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A Gathering of Storms: The Impact of COVID-19 Pandemic on the Balance of Payments of Emerging Markets and Developing Economies (EMDEs)

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ABSTRACT

The aim of this article is to track the impact of the COVID-19 pandemic crisis on EMDEs focusing on the performance of their Balance of Payments (BOPs). EMDEs are facing simultaneous hits in their BOPs as they try to cope with the domestic impact of the COVID-19 pandemic. Those impacts call for a rethinking of some aspects of the Keynesian Approach to BOPs while strengthening the view of international financial markets as hierarchical and volatile institutions. The external impacts can be summarized in four channels: (i) The unprecedented capital flight which has led to depreciation, scarcity of hard currency, debt problems and rising spreads in domestic currency; (ii) the fall in commodity prices, a major component of the export basket in most EMDEs; (iii) the contraction in global aggregate demand and supply, which together with lower commodity prices lead to reduced export earnings; and (iv) the decrease in remittances, a major supply of hard currency in several EMDEs and Low-Income Countries (LICs). The concomitant impact of these "storms" has limited the capabilities and efficiency of governments to adopt fiscal and monetary stimulus packages and to respond to the sanitary requirements. Government reactions are also clogged by the large weight of the informal sector in EMDEs.

Introduction

The irruption and speed of COVID-19 pandemic transmission have affected significant virulence EMDEs (Kohlscheen, Mojon, and Ress 2020; Pollitt et al. 2020). External transmission channels through BOPs dominance have shown a critical incidence on output, consumption, investment, wages, and employment (Titelman and Pérez Caldentey 2015; Ocampo 2011). COVID-19 pandemic reveals its main consequences on these macroeconomic variables through the incidence of trade and financial channels (BIS 2020). In the first case, the COVID-19 pandemic has seriously affected external demand, export commodity prices, and international remittances (CEPAL 2020a; World Bank 2020). In the second case, the global virus propagation has exerted external pressures on capital and financial flows, international reserves, nominal exchange rates, interest rates, and domestic spreads (Hofmann, Shim, and Shin 2020; Vernengo 2020).

Recent empirical evidence has shown that the COVID-19 pandemic has generated the worst world economic recession since the Great Depression (Casilda Béjar 2020). It has also contributed to create severe perturbations in international trade, provoking the fall of several international

commodity prices (CEPAL 2020b). The COVID-19 pandemic has engendered the biggest financial capital outflows from EMDEs in history (BIS 2020). EMDEs have also suffered negative spillovers from the recession in developed countries. The destruction of employment and the paralysis of economic activity reduced immigrant remittances to their home countries (Djankov and Panizza 2020).

The surge in international uncertainty and risk spread among all countries have imposed huge macroeconomic policy challenges (Baker et al. 2020; Seccareccia 2019). EMDEs countries face less policy space to counteract the negative effects of the COVID-19 pandemic (Aizenman et al. 2019), and also display several idiosyncratic structural elements that increase their vulnerability to external global negative macroeconomic shocks: (1) high macroeconomic volatility of their business cycles and economic growth rates (Panigo, Chena, and Toledo 2020; Aguiar and Gopinath 2007); (2) widespread labor market informality (ILO 2020); (3) shallow domestic financial markets (World Bank 2016); (4) exchange rate instability (Guzmán, Ocampo, and Stiglitz 2018); (5) exposure to external capital and financial flows reversals, which are specially sensitive to exogenous push factors (Csonto and Ivaschenko 2013; Bortz and Kaltenbrunner 2018); (6) strong dependency on commodity exports and external remittances (United Nations 2020; OECD 2020; Pérez Caldentey 2020); and (7) prevalence of cyclically balanced fiscal rules and monetary inflation targeting regimes (Seccareccia and Khan 2019; Ha, Kose, and Ohnsorge 2019; Schaechter et al. 2012).

Despite these stylized facts, EMDEs governments have adopted unusual monetary and fiscal expansion policies to contain the incidence of global supply and demand shocks imposed through the COVID-19 pandemic spreading (Benmelech and Tzur-Ilan 2020). Reduction in nominal interest rate policies and interventions in domestic debt market are common monetary policy measures adopted in this extraordinary context (Gallagher et al. 2020). Increases in current public spending and unconditional government cash transfers are some of the main fiscal policy actions that EMDEs battle through the COVID-19 pandemic (Alberola et al. 2020).

The present article has two main aims. The first one is to provide a simple analytical device with a Keynesian twist that allows us to understand some specific macro-foundations of microeconomic behavior decisions in the case of institutional agents that face some of these COVID-19 pandemic dissemination consequences. The second aim is to analyze the main economic interactions between governments and central banks in terms of fiscal and monetary policy coordination, and different alternatives and limitations that EMDEs face to react countercyclically to the COVID-19 pandemic. We show that several possibilities arise according to the institutional regimes surrounding central bank independence and legal restrictions on central bank intervention and on the sensitivity and tolerance of exchange rate fluctuations (Vernengo and Pérez Caldentey 2019).

Therefore, through a simple Keynesian open economy macroeconomic model, we are capable to kill two birds with only one stone. First, we provide a formal benchmark to study how global virus dissemination negatively impacts several EMDEs macroeconomic variables through trade and financial transmission channels; and we compare and confront several fiscal and monetary policy alternatives in terms of EMDEs choices that allow us to identify four different macroeconomic policy regimes.

The article structure is as follows. In Section I, we show some basic stylized facts from the economic impact of the COVID-19 pandemic in EMDEs, focusing on the open economy dimension and the subsequent policy response. In Section II, we introduce our stylized Keynesian open economy macroeconomic model to analyze the main COVID-19 pandemic economic effects propagation through trade and financial transmission channels in EMDEs. In Section III, we provide a theoretical classification of our four policy regimes. To achieve this aim, we use different macroeconomic closures by combining several possibilities to coordinate countercyclical fiscal and monetary policy actions, bearing in mind the two polar exchange rate regimes. In Section IV, we use the main economic policy implications of our model, in the different regimes, to analyze the variety of fiscal and monetary government support measures in EMDEs in response to

Billion of Dollars
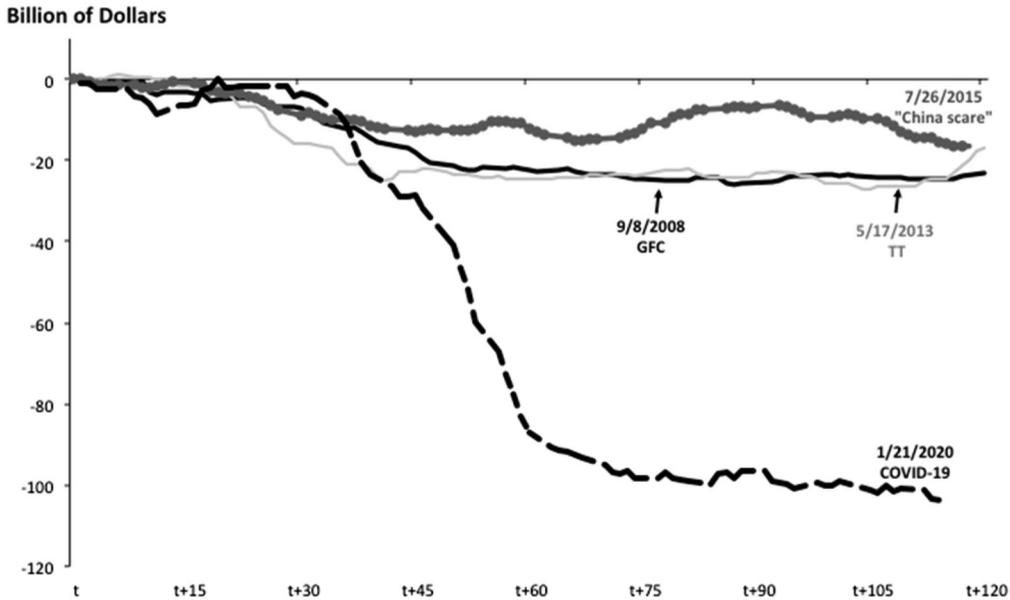
Graph 1. Accumulated nonresident portfolio flows to EMDEs since indicated date. *Source*: Jonathan Fortun, Daily Capital Flows Tracker© 2020 Institute of International Finance, Inc. All rights reserved.

COVID-19 pandemic. In Section V, we offer some final thoughts and examine policy economic implications to conclude the analysis.

COVID-19 Pandemic External Impact on EMDEs

The spread of the COVID-19 pandemic has shown multiple impacts on advanced and developing countries, not least in health and sanitary conditions. This article focuses on the open economy dimension of these effects, looking particularly at what happened in EMDEs. In that regard, there are some specific developments that stand out for its speed and depth. One of the most resounding is the capital flight out of EMDEs and into major financial centers. The COVID-19 pandemic capital flight episode dwarfed every other major "scare" episode in the last decades, including the 2008 Global Financial Crisis (GFC), the 2013 Taper Tantrum (TT), and the 2015 "China scare." Graph 1 shows the outflow comparing with the other mentioned cases, using data of the Institute of International Finance.

On January 21, 2020, the US announced the first case of COVID-19 pandemic on its soil, and the World Health Organization confirmed the transmission from human to human. A month afterwards, data shows that outflows from EMDEs cumulated to USD 4 billion. That was a quarter of the capital flight observed (in a similar amount of time) during the TT, and about half of what was observed during the GFC and the "China scare." In the following month, outflows had reached USD 87 billion, more than tripling the magnitudes of the GFC and the TT, and seven times the outflows during the "China scare." There was a USD 84 billion outflow from EMDEs in one month. Around 71% of cumulated outflows (USD 74 billion) left equity markets, the other 29% left bond markets. Outflows stabilized after the third month (in April), afterward the Federal Reserve injected dollar liquidity in the US, in advanced and in developing countries. On March 19th, the Federal Reserve announced the establishment of dollar swap agreements with several central banks, including Brazil, South Korea, and Mexico. On March 31st it announced the establishment of a temporary repo facility with foreign central banks, using Treasury securities as collateral for dollar borrowing.

These outflows were reflected in rises on bond spreads (Arslan, Drehmann, and Hofmann 2020), and sudden exchange rate depreciations. Graph 2a,b show the evolution of exchange rates of major EMDEs, indexed to the value of December 31, 2019. Almost all the countries in this sample had a peak in their exchange rates in April (except Brazil, which saw a peak in May). Latin American countries were affected more severely than Asian ones (CEPAL 2020a), who even
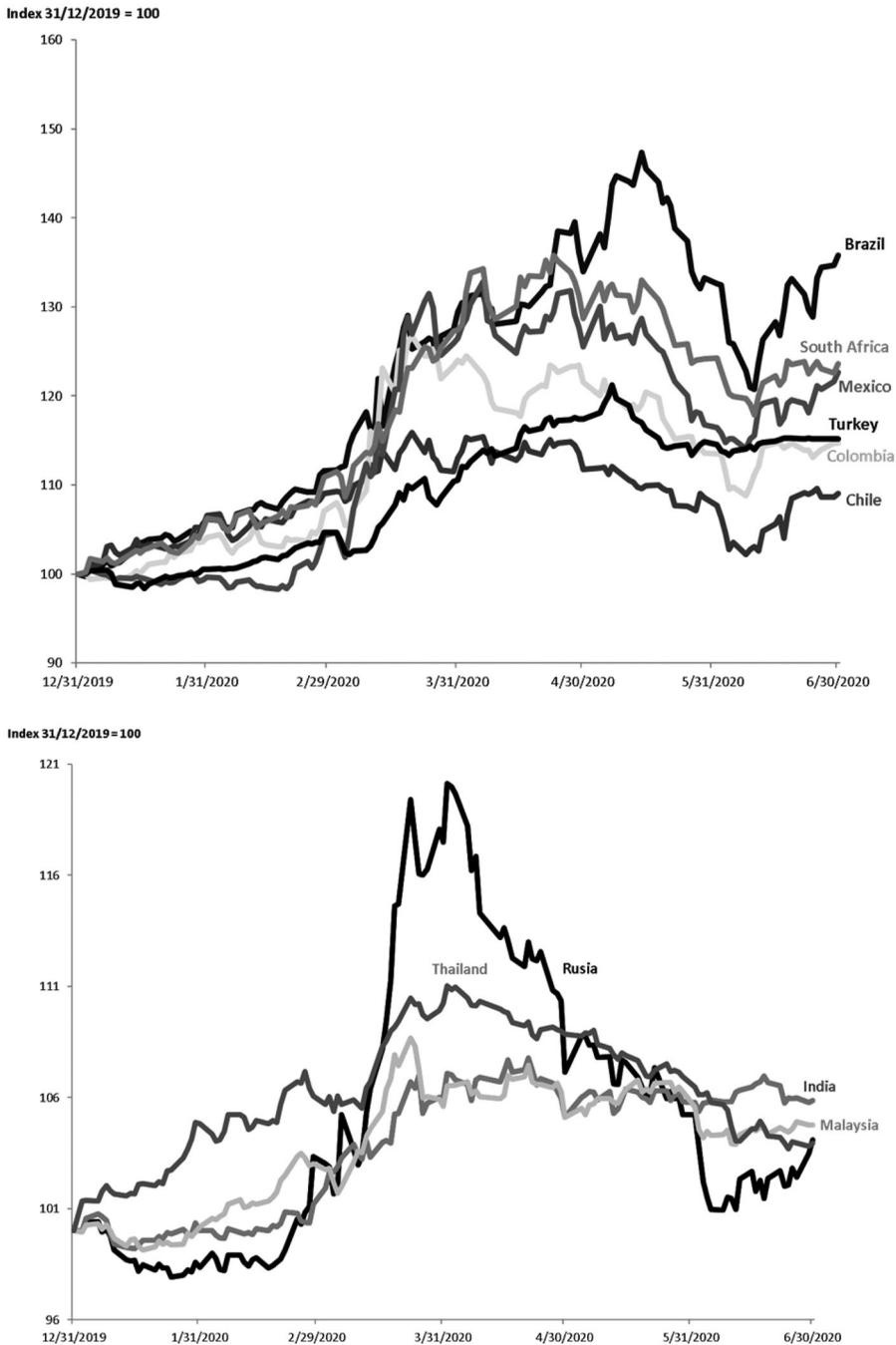
Graphs 2. (a,b) Exchange rate movements in selected emerging economies. *Source*: Authors' elaboration based on BIS Statistical Warehouse Data. Exchange rates reflects units of local currency per US dollar. Index 31/12/2019 = 100.

started to appreciate already in March. After the Federal Reserve implemented swaps agreement and offered liquidity facilities to countries such as Brazil and Mexico, the panic started to recede. Hofmann, Shim, and Shin (2020) show that pressure was felt not only on exchange rates but also on borrowing costs, even denominated in local currency. One particularly aggravating factor was the larger presence of foreign investors in the domestic currency bond market, corroborating the thesis presented by Kaltenbrunner and Painceira (2015), Bonizzi (2017), and Gabor (2020).

The sudden increase in global liquidity preference was also felt in financialized markets, such as commodity markets. Table 1 presents the monthly evolution of the World Bank Commodity Price Data Index. Energy prices were most affected, but also agricultural products and metals and minerals took a hit. In May they started to recover.

The world entered a severe recession, and that was reflected in falling exports. Countries that relied on tourism were particularly affected, given the traveling restrictions worldwide. A further significant impact will be felt through remittances' flows. After reaching a peak in 2019, the World Bank estimates that remittances to LICs will fall by approximately 20% in 2020 (World Bank 2020; Sayeh and Ralph 2020). Regions that will face the largest decline are Europe and Central Asia, Sub-Saharan Africa, and South Asia, according to expectations. Remittances play a significant role in the BOPs and in income in many LICs and EMDEs. According to data from the Global Knowledge Partnership on Migration and Development, remittance flows amounted to over 10% of GDP in 31 countries during 2019, with peaks of 37% in Tonga and Haiti.[1] These external impacts interacted with domestic structural conditions, such as informality, urban-rural population spreads, population density, sanitary conditions, health systems, and a long *et cetera*.

To sum up, the COVID pandemic was a big hit to EMDEs and LICs, not least from a BOPs perspective, both from the current and the capital and financial accounts. There were offers of partial debt payments suspensions to LICs by the World Bank and the IMF, but the growth of debt servicing after 2012 has put many EMDEs under pressure (UNCTAD 2020). This article proposes a Keynesian open economy macroeconomic model to include formally many of these shocks, the feedbacks, and the obstacles that condition policy response and policy effectiveness.

Table 1. Index of commodity prices.

	Energy	Agriculture	Fertilizers	Metals and minerals
2019–12	76.88	83.62	72.63	77.47
2020–01	74.44	84.34	70.84	77.70
2020–02	64.96	81.25	71.03	73.02
2020–03	42.06	78.18	73.33	68.71
2020–04	29.35	76.07	73.30	65.55
2020–05	38.81	76.62	67.44	68.01
2020–06	48.34	79.78	66.80	73.68
2020–07	51.28	81.93	69.84	79.09
% Change	−33.3%	−2.0%	−3.8%	2.1%

Source: World Bank Commodity Price Data. Monthly indices based on nominal US dollars, 2010 = 100. Updated on August 4, 2020.

The Model

Accounting

The model describes an economy made of five institutional agents: Households, firms, government, central bank, and the rest of the world. There are three things to point out about this configuration. First, as will be clear below, we include two types of households: Formal and informal ones. The former accumulate financial assets (in the form of government debt), the latter

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[1]Information available at https://www.knomad.org/data/remittances.

Table 2. Social accounting and financial matrix.

	Households	Firms	Government	Central Bank	Rest of the world
Consumption	$-C$	$+C$			
Public expenditure		$+G$	$-G$		
Exports		$+p_x.x.E$			$-p_x.x.E$
Imports		$-p_m.m.E$			$+p_m.m.E$
Wages	$+WL$	$-WL$			
Public transfers	$+TR_d$		$-TR_d$		
Remittances	$+TR_f.E$				$-TR_f.E$
Taxes	$-T$		$+T$		
Int. on external debt			$-i_f.D_{t-1}^f E$		$+i_f D_{t-1}^f E$
Int. on domestic debt	$+i_d.D_{t-1}^{hd}$		$-i_d.D_{t-1}^d$	$+i_d.D_{t-1}^{cbd}$	
Changes in the stock of					
External debt			$+\Delta D_t^f.E$		$-\Delta D_t^f.E$
Domestic debt	$-\Delta D_t^{hd}$		$+\Delta D_t^d$	$-\Delta D_t^{cbd}$	
International reserves				$-\Delta R$	$+\Delta R$

Source: own elaboration.

consume all their income. Second, we chose not to include commercial banks in the model. In this work, we are not concerned with the links between productive units and the financial sector. Though we understand that this sets up apart from the traditional Keynesian analysis of the monetary interactions in an open economy, it would add unnecessary complications for the arguments we want to make. In short, we are ruling out the analysis of liquidity, risk and solvency issues involving the private sector during the pandemic. Third, precisely for clarifying those arguments, we split the government from the central bank. Table 2 shows the transaction matrix that records all flow transactions and changes in the stock of assets that are happening in the economy. A notation clarification: A minus sign in the change of asset holdings represents an acquisition (a purchase) of such asset, while a plus sign represents a sale of said asset.

As we mentioned above, there are two kinds of households, who receive different types of incomes. While both receive wage income, formal workers manage to save part of their income and accumulate financial assets, i.e., government domestic debt denominated in domestic currency, for which they receive an interest income. They are also the only type of workers who pay taxes. Informal workers, on the other hand, receive remittances and eventually public transfers, but we assume that they consume all their income.

Firms sell to consumers, to the government, to the rest of the world, buy intermediate imported goods, and pay wages to both formal and informal workers.

The government buys consumption goods from firms, it also makes transfers to informal households and pays interests on its debt to holders: Formal households, the central bank and the rest of the world (the latter, denominated in a foreign currency). For the sake of simplicity, its domestic debt is only denominated in domestic currency, and its external debt is only denominated in foreign currency.[2] The other asset of the central bank is international reserves. The current account, in turn, is composed of the trade balance, remittances from the rest of the world, and interest payment on the external debt (we assume the economy is a net debtor country). The financial account is composed of external debt flows and foreign reserves.

Production, Wages, and Prices

Firms' production function is nested in two levels. In the first level, output is produced with a composite labor factor and imports, with a Leontief technology. Therefore, there is no substitution between inputs and labor demand is proportional to output:

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[2]See the mentioned works of Bonizzi (2017), Gabor (2020), and Kaltenbrunner and Painceira (2015).

$$L = a \cdot Q \tag{1}$$

where a is the unit labor-requirement per unit of final output (Q).

In the second level, firms must decide which amount of labor will be composed by any of the two varieties: Formal and informal.

$$L = L_f + L_u \tag{2}$$

We assume that formal employment has an elasticity lower than unity with regards to the change in total employment. The opposite holds for informal workers. We acknowledge that this is *not* usually the case in EMDEs (Albertini, Poirier, and Sopraseuth 2019; Fernández and Meza 2015). Traditionally, the informal sector acts as a buffer for employment losses in the formal sector, cushioning income losses. It is also the first step when inactive people enter the labor force and search for a job. Informal employment is, therefore, acyclical or even countercyclical in many EMDEs. However, COVID-19 pandemic is different. First, some of the most affected sectors in EMDEs and LDCs are those that present high informality rate: Retail, tourism, construction, etc. Second, informal workers are also less likely to switch to home working. Third, restrictions on movements and public transportation during the pandemic affect disproportionally informal workers (FAO 2020; ILO 2020). We therefore have:

$$L_f = \mu_0 \cdot L^{\mu_1} = \mu_0 (a \cdot Q)^{\mu_1} \tag{3}$$

with $\mu_1 < 1$. Then:

$$L_u = L - L_f = a \cdot Q - \mu_0 (a \cdot Q)^{\mu_1} \tag{4}$$

We assume that the nominal wage of formal workers is fixed at $\overline{w_f}$, and that nominal wages of informal ones is a proportion of formal wages $b_1 \overline{w_f}$, with $b_1 < 1$. For the sake of simplicity, we are not adding additional equations to formalize the unemployment behavior. Implicitly, we assume that formal sector workers, who lose their jobs, move to the informal type and potentially can receive a compensation from government. In a nutshell, informal household contains all the informal workers before the crisis, and all the formal and informal ones that were fired during the COVID-19 pandemic.

EMDEs are generally price-taker small open economies when it comes to international trade. Many of them have an export profile concentrated in primary commodities, and we will take that as our model case. Since the 2000s, commodities have become a financial asset for investors to speculate (Bastourre, Carrera, and Ibarlucía 2012), and their prices are partially explained by the liquidity conditