COVID-19 stringency measures and foreign investment: an early assessment

COVID-19 stringency measures and foreign investment: an early assessment

Abstract

This paper investigates the evolution of foreign investment in the immediate aftermath of the implementation of COVID-19 government stringency measures. The average stringency index is not correlated with inward investment positions. However, after removing country fixed-effect and controlling for the severity of the outbreak spread, the within-country standard deviation of the stringency index is positively and significantly correlated with inward portfolio investments, at the end of the first quarter of 2020. At the end of the second quarter, the same dispersion measure is instead not associated with a significant change in inward investment. We interpret this evidence as follows. Foreign portfolio investments, typically more volatile and reactive than foreign direct ones, are more responsive, at the end of the first quarter, to governments' prompt interventions than to gradual ones, thus suggesting that the former policies are perceived as a more serious commitment to stem the spread of COVID-19. In the second quarter, instead, the standard deviation of the index captures the abrupt retreats of the containment measures, together with the timely adoption of policies, thus becoming less informative for foreign investors.

Keywords: International Investments, COVID-19, stringency index.
JEL Classifications: G11, G15, G30

1 Motivation and relevant literature

Since the outbreak of the COVID-19 pandemic, many governments have been forced to introduce unprecedented containment policies, such as travel restrictions, school and workplace closings, and stay-at-home orders. Though the assessment of the economic and financial consequences of these restrictions cannot be properly evaluated and measured yet, the global spread of COVID-19 has already lead recession, erosion of confidence and higher uncertainty (OECD (2020b)).

An already vast literature (Brodeur et al. (2021), for a review) has investigated, on the one hand, the quantitative macroeconomic effects of COVID, and, on the other hand, its socioeconomic consequences.

The first strand of literature encompasses contributions which quantify the adverse impact of COVID-19, and the ensuing lockdowns, on the main macroeconomic factors: gross domesic product (Bank (2020); OECD (2020c); IMF (2020)), aggregate consumption (Baker et al. (2020); Eichenbaum et al. (2020)), global value chains and labor supply (Bonadio et al. (2020); Elenev et al. (2020); Eppinger et al. (2020); Brinca et al. (2020)). The other complementary strand of literature comprises studies documenting the socioeconomic consequences of the pandemic on employment (Kahn et al. (2020); Kahn et al. (2020); Rojas et al. (2020); Gupta et al. (2020); Su et al. (2021)), health (Goldstein and Lee (2020); Lin and Meissner (2020); Béland et al. (2020)), and inequality (Adams-Prassl et al. (2020); Forsythe et al. (2020); Couch et al. (2020); Bartos et al. (2020)). As underlined by Brodeur et al. (2021), what emerges from this rich and heterogeneous picture is that the effects vary not only by the stringency of the social distancing measures adopted, but also by their length of implementation, and by the degree of compliance with them.

As far as financial markets are concerned, there is scarce pre-COVID literature on how epidemics impact financial markets, and all imperfect parallels with other natural disasters or terroristic attacks are hardly going to fit the COVID phenomenon, due to its vast and unprecedented nature (Godell (2020)). Indeed, according to Baker et al. (2020), COVID-19 has led to massive spikes in uncertainty, with no close historical parallels.

The growing recent literature about the impact of the COVID event on financial markets generally

converges on the evidence of a significant impact of COVID confirmed cases or deaths on financial markets' volatility and liquidity. Albulescu (2021) empirically investigates the effect of the official announcements regarding the COVID-19 new cases of infection and fatality ratio on the financial markets volatility in the United States, and finds that the coronavirus pandemic is an important source of financial volatility. Similarly, Baig et al. (2021) find that increases in confirmed cases and deaths due to coronavirus in the US are associated with a significant increase in market illiquidity and volatility, while declining sentiment and the implementations of restrictions and lockdowns contribute to the deterioration of liquidity and stability of markets. Salisu and Vo (2020) find that COVID-19 health-news trends are good predictor of stock returns since the emergence of the pandemic. Li et al. (2021) highlight that both the Covid-19 cases and deaths significantly induce the decline in the Shanghai Stock Exchange index. Ashraf (2020) finds that stock markets in 64 countries responded negatively and quickly to the growth in COVID-19 confirmed cases, with a response varying over time and depending on the stage of outbreak.

As far as international investments are concerned, Saurav et al. (2020) highlight that the COVID-19 crisis represents for international enterprises a new and unprecedented source of investor risk that has depressed investor confidence. OECD (2020a) and OECD (2020d) assess that foreign direct investments of firms are expected to decline sharply as a consequence of the pandemic and of the stringent public health measures to limit the spread of the COVID-19. Portfolio investments, typically more volatile and reactive than direct investments, reacted even earlier to the shock that the pandemic inflicted on the global economy: emerging market economies have indeed already experienced a massive drop of portfolio investment inflows, because international investors are more prone to transfer capital back home, or invest in safer assets, during periods of uncertainty. Kizys et al. (2021) study the effects of the Oxford COVID-19 Government Response Tracker, whose higher scores are associated with greater stringency, on herding behavior in international stock markets during the coronavirus COVID-19 outbreak. They disclose the presence of herding behavior in the first three months of 2020 in 72 countries stock markets' countries, but also highlight that this herding behavior is mitigated by a more stringent government response to the coronavirus crisis, by way of reducing

multidimensional uncertainty.

On a purely theoretical level, the relationship between stringency measures and foreign investment is far from obvious. Foreign investors could indeed be averted from investing in a country adopting more radical stringency measures, because it could entail a recession period making the assets issued by that country less profitable; conversely, foreign investors could be even allured by the assets issued by countries adopting more radical containment policies, because these could be perceived as a severe immediate cost to avoid even higher costs in the near future. The final balance of these forces is therefore an empirical matter, and this paper contributes to the existing literature by empirically assessing whether and how foreign investment has reacted in the immediate aftermath of the adoption of COVID-19 government stringency measures.

We find that the average stringency index is not correlated with inward investment positions. Also building on the survey by Brodeur et al. (2021) cited above, which emphasizes that the effects may vary not only by the stringency of the social distancing measures, but also by their length of implementation, or degree of compliance, we conjecture that the graduality in the introduction of these policies could matter. In fact, as pointed out by Hale et al. (2020), as the disease has spread around the world, the governments' restriction policies have differed across countries and over time: some have rapidly introduced very strict measures, such as total lockdowns, and then have removed them, as a consequence of a reduction in community transmission; other countries instead reacted with less severe rise and fall of containment measures, as small outbreaks occurred.

We check if this heterogeneous graduality in the adoption of the stringency measures has significantly affected foreign investors. After partialling out the severity of the outbreak, as captured by new deaths or new cases, and removing country fixed-effects, we observe that, in the first quarter of 2020, a higher within-country standard deviation in the stringency measures seems to have made the adopting economy relatively more attractive to foreign portfolio investors. We provide a temptative interpretation of this evidence: the within-country standard deviation could proxy the timeliness of governments' action, in the immediate aftermath of the COVID outbreak. If the prompt adoption of containment measures is interpreted as a serious commitment to restrain the uncontrolled spread

of the virus, it could have indeed fostered cross-border inward investment.

The remainder of the paper is structured as follows. In Section 2, we sketch the estimable equation. In Section 3, we describe the data, and provide some descriptive statistics. In Section 4, we report the results of the empirical analysis, with some robustness checks. Section 5 concludes.

2 Estimable equation

Our objective is to assess the evolution of international investments in the aftermath of the adoption of COVID-19 containment measures.

Specifically, we empirically test the existence of a relationship between the stringency index in a country and its foreign liabilities (or inward investments).

Let's define, first, the growth of liabilities Δ as the change in the level of liabilities from period t to period $t+1$, divided by its initial value in t:

$$\Delta \equiv (L_{t+1} - L_t)/L_t \tag{1}$$

In particular, when considering the first quarter ($q1$) of 2020, the growth of liabilities $\Delta q1$, is the difference between the liabilities at the end of the first quarter (March 2020, L_{03_20}) and the liabilities at the end of 2019 (December 2019, L_{12_19}), scaled by the liabilities at the end of 2019 (December 2019, L_{12_19})

$$\Delta q1 \equiv (L_{03\_20} - L_{12\_19})/L_{12\_19} \tag{1a}$$

To partial out the seasonality of foreign investment allocations, we consider an alternative definition of the dependent variable, that is, the measure $diff\Delta$, defined as the difference between the Δ measure in 2020 and the corresponding measure in 2019:

$$diff\Delta \equiv \Delta_{2020} - \Delta_{2019} \tag{2}$$

For instance, $diff\Delta q1$ refers to the first quarter measure, and is defined as the difference between the measure in equation (1a) and its counterpart in 2019, as follows:

$$diff\Delta q1 \equiv \Delta q1_{2020} - \Delta q1_{2019} \tag{2a}$$

We compute this growth in liabilities for the first two quarters ($\Delta q1$ and $\Delta q2$) and also for the first semester ($\Delta s1$) of 2020, for different types of liabilities: total, foreign direct and foreign portfolio inward investments.

We regress the growth in foreign liabilities on the average stringency index in the country (SI), and on its within-country standard deviation (σSI), running the following regression:

$$\Delta = \alpha + \beta(SI) + \gamma(\sigma SI) + controls + \varepsilon \tag{3}$$

In this paper, we are mainly interested in testing the significance, sign and size of the β and γ coefficients. If the adoption of stringent containment measures (SI) deters (or attracts) foreign inward investment, then we should observe a significant negative (or positive) β coefficient. As anticipated, we also include a measure of the within-country dispersion of the stringency index (σSI): a negative γ would entail a reduction in attractiveness, while a positive γ could reveal an appreciation by foreign investors.

We trade-off a parsimonious specification, due to the low number of observations, with the need to include time-varying regressors, which might contribute to explain the growth in foreign investments, and covariates potentially correlated with our main regressors, whose exclusion could bias the estimated coefficients. It is worth stressing that, since the dependent variable is defined in difference form, we can safely ignore any country-specific fixed effects, as these are removed by construction.

We include, first, the (lagged) appreciation in the Nominal Effective Exchange Rate (NEER), because its change might have affected foreign investment. Second, we control for the number of new COVID-deaths and its within-country standard deviation, as the stringency index is potentially strongly correlated with the health indicators of the epidemic spread. Finally, we include two binary

indicators of economic and financial development, to control, for instance, for the presence of any eventual flight to quality propensity by foreign investors.

To estimate the parameters in equation (3), we adopt, in the baseline specification, a Robust Least Squares estimation. Ordinary least squares estimators are sensitive to the presence of observations that lie outside the norm for the regression model of interest. The sensitivity of conventional regression methods to these outlier observations can result in coefficient estimates that do not accurately reflect the underlying statistical relationship. Robust least squares refers to a variety of regression methods specifically designed to be robust, or less sensitive, to outliers. Among Robust Least Squares, we adopt the M-estimation developed by Huber (1973).[1] Alternative estimation methods, such as standard OLS and Quantile regressions, are reported, for comparison.

3 Data and descriptive statistics

We consider inward investment in 53 countries, upon data availability. Data on foreign liabilities are drawn from the International Investment Position Statistics, released by the IMF, which provides information on foreign assets and liabilities, classified in several categories and instruments, at a quarterly frequency. In our analysis, total liabilities (total inward investments) are also split into foreign direct and foreign portfolio investments.

The source of COVID-related data is a Github ongoing repository of data on coronavirus, the Coronavirus Open Citations Dataset.

We draw from this dataset our main regressor, the stringency index (SI), which represents a proxy for the severity of the containment policy measures adopted, and the data about new COVID-deaths and cases per million of inhabitants. These data are originally reported at a daily frequency, but in order to match the quarterly frequency of the dependent variable, we construct quarterly averages and within-country quarterly standard deviations.

We include in our specification other three controls. First, the NEER (Nominal effective ex-

[1] Our results are robust to alternative Robust Least Squares methods, such as the S-estimation and the MM-estimation (results are not reported, but are available upon request).

change rate, broad index), released by the Bank for International Settlements. Then, we include two binary indicators of economic and financial development, i.e., the GDP per capita and the market capitalization per GDP, drawn from CEIC data.

In Figure 1 and 2, we report the distribution of the dependent variable. Figure 1 relies on the Δ measure defined in equation (1), for both the first quarter ($\Delta q1$, panels #a) and the second quarter ($\Delta q2$, panels #b). Panels (1a) and (1b) refer to total inward investments, panels (2a) and (2b) to foreign direct investment, while panels (3a) and (3b) refer to portfolio investments. We can observe, first, that the Δ measure is more negatively skewed in the first quarter, than in the second quarter. Second, the distribution of portfolio inward investment is more negatively skewed than the distribution of direct investment.

Figure 2 is similar to Figure 1, but relies on the $diff\Delta$ measure defined in equation (2): a comparison across quarters and types of investments (direct or portfolio) reveals the same pattern observed in Figure 1. By comparing Figure 1 and 2, we can notice that, in the first quarter, the distribution of the measure controlling for seasonality, defined in equation (2a), is more negatively skewed than the one relying on equation (1a), especially for portfolio investment.[2]

In Figure 3, we report the distribution and main descriptive statistics of the quarterly stringency index and its within-country standard deviation. Panels (#a) refer to the first quarter, while panels (#b) refer to the second quarter. Panels (1a) and (1b) focus on the average quarterly stringency index (SI), while panels (2a) and (2b) refer to the within-country standard deviation (σSI).

The average stringency index, whose original values range 0-100, in the first quarter is about 19, while in the second quarter is about 71, thus disclosing the dramatic tightening of the anti-COVID 19 containment measures.

However, panels (2a) and (2b) provide an additional piece of information on the stringency index: by comparing the within-country standard deviation in the two quarters, we observe that its average is significantly larger in the first than in the second quarter (26 versus 10). From Figure 3, we learn that, though the average stringency index SI in the first quarter is about one-fourth of its level in

[2]Figure 4, in Appendix B, is similar to Figures 1 and 2, but reports the growth in foreign liabilities in the first semester of 2020.

the second quarter, the average within-country standard deviation is about 2.5 times larger: the adoption of containment measures has been more abrupt in the immediate aftermath of the COVID spread, in order to face the challenge of the unprecedented event and its severe consequences.[3]

4 Regression analysis

4.1 Main findings

In Table 1, we report the main findings of our regression analysis for the first quarter, under a Robust Least Squares estimation. Columns (1a) and (1b) report results relative to total foreign inward investment, columns (2a) and (2b) refer to foreign direct investments, while columns (3a) and (3b) refer to portfolio investments. Columns (#a) rely on the growth measure Δ, whose structure is defined in equation (1), while columns (#b) rely on the $diff\Delta$ measure, whose structure is defined in equation (2).

As anticipated in Section 2**,** we are forced to keep a parsimonious specification, because we can rely on a quite limited country sample.

The dependent variable is defined in difference form, which allows us to ignore any problem related to country-specific fixed effects, removed by construction.

We are however concerned, on the one hand, about time-varying regressors which might concur to explain the growth in foreign investments, and, on the other hand, about covariates potentially correlated with our main regressors, whose exclusion could bias the estimated coefficients.

We include the (one-month lagged) growth in the Nominal Effective Exchange Rate (NEER),[4] a measure of the appreciation of the economy's currency against a broad basket of currencies, because its change might have affected foreign investment. Second, we control for the number of new COVID-deaths and its within-country standard deviation: the stringency index is likely correlated with this

[3]Notice that the value of the standard deviation of the stringency index reported in Panels (1a) and (1b) differs from the one reported in Panels (2a) and (2b), because the former seizes the overall standard deviation (within and between country), while the latter refers to the within-country standard deviation only, the indicator we include as a regressor in the analysis.

[4]We include its one-month lagged value, to avoid endogeneity issues.

specific indicator of the epidemic, as it represents the government reaction to contain new cases, deaths, and intensive-care treatments.[5]

Finally, we include two binary indicators of economic and financial development, to account for a potential different flow of foreign investments towards high versus low developed countries: for instance, according to the flight to quality rationale, in the presence of a global shock, foreign investors would deviate their investments to more stable and developed economies.[6]

First of all, we observe a significant negative coefficient of the constant term. The constant's coefficient represents the mean of the dependent variable, if all regressors are set to zero. We observe that the dynamics of the growth in foreign liabilities for countries with low economic and financial development (since also the indicators of development are set to zero) is strongly negative, from -10% to -33%, depending on the growth definition and on the subset of liabilities considered, which is consistent with the substantial average decrease in foreign investment after the COVID outbreak, already observed in Figure 1 (panels 1a, 2a and 3a).

As far as our main regressors are concerned, we first observe that the average stringency index (SI) does not affect the growth in inward liabilities in the first quarter of 2020. However, the coefficients of the within-country standard deviation (σSI) are positive and highly significant for foreign portfolio investment (columns (3a) and (3b)), for both Δ measures considered: a one-unit increase of the σSI pushes inward portfolio investment from 0.64 to 0.66%. If we recall that, in the first quarter, the mean of σSI is 26 (the median is 27), we point to an economically sizeable effect. The coefficient of σSI for total liabilities, driven by the strong significance of its portfolio investment component, is about 0.3%, while the coefficient for direct inward investment is significant only in column (2a).

As far as the other regressors are concerned, the coefficients related to the COVID-new deaths per million are never significant, while the appreciation of the currency is (marginally) significant only for foreign direct investment, and only in the second specification of the growth measure. The

[5]Results are left qualitatively unchanged, when considering a regression specification with the number of deaths per million of inhabitants in logs, rather than in levels.

[6]Since these controls are not available at a quarterly frequency for most of countries, we include them as lagged time-invariant covariates.

binary regressors capturing the economic and financial development of the receiving economy seem to deliver contrasting, and non systematic results: on the one hand, countries with higher than median GDP per capita seem to witness a dampened drop in the growth of foreign liabilities; on the other hand, countries with higher than median market capitalization per GDP, seem to suffer even more the contraction in foreign inward investment. Though the evidence about the relationship between liabilities' growth and development is worth-investigating, we must underline that, also in this case, the significance of the coefficients is usually quite weak and far from systematic across instruments and dependent variable's specifications.

To allow an immediate comparison over time, across various types of liabilities, and different definitions of the dependent variable and regressors, we report in a singe table, Table 2, only the coefficients of the regressors of interest, SI and σSI; at the bottom of the table, we specify the other controls included in the regression, following the same econometric specification of Table 1.

Table 2 is horizontally partitioned into three panels: panel I refers to total foreign investment, panel II to foreign direct investment, while panel III to foreign portfolio investment. Columns (1a) and (1b) report results relative to the first quarter of 2020, already displayed in Table 1, columns (2a) and (2b) refer to the second quarter, while columns (3a) and (3b) refer to the first semester of 2020.[7]

We observe that, after removing country fixed-effects and controlling for the severity of the epidemic spread across economies, as captured by the number of new COVID-death/new COVID-cases per million, the only significant coefficients refer to the effect of the within-country standard deviation (σSI) for portfolio investors, and only at the end of the first quarter of 2020, as already found in Table 1. The coefficients are never significant in the last four columns, which refer to the second quarter and first semester of 2020.

From this table, we derive three main considerations. First, portfolio investors reveal to be the ones more sensitive to the stringency index. Second, the allocation of foreign portfolio investors

[7]When considering the first quarter, $\Delta q1$ is regressed on the "pure" first quarter stringency index (as SI was null at the end of 2019), while when considering the second quarter, $\Delta q2$ is regressed on the growth in the stringency index from the first to the second quarter. By considering the full semester $\Delta s1$, we are able to check our regression findings, when considering as a regressor the "pure" second quarter stringency index.

seems to have been affected by the within-country standard deviation of the stringency index, rather than by its average level. Third, the effect is significant only at the end of the first quarter.

Let's try to provide an interpretative key to these pieces of evidence.

First of all, we are not surprised to observe that portfolio investments are more affected by the policy measures adopted, because they are typically more volatile and reactive than foreign direct investments, and then were expected to react earlier also to the pandemic shock.

Second, we observe that, at the end of the first quarter of 2020, portfolio investors have not been driven by the average stringency of the policy adopted, but rather by its standard deviation, which might capture the sharpness of the government reaction, as opposed to the graduality of the interventions.

Third, the difference across quarters is systematic. This evidence is consistent with the work of Ashraf (2020), which suggests that stock markets have quickly responded to COVID-19 pandemic, and that this response has varied over time, depending on the stage of outbreak, with a stronger negative market reaction during early days of confirmed cases. The prompt adoption of containment measures in the immediate aftermath of the COVID crisis, compared to more gradual ones, might have been interpreted by foreign investors as a serious commitment to face the negative consequences of an uncontrolled spread of the virus. In the second quarter, instead, the standard deviation of the index within a country seizes also the retreat of the containment measures: when this index gets blurred and just weakly correlated with the timeliness in the implementation of rigorous containment measures, it also becomes loosely correlated with cross-border investment.

It is worth stressing that the aim of this research is to establish the existence of a connection between the COVID restrictive measures and foreign investors' allocation choices. A rigorous critical assessment of the containment measures imposed by different countries and the appropriateness of their timing, would require a throughout study of the implementation of different policies in different economies, which is far beyond the scope of this paper. Indeed, both the intensity and the speed of adoption of containment measures in different countries can be strictly related to the severity of the effects of the COVID spread, which has shown a notable degree of cross-country heterogeneity. While

the reasons behind this heterogeneity are still quite obscure, and scientific research will hopefully make them clearer in the near future, it can be argued that governments cannot be blamed or praised for the measures adopted, as these have been country-specific reactions to country-specific conditions, in terms of severity of cases, deaths, and pre-existing efficiency of the national health system. In our analysis, by controlling for epidemic indicators, such as the new COVID deaths per million of inhabitants, and by removing country fixed-effects, we try to partial out this cross-country heterogeneity, in order to capture the eventual effects of the level of the stringency measures (SI) and its within-country dispersion (σSI) on foreign investments, on top of the severity of the spread.[8]

In the remainder of the paper, we undergo our findings to a bunch of robustness checks, to infer the strengths and limits of the analysis.

4.2 Sensitivity checks

In the following tables, we check the sensitivity of our findings to alternative controls (Table 3), country sample specifications (Table 4), and estimation strategies (Table 5).

In Table 3, we include the variable "new COVID-cases per mn of inhabitants" (and its within-country standard deviation), as an alternative to "new COVID-deaths per mn of inhabitants" (and its within-country standard deviation). Ashraf (2020) finds that stock markets reacted more proactively to the growth in number of confirmed cases as compared to the growth in number of COVID deaths. We therefore check whether our findings are affected by the introduction of this alternative covariate. We observe instead a pattern qualitatively very similar to Table 2, in which the only significant coefficients are those related to σSI, in the first quarter, for foreign portfolio investment: quantitatively, the effect is reduced, but still important, since a one-unit increase in the dispersion index leads to 0.4% larger inward portfolio investments.

In Table 4, we test whether our findings survive to the exclusion of specific countries from the sample. In columns (1a) and (1b) of Table 4, we exclude China from the sample. China has been

[8] The correlation coefficient between the average stringency index (SI) and the "new COVID-deaths per mn" average is equal to 0.22 (significant at 5% level) in the first quarter, and 0.04 (non significant) in second quarter. The correlation coefficient between the corresponding within-country standard deviation (σSI) is not statistically significant (equal to 0.17 in the first quarter, and -0.04 in the second quarter).

the first country to be struck by the COVID spread, several weeks before other countries. The effect of the stringency index and its dispersion measure could therefore have been distorted by China's asynchronic timing of lockdown and loosening measures, both in the first and in the second quarter.

By comparison with Table 2, we observe that the exclusion of China reduces the impact of σSI on foreign portfolio investors from 0.64 to 0.56%, when considering the Δ measure of column (1a), and from 0.66 to 0.65%, when considering the $diff\Delta$ measure of column (1b): the size of the coefficient is affected, but the effect remains still sizeable and significant.

In columns (2a) to (4b) of Table 4, we exclude from the sample potential offshore financial centres, to make sure our results are not driven by economies which would distort investors' decisions for reasons hard to control for, in our analysis. We consider three different classifications proposed by the literature: columns (2a) and (2b) report the results under the classification proposed by Damgaard et al. (2018), columns (3a) and (3b) follow Zoromé (2007), while columns (4a) and (4b) follow Lane and Milesi-Ferretti (2017) (see Appendix A.1, for details on the offshore countries excluded).

We confirm that, at the end of the first quarter of 2020, foreign investors' allocation is affected by the within-country dispersion of the stringency index, rather than by the stringency index itself. Differently from previous findings, however, we observe, that σSI systematically affects all types of foreign investors, direct and portfolio, under both specifications of the dependent variable. The impact on foreign direct investors, negligible in the full sample case, becomes not only statistically significant, but also economically sizeable, ranging from 0.43 to 0.62%. However, consistently with our previous findings, the impact remains larger for foreign portfolio investors than for direct investors. Also the size of the effect is significantly boosted after the exclusion of offshore countries, ranging from 0.71 to 0.80%, depending on the specification. Interestingly, the exclusion of offshore centres makes our findings even more general and systematically valid.[9]

Finally, Table 5 reports results for the first quarter of 2020, under different econometric model specifications.

[9] Tables 4a and 4b in Appendix B report the corresponding tables for the second quarter and the first semester. The coefficients are non significant, with the exception of one (marginally) significant negative coefficient for the average SI, in column (1a) of Table 4a, relative to foreign direct investment, but only relative to one of the two measures of the dependent variable.

The results under the standard OLS specification (columns (1a) and (1b)) are qualitatively similar to the ones under the Robust Least Squares approach of Table 2: the coefficient in column (1a) is reduced (from 0.64 to 0.56%), while the coefficient in column (1b) is marginally increased (from 0.66 to 0.68%).

In columns (2a) to (4b), we report the results of a Quantile regression: whereas the method of least squares estimates the conditional mean of the response variable, quantile regression estimates its conditional median (or other quantiles), thus being potentially more robust against outliers in the response measurements. In columns (2a) and (2b), we report the conditional 25th percentile, in columns (3a) and (3b) the median, and in columns (4a) and (4b) the 75th percentile of the response variable.

We observe, first, that the coefficient of the σSI factor is again systematically significant only for foreign portfolio investors: there is only one (marginally) significant coefficient in the total investment panel, and one in the direct investment panel, both at the 25th percentile, but this significance is not robust across both Δ measures of the dependent variable. Focusing on panel III, referred to foreign portfolio investment, we observe that the coefficients vary over percentiles and definitions of the Δ measure. The coefficient of the measure of dispersion σSI is (marginally) significant at the 25th percentile of the response variable (0.55, column (2b)), but only when defined as in equation (2), while it systematically affects the median and 75th percentile of the response variable, under both definitions of the Δ measure. Interestingly, there is no precise ranking in the effect of σSI over these two percentiles: according to the Δ measure defined in equation (1), the effect on the median of the response variable is larger than its effect on the 75th percentile, and vice versa when considering the alternative $diff\Delta$ measure defined in equation (2).

Overall, the results of Table 5 indicate that our findings are not driven by the choice of the econometric model.[10]

[10] Tables 5a and 5b in Appendix B, referred, respectively, to the second quarter and the first semester of 2020, confirm the absence of significant effects in the second quarter of 2020. The only exception is relative to column (4b) of panel II (foreign direct investment) of Table 5b: there are two (marginally) significant negative coefficient for the average SI and its standard deviation σSI, but only for one of the two measures of the dependent variable.

5 Conclusions

This paper investigates the evolution in foreign investment in the immediate aftermath of the adoption of government stringency measures to restrain the spread of COVID-19. Foreign investors could be averted from investing in a country adopting more radical stringency measures, because it could entail a recession period making less profitable the assets issued by that country. Conversely, foreign investors could be allured by the assets issued by countries adopting more radical containment policies, because these could be perceived as a severe immediate cost to avoid even higher costs in the near future.

We observe that the quarterly average stringency index in each country does not affect inward investment. However, the within-country standard deviation of the stringency index does. In particular, we observe that, after controlling for the severity of the COVID-contagion and removing country fixed-effect, a higher within-country standard deviation in the stringency index makes the adopting countries relatively more attractive for foreign portfolio investors, but only at the end of the first quarter of 2020. An increase of one unit of the within-country standard deviation of the stringency index pushes inward portfolio investments from 0.4% up to 0.8%, depending on the specification adopted. Being the average within-country standard deviation of the stringency index equal to 26 in the first quarter, we point to a sizeable average impact on foreign portfolio investments. This evidence can be interpreted as follows. At the end of the first quarter of 2020, the growth in foreign portfolio investments, typically more volatile and reactive than foreign direct ones, responds to governments' prompt and severe reactions more than to gradual ones, since the former can represent for foreign investors a more serious commitment to stem the spread of COVID-19. At the end of the second quarter, instead, the standard deviation of the index within a country also captures the retreat of the containment measures: when this index gets blurred and just weakly correlated with the timeliness in the implementation of rigorous containment measures, it also becomes loosely statistically correlated with cross-border investment.

This early evidence seems to suggest that foreign portfolio investors, when allocating their investment abroad, value, more than the average stringency of the government containment policies, the

speed in the adoption of these measures, as a commitment to stability, lower uncertainty, and then higher adjusted risk-returns in the near future.

References

Adams-Prassl, A., T. Boneva, M. Golin, and C. Rauh (2020). Inequality in the impact of the coronavirus shock: Evidence from real time surveys. *Journal of Public Economics 189*, 104245.

Albulescu, C. (2021). COVID-19 and the united states financial markets' volatility. *Finance Research Letters 38*.

Ashraf, B. (2020). Stock markets reaction to covid-19: Cases or fatalities? *Research in International Business and Finance 54*.

Baig, A., H. A. Butt, O. Haroon, and S. Rizvi (2021). Deaths, panic, lockdowns and us equity markets: The case of COVID-19 pandemic. *Finance Research Letters 38*.

Baker, S., N. Bloom, S. Davis, and S. Terry (2020). Covid-induced economic uncertainty. Working Paper 26983, NBER.

Bank, W. (2020). *Global Economic Prospects*. Washington, DC: World Bank.

Bartos, V., M. Bauer, J. Cahlikova, and J. Chytilová (2020). COVID-19 crisis fuels hostility against foreigners. IZA Discussion Paper 13250, Institute of Labor Economics, Bonn, Germany.

Bonadio, B., Z. Huo, A. Levchenko, and N. Pandalai-Nayar (2020). Global supply chains in the pandemic. Working Paper 27224, NBER.

Brinca, P., J. Duarte, and M. Faria-e-Castro (2020). Measuring labor supply and demand shocks during covid-19. Working Paper 020-011, Federal Reserve Bank, St. Louis, MO.

Brodeur, A., D. Gray, A. Islam, and S. Bhuiyan (2021). A literature review of the economics of COVID-19. *Journal of Economic Surveys*, 1–38.

Béland, L.-P., A. Brodeur, D. Mikola, and T. Wright (2020). The short-term economic consequences of COVID-19: Occupation tasks and mental health in canada. IZA Discussion Paper 13254, Institute of Labor Economics, Bonn, Germany.

Couch, K., R. Fairlie, and H. Xu (2020). Early evidence of the impacts of COVID-19 on minority unemployment. *Journal of Public Economics 192*, 104287.

Damgaard, J., T. Elkjaer, and N. Johannesen (2018). Piercing the veil. *International Monetary Fund: Finance and Development Quarterly 55(2)*, 50–53.

Eichenbaum, M., S. Rebelo, and M. Trabandt (2020). The macroeconomics of epidemics. Working Paper 26882, NBER.

Elenev, V., T. Landvoigt, and S. Van Nieuwerburgh (2020). Can the covid bailouts save the economy? Working Paper 27207, NBER.

Eppinger, P., G. Felbermayr, O. Krebs, and B. Kukharskyy (2020). COVID-19 shocking global value chains. Working Paper 2167, Kiel Institute for the World Economy, Germany.

Forsythe, E., L. Kahn, F. Lange, and D. Wiczer (2020). Labor demand in the time of COVID-19: Evidence from vacancy postings and ui claims. *Journal of Public Economics 189*, 104238.

Godell, J. (2020). COVID-19 and finance: Agendas for future research. *Finance Research Letters 35*, 1–5.

Goldstein, J. and R. Lee (2020). Demographic perspectives on the mortality of COVID-19 and other epidemics. *Proceedings of the National Academy of Sciences 117(36)*, 22035.

Gupta, S., L. Montenovo, T. Nguyen, F. Rojas, I. Schmutte, K. Simon, B. Weinberg, and C. Wing (2020). Effects of social distancing policy on labor market outcomes. Working Paper 27280, NBER.

Hale, T., T. Phillips, A. Petherick, B. Kira, N. Angrist, K. Aymar, S. Webster, S. Majumdar, L. Hallas, H. Tatlow, and E. Cameron-Blake (2020). Risk of openness index: When do government responses need to be increased or maintained? *Research note, University of Oxford and Blavatnik School of Government , September*.

Huber, P. (1973). Robust regression: Asymptotics, conjectures and monte carlo. *Annals of Statistics 1(5)*, 799–821.

IMF (2020). World economic outlook update, October 2020: A long and difficult ascent. Technical report, IMF.

Kahn, L., F. Lange, and D. Wiczer (2020). Labor demand in the time of COVID-19: Evidence from vacancy postings and ui claims. Working Paper 27061, NBER.

Kizys, R., P. Tzouvanas, and M. Donadelli (2021). From covid-19 herd immunity to investor herding in international stock markets: The role of government and regulatory restrictions. *International Review of Financial Analysis 74*.

Lane, P. and G. Milesi-Ferretti (2017). International financial integration in the aftermath of the global financial crisis. *IMF Working Papers 17/115*.

Li, C., C. Su, M. Altuntas, and X. Li (2021). COVID-19 and stock market nexus: evidence from Shanghai stock exchange. *Economic Research-Ekonomska Istraživanja*, 1–14.

Lin, P. and C. Meissner (2020). A note on long-run persistence of public health outcomes in pandemics. Working Paper 27119, NBER.

OECD (2020a). Foreign direct investment flows in the time of covid-19. *Tackling Coronavirus (COVID-19): contributing to a global effort, May 2020*.

OECD (2020b). Global financial markets policy responses to covid-19. *WP, OECD Directorate for Financial and Enterprise Affairs, March 2020*.

OECD (2020c). Oecd economic outlook. *OECD iLibrary*.

OECD (2020d). OECD investment policy responses to covid-19. *Tackling Coronavirus (COVID-19): contributing to a global effort, June 2020*.

Rojas, F., X. Jiang, L. Montenovo, K. Simon, B. Weinberg, and C. Wing (2020). Is the cure worse than the problem itself? Immediate labor market effects of COVID-19 case rates and school closures in the u.s. Working Paper 27127, NBER.

Salisu, A. and X. Vo (2020). Predicting stock returns in the presence of covid-19 pandemic: The role of health news. *International Review of Financial Analysis 71*.

Saurav, A., P. Kusek, and R. Kuo (2020). The impact of covid-19 on foreign investors: early evidence from a global pulse survey. *Global Investment Climate, World Bank Group , April 2020*.

Su, C., K. Dai, S. Ullah, and Z. Andlib (2021). COVID-19 pandemic and unemployment dynamics in European economies. *Economic Research-Ekonomska Istraživanja*, 1–13.

Zoromé, A. (2007). Concept of offshore financial centers: In search of an operational definition. *IMF Working Paper WP/07/87*.

Tables

Figure 1. Quarterly growth in inward investment

This figure reports, in panels #a) and #b), the growth in inward investment, at the end of the first, $\Delta q1$, and second quarter of 2020, $\Delta q2$, respectively, as defined in equation (1). Panels 1a) and 1b) refer to total foreign inward investments, panels 2a) and 2b) refer to foreign direct investments, and panels 3a) and 3b) refer to foreign portfolio investments. To enhance readability, growth rates are reported in percentage.

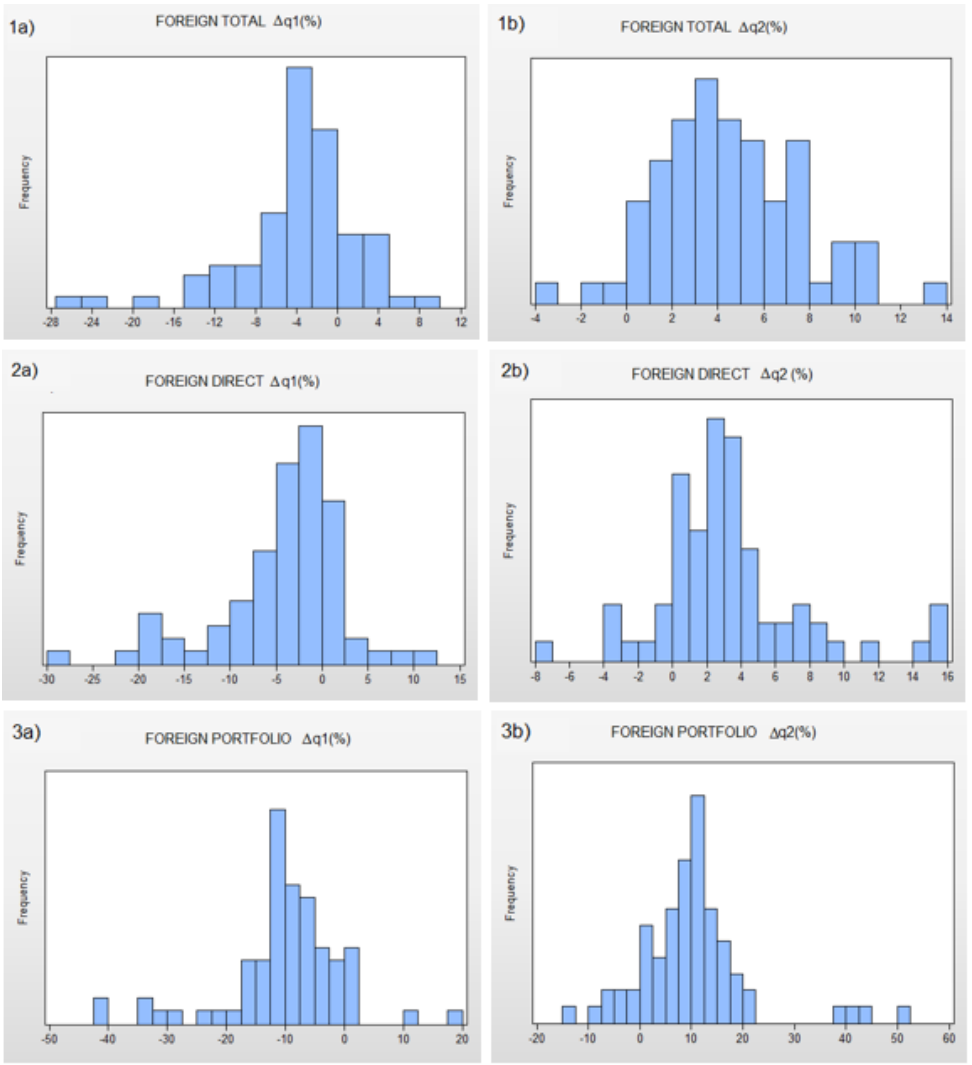

Figure 2. Quarterly growth in inward investment (difference relative to 2019 growth)

This figure is the same as Figure 1, but the quarterly growth in inward investment at the end of the first, $diff\Delta q1$, and second quarter of 2020, $diff\Delta q2$, respectively, are defined as differences with respect to the corresponding quarterly growth in 2019, as defined in equation (2). To enhance readability, growth rates are reported in percentage.

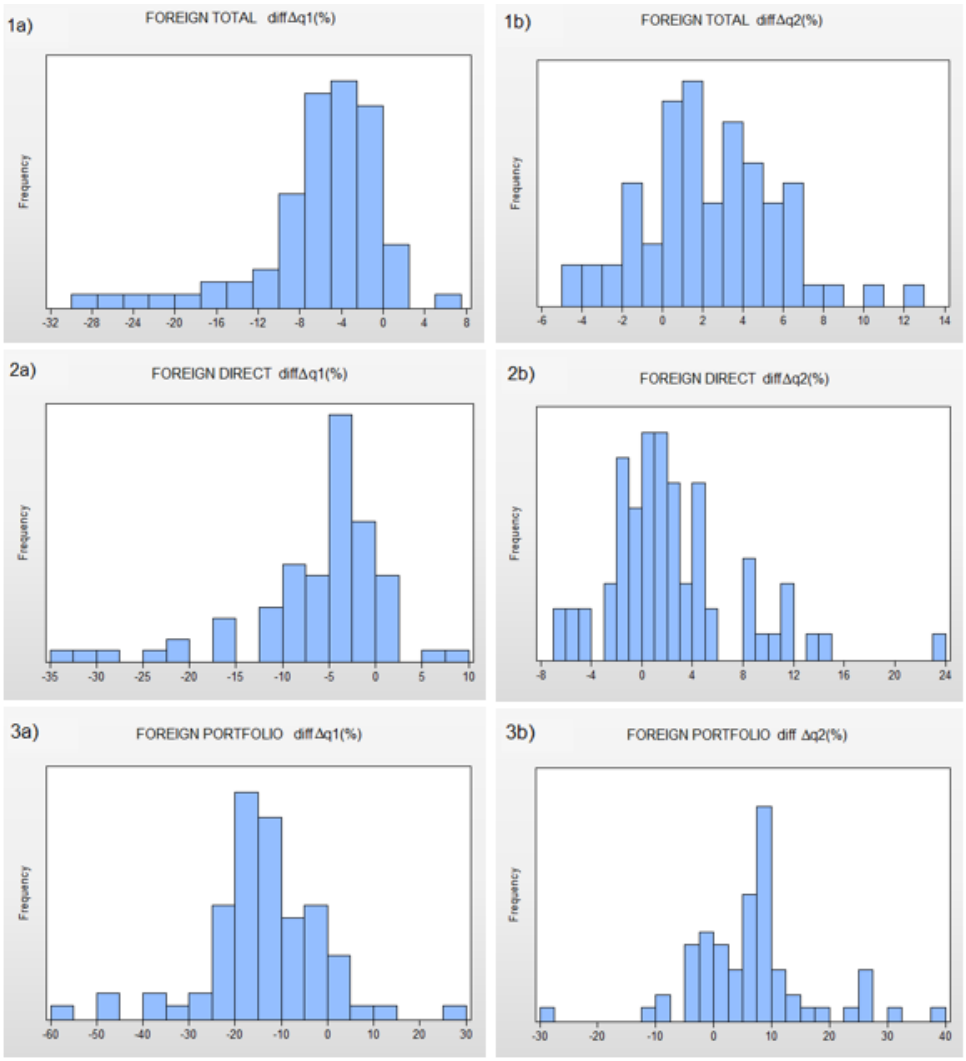

Figure 3. Stringency index: within-country average and standard deviation (by quarter)

This figure reports the distribution and main descriptive statistics of the average within-country Stringency Index, SI, in panels 1a) and 1b), and of the within-country standard deviation of the Stringency Index, σSI, in panels 2a) and 2b). Panels #a) refer to the first quarter of 2020, while panels #b) refer to the second quarter of 2020.

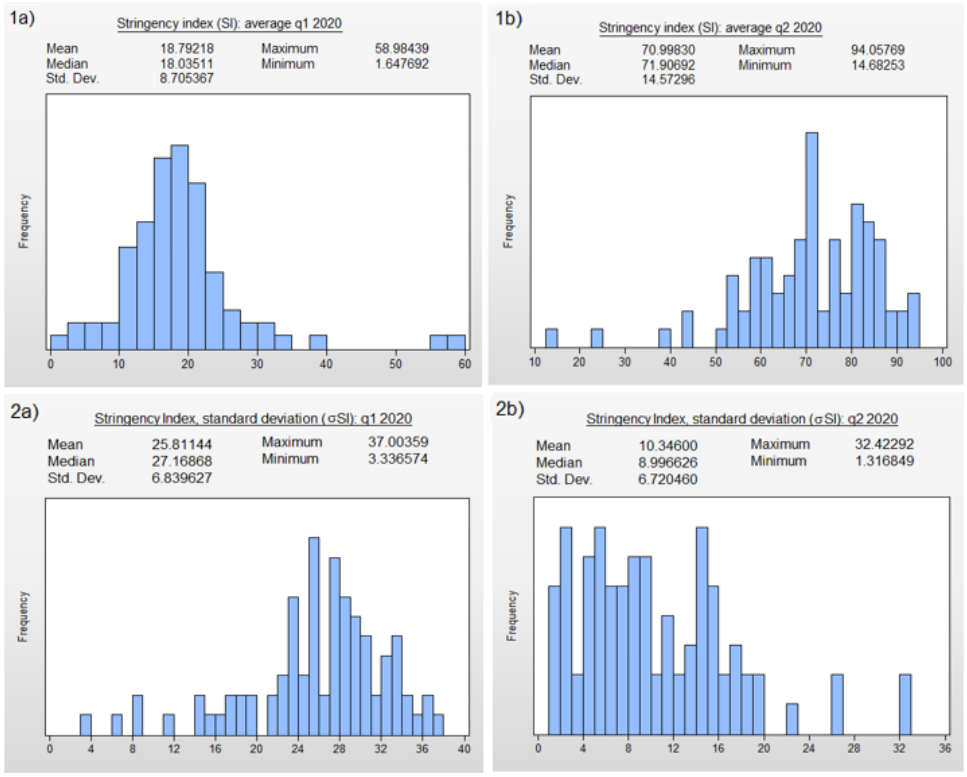

Table 1. Main findings (first quarter, q1)

This table reports the results of a Robust Least Squares regression (M-estimation), following equation (3). The dependent variable is the quarterly growth in foreign liabilities, constructed as equation in (1a), in columns #a, or as in equation (2a), in columns #b. Columns (1a) and (1b) refer to foreign total, columns (2a) and (2b) to foreign direct, and columns (3a) and (3b) to foreign portfolio inward investment. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively.

	Main findings					
	q1 (mar2020-dec2019)/dec2019					
	Foreign total		Foreign Direct		Foreign portfolio	
	Δq1	diffΔq1	Δq1	diffΔq1	Δq1	diffΔq1
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
constant	-0.1459 ***	-0.1577 ***	-0.1413 ***	-0.1020 **	-0.2638 ***	-0.3153 ***
	(0.0419)	(0.0477)	(0.0500)	(0.0446)	(0.0481)	(0.0551)
stringency index (**SI**)	0.0005	-0.0001	-0.0001	-0.0007	-0.0007	-0.0016
	(0.0011)	(0.0011)	(0.0013)	(0.0011)	(0.0013)	(0.0013)
st.dev. stringency index$_j$ (σ**SI**$_j$)	0.0027 *	0.0030 *	0.0034 *	0.0021	0.0064 ***	0.0066 ***
	(0.0015)	(0.0017)	(0.0018)	(0.0016)	(0.0017)	(0.0020)
high_econ. development	0.0510 ***	0.0356 *	0.0278	0.0264	0.0393 *	0.0517 **
	(0.0188)	(0.0206)	(0.0225)	(0.0193)	(0.0216)	(0.0238)
high_fin. development	-0.0706 **	-0.0541	-0.0561	-0.0261	-0.0570	-0.1059 ***
	(0.0319)	(0.0329)	(0.0382)	(0.0308)	(0.0367)	(0.0380)
new COVID deaths per mn	-0.0590	-0.0091	-0.0200	-0.0202	-0.0103	0.0664
	(0.1256)	(0.1296)	(0.1501)	(0.1212)	(0.1443)	(0.1497)
st.dev. new COVID deaths per mn	0.0171	0.0001	0.0001	0.0114	-0.0165	-0.0497
	(0.0565)	(0.0583)	(0.0675)	(0.0545)	(0.0649)	(0.0673)
Δ NEER (1-month lag)	0.6045	0.0407	1.0991	0.8267 *	0.2868	-0.2923
	(0.6051)	(0.4805)	(0.7228)	(0.4491)	(0.6950)	(0.5549)
#obs	53	53	53	53	53	53
R^2	0.18	0.08	0.09	0.15	0.13	0.15

Table 2. Main findings

This table reports only the coefficients of our main regressors (SI and σSI), following the econometric specification in equation (3), for the first quarter (columns (1a) and (1b)), the second quarter (columns (2a) and (2b)), and the first semester (columns (3a) and (3b)) of 2020. Panel I, II and III refer, respectively, to total, direct and portfolio inward investment. The econometric specification, as in Table 1, also includes the controls reported at the bottom of the table (the number of the new COVID deaths per mn, its standard deviation, the (one-month lagged) quarterly appreciation in the nominal effective exchange rate, and binary indicators of economic development and financial development). ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively.

	Main findings					
INWARD INVESTMENT	q1(dec2019-mar2020)		q2(mar2020-jun2020)		s1(dec2019-jun2020)	
	Δq1	diffΔq1	Δq2	diffΔq2	Δs1	diffΔs1
I. FOREIGN TOTAL	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
stringency index$_j$ (**SI**$_j$)	0.0005	-0.0001	-0.0008	-0.0008	0.0000	-0.0002
	(0.0011)	(0.0011)	(0.0034)	(0.0039)	(0.0004)	(0.0005)
st.dev. stringency index$_j$ (σ**SI**$_j$)	0.0027 *	0.0030 *	-0.0151	-0.0091	0.0000	0.0012
	(0.0015)	(0.0017)	(0.0189)	(0.0212)	(0.0011)	(0.0012)
#obs	53	53	51	51	51	51
R^2	0.18	0.08	0.06	0.07	0.39	0.19
II. FOREIGN DIRECT	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
stringency index$_j$ (**SI**$_j$)	-0.0001	-0.0007	-0.0057	-0.0049	0.0002	-0.0006
	(0.0013)	(0.0011)	(0.0037)	(0.0042)	(0.0003)	(0.0005)
st.dev. stringency index$_j$ (σ**SI**$_j$)	0.0034 *	0.0021	0.0240	-0.0001	-0.0001	-0.0020
	(0.0018)	(0.0016)	(0.0202)	(0.0233)	(0.0006)	(0.0013)
#obs	53	53	51	51	51	51
R^2	0.18	0.08	0.06	0.07	0.39	0.19
III. FOREIGN PORTFOLIO	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
stringency index$_j$ (**SI**$_j$)	-0.0007	-0.0016	0.0050	0.0020	0.0007	0.0011
	(0.0013)	(0.0013)	(0.0037)	(0.0070)	(0.0009)	(0.0010)
st.dev. stringency index$_j$ (σ**SI**$_j$)	0.0064 ***	0.0066 ***	-0.0048	-0.0415	0.0004	0.0022
	(0.0017)	(0.0020)	(0.0202)	(0.0384)	(0.0021)	(0.0024)
#obs	53	53	51	51	51	51
R^2	0.18	0.08	0.06	0.07	0.39	0.19
other controls: new COVID deaths per mn, st.dev. new COVID deaths per mn, (lag) NEER, (lag) economic development, (lag) financial development						

Table 3. Sensitivity analysis: controls' specification

This table is the same as Table 2, but the covariate "new number of COVID deaths per mn" is replaced by the covariate "new cases of COVID per mn", with its corresponding within-country standard deviation.

	Sensitivity analysis					
	Controls' specification: new COVID cases per mn (alternative to new deaths per mn)					
INWARD INVESTMENT	q1(dec2019-mar2020)		q2(mar2020-jun2020)		s1(dec2019-jun2020)	
	Δq1	diffΔq1	Δq2	diffΔq2	Δs1	diffΔs1
I. FOREIGN TOTAL	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
stringency index$_j$ (**SI**$_j$)	0.0004	0.0003	0.0012	0.0008	0.0001	0.0000
	(0.0011)	(0.0008)	(0.0038)	(0.0041)	(0.0004)	(0.0006)
st.dev. stringency index$_j$ (σ**SI**$_j$)	0.0023	-0.0006	-0.0198	-0.0111	0.0003	0.0013
	(0.0015)	(0.0013)	(0.0192)	(0.0212)	(0.0011)	(0.0013)
#obs	53	53	51	51	51	51
R^2	0.17	0.07	0.04	0.05	0.44	0.18
II. FOREIGN DIRECT	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
stringency index$_j$ (**SI**$_j$)	-0.0004	-0.0006	-0.0047	-0.0040	0.0005	-0.0003
	(0.0012)	(0.0011)	(0.0043)	(0.0053)	(0.0003)	(0.0006)
st.dev. stringency index$_j$ (σ**SI**$_j$)	0.0025	0.0021	0.0176	-0.0049	-0.0001	-0.0017
	(0.0016)	(0.0017)	(0.0219)	(0.0275)	(0.0008)	(0.0014)
#obs	53	53	51	51	51	51
R^2	0.17	0.07	0.04	0.05	0.44	0.18
III. FOREIGN PORTFOLIO	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
stringency index$_j$ (**SI**$_j$)	-0.0004	-0.0010	0.0058	0.0017	0.0009	0.0011
	(0.0010)	(0.0013)	(0.0041)	(0.0070)	(0.0009)	(0.0010)
st.dev. stringency index$_j$ (σ**SI**$_j$)	0.0038 ***	0.0045 **	-0.0072	-0.0334	0.0008	0.0022
	(0.0013)	(0.0020)	(0.0208)	(0.0360)	(0.0022)	(0.0024)
#obs	53	53	51	51	51	51
R^2	0.17	0.07	0.04	0.05	0.44	0.18
other controls: new COVID cases per mn, st.dev. new COVID cases per mn, (lag) NEER, (lag) economic development, (lag) financial development						

Table 4. Sensitivity analysis: sample specification

This table is the same as Table 2, but the sample excludes China (columns (1a) and (1b)), or offshore countries (from columns (2a) to (4b)), according to three alternative offshore definitions: columns (2a) and (2b) follow the classification in Damgaard et al. (2018), columns (3a) and (3b) follow Zoromé (2007), columns (4a) and (4b) follow Lane and Milesi-Ferretti (2017) (see Appendix A.1 for details).

	Sensitivity analysis							
	Sample specification							
INWARD INVESTMENT	q1(dec2019-mar2020)							
	No China		No offshore					
	Δq1	diffΔq1	Δq1	diffΔq1	Δq1	diffΔq1	Δq1	diffΔq1
I. FOREIGN TOTAL	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
stringency index$_j$ (**SI**$_j$)	0.0003	-0.0002	0.0006	-0.0006	0.0005	-0.0005	0.0003	-0.0006
	(0.0016)	(0.0016)	(0.0009)	(0.0011)	(0.0011)	(0.0009)	(0.0011)	(0.0009)
st.dev. stringency index$_j$ (σ**SI**$_j$)	0.0027 *	0.0030 *	0.0023 *	0.0049 ***	0.0047 ***	0.0059 ***	0.0049 ***	0.0060 ***
	(0.0015)	(0.0018)	(0.0014)	(0.0019)	(0.0016)	(0.0016)	(0.0016)	(0.0017)
#obs	52	52	49	49	47	47	45	45
R^2	0.18	0.09	0.17	0.12	0.20	0.17	0.24	0.19
II. FOREIGN DIRECT	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
stringency index$_j$ (**SI**$_j$)	-0.0016	-0.0022	-0.0004	-0.0006	0.0000	-0.0004	0.0000	-0.0004
	(0.0016)	(0.0015)	(0.0015)	(0.0013)	(0.0015)	(0.0012)	(0.0016)	(0.0013)
st.dev. stringency index$_j$ (σ**SI**$_j$)	0.0028 *	0.0023	0.0051 **	0.0043 **	0.0061 ***	0.0060 ***	0.0062 **	0.0059 **
	(0.0016)	(0.0016)	(0.0022)	(0.0021)	(0.0023)	(0.0023)	(0.0025)	(0.0024)
#obs	52	52	49	49	47	47	45	45
R^2	0.08	0.17	0.13	0.16	0.15	0.17	0.17	0.17
III. FOREIGN PORTFOLIO	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
stringency index$_j$ (**SI**$_j$)	-0.0023	-0.0009	-0.0012	-0.0021	-0.0006	-0.0017	-0.0008	-0.0021
	(0.0016)	(0.0019)	(0.0014)	(0.0014)	(0.0013)	(0.0015)	(0.0014)	(0.0017)
st.dev. stringency index$_j$ (σ**SI**$_j$)	0.0056 ***	0.0065 ***	0.0080 ***	0.0080 ***	0.0079 ***	0.0071 **	0.0080 ***	0.0072 **
	(0.0016)	(0.0020)	(0.0021)	(0.0024)	(0.0021)	(0.0028)	(0.0022)	(0.0030)
#obs	52	52	49	49	47	47	45	45
R^2	0.12	0.13	0.19	0.17	0.16	0.12	0.16	0.16

other controls: new COVID deaths per mn, st.dev. new COVID deaths per mn, (lag) NEER, (lag) economic development, (lag) financial development

Table 5. Sensitivity analysis: specification of the econometric model

This table is the same as Table 2, but under alternative econometric specifications: OLS in columns (1a) and (1b), and Quantile regressions in columns (2a) to (4b).

	Sensitivity analysis							
	Econometric model specification							
INWARD INVESTMENT	q1(Dec2019-Mar2020)							
	OLS		**Quantile regression**					
			p25		p50		p75	
	Δq1	diffΔq1	Δq1	diffΔq1	Δq1	diffΔq1	Δq1	diffΔq1
I. FOREIGN TOTAL	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
stringency index$_j$ (**SI**$_j$)	0.0006	0.0003	0.0011	0.0006	0.0001	-0.0001	0.0000	0.0002
	(0.0011)	(0.0012)	(0.0009)	(0.0011)	(0.0012)	(0.0012)	(0.0011)	(0.0010)
st.dev. stringency index$_j$ (σ**SI**$_j$)	0.0026 *	0.0026	0.0030	0.0052 *	0.0037	0.0048	0.0019	-0.0002
	(0.0015)	(0.0018)	(0.0020)	(0.0027)	(0.0029)	(0.0035)	(0.0025)	(0.0023)
#obs	53	53	53	53	53	53	53	53
R^2/Pseudo-R^2	0.32	0.22	0.19	0.14	0.10	0.05	0.15	0.07
II. FOREIGN DIRECT	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
stringency index$_j$ (**SI**$_j$)	0.0004	0.0001	0.0002	0.0008	-0.0001	-0.0001	-0.0003	-0.0004
	(0.0013)	(0.0016)	(0.0013)	(0.0012)	(0.0014)	(0.0014)	(0.0012)	(0.0011)
st.dev. stringency index$_j$ (σ**SI**$_j$)	0.0040 **	0.0036	0.0089 **	0.0052	0.0028	0.0037	0.0010	0.0008
	(0.0018)	(0.0024)	(0.0039)	(0.0033)	(0.0029)	(0.0035)	(0.0024)	(0.0023)
#obs	53	53	53	53	53	53	53	53
R^2/Pseudo-R^2	0.20	0.15	0.22	0.16	0.09	0.11	0.10	0.13
III. FOREIGN PORTFOLIO	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
stringency index$_j$ (**SI**$_j$)	-0.0009	-0.0017	0.0010	0.0000	-0.0018	-0.0018	-0.0005	-0.0028 **
	(0.0016)	(0.0019)	(0.0026)	(0.0019)	(0.0025)	(0.0013)	(0.0010)	(0.0010)
st.dev. stringency index$_j$ (σ**SI**$_j$)	0.0056 **	0.0068 **	0.0022	0.0055 *	0.0072 ***	0.0055 **	0.0045 *	0.0074 ***
	(0.0022)	(0.0029)	(0.0031)	(0.0032)	(0.0025)	(0.0024)	(0.0026)	(0.0023)
#obs	53	53	53	53	53	53	53	53
R^2/Pseudo-R^2	0.28	0.21	0.23	0.20	0.11	0.16	0.11	0.11
other controls: new COVID deaths per mn, st.dev. new COVID deaths per mn, (lag) NEER, (lag) economic development, (lag) financial development								

A Data appendix

A.1 Dependent variables

Foreign inward investments

The growth in liabilities Δ, at quarterly or semi-annual level (end of period), follows equation (1):

$\Delta q1 \equiv (L_{03\_20} - L_{12\_19})/L_{12\_19}$
$\Delta q2 \equiv (L_{06\_20} - L_{03\_20})/L_{03\_20}$
$\Delta s1 \equiv (L_{06\_20} - L_{12\_19})/L_{12\_19}$
or equation (2):
$diff\Delta q1 \equiv (L_{03\_20} - L_{12\_19})L_{12\_19} - (L_{03\_19} - L_{12\_18})/L_{12\_18}$
$diff\Delta q2 \equiv (L_{06\_20} - L_{03\_20})/L_{03\_20} - (L_{06\_19} - L_{03\_19})/L_{03\_19}$
$diff\Delta s1 \equiv (L_{06\_20} - L_{12\_19})/L_{12\_19} - (L_{06\_19} - L_{12\_18})/L_{12\_18}$

The liabilities L considered are, alternatively: Total foreign inward investment, Foreign Direct investment and Foreign Portfolio Investment.

Source: International Investment Position Statistics (IMF)

Baseline sample

Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, China, Colombia, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, Latvia, Lithuania, Luxembourg, Malaysia, Netherlands, New Zealand, Norway, Peru, Philippines, Poland, Portugal, Romania, Russia, Saudi Arabia, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Thailand, Turkey, United Kingdom, United States.

Offshore countries

In Tables 5, 5a and 5b, we restrict the sample to exclude potential offshore countries. Columns (2) and (2a) refer to the offshore classification specified in Damgaard et al. (2018). From our original sample, Hong Kong, Ireland, Luxembourg, the Netherlands and Singapore are excluded. Columns (3) and (3a) refer to the offshore classification specified in Zoromé (2007). From our original sample Cyprus, Hong Kong, Ireland, Latvia, Luxembourg, Malta, Singapore, Switzerland and United Kingdom are excluded. Columns (4) and (4a) refer to the offshore classification specified in Lane and Milesi-Ferretti (2017). From our original sample Belgium, Cyprus, Hong Kong, Ireland, Luxembourg, Malta, the Netherlands, Singapore, Switzerland and the United Kingdom are excluded.

A.2 Regressors

Main regressor

Stringency index (and its within-country standard deviation)

The Stringency Index is a daily aggregate measure of the overall stringency of containment and closure policies. It is calculated by taking the ordinal value and adding a weighted constant if the policy is general rather than targeted, if applicable, which are then re-scaled by their maximum value to create a score between 0 and 100. More information can be found at Oxford's Government Response Tracker, https://www.bsg.ox.ac.uk/research/research-projects/coronavirus-government-response-tracker

In our analysis, we consider and report as regressors both the quarterly overall mean of the daily stringency index (SI_j) and its quarterly standard deviation (σSI_j), computed within each country over the corresponding quarter.

Source: https://github.com/OxCGRT/covid-policy-tracker

Other controls

New COVID death per mn (and its within-country standard deviation)

This is a daily variable, reported by the countries' authorities. In our analysis, we consider both the quarterly average of new COVID-19 deaths and its standard deviation, computed within each country over the corresponding quarter. This covariate closely follows the stringency index: it is always included in the regression specification in the form of the stringency index. To avoid eventual zeros at the denominator (when considering the growth rate of "new COVID death per mn" in the second quarter), we add 0.0001 to the corresponding values.(which is negligible relative to both the average and the standard deviation).

Source: https://github.com

New COVID cases per mn (and its within-country standard deviation)

This is a daily variable, reported by the countries' authorities. In our analysis, we consider both the average quarterly number of new COVID-19 cases and its standard deviation, computed within each country over the corresponding quarter. This covariate closely follows the stringency index: it is always included in the regression specification in the form of the stringency index.

Source: https://github.com

Nominal Effective Exchange Rate

BIS effective exchange rate Nominal, Broad Indices Monthly averages; 2010=100. The NEER regressor is included with the same structure as the dependent variable. For instance, if the dependent variable is $\Delta q1$ as defined in equation (1a), then the regressor included is $(NEER_{03\_20} - NEER_{12\_19})/NEER_{12\_19}$

Source: Bank for International Settlements

Economic Development

GDP per capita (year: 2019, or latest available data). The regressor included is a binary variable equal to 1 if the GDP per capita is larger than the sample mean, and 0 otherwise.

Source: CEIC data

Financial development

Market capitalization to GDP (year: 2019, or latest available data). The regressor included is a binary variable equal to 1 if the market capitalization per GDP is larger than the sample mean, and 0 otherwise.

Source: CEIC data

B Additional tables

Figure 4. Semi-annual growth in inward investment (%)

This figure is similar to Figure 1 and 2, but reports the growth in foreign liabilities at the end of the first semester of 2020. Panels #a) refer to the measure $\Delta s1$, following equation (1), while panels #b) refer to the measure $diff\Delta s1$, following equation (2). To enhance readability, growth rates are reported in percentage.

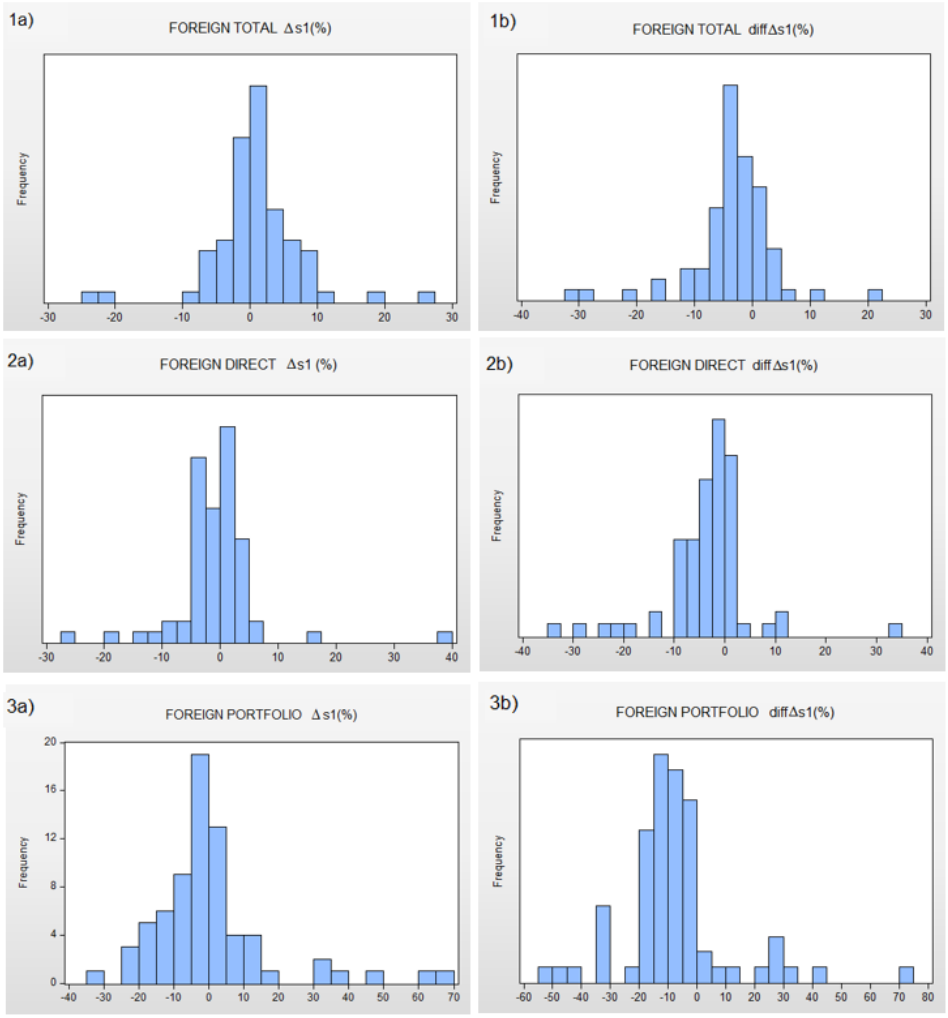

Table 4a. Sensitivity analysis: sample specification (second quarter 2020)

This table is the same as Table 4, but refers to the end of the second quarter of 2020, rather than to the first quarter.

		Sensitivity analysis							
		Sample specification							
INWARD INVESTMENT		q2(Mar2020-Jun2020)							
		No China		**No offshore**					
		Δq2	diffΔq2	Δq2	diffΔq2	Δq2	diffΔq2	Δq2	diffΔq2
I. FOREIGN TOTAL		(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
stringency index$_j$ (**SI**$_j$)		-0.0012	-0.0005	0.0023	0.0004	0.0038	0.0037	0.0040	0.0040
		(0.0036)	(0.0041)	(0.0037)	(0.0042)	(0.0036)	(0.0041)	(0.0037)	(0.0042)
st.dev. stringency index$_j$ (σ**SI**$_j$)		-0.0156	-0.0084	-0.0217	0.0126	-0.0185	0.0026	-0.0197	0.0012
		(0.0192)	(0.0215)	(0.0257)	(0.0285)	(0.0239)	(0.0264)	(0.0250)	(0.0271)
	#obs	50	50	47	47	45	45	43	43
	R^2	0.06	0.07	0.15	0.08	0.15	0.14	0.15	0.14
II. FOREIGN DIRECT		(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
stringency index$_j$ (**SI**$_j$)		-0.0069 *	-0.0041	-0.0026	-0.0045	-0.0011	-0.0015	-0.0010	-0.0012
		(0.0040)	(0.0044)	(0.0035)	(0.0055)	(0.0039)	(0.0060)	(0.0042)	(0.0063)
st.dev. stringency index$_j$ (σ**SI**$_j$)		0.0214	0.0017	0.0151	0.0091	0.0225	0.0003	0.0232	-0.0034
		(0.0211)	(0.0231)	(0.0250)	(0.0373)	(0.0263)	(0.0388)	(0.0286)	(0.0403)
	#obs	50	50	47	47	45	45	43	43
	R^2	0.09	0.11	0.12	0.11	0.07	0.12	0.06	0.13
III. FOREIGN PORTFOLIO		(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
stringency index$_j$ (**SI**$_j$)		0.0039	0.0041	0.0051	0.0018	0.0030	0.0027	0.0007	0.0028
		(0.0039)	(0.0073)	(0.0055)	(0.0078)	(0.0069)	(0.0090)	(0.0074)	(0.0096)
st.dev. stringency index$_j$ (σ**SI**$_j$)		-0.0074	-0.0371	-0.0332	-0.0484	-0.0567	-0.0550	-0.0674	-0.0516
		(0.0208)	(0.0387)	(0.0389)	(0.0536)	(0.0462)	(0.0581)	(0.0506)	(0.0619)
	#obs	50	50	47	47	45	45	43	43
	R^2	0.17	0.09	0.12	0.08	0.11	0.06	0.11	0.06
other controls: new COVID deaths per mn, st.dev. new COVID deaths per mn, (lag) NEER, (lag) economic development, (lag) financial development									

Table 4b. Sensitivity analysis: sample specification (first semester 2020)

This table is the same as Table 4, but refers to the end of the first semester of 2020 (relative to the end of 2019), rather than to the first quarter.

