THE COVID-19 CRISIS AND ITS INITIAL IMPACTS ON EMERGING COUNTRIES: AN ANALYSIS BASED ON THE EXCHANGE RATE PRESSURE INDEX

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Abstract

The objective of this article is to make an empirical characterization of the initial phase of the COVID-19 crisis, which caused greater turbulence on emerging countries, using an exchange rate pressure index that aims to measure the impacts on the exchange rate and international reserves. Conclusions: i) the most acute period of the crisis occurred in March/20, being among the three largest periods of exchange rate pressure since 2003 — behind October/08 and September/11; ii) Nigeria, Brazil, Mexico, Turkey and South Africa saw the most severe and persistent effects; iii) in most countries, the external adjustment occurred mainly through exchange rate devaluations — the same pattern as the 2008 crisis.

Keywords: Covid-19; Emerging countries; Exchange rate pressure index; Exchange rate; International reserves.
JEL Code: E65; F31; F32.

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1. Introduction

In the early 2020, the world was surprised by the outbreak of a pandemic with very serious health and human effects. Faced with such an unusual and uncertain situation, domestic economies and international economic relations underwent major instabilities and one of the most severe economic crises in recent decades. In international financial flows, there were significant outflows of capital from emerging countries (ECs). Data from the International Monetary Fund (IMF) show that, considering Jan 21, 2020 as the onset of instabilities arising from the pandemic, the net outflow of capital by non-residents in the portfolio account after 60 days was of more than US$ 100 billion (IMF, 2020, p.9-10). In an equivalent period, even in relative terms of GDP, this account represents the largest outflow ever recorded, being almost four times that observed in the global financial crisis of 2008. Gallagher, Ocampo & Volz (2020) also note: i) the fall in commodity prices; ii) contraction of remittances; and iii) that, by the end of April, more than 100 countries had already consulted with the IMF on emergency financing.

The analysis of the effects of external crises, in temporal terms, can be segmented into two types: a) those that analyze the short-term impacts, that is, more immediate and in the initial months; b) those that analyze the medium and long-term impacts, that is, beyond the initial phase. Obviously, this separation always involves some degree of subjectivity; however, it proves important, among other reasons, for a more in-depth understanding of the role of the monetary authority in the face of these turbulences. Analyses of the first type, considering the short term, highlight measures that can be adopted to mitigate the shock (for example: raising interest rates, international reserve swap agreements), which are more urgent measures. In analyses of the second type, considering the medium and long term, it is important to understand what the possibilities of action are in terms of prudence, aiming to restrain or reduce future crises in times of contraction of international liquidity.

The objective of this article is to make an empirical characterization of the first type, in the initial phase of the COVID-19 crisis on emerging countries, using an exchange rate pressure index that aims to measure the impacts on the exchange rate and international reserves. It will focus on the period between February and May 2020, as the data indicate that from May 2020 the flows began to have a more "normal" pattern; therefore, the chosen period would capture the most turbulent phase.

The article aims to answer the following questions: i) what period(s) was (were) the most acute at the initial phase of the COVID-19 crisis?; ii) what was the magnitude/severity for ECs?; iii) in which countries (within the selected sample) was it the most severe?; and iv) how the adjustment occurred in each country?

In order to answer them, the methodology adopted consists in: a) the description of the debate on the international financial/monetary system functioning hierarchically and the greater fragility of the ECs; b) the survey of what is meant by exchange rate crises and how to measure the pressure on the external sector of an economy; c) the definition of the ECs sample to be studied; d) a quantitative part, using an exchange rate pressure index, as in Baumann and Gonçalves (2015), which takes into account variations in exchange rate and reserves. Finally, since the study is on something recent and whose developments have not yet been completely finalized, this research can be considered exploratory.

The contributions proposed in this article consist mainly of making a first characterization of the initial phase of the pandemic crisis, empirically, considering the impacts on the external sector and advancing in the theoretical discussion on the definition and measurement of periods of exchange rate pressures in ECs.

In addition to this introduction and the final considerations, the article consists of 3 more sections. The first presents a literature review on the weaknesses of ECs in environments of high capital mobility. The second section presents the methodology adopted. Data analysis is the object of section 3.

2. Capital flow instabilities in the contemporary international monetary and financial system and emerging countries

The contemporary international monetary and financial system (IMFS) has an eminently unstable character that distinguishes it significantly from its predecessor, when the Bretton Woods Agreement was still in force. Based on Blecker (2005), we can summarize its main characteristics as follows: high volatility of exchange rates, which have become predominantly determined by international capital flows; chronic trade imbalances; more occurrences of financial crises; pro-cyclical behavior of international investments, especially portfolio; and increasingly internationally interconnected business cycles.

The more volatile and unstable dynamics provided by free capital mobility and the floating exchange rate regime must be understood in conjunction. The reduced control over capital flows allowed them to migrate more easily between different markets. This led to greater competition to attract international capital, which began to arbitrate in different markets in search of greater returns.

According to Crotty & Epstein (1996), the high and unstable flow of short-term capital (hot money) was an important factor in intensifying the environment of uncertainty that had followed after the Golden Age. By entering and leaving a country too easily, it caused high instability, especially in exchange rates. International investors would play a key role in this increased instability. According to Gowan (2009), these investors, especially investment banks, started to work with arbitrage gains in different markets, aiming to find possibilities to speculate in relation to local assets and currencies, which ended up generating crises in the markets in which they operate.

However, capital also targets liquidity, and, at the international level, no yield-providing asset exceeds the liquidity of the U.S. federal government securities. Thus, in the presence of free capital mobility and the dollar as a key currency, the decisions of the Federal Reserve (Fed) regarding interest rates will be the main determinant of international liquidity cycles and, consequently, of the capital inflows and outflows from several countries. As a result of the floating exchange rate regime, exchange rates are subject to large fluctuations.

The above paragraphs showed the increasingly volatile and mimetic character of capital flows in the contemporary IMFS. At this time, it is worth pointing out the factors that make ECs especially vulnerable to reversals in international liquidity cycles. According to Prates (2002), the asymmetries of the IMFS constitute the determining factor to make ECs more susceptible to the vicissitudes of the international financial market.

As demonstrated by De Conti (2011), ECs in general do not stand out in any of the indicators that are determinant in the hierarchy of currencies, being always below the central countries as to the size of trade flows, financial flows, financial system size and depth, and in terms of geopolitical power and political voluntarism. These characteristics make ECs' currencies have low liquidity at the international level and, as a result, they are called peripheral currencies.

The demand for peripheral currencies will be directly correlated to the interest rate differential practiced by the ECs and the issuer of the key currency. If there is no sufficient response from the monetary policy to the increased interest rate of the country issuing the key currency, the peripheral currency could depreciate abruptly, as there would be no ceiling on the exchange rate of peripheral currencies equivalent to that of central currencies. However, at certain times, even exorbitant increases in interest rates would be insufficient, because if there is expectation of currency depreciation, capital will not remain for a period sufficient to obtain yields on interests of securities. Another aspect is that depending on the intensity of the preference for liquidity, profitability loses relevance in the decision to allocate the portfolios of international entities (Carneiro, 2013).

It could be argued that intense devaluations would be favorable to ECs, as it would improve the competitiveness of their products and, therefore, the capital outflow in the financial account would be offset by the improvement in the current account. However, as noted by Bresser-Pereira (2020), the fundamental element to provide greater competitiveness to companies is the long-term exchange rate. Thus, strong currency devaluations would result from exchange rate crises, but, in the long cycle, the conditions for appreciation of these currencies would be predominantly domestic.

If, on the one hand, the exogenous nature of capital flows makes financially open ECs susceptible to changes in the liquidity preference of international agents, on the other hand, countries that consciously adopt the strategy of using external savings will be even more susceptible to such movements. According to Bresser-Pereira (2020, p. 613), there is a predominance of two economic policies in ECs, except for East Asia, namely: "growth with external indebtedness and the exchange rate anchor policy to control inflation." The second strategy requires appreciated exchange rate, while the first is compatible with currency appreciation because it relies on capital inflows in search of greater profitability.

It should be noted that the volume of capital flows to ECs has a high weight in the financial and foreign exchange markets of these countries, which would be another fundamental aspect of the financial asymmetry (Prates, 2002). Thus, in the same way that it allows the combination of constant deficits in current transactions with exchange rate appreciation, at the time of reversal of these flows, the impact on the exchange rate will be even more significant.

Capital inflows in these countries, therefore, may cease even if there is no worsening in internal conditions, only requiring, as mentioned above, a change in the expectations of financial agents or an increased preference for liquidity. On the other hand, at a time when investors want greater returns at the expense of greater liquidity, there is an increase in the share of lower quality assets in their portfolios, in which emerging countries' debt securities fall (Prates, 2002; Cintra & Prates, 2006). As noted above, the increased mimetic character of financial transactions across the globe has considerably raised the volatility with which these flows enter and exit emerging countries.

The role of capital flows in creating instabilities in ECs' foreign exchange markets has been shown by several studies over the last decades. For the period 2000-2014, Aizenman & Binici (2016) estimated that external factors caused a significant pressure on the foreign exchange markets of OECD countries and emerging markets, albeit with a greater impact on the latter.

Regarding the relation between financial flows directed to ECs and the US monetary policy, Tillmann (2016) concludes that an unexpected increase in the Fed's propensity to carry out quantitative easing (QE) policies increases not only capital flows (portfolio) to ECs, but also stock prices, appreciations in exchange rates of emerging markets, and reduces bonds' spreads (EMBI spread).

Anaya, Hachula & Offermanns (2017) found in their econometric study for the period from January 2008 to December 2014 that an expansionary shock in US monetary policy is significant to an increase in portfolio flows to ECs, and is also accompanied by a persistent movement in real and financial variables in the respective countries.

In turn, the econometric study of Koepke (2018) assesses the impacts of the US monetary policy and of its expectation of variation on portfolio investment flows to ECs during the period from 2000 to 2013. It is concluded that there is a predominance of external variables over internal ones and that there is an asymmetric effect on changes in expectations, because when they are of tightening they cause a drop in capital flows to ECs that is more significant than it occurs when they are of easing.

What can be observed, based on the analyzed texts, is that, in general, sound domestic conditions do not guarantee that ECs are not affected by the central countries' monetary policies and by liquidity fluctuations. However, countries that are constantly dependent on capital

inflows tend to be even more affected by these movements.

3. Methodology – Exchange rate crises – Definitions and main indicators

One of the central aspects of this article is to understand the concept of exchange rate crisis and, concomitantly, to define an appropriate methodology for subsequent empirical analysis. There is an extensive debate in the literature about the causes of exchange rate crises. Within the mainstream, it has evolved through the first, second and third generation models. In the heterodox field, these models are criticized in the sense that exchange rate crises occur due to flaws intrinsic to the contemporary dynamics of the IMFS. There is also in this field, literature that emphasizes the issues of monetary and financial asymmetries as the main sources of explanation for ECs being more susceptible to international liquidity cycles, as explored in the first section.

The objective, however, is not to focus on the cause, but on the very concept of exchange rate crisis, given that works on the causes are abundant, while this point of the debate has received less attention. Such definitions seek to point out the elements that allow characterizing a given episode as an exchange rate crisis. There are some studies in the literature that can contribute to the understanding of this concept. Krugman (1979) focuses the explanation on fixed exchange rate regimes and similar frameworks. According to the author, a standard movement of crisis would begin with gradual reductions in reserves to defend currency parity. The extent of the loss of reserves may reach the point at which its volume will be excessively low, leading to a speculative attack, which will eliminate the rest of the reserves, making it impossible for the exchange rate regime to be maintained. There would also be the possibility of resorting to additional reserves, such as gold, or to emergency loans. In these cases, confidence could be regained and the exchange rate regime could be maintained. The other possibility would be that the agents would not regain their confidence, which would lead to new attacks, further eroding reserves, until the abandonment of the exchange rate regime became irreversible.

Garber & Svensson (1995) adopt a broad concept of exchange rate crisis. In general, a new exchange rate regime would become inevitable after a succession of events, such as: i) large losses of reserves; ii) sudden increases in interest rates; iii) increase in spreads in the financial

market; iv) implementation of capital controls; and v) large and discontinuous changes in the exchange rate, marking a period of high turbulence.

The works mentioned above provide important contributions to the understanding of the concept, but are limited to fixed and semi-fixed exchange rate regimes. However, it is also possible to use broader concepts for exchange rate crisis, which are compatible with different exchange rate regimes, as explained below.

Eichengreen, Rose & Wyplosz (1995) present several elements that help in understanding exchange rate crises. Initially, the authors understand that, in order to reach a definition, it is necessary to distinguish between exchange rate crisis and exchange rate realignment in fixed exchange rate regimes and similar ones. Realignment can occur voluntarily, or due to pressures on the foreign exchange market, through a speculative movement of sale of the domestic currency. In the exchange rate crisis, in turn, the speculative attack will necessarily cause either a strong exchange rate depreciation or force the monetary authority to abruptly raise the interest rate or dispose of international reserves. By this definition, an exchange rate crisis will not necessarily lead to depreciations, as the monetary authority can be effective in its domestic currency defense policy. On the other hand, the concept of crisis employed by the authors excludes exchange rate arrangement changes not preceded by or not associated with significant pressures on the foreign exchange market.

The next step for the authors presented in the previous paragraph is the identification of crises. As they are closely related to speculative attacks, the authors focused on analyzing them, which are characterized by extreme pressures on the foreign exchange market. Based on the work of Girton & Roper (1977), Eichengreen, Rose & Wyplosz (1995) distinguish speculative pressure and speculative attacks. The classification into speculative pressure or speculative attack would be carried out by calculating the weighted average of variations in exchange rate, interest rates, and reserves, where all variables are measured in relation to their prevailing observations. Speculative attacks would occur when this pressure movement reaches extreme values. Numerically, it was considered a crisis when the weighted average of the variables mentioned above, in two subsequent quarters, was at least two standard deviations above the average.

Kaminsky & Reinhart (1999), although based on a definition of crisis employed by Frankel & Rose (1996) — that exchange rate crisis occurs when devaluation in a given month is

of at least 25% and that it is at least 10% higher than the devaluation in the previous month —, employ a calculation quite similar to that of Eichengreen, Rose & Wyplosz (1995). However, they do not include the variation in the nominal interest rate. Thus, the calculation used to observe if there was an exchange rate crisis is a weighted average between the variations in exchange rate and reserves, so that the weights of the two components of the index have equal sample volatilities. It was considered a crisis only when the variation was equal to or greater than three deviations in relation to the average. Baumann & Gonçalves (2015) build an Exchange Rate Pressure Index (ERPI) based on the literature addressed in this section, showing that it encompasses empirical analyses that present the construction of indices for exchange rate pressure and indices for turbulence in the foreign exchange market. The ERPI, detailed below, consists in a weighted average of variations in exchange rate and international reserves.

Unlike what was observed in Krugman (1979) and Garber & Svensson (1995), Eichengreen, Rose & Wyplosz (1995), Kaminsky & Reinhart (1999), and Baumann & Gonçalves (2015) use concepts of exchange rate crisis that adapt well to both fixed and floating exchange rate regimes. In the present study, we decided to revisit the calculation of these indicators to assess the initial impact of the coronavirus crisis on the foreign exchange market of ECs. The indicator to be used will be closer to that used by Kaminsky & Reinhart (1999) and Baumann & Gonçalves (2015).

Baumann & Gonçalves (2015) build a simplified version of the Exchange Rate Pressure Index (ERPI):

$$\text{ERPI} = \pi \left(\frac{\Delta e}{e}\right) - \rho\left(\frac{\Delta R}{R}\right) \quad (1)$$

Being $\Delta e/e$ the variation in the nominal exchange rate in 12 months, π the inverse of the standard deviation of the variation in exchange rate, $\Delta R/R$ the variation in international reserves in 12 months, and ρ the inverse of the standard deviation of the variation in international reserves. In addition, in the calculation of this Index the time series are monthly, the ERPI is standardized by the max-min method, ranging from 100 to 0 and some of the outliers are removed.

The current work uses an index that is very close to the ERPI; the essence of the formula is the same, that is, it is based on dividing the variation of a variable (exchange rate and reserves)

by its standard deviation, which shows how significant this variation was in terms of its history. However, the formula adopted in the current work has two important differences in relation to that of Baumann & Gonçalves (2015): (i) it does not discard outliers; (ii) the variations in reserves and exchange rate are calculated for each month, taking into account the variation in relation to the immediately preceding month and not the variation in 12 months. Another important distinction is that we will use the indicator without standardization by the max-min method, for considering that it is suitable for comparing the same country in different periods, but not for different countries in the same period. Despite these minor modifications, we will keep the name ERPI.

Another issue that can be pointed out as to the index is that, during a period of international turbulence, it is expected that the currency depreciates (increase in the value of the nominal exchange rate) and that international reserves decrease. Therefore, given that in the equation the reserves have a negative sign, in practice we have the sum between the variations of the two variables weighted by their standard deviation.

Borrowing the concepts of Eichengreen, Rose & Wyplosz (1995) and, replacing the term speculative pressure with exchange rate pressure, the ERPI will show if there was exchange rate pressure, when the index is between 1 and 2, and high exchange rate pressure when this indicator is above 2.

Even while adopting another term, the concept of high exchange rate pressure is the same as the speculative attack of Eichengreen, Rose & Wyplosz (1995), that is, "extreme pressures on the foreign exchange market."

The option for this term (speculative attack or exchange rate pressure) occurred because we understand that the term "exchange rate crisis" requires more characterizations. This term should be used in situations where external sector instabilities (or, in the terms adopted here, speculative attacks/high exchange rate pressure) significantly affect the domestic economy. These impacts feature: i) the transfer of depreciation to prices (passthrough); ii) the increase in the value (in domestic currency) of dollar-denominated debts, as well as their rollover conditions; iii) incentive to phenomena such as herd behaviors. Depending, among other factors, on the productive structure, imported and exported goods and services, degree of dollarization, and the indebtedness profile of an economy these impacts will have different degrees of intensity. A

given exchange rate variation can trigger an economic crisis in a country, but not in another, the same being true for the ERPI. In a sample with a large number of countries, as is the case here, it would be unfeasible to do the analysis on a case-by-case basis.

Given these considerations, it is argued that these indicators are adequate to measure the magnitude of instabilities arising from the external sector, but do not inform how destabilizing they can be and, therefore, the term crisis does not necessarily apply even in situations of high ERPI. In other words, a country can have high exchange rate pressure/speculative attacks without this posing a significant problem for the domestic economy. Whereas saying that the country went through an exchange rate crisis, but that it did not have significant consequences does not seem appropriate.

The definition of the sample was based on the gross domestic product (GDP) of the ECs, measured in nominal US$, with reference to 2018. The thirty-six largest emerging economies with their own currency and data availability were selected, aiming to capture the impacts of the coronavirus crisis in these countries. The inclusion of South Korea and Singapore should be justified. Although both countries are classified by the World Bank and the IMF as, respectively, high-income and advanced-economy countries, the concept of ECs used in the present work refers to peripheral currency issuing countries. According to the methodology employed by De Conti (2011) previously presented and used here, the currency of these countries cannot yet be classified as central.

To calculate the standard deviation of each of the variables, we used data ranging from January 2003 to May 2020. The source of the data was the International Monetary Fund (IMF)[1]. In cases where data were not available from the IMF (Saudi Arabia, Chile, Egypt, Nigeria, Pakistan and Peru), the sources were the corresponding monetary authorities.

4. The impact of the pandemic crisis on the external sector of emerging countries

In this section, the data are analyzed considering the behavior of the exchange rate and reserves of each country using the methodology presented in section 2 – more detailed data by

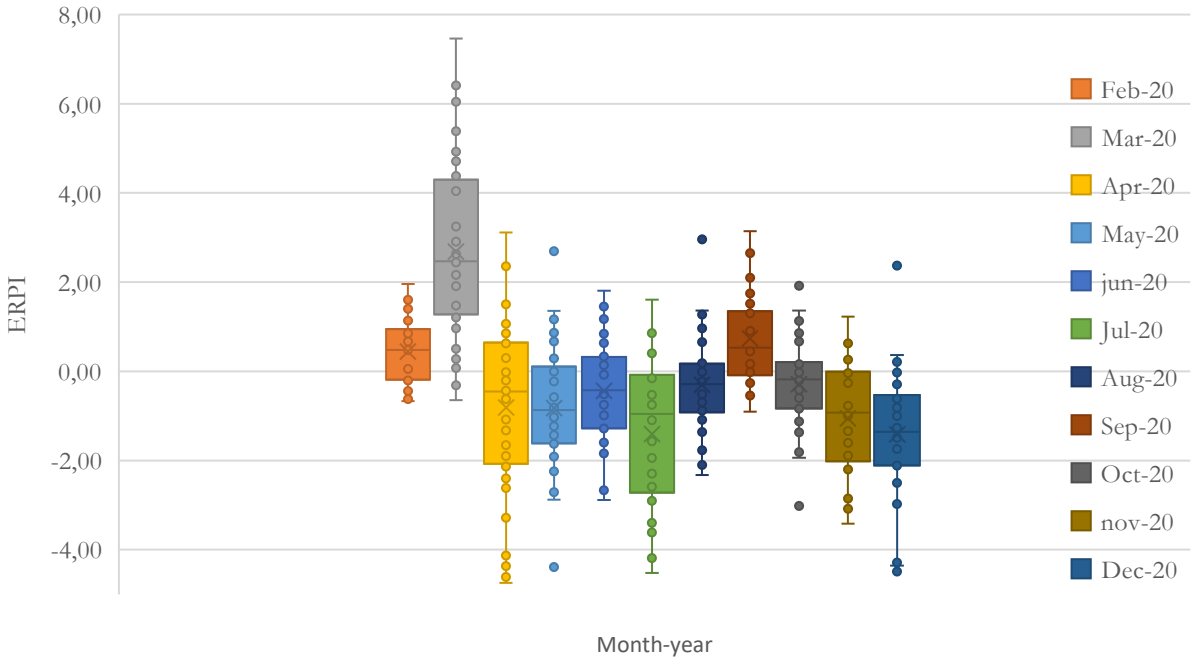
[1] IMF Data. Available at https://data.imf.org/?sk=388dfa60-1d26-4ade-b505-a05a558d9a42. Accessed on January 20th, 2023.

country can be viewed in the appendix. To this end, we prepared different indicators and, given their limitations, none of them can provide conclusive answers alone and, therefore, should be analyzed in conjunction. We seek to obtain a view of the recent period in different dimensions, namely: i) what period(s) is(are) the most acute in the initial phase of the COVID-19 crisis; ii) what is its magnitude/severity; iii) in which countries (within the selected sample) it was most severe; and iv) how the adjustment occurred in each country.

4.1 Periodization of the 2020 pandemic crisis

The first analysis deals with the periodization of the pandemic crisis, showing when its effects were strongest in terms of exchange rate pressure. According to the IMF (2020), the instabilities resulting from the pandemic occurred from January 21, 2020 onwards. As the index is calculated according to monthly variations, the month chosen as the initial was February. Based on the average of the exchange rate pressure index (ERPI) (Figure 1) of the set of countries, as per the methodology presented in section 2, we see that the most serious effects occurred in March, when the average (indicated by an "x" and their respective values) and the median (indicated by the dash inside the box) are the largest of the period, around 2.7 and 2.4, respectively, which indicates a high exchange rate pressure. In addition, in 26 out of 36 countries the indicator reached its highest value in March. Another relevant aspect suggested by the Figure is a greater dispersion of values in the months of March, April and July.

Figure 1 – Average and distribution of the ERPI (Feb/20–Dec/20; n. of deviations)



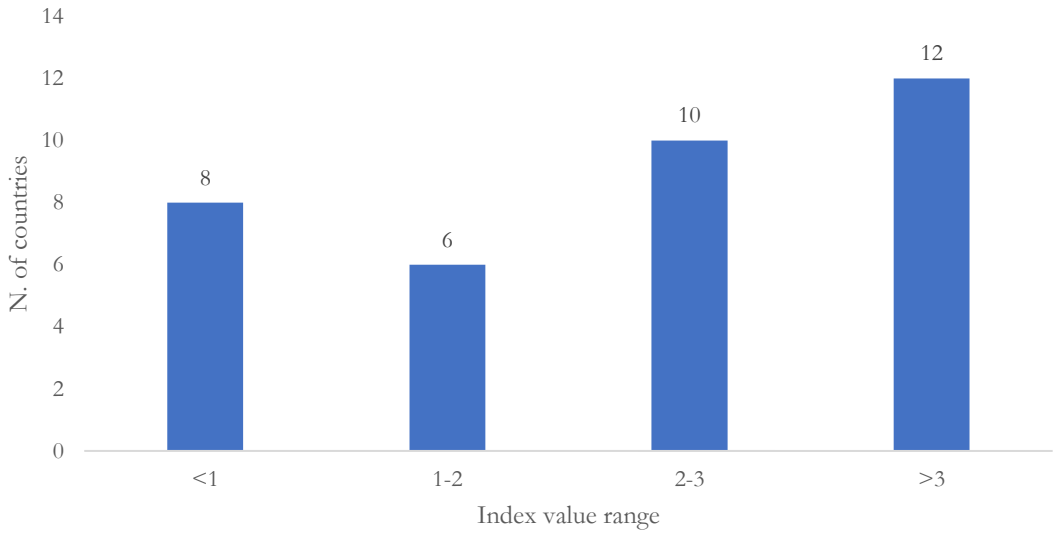
Source: Prepared by the authors using data from IMF and monetary authorities

Still on Figure 1, we see the highest rise in March. The recovery begins in April, a month in which the average becomes negative. For the rest of the period presented, the average was above zero (though still below 1) only in September, which suggests that, with regard to instabilities in the external sector, the crisis had already lost momentum. As the following months did not see episodes of exchange rate pressure (index greater than 1) we focus on the period of the more acute instabilities (February to May).

4.2 How strong were the instabilities?

The second point is to understand the magnitude of the instabilities. Figure 1 already shows this severity, given that, even if it is an average of 36 countries, in the month of greatest instability, March, its ERPI reached a high value, of 2.7. As seen in Figure 2, in March, in only 8 (22.2%) countries the index was below 1 (includes negative values), in 6 (16.7%) it was between 1 and 2, in 10 (27.8%) it was between 2 and 3, and in 12 of them (33.3%) it was above 3, and of these, 10 were above 4. The fact that more than 60% of the countries had an index above 2, that is, high exchange rate pressure, indicates that the crisis was considerably strong on most of them.

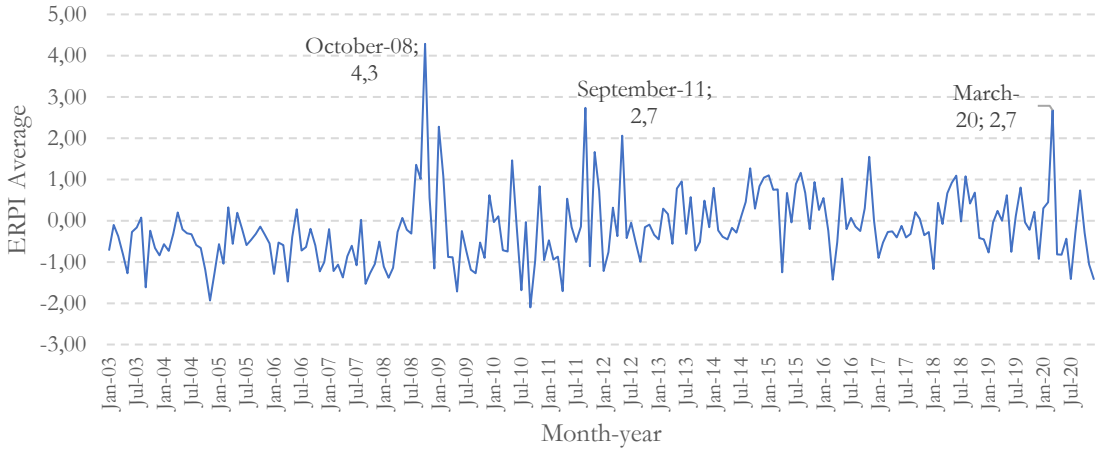
Figure 2 – ERPI Distribution countries - March/2020 (n. of countries per range)



Source: Prepared by the authors using data from IMF and monetary authorities

Another way to understand the severity of the crisis is to compare it with previous periods. As seen in Figure 3, taking the average of countries since 2003, March 2020 is only smaller than that of October 2008, marked by the great financial crisis that erupted in the US, and is practically the same as that of September 2011, caused by the developments of the Eurozone crisis. In these 18 years, only in two other occasions this average was above 2: in January 2009 (2.27) and May 2012 (2.06).

Figure 3 – ERPI Average – Jan/2003 to Dec/2020 (n. of deviations)



Source: Prepared by the authors using data from IMF and monetary authorities

4.3 Which countries have been the most affected by the COVID-19 crisis?

This stage of the analysis aims to assess the countries most affected by external instabilities.

Figure 4 shows the ERPI average from February to May 2020. The analysis of the average is useful to find if the instabilities were more transient or lasting. The 4-month average provides a better idea of the severity of the crisis and how quickly the countries recovered (or not) from it. The fact that, for example, a country had more intense pressure in a specific month does not mean that, considering the entire period, it was the most affected, as its recovery may have been equally rapid.

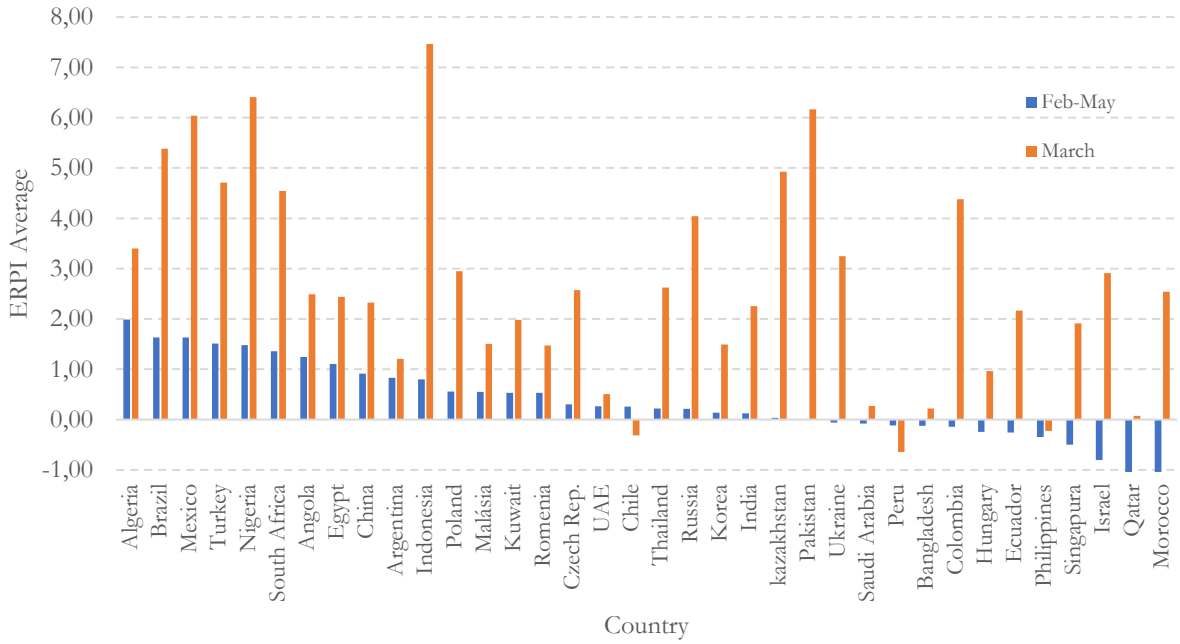
Figure 4 shows that in the period the most affected country was Algeria, with 1.99. Another 7 countries had an indicator above 1, which indicates a persistent exchange rate pressure. Pakistan was the least affected country in the period (ERPI of 0.01) and 12 countries showed improvements in the indicator, especially Morocco, who's ERPI was -1.13.

Figure 4 also shows the isolated variations of the ERPI for the month of March. In it, it should be noted the significant values reached by Indonesia (7.5), Nigeria (6.4), Pakistan (6.2), and Mexico (6.0), all above 6. The best performing countries were Philippines (-0.2), Chile (-0.3) and Peru (-0.6), the only ones with negative values. Countries such as Chile and Peru presented low values for March, but this may be related to the fact that they underwent high instabilities in the months prior to the pandemic. Chile, for example, reached 4.3 in January 2020 and 1.6 in

February and Peru presented values above 1 in the same months (1.3 and 1.6, respectively), well above the average of the set of countries (0.30 and 0.45 respectively).

Comparing the variations of the broader period with those of March (Figure 4), we see that despite having the strongest pressure in this month (7.5), Indonesia's recovery was very rapid, as in the February–May period its ERPI was below 0.8, same as in Pakistan (6.2 in March and 0.01 in the period and Kazakhstan (4.9 and 0.04, respectively). Colombia, Morocco and Israel also draw attention because even with high values in March, they presented negative values for the period. Nigeria, Brazil, Mexico, Turkey and South Africa had high values and were among the highest both for March and considering the average of the period, indicating a less intense recovery when compared to the others.

Figure 4 – ERPI average Feb–May/2020 and March 2020 (n. of deviations)



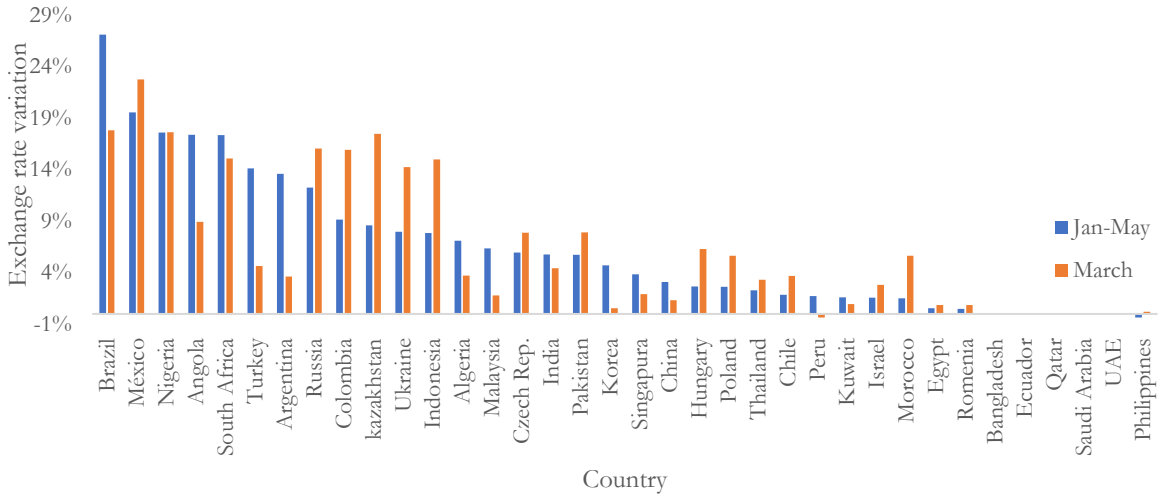
Source: Prepared by the authors using data from IMF and monetary authorities.

4.4 How was the external adjustment made?

A first way to make this assessment, of how the external adjustment was made, is to directly examine the exchange rate and reserve variations in the period. Figure 5 shows the total exchange rate variation between January and May (last business day of each month) and in March for the countries. In the period between January and May, Brazil had the largest variation, reaching 27.1%. In 8 countries, depreciation was above 10% in the period. Of the fixed exchange

rate countries, Ecuador, Qatar, Saudi Arabia and the United Arab Emirates sustained their parities, while Nigeria promoted a devaluation of 17.6% in March. Philippines was the only country where the currency appreciated. In March, the country with the highest variation was Mexico, with 22.7%.

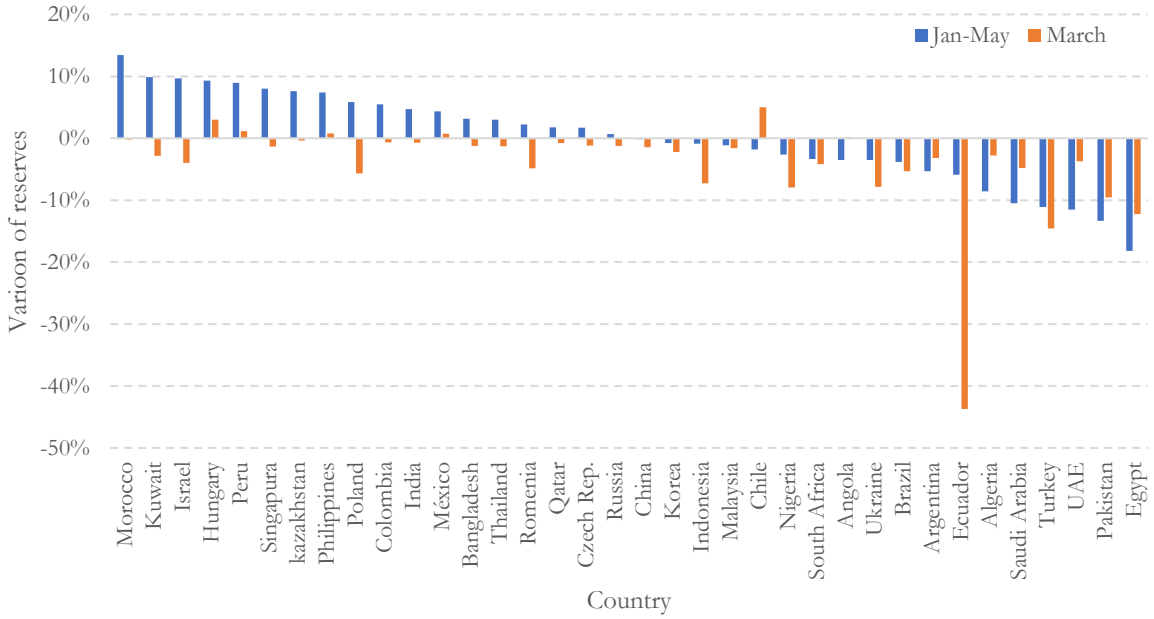
Figure 5 – Exchange rate variation January/2020–May/2020 and March/2020 (end of period; %)



Source: Prepared by the authors using data from IMF and monetary authorities.

In the case of reserves (Figure 6), the dynamics were different from the exchange rate, as in half of the countries there was an increase in reserves between January and May 2020. Morocco was the country with the highest increase, 13.4%. The country with the largest loss was Egypt, with a reduction of 18.2%. According to Denbee, Jung & Paternó (2016), during the most critical months of the 2008 crisis, the use of reserves in most emerging countries did not exceed 25% of the available volume, which would indicate a "fear of loss of reserves" as opposed to "fear of fluctuation." In the period covered here, no country used even 20% of the total and only 5 used more than 10%. Considering each month individually, this proportion was even lower. Ecuador was the country that made the most proportional use of its reserves, 44% in March, followed by Turkey, which, in the same month, used 14.6% of its stock. In addition to these, only Pakistan (14% in May) and Egypt (12.3% in March) used more than 10% of their reserves.

Figure 6 – Variation of reserves Jan–May/2020 and March/2020 (%)



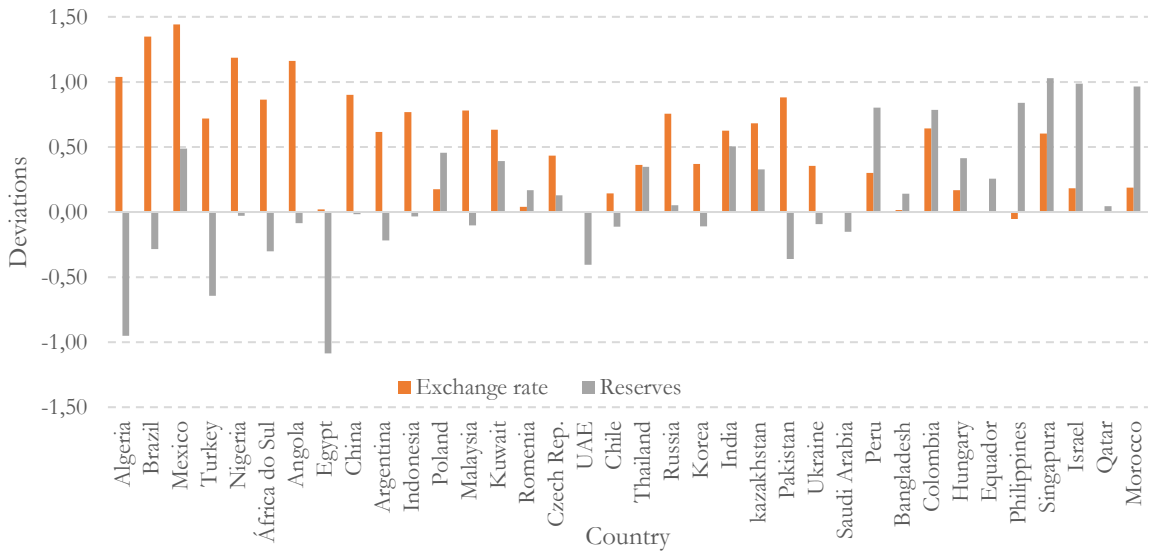
Source: Prepared by the authors using data from IMF and monetary authorities

As already addressed in Section 2, direct comparison between reserve and exchange rate variations may not be very informative, since the variation patterns are not the same. The analysis will then be conducted by disaggregating the ERPI, that is, comparing the variation weighted by the standard deviations for each variable (exchange rate and reserves). The values (average for the February–May 2020 period) are presented in Figure 7, ordered from the highest to the lowest ERPI value. For countries where both bars are above (below) zero, there was exchange rate devaluation (appreciation) and loss (gain) of reserves, indicating that the instabilities of the external sector were absorbed by the two variables, and the largest bar indicates whether the adjustment was made more by the variation of reserves or of the exchange rate. As can be seen, in most countries the adjustment was more through exchange rate than reserves. Egypt, in turn, even though it is not a fixed exchange rate country, clearly was not afraid to use reserves to keep the exchange rate stable. It was the only case of a country that does not adopt a fixed exchange rate in which the weighted variation of reserves was greater than that of the exchange rate, that is, it would be the only country in which the "fear of fluctuation" would have prevailed.

In cases where there was exchange rate devaluation and increase in reserves (blue bar above and orange bar below zero) the adjustment would have been only by the exchange rate, as it would indicate that even if the country had conditions (availability of reserves), it would

have chosen not to intervene in the exchange rate or intervene less than it could. That is, in these cases, an orange bar larger than the blue bar indicates even more strongly the "fear of loss of reserves." Mexico is a good example, because even with an indicator above 1 in the exchange rate, the country had a gain in reserves in the period, the same occurring, to a lesser extent, with Colombia, Singapore and India. Brazil, Nigeria and Angola had no gain in reserves, but the strong exchange rate devaluation combined with the small variation in reserves indicates a low willingness to use them. An alternative interpretation (especially in cases where reserves grew) is that there was not necessarily reluctance to use reserves, but rather monetary authorities considered that the ongoing devaluation did not have significant negative consequences for the domestic economy.

Figure 7 – Exchange rate and reserves (number of deviations; Feb–May/2020)



Source: Prepared by the authors using data from IMF and monetary authorities

Figure 8 shows the number of exchange rate and reserve deviations for the month of March. Based on it, it is possible to observe the magnitude of the instability, especially in the exchange rate, which reached 6.4 in Mexico and was above 3 in nine countries. As occurred in the February–May period, variations in reserves were smaller, with only Turkey (3.9) above 3.

Figure 8 – Exchange rate and reserves (number of deviations; March/2020)

Source: Prepared by the authors using data from IMF and monetary authorities

5. Final Remarks

The objective of this article was to analyze the initial impacts of the COVID-19 crisis on the external sector of a set of ECs, as well as how the adjustment was made. To this end, we carried out a literature review on the weaknesses of the ECs in environments of high capital mobility, showing that the current international monetary and financial system is hierarchical and asymmetric, constituting an element that is unfavorable to ECs.

The section on methodological discussion presented some papers that discuss the concept of exchange rate crisis. In this work, the concept of exchange rate pressure is used in lieu of exchange rate crisis. This is due to the fact that high exchange rate pressures do not necessarily result in crises (instabilities in the foreign exchange market that would lead to domestic problems) and because the characterization of an episode as a crisis would require specific analyses of the corresponding countries, which is outside the scope of this article.

Accordingly, the empirical part was based on the use of ERPI, an exchange rate pressure index, which takes into account variations in exchange rate and reserves — weighting by their standard deviations.

Based on the ERPI and the data for a set of ECs, it was pointed out that: i) the most acute period of the crisis occurred in March, the recovery began in April and there was no significant worsening in the remainder of 2020; ii) on the magnitude of the crisis, by analyzing

the ERPI from Jan/2003 to December/2020, it can be observed that March 2020 was the third most severe episode, only behind Oct/2008 and Sep/2011; iii) the countries, within the selected sample, whose effects were more severe and persistent were Nigeria, Brazil, Mexico, Turkey and South Africa; iv) on the method of adjustment in the countries, between January and May, Brazil was the one that had the highest exchange rate devaluation, and based on the monthly average of the ERPI, for the period between February and May, it was shown that in most of the countries the external adjustment was more through exchange rate than reserves.

This research enabled us to outline a representation that helps illustrate how the external sector of the ECs was affected during the initial phase of the pandemic, however, improvements and developments for future research can be pointed out: incorporate the evolution of stocks of external liabilities and assets; expand the number of variables used (e.g. interest rates); compare the performance of ECs in relation to developed countries; study the medium and long-term impacts of the COVID-19 crisis. Furthermore, it is essential to seek to understand why some countries were more affected than others, or what are the main determinants of ERPI, which would require more detailed studies of each economy or an econometric analysis that would enable establishing such relations. These incorporations will certainly enable an even broader understanding of the subject at hand, but they are outside the scope of this article, which proposes to be a first attempt at systematizing a very recent crisis.

Finally, taking into consideration the initial phase of the COVID-19 crisis and the reactions of the ECs, it can be pointed out that the worst month of the crisis for this set of countries was March 2020 and that most countries recovered quickly regarding external indicators. Moreover, it is essential to note that countries seem to have chosen to minimize losses in international reserves, choosing, at the most acute time of the crisis, to make an adjustment primarily through exchange rate devaluation.

The joint analysis of emergent enable us to observe, as pointed out in Section 2, that they share common weaknesses, resulting from a hierarchical and asymmetric system. Therefore, we should also devise cooperative solutions that enable the efficient work of monetary authorities at the height of the turbulence of external cycles and also mitigate the instabilities of the system, such as capital controls, joint reserve funds, *swap* lines and the strengthening of IMF's special drawing rights.

These aspects are important and should be taken into account in the strategies of the central banks of the ECs, especially if we consider that international crises have not been rare in recent decades. Even before the COVID-19 pandemic was considered as ended, for example, the Russian invasion of Ukraine caused new instabilities to the global economy.

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Appendix

Table 1 – ERPI: Highest value and average for February–May 2020 — Selected countries

		Average for Feb–May		
Country	Most unstable month (value)	Variation in exchange rate (No. of deviations)	Variation in reserves (No. of deviations)	ERPI
Algeria	March (3.40)	1.04	−0.95	1.99
South Africa	March (4.55)	0.86	-0.30	1.36
Angola	March (2.49)	1.16	−0.08	1.25
Saudi Arabia	September (2.10)	0.00	−0.15	0.15
Argentina	November (1.22	0.61	−0.22	0.83
Bangladesh	March (0.22)	0.02	0.14	−0.12
Brazil	March (5.38)	1.35	-0.28	1.63
Qatar	September (1.07)	0.00	0.05	-1.09
Kazakhstan	March (4.93)	0.68	0.33	0.04
Chile	January (4.27)	0.14	−0.11	0.26
China	March (2.33)	0.90	-0.02	0.92
Colombia	March (4.38)	0.64	0.79	−0.14
Korea	September (1.58)	0.37	-0.11	0.14
UAE	September (1.52)	0.00	-0.41	0.27
Egypt	March (2.44)	0.02	-1.09	1.11
Ecuador	March (2.16)	0.00	0.26	−0.26
Philippines	June (1.80)	-0.05	0.84	-0.34
Hungary	January (2.01)	0.17	0.41	−0.25
India	March (2.25)	0.63	0.50	0.12
Indonesia	March (7.46)	0.77	-0.03	0.80
Israel	March (2.91)	0.18	0.99	-0.80
Kuwait	March (1.98)	0.63	0.39	0.53
Malaysia	February (1.96)	0.78	-0.10	0.55
Morocco	March (2.54)	0.19	0.96	-1.13
Mexico	March (6.04)	1.44	0.49	1.63
Nigeria	March (6.41)	1.19	-0.03	1.48
Pakistan	March (6.17)	0.88	-0.36	0.01
Peru	May (2.7)	0.30	0.80	-0.12
Poland	March (2.95)	0.17	0.46	0.56

Czech Rep .	March (2.57)	0.43	0.13	0.31
Romania	March (1.48)	0.04	0.17	0.53
Russia	March (4.04)	0.75	0.05	0.22
Singapore	March (1.91)	0.60	1.03	-0.50
Thailand	March (2.63)	0.36	0.35	0.22
Turkey	March (4.85)	0.72	-0.64	1.51
Ukraine	March (3.21)	0.35	-0.09	-0.06

Source: Prepared by the authors using data from IMF and monetary authorities