	(-1.18)	(-1.13)	(0.44)	(-0.43)	(-1.54)	(-0.98)	(-0.54)
VIX	0.159							
	(1.66)							
S&P500	-0.481							
	(-0.69)							
WTI_OIL	-0.011							
	(-0.66)							
Equity	-0.804**	-0.831	-0.826	-0.828	-0.836	-1.310	-0.836	-0.790
	(-2.67)	(-1.23)	(-1.22)	(-1.22)	(-1.24)	(-1.43)	(-1.24)	(-1.16)
EXR	2.456**	2.434	2.421	2.409	2.432	2.579	2.437	2.458
	(2.65)	(1.57)	(1.56)	(1.54)	(1.58)	(1.52)	(1.57)	(1.58)
Fiscal	0.015							
	(1.87)							
Fiscal*ΔC19	0.029	0.036						
	(0.27)	(0.35)						
DebtGDP*ΔC19			0.093					
			(0.66)					
FBalGDP*ΔC19				1.424				
				(1.22)				
Rating*ΔC19					0.000			
					(0.06)			
Debt12M*ΔC19						1.712		
						(1.40)		
Int%Rev*ΔC19							0.005	
							(0.01)	
GDPgwth*ΔC19								-2.379
								(-1.34)
Country_FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time_FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes
r2	0.125	0.208	0.209	0.209	0.208	0.218	0.208	0.210
N	785	785	785	785	785	687	785	785

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A15

	Asia (1) ΔCDS	Asia (2) ΔCDS	Asia (3) ΔCDS	Asia (4) ΔCDS	Asia (5) ΔCDS	Asia (6) ΔCDS	Asia (7) ΔCDS	Asia (8) ΔCDS
ΔCovid	0.082**	0.039	0.048	0.038	0.057	0.048	0.026	0.065**
	(2.52)	(1.38)	(0.77)	(1.41)	(1.37)	(1.42)	(1.26)	(2.38)
VIX	0.066**							
	(2.39)							
S&P500	-0.863***							
	(-4.80)							
WTI_OIL	0.008							
	(1.55)							
Equity	-0.207	-0.096	-0.096	-0.096	-0.097	-0.070	-0.110	-0.096
	(-1.18)	(-1.03)	(-1.03)	(-1.03)	(-1.03)	(-0.89)	(-1.04)	(-1.02)
EXR	1.313	0.610	0.585	0.606	0.590	0.377	0.984	0.584
	(1.13)	(0.63)	(0.63)	(0.63)	(0.60)	(0.41)	(0.86)	(0.59)
Fiscal	0.003							
	(1.08)							
Fiscal*ΔC19	-0.012	0.024						
	(-0.27)	(0.62)						
DebtGDP*ΔC19			0.002					
			(0.03)					
FBalGDP*ΔC19				-0.282				
				(-0.68)				
Rating*ΔC19					-0.001			
					(-0.17)			
Debt12M*ΔC19						0.099		
						(0.34)		
Int%Rev*ΔC19							0.239***	
							(3.86)	
GDPgwth*ΔC19								-0.348
								(-0.54)
Country_FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time_FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes
r2	0.266	0.461	0.461	0.461	0.461	0.503	0.556	0.461
N	1108	1108	1108	1108	1108	1007	805	1108

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A16

Table A16 represents the same analysis as in table A15, but dropping the observations for India and Pakistan, for reasons identified in Robustness analysis.