		Sensitivity analysis							
		Sample specification							
INWARD INVESTMENT		s1(Dec2019-Jun2020)							
		No China		**No offshore**					
		Δs1	diffΔs1	Δs1	diffΔs1	Δs1	diffΔs1	Δs1	diffΔs1
I. FOREIGN TOTAL		(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
stringency index$_j$ (**SI**$_j$)		0.0000	-0.0002	0.0000	-0.0002	0.0002	0.0000	0.0001	0.0000
		(0.0004)	(0.0005)	(0.0004)	(0.0005)	(0.0004)	(0.0006)	(0.0004)	(0.0007)
st.dev. stringency index$_j$ (σ**SI**$_j$)		0.0000	0.0013	0.0001	0.0013	-0.0002	0.0013	-0.0001	0.0013
		(0.0011)	(0.0013)	(0.0010)	(0.0012)	(0.0010)	(0.0014)	(0.0009)	(0.0014)
	#obs	50	50	47	47	45	45	43	43
	R^2	0.40	0.19	0.47	0.22	0.53	0.40	0.55	0.39
II. FOREIGN DIRECT		(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
stringency index$_j$ (**SI**$_j$)		0.0002	-0.0006	0.0001	-0.0005	0.0005	-0.0001	0.0005	0.0001
		(0.0003)	(0.0005)	(0.0003)	(0.0007)	(0.0003)	(0.0008)	(0.0003)	(0.0008)
st.dev. stringency index$_j$ (σ**SI**$_j$)		-0.0001	-0.0019	-0.0001	-0.0019	-0.0001	-0.0011	-0.0001	-0.0010
		(0.0007)	(0.0013)	(0.0006)	(0.0015)	(0.0007)	(0.0017)	(0.0008)	(0.0017)
	#obs	50	50	47	47	45	45	43	43
	R^2	0.31	0.20	0.34	0.21	0.37	0.27	0.36	0.26
III. FOREIGN PORTFOLIO		(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
stringency index$_j$ (**SI**$_j$)		0.0007	0.0012	0.0007	0.0009	0.0008	0.0012	0.0007	0.0008
		(0.0009)	(0.0010)	(0.0009)	(0.0011)	(0.0010)	(0.0013)	(0.0010)	(0.0014)
st.dev. stringency index$_j$ (σ**SI**$_j$)		0.0002	0.0021	0.0005	0.0026	-0.0003	0.0025	-0.0001	0.0028
		(0.0021)	(0.0024)	(0.0022)	(0.0026)	(0.0022)	(0.0028)	(0.0023)	(0.0030)
	#obs	50	50	47	47	45	45	43	43
	R^2	0.38	0.15	0.41	0.24	0.40	0.15	0.41	0.17

other controls: new COVID deaths per mn, st.dev. new COVID deaths per mn, (lag) NEER, (lag) economic development, (lag) financial development

Table 5a. Sensitivity analysis: econometric specification (second quarter 2020)

This table is the same as Table 5, but refers to the end of the second quarter of 2020, rather than to the first quarter.

	Sensitivity analysis							
	Econometric model specification							
INWARD INVESTMENT	q2(Mar2019-Jun2020)							
	OLS		**Quantile regression**					
			p25		p50		p75	
	Δq2	diffΔq2	Δq2	diffΔq2	Δq2	diffΔq2	Δq2	diffΔq2
I. FOREIGN TOTAL	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
stringency index$_j$ (**SI**$_j$)	-0.0007	-0.0006	-0.0008	-0.0010	0.0002	-0.0039	0.0014	0.0062
	(0.0055)	(0.0058)	(0.0047)	(0.0052)	(0.0053)	(0.0052)	(0.0051)	(0.0058)
st.dev. stringency index$_j$ (σ**SI**$_j$)	-0.0182	-0.0155	-0.0206	-0.0243	0.0065	-0.0277	-0.0102	0.0169
	(0.0301)	(0.0317)	(0.0278)	(0.0298)	(0.0446)	(0.0323)	(0.0327)	(0.0429)
#obs	51	51	51	51	51	51	51	51
R^2/Pseudo-R^2	0.02	0.06	0.07	0.14	0.06	0.08	0.06	0.09
II. FOREIGN DIRECT	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
stringency index$_j$ (**SI**$_j$)	-0.0040	-0.0022	-0.0026	-0.0026	-0.0060	-0.0057	-0.0081	-0.0049
	(0.0084)	(0.0085)	(0.0057)	(0.0064)	(0.0053)	(0.0057)	(0.0057)	(0.0059)
st.dev. stringency index$_j$ (σ**SI**$_j$)	-0.0259	-0.0236	0.0211	0.0016	0.0042	-0.0096	-0.0291	-0.0265
	(0.0461)	(0.0468)	(0.0237)	(0.0279)	(0.0270)	(0.0286)	(0.0321)	(0.0425)
#obs	51	51	51	51	51	51	51	51
R^2/Pseudo-R^2	0.05	0.05	0.07	0.14	0.05	0.07	0.11	0.08
III. FOREIGN PORTFOLIO	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
stringency index$_j$ (**SI**$_j$)	0.0045	0.0035	0.0059	0.0065	0.0049	0.0044	-0.0049	0.0133
	(0.0085)	(0.0077)	(0.0092)	(0.0094)	(0.0056)	(0.0081)	(0.0085)	(0.0094)
st.dev. stringency index$_j$ (σ**SI**$_j$)	0.0043	-0.0396	-0.0026	-0.0154	-0.0079	-0.0295	-0.0418	-0.0152
	(0.0468)	(0.0426)	(0.0385)	(0.0436)	(0.0306)	(0.0506)	(0.0323)	(0.0421)
#obs	51	51	51	51	51	51	51	51
R^2/Pseudo-R^2	0.11	0.11	0.18	0.19	0.11	0.08	0.13	0.06
other controls: new COVID deaths per mn, st.dev. new COVID deaths per mn, (lag) NEER, (lag) economic development, (lag) financial development								

Table 5b. Sensitivity analysis: econometric specification (first semester 2020)

This table is the same as Table 5, but refers to the end of the first semester of 2020 (relative to the end of 2019), rather than to the first quarter.

	Sensitivity analysis							
	Econometric model specification							
INWARD INVESTMENT	s1(Dec2019-Jun2020)							
	OLS		**Quantile regression**					
			p25		p50		p75	
	Δs1	diffΔs1	Δs1	diffΔs1	Δs1	diffΔs1	Δs1	diffΔs1
I. FOREIGN TOTAL	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
stringency index$_j$ (**SI**$_j$)	-0.0002	-0.0006	0.0001	-0.0001	0.0001	-0.0005	0.0000	-0.0015
	(0.0006)	(0.0008)	(0.0004)	(0.0005)	(0.0006)	(0.0010)	(0.0007)	(0.0018)
st.dev. stringency index$_j$ (σ**SI**$_j$)	-0.0003	0.0016	0.0008	0.0023	0.0000	0.0016	0.0006	0.0000
	(0.0015)	(0.0018)	(0.0013)	(0.0016)	(0.0014)	(0.0018)	(0.0022)	(0.0026)
#obs	51	51	51	51	51	51	51	51
R^2/Pseudo-R^2	0.45	0.38	0.50	0.38	0.31	0.16	0.23	0.14
II. FOREIGN DIRECT	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
stringency index$_j$ (**SI**$_j$)	0.0000	-0.0007	0.0002	0.0000	0.0003	-0.0006	0.0008	-0.0021 *
	(0.0008)	(0.0010)	(0.0004)	(0.0006)	(0.0004)	(0.0016)	(0.0006)	(0.0012)
st.dev. stringency index$_j$ (σ**SI**$_j$)	-0.0012	-0.0008	0.0000	-0.0007	-0.0007	-0.0015	-0.0002	-0.0037 *
	(0.0019)	(0.0024)	(0.0008)	(0.0013)	(0.0009)	(0.0022)	(0.0018)	(0.0018)
#obs	51	51	51	51	51	51	51	51
R^2/Pseudo-R^2	0.33	0.28	0.40	0.31	0.31	0.20	0.13	0.10
III. FOREIGN PORTFOLIO	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
stringency index$_j$ (**SI**$_j$)	0.0001	-0.0002	0.0007	0.0004	0.0011	0.0019	0.0000	0.0008
	(0.0012)	(0.0013)	(0.0009)	(0.0013)	(0.0011)	(0.0013)	(0.0021)	(0.0022)
st.dev. stringency index$_j$ (σ**SI**$_j$)	0.0030	0.0037	0.0020	0.0037	0.0021	0.0026	-0.0020	0.0026
	(0.0030)	(0.0031)	(0.0026)	(0.0033)	(0.0033)	(0.0036)	(0.0029)	(0.0054)
#obs	51	51	51	51	51	51	51	51
R^2/Pseudo-R^2	0.40	0.39	0.42	0.23	0.28	0.18	0.23	0.15
other controls: new COVID deaths per mn, st.dev. new COVID deaths per mn, (lag) NEER, (lag) economic development, (lag) financial development								