	AsiaR (1) ΔCDS	AsiaR (2) ΔCDS	AsiaR (3) ΔCDS	AsiaR (4) ΔCDS	AsiaR (5) ΔCDS	AsiaR (6) ΔCDS	AsiaR (7) ΔCDS	AsiaR (8) ΔCDS
ΔCovid	0.081**	0.031	0.021	0.026	0.062	0.046	0.026	0.114**
	(2.69)	(1.25)	(0.39)	(1.29)	(0.74)	(1.33)	(1.26)	(2.93)
VIX	0.064*							
	(2.01)							
S&P500	-1.026***							
	(-5.98)							
WTI_OIL	0.003							
	(0.76)							
Equity	-0.199	-0.100	-0.100	-0.102	-0.099	-0.069	-0.110	-0.099
	(-1.11)	(-1.00)	(-0.99)	(-1.01)	(-1.00)	(-0.83)	(-1.04)	(-0.99)
EXR	1.274	0.881	0.903	0.870	0.818	0.523	0.984	0.793
	(0.84)	(0.77)	(0.82)	(0.78)	(0.70)	(0.50)	(0.86)	(0.69)
Fiscal	0.006							
	(1.62)							
Fiscal*ΔC19	-0.004	0.079**						
	(-0.10)	(2.43)						
DebtGDP*ΔC19			0.064					
			(0.66)					
FBalGDP*ΔC19				-1.056***				
				(-3.59)				
Rating*ΔC19					-0.001			
					(-0.11)			
Debt12M*ΔC19						0.215		
						(0.77)		
Int%Rev*ΔC19							0.239***	
							(3.86)	
GDPgwth*ΔC19								-1.196*
								(-1.96)
Country_FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time_FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes
r2	0.300	0.553	0.552	0.554	0.551	0.622	0.556	0.552
N	906	906	906	906	906	805	805	906

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A17

	Middle East (1) ΔCDS	Middle East (2) ΔCDS	Middle East (3) ΔCDS	Middle East (4) ΔCDS	Middle East (5) ΔCDS	Middle East (6) ΔCDS	Middle East (7) ΔCDS	Middle East (8) ΔCDS
ΔCovid	0.071**	0.013	0.028	0.005	-0.052**	-0.022	0.059	0.023
	(2.47)	(0.35)	(0.53)	(0.16)	(-2.58)	(-0.78)	(1.45)	(0.76)
VIX	0.042**							
	(2.50)							
S&P500	-0.780*							
	(-2.39)							
WTI_OIL	-0.001							
	(-0.09)							
Equity	-0.045	-0.035	-0.035	-0.035	-0.033	-0.029	-0.114	-0.033
	(-1.45)	(-1.73)	(-1.72)	(-1.76)	(-1.76)	(-1.83)	(-1.85)	(-1.75)
EXR	2.528**	1.464	1.405	1.490	1.629	2.210	-1.146	1.455
	(3.29)	(1.08)	(1.03)	(1.10)	(1.28)	(1.73)	(-0.71)	(1.09)
Fiscal	0.011***							
	(6.43)							
Fiscal*ΔC19	-0.071*	-0.020						
	(-2.16)	(-0.54)						
DebtGDP*ΔC19			-0.039					
			(-0.65)					
FBalGDP*ΔC19				-0.003				
				(-0.01)				
Rating*ΔC19					0.005			
					(1.50)			
Debt12M*ΔC19						0.065		
						(0.80)		
Int%Rev*ΔC19							-0.197	
							(-0.52)	
GDPgwth*ΔC19								-1.101
								(-1.47)
Country_FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time_FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes
r2	0.222	0.467	0.468	0.467	0.472	0.471	0.672	0.470
N	588	588	588	588	588	487	253	588

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A18

	Europe (1) ΔCDS	Europe (2) ΔCDS	Europe (3) ΔCDS	Europe (4) ΔCDS	Europe (5) ΔCDS	Europe (6) ΔCDS	Europe (7) ΔCDS	Europe (8) ΔCDS
ΔCovid	0.024	-0.007	-0.020	0.001	-0.005	-0.009	-0.012	0.076
	(1.71)	(-0.81)	(-0.98)	(0.11)	(-0.34)	(-1.13)	(-0.69)	(1.96)
VIX	-0.044**							
	(-3.98)							
S&P500	-0.364***							
	(-5.50)							
WTI_OIL	-0.001							
	(-0.49)							
Equity	-0.026	-0.135	-0.142	-0.150	-0.135	-0.138	-0.137	-0.132
	(-0.14)	(-0.73)	(-0.78)	(-0.80)	(-0.73)	(-0.75)	(-0.75)	(-0.72)
EXR	0.659*	-0.148	-0.177	-0.152	-0.155	-0.169	-0.160	-0.061
	(2.31)	(-0.36)	(-0.40)	(-0.38)	(-0.38)	(-0.38)	(-0.37)	(-0.16)
Fiscal	0.001							
	(0.53)							
Fiscal*ΔC19	0.014	0.004						
	(0.56)	(0.29)						
DebtGDP*ΔC19			0.030					
			(0.64)					
FBalGDP*ΔC19				0.526**				
				(2.58)				
Rating*ΔC19					0.000			
					(0.00)			
Debt12M*ΔC19						0.067		
						(0.51)		
Int%Rev*ΔC19							0.172	
							(0.36)	
GDPgwth*ΔC19								-1.865
								(-1.87)
Country_FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time_FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes
r2	0.104	0.495	0.496	0.497	0.495	0.495	0.495	0.496
N	606	606	606	606	606	606	606	606

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A19

	Africa (1) ΔCDS	Africa (2) ΔCDS	Africa (3) ΔCDS	Africa (4) ΔCDS	Africa (5) ΔCDS
ΔCovid	-0.118**	-0.180	0.021	-0.283*	-0.117**
	(-2.89)	(-1.33)	(0.37)	(-1.92)	(-2.84)
Equity	-0.122	-0.340	-0.137	-0.121	-0.121
	(-1.06)	(-1.42)	(-1.06)	(-1.05)	(-1.05)
EXR	1.179	1.174	1.203	1.156	1.177
	(1.53)	(1.32)	(1.47)	(1.50)	(1.51)
Fiscal*ΔC19	0.076	0.130	-0.027	0.117*	0.070
	(1.75)	(1.18)	(-0.36)	(1.86)	(1.59)
health_index		0.001			
		(0.62)			
trade_index			-0.166*		
			(-1.98)		
ghsscore_i~x				0.386	
				(1.20)	
gIQ_index					-0.861
					(-0.25)
Country_FE	Yes	Yes	Yes	Yes	Yes
Time_FE	Yes	Yes	Yes	Yes	Yes
r2	0.332	0.264	0.368	0.334	0.332
N	904	534	803	904	904

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A20

	Am. Latina (1) ΔCDS	Am. Latina (2) ΔCDS	Am. Latina (3) ΔCDS	Am. Latina (4) ΔCDS	Am. Latina (5) ΔCDS
ΔCovid	-0.063	-0.029	0.060	-0.740**	-0.049
	(-1.18)	(-0.35)	(1.05)	(-3.46)	(-1.12)
Equity	-0.831	-1.306	-0.809	-0.748	-0.835
	(-1.23)	(-1.34)	(-1.19)	(-1.10)	(-1.24)
EXR	2.434	2.446	2.472	2.298	2.424
	(1.57)	(1.43)	(1.59)	(1.48)	(1.54)
Fiscal*ΔC19	0.036	0.025	0.010	0.056	0.014
	(0.35)	(0.22)	(0.12)	(1.24)	(0.12)
health_index		-0.001			
		(-0.86)			
trade_index			-0.223		
			(-1.45)		
ghsscore_i~x				1.316**	
				(3.38)	
gIQ_index					-2.690
					(-0.41)
Country_FE	Yes	Yes	Yes	Yes	Yes
Time_FE	Yes	Yes	Yes	Yes	Yes
r2	0.208	0.209	0.210	0.214	0.209
N	785	529	785	785	785

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A21

	Asia (1) ΔCDS	Asia (2) ΔCDS	Asia (3) ΔCDS	Asia (4) ΔCDS	Asia (5) ΔCDS
ΔCovid	0.039	0.017	0.067	0.004	0.038
	(1.38)	(0.38)	(1.09)	(0.04)	(1.26)
Equity	-0.096	-0.547*	-0.102	-0.095	-0.096
	(-1.03)	(-2.00)	(-1.05)	(-1.01)	(-1.02)
EXR	0.610	0.162	0.622	0.601	0.609
	(0.63)	(0.17)	(0.64)	(0.62)	(0.63)
Fiscal*ΔC19	0.024	0.035	0.011	0.035	0.026
	(0.62)	(0.80)	(0.20)	(0.70)	(0.53)
health_index		0.000			
		(0.35)			
trade_index			-0.033		
			(-0.68)		
ghsscore_i~x				0.071	
				(0.48)	
gIQ_index					0.403
					(0.14)
Country_FE	Yes	Yes	Yes	Yes	Yes
Time_FE	Yes	Yes	Yes	Yes	Yes
r2	0.461	0.497	0.453	0.461	0.461
N	1108	825	1007	1108	1108

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A22

Table A22 represents the same analysis as in table A21, but dropping the observations for India and Pakistan, for reasons identified in Robustness analysis.

	AsiaR (1) ΔCDS	AsiaR (2) ΔCDS	AsiaR (3) ΔCDS	AsiaR (4) ΔCDS	AsiaR (5) ΔCDS
ΔCovid	0.031	-0.005	0.079	-0.028	0.030
	(1.25)	(-0.14)	(1.26)	(-0.36)	(1.10)
Equity	-0.100	-0.693	-0.112	-0.098	-0.100
	(-1.00)	(-1.70)	(-1.04)	(-0.98)	(-0.98)
EXR	0.881	0.263	0.894	0.865	0.879
	(0.77)	(0.23)	(0.79)	(0.76)	(0.77)
Fiscal*ΔC19	0.079**	0.112***	0.081*	0.093*	0.080**
	(2.43)	(4.46)	(2.03)	(2.25)	(2.32)
health_index		0.000			
		(0.25)			
trade_index			-0.063		
			(-1.12)		
ghsscore_i~x				0.121	
				(0.82)	
gIQ_index					0.846
					(0.28)
Country_FE	Yes	Yes	Yes	Yes	Yes
Time_FE	Yes	Yes	Yes	Yes	Yes
r2	0.553	0.628	0.556	0.554	0.553
N	906	681	805	906	906

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A23

	Middle East (1) ΔCDS	Middle East (2) ΔCDS	Middle East (3) ΔCDS	Middle East (4) ΔCDS	Middle East (5) ΔCDS
ΔCovid	0.013	0.098	0.132	-0.075	0.019
	(0.35)	(1.64)	(0.90)	(-1.25)	(0.50)
Equity	-0.035	-0.663**	-0.035	-0.034	-0.034
	(-1.73)	(-2.79)	(-1.60)	(-1.76)	(-1.78)
EXR	1.464	1.532	13.943	1.344	1.504
	(1.08)	(1.28)	(1.43)	(1.00)	(1.15)
Fiscal*ΔCl9	-0.020	-0.045	0.113	-0.020	-0.045
	(-0.54)	(-1.39)	(0.65)	(-0.68)	(-1.01)
health_index		-0.002*			
		(-2.01)			
trade_index			-0.181		
			(-0.79)		
ghsscore_i~x				0.213	
				(1.18)	
gIQ_index					3.832
					(1.65)
Country_FE	Yes	Yes	Yes	Yes	Yes
Time_FE	Yes	Yes	Yes	Yes	Yes
r2	0.467	0.522	0.473	0.470	0.471
N	588	355	487	588	588

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A24

	Europe (1) ΔCDS	Europe (2) ΔCDS	Europe (3) ΔCDS	Europe (4) ΔCDS	Europe (5) ΔCDS
ΔCovid	-0.007	0.001	0.005	-0.042	-0.023
	(-0.81)	(0.07)	(0.19)	(-1.24)	(-1.54)
Equity	-0.135	-0.198	-0.133	-0.137	-0.145
	(-0.73)	(-0.90)	(-0.72)	(-0.74)	(-0.79)
EXR	-0.148	-0.188	-0.123	-0.164	-0.224
	(-0.36)	(-0.43)	(-0.32)	(-0.39)	(-0.52)
Fiscal*ΔCl9	0.004	-0.003	0.006	0.009	0.012
	(0.29)	(-0.17)	(0.38)	(0.55)	(0.74)
health_index		-0.000			
		(-0.19)			
trade_index			-0.011		
			(-0.43)		
ghsscore_i~x				0.064	
				(1.06)	
gIQ_index					2.791
					(1.10)
Country_FE	Yes	Yes	Yes	Yes	Yes
Time_FE	Yes	Yes	Yes	Yes	Yes
r2	0.495	0.524	0.495	0.495	0.496
N	606	356	606	606	606

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A25

	Threshold	Beta High (ΔCovid)	Beta Low (ΔCovid)	Z-stat for the difference in Betas	High	Low
Fiscal space indicator - Africa	0***	0.007	-0.003	0.262	8	1
t-stat		(0.454)	(-0.08)			
Fiscal space indicator - Asia	0.202***	0.064**	0.074*	-0.207	6	5
t-stat		(2.295)	(1.745)			
Fiscal space indicator - Middle East	0.205***	0.003	0.062*	-1.747*	3	4
t-stat		(0.434)	(1.862)			
Fiscal space indicator - America Latina	0.852	0.205***	0.023	2.573**	1	7
t-stat		(2.979)	(1.323)			
Fiscal space indicator - Europe	0	0.035**	0.020*	0.937	5	1
t-stat		(2.623)	(2.002)			
Fiscal space indicator - Asia (s/Pakistan and India)	0.202**	0.050*	0.074*	-0.468	4	5
t-stat		(1.698)	(1.745)			
%Debt/GDP - Africa	29.17***	0.009	-0.097	0.888	8	1
t-stat		(0.658)	(-0.817)			
%Debt/GDP - Asia	57.24***	0.062*	0.078*	-0.291	4	7
t-stat		(1.746)	(1.88)			
%Debt/GDP - Middle East	62.09	0.007	0.049**	-1.627	1	6
t-stat		(0.7)	(2.033)			
%Debt/GDP - America Latina	87.87	0.205***	0.023	2.573**	1	7
t-stat		(2.979)	(1.323)			
%Debt/GDP - Europe	65.48	0.057*	0.026**	0.960	1	5
t-stat		(1.869)	(2.224)			
%Debt/GDP - Asia (s/Pakistan and India)	41.29***	0.042	0.078	-0.655	4	5
t-stat		(1.48)	(1.651)			
Sovereign Rating - Africa	10.84***	0.014	-0.003	0.482	2	7
t-stat		(0.431)	(-0.217)			
Sovereign Rating - Asia	12.33***	0.088*	0.045	0.735	5	6
t-stat		(1.736)	(1.604)			
Sovereign Rating - Middle East	10.72**	0.083*	0.005	1.797*	3	4
t-stat		(1.932)	(0.618)			
Sovereign Rating - America Latina	6	0.025	0.138*	-1.470	6	2
t-stat		(1.34)	(1.842)			
Sovereign Rating - Europe	12.7	0.02**	0.04**	-0.937	1	5
t-stat		(2.002)	(2.623)			
Sovereign Rating - Asia (s/Pakistan and India)	12.33***	0.088*	0.033	0.912	5	4
t-stat		(1.736)	(1.048)			

Table A26

Pos_rate - is defined as the interaction between **Positivity rate,** as defined in **Robustness Analysis for Developing Economies**, and **ΔCovid**.

	Developing (1) ΔCDS	Developing (2) ΔCDS	Developing (3) ΔCDS	Developing (4) ΔCDS	Developing (5) ΔCDS	Developing (6) ΔCDS	Developing (7) ΔCDS	Developing (8) ΔCDS
ΔCovid	0.044	-0.014	-0.019	-0.002	0.009	-0.006	-0.008	0.050
	(1.55)	(-0.41)	(-0.48)	(-0.08)	(0.15)	(-0.18)	(-0.31)	(1.49)
VIX	0.063*							
	(2.02)							
S&P500	-0.441**							
	(-2.18)							
WTI_OIL	0.000							
	(0.04)							
Equity	-0.155	-0.116	-0.116	-0.116	-0.116	-0.103	-0.280	-0.113
	(-1.46)	(-1.39)	(-1.40)	(-1.40)	(-1.39)	(-1.31)	(-1.36)	(-1.37)
EXR	1.893***	1.510***	1.519***	1.510***	1.508***	1.648**	1.577**	1.524***
	(4.64)	(2.82)	(2.86)	(2.80)	(2.78)	(2.63)	(2.65)	(2.91)
Pos_rate	0.015	-0.104*	-0.095*	-0.093*	-0.097*	-0.102*	-0.092	-0.191**
	(0.26)	(-1.95)	(-1.84)	(-1.80)	(-1.85)	(-1.97)	(-1.54)	(-2.36)
Fiscal	0.010***							
	(2.98)							
Fiscal*ΔC19	-0.002	0.039						
	(-0.03)	(0.69)						
DebtGDP*ΔC19			0.044					
			(0.73)					
FBalGDP*ΔC19				-0.195				
				(-0.53)				
Rating*ΔC19					-0.000			
					(-0.03)			
Debt12M*ΔC19						0.089		
						(0.61)		
Int%Rev*ΔC19							0.121	
							(1.00)	
GDPgwth*ΔC19								-1.432
								(-1.49)
Country_FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time_FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes
r2	0.084	0.136	0.136	0.135	0.135	0.124	0.144	0.138
N	2756	2756	2756	2756	2756	2456	2297	2756

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A27

	Developing	Developing	Developing	Developing	Developing
	(1)	(2)	(3)	(4)	(5)
	ΔCDS	ΔCDS	ΔCDS	ΔCDS	ΔCDS
ΔCovid	-0.014	0.012	0.045	-0.169	-0.008
	(-0.41)	(0.28)	(1.03)	(-1.21)	(-0.21)
Equity	-0.116	-0.817***	-0.115	-0.115	-0.116
	(-1.39)	(-3.62)	(-1.38)	(-1.40)	(-1.39)
EXR	1.510***	1.302**	1.492**	1.520***	1.503***
	(2.82)	(2.53)	(2.66)	(2.92)	(2.77)
Pos_rate	-0.104*	-0.213*	-0.175***	-0.149**	-0.117*
	(-1.95)	(-1.97)	(-2.78)	(-2.25)	(-1.97)
Fiscal*ΔC19	0.039	0.031	0.033	0.079	0.032
	(0.69)	(0.53)	(0.68)	(1.09)	(0.57)
health_index		-0.041			
		(-0.80)			
trade_index			-0.066**		
			(-2.06)		
ghsscore_i~x				0.302	
				(1.27)	
gIQ_index					-1.308
					(-0.37)
Country_FE	Yes	Yes	Yes	Yes	Yes
Time_FE	Yes	Yes	Yes	Yes	Yes
r2	0.136	0.148	0.136	0.137	0.136
N	2756	1836	2655	2756	2756

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A28

ΔDeathsC19 - is defined as the difference in the logarithms of total Covid-19 deaths in day t, and in day t-1. All interaction variables are given by the multiplication of the respective indicator (as defined before), and **ΔDeathsC19**.

	Developing (1) ΔCDS	Developing (2) ΔCDS	Developing (3) ΔCDS	Developing (4) ΔCDS	Developing (5) ΔCDS	Developing (6) ΔCDS	Developing (7) ΔCDS	Developing (8) ΔCDS
ΔDeathsC19	0.033**	-0.000	-0.018	-0.007	-0.016	-0.020	0.005	-0.029
	(2.07)	(-0.01)	(-0.68)	(-0.43)	(-0.33)	(-1.00)	(0.27)	(-1.22)
VIX	0.052**							
	(2.41)							
S&P500	-0.568***							
	(-3.81)							
WTI_OIL	-0.001							
	(-0.26)							
Equity	-0.125**	-0.079*	-0.079*	-0.079*	-0.079*	-0.067*	-0.150*	-0.079*
	(-2.20)	(-1.94)	(-1.95)	(-1.94)	(-1.94)	(-1.81)	(-1.72)	(-1.95)
EXR	1.973***	1.413***	1.411***	1.412***	1.411***	1.466***	1.565**	1.409***
	(4.45)	(2.88)	(2.87)	(2.86)	(2.87)	(2.73)	(2.72)	(2.86)
Fiscal	0.015***							
	(5.26)							
Fiscal*ΔC19	-0.041	-0.022						
	(-1.06)	(-0.45)						
DebtGDP*ΔC19			0.018					
			(0.31)					
FBalGDP*ΔC19				0.060				
				(0.16)				
Rating*ΔC19					0.001			
					(0.16)			
Debt12M*ΔC19						0.125		
						(0.63)		
Int%Rev*ΔC19							-0.172	
							(-1.16)	
GDPgwth*ΔC19								0.657
								(1.11)
Country_FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time_FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes
r2	0.096	0.157	0.157	0.156	0.156	0.147	0.163	0.157
N	4031	4031	4031	4031	4031	3626	3080	4031

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A29

	Developing	Developing	Developing	Developing	Developing
	(1)	(2)	(3)	(4)	(5)
	ΔCDS	ΔCDS	ΔCDS	ΔCDS	ΔCDS
ΔDeathsC19	-0.000	-0.019	-0.041	0.073	0.001
	(-0.01)	(-0.42)	(-1.06)	(0.74)	(0.04)
Equity	-0.079*	-0.533***	-0.080*	-0.079*	-0.079*
	(-1.94)	(-3.04)	(-1.92)	(-1.94)	(-1.94)
EXR	1.413***	1.345**	1.439***	1.407***	1.413***
	(2.88)	(2.57)	(2.82)	(2.86)	(2.88)
Fiscal*ΔC19	-0.022	-0.042	-0.018	-0.038	-0.024
	(-0.45)	(-0.79)	(-0.36)	(-0.67)	(-0.41)
health_index		0.039			
		(0.65)			
trade_index			0.045		
			(1.57)		
ghsscore_i~x				-0.139	
				(-0.83)	
gIQ_index					-0.298
					(-0.08)
Country_FE	Yes	Yes	Yes	Yes	Yes
Time_FE	Yes	Yes	Yes	Yes	Yes
r2	0.157	0.164	0.154	0.157	0.157
N	4031	2639	3725	4031	4031

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A30

	Developed (1) ΔCDS	Developed (2) ΔCDS	Developed (3) ΔCDS	Developed (4) ΔCDS	Developed (5) ΔCDS	Developed (6) ΔCDS	Developed (7) ΔCDS	Developed (8) ΔCDS
ΔDeathsC19	0.010	-0.002	0.007	0.030***	0.099**	0.022	0.024*	0.035*
	(0.83)	(-0.21)	(0.51)	(3.19)	(2.28)	(1.42)	(2.00)	(1.99)
VIX	-0.006							
	(-0.51)							
S&P500	-0.229***							
	(-2.82)							
WTI_OIL	-0.005**							
	(-2.47)							
Equity	-0.689***	-0.275***	-0.276***	-0.279***	-0.275***	-0.280***	-0.279***	-0.280***
	(-4.05)	(-3.02)	(-3.04)	(-3.02)	(-3.02)	(-3.03)	(-3.07)	(-3.03)
EXR	-0.367	-0.685	-0.692	-0.685	-0.704	-0.705	-0.841*	-0.719
	(-1.26)	(-1.49)	(-1.49)	(-1.52)	(-1.54)	(-1.53)	(-1.74)	(-1.57)
Fiscal	0.002							
	(0.96)							
Fiscal*ΔC19	0.078**	0.073***						
	(2.62)	(3.47)						
DebtGDP*ΔC19			0.037**					
			(2.35)					
FBalGDP*ΔC19				-0.546				
				(-1.44)				
Rating*ΔC19					-0.004			
					(-1.69)			
Debt12M*ΔC19						0.137		
						(0.93)		
Int%Rev*ΔC19							0.205	
							(0.91)	
GDPgwth*ΔC19								-0.037
								(-0.06)
Country_FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time_FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes
r2	0.182	0.342	0.341	0.340	0.340	0.339	0.350	0.339
N	3254	3254	3254	3254	3254	3254	3050	3254

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A31

	Developed	Developed	Developed	Developed	Developed
	(1)	(2)	(3)	(4)	(5)
	ΔCDS	ΔCDS	ΔCDS	ΔCDS	ΔCDS
ΔDeathsC19	-0.002	0.039*	0.021	0.018	0.025**
	(-0.21)	(1.86)	(0.75)	(0.28)	(2.69)
Equity	-0.275***	-0.401***	-0.312**	-0.263***	-0.274***
	(-3.02)	(-2.97)	(-2.71)	(-2.95)	(-3.02)
EXR	-0.685	-0.792*	-0.738	-0.681	-0.700
	(-1.49)	(-1.76)	(-1.61)	(-1.43)	(-1.56)
Fiscal*ΔC19	0.073***	0.072***	0.059**	0.072***	0.062***
	(3.47)	(3.80)	(2.38)	(3.19)	(2.80)
health_index		-0.071**			
		(-2.65)			
trade_index			-0.015		
			(-0.85)		
ghsscore_i~x				-0.030	
				(-0.29)	
gIQ_index					-1.854***
					(-3.70)
Country_FE	Yes	Yes	Yes	Yes	Yes
Time_FE	Yes	Yes	Yes	Yes	Yes
r2	0.342	0.375	0.350	0.354	0.343
N	3254	2318	3157	3152	3254

t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A32

Threshold		Beta High (ΔCovid)	Beta Low (ΔCovid)	Z-stat for the difference in Betas	Country Split	
					High	Low
HDI	0.707***	0.046*** (3.338)	0.027 (1.226)	0.743	30	11
Fiscal space - Developing (HDI Upper Threshold)	0.493***	0.037* (1.662)	0.048*** (3.147)	-0.400	9	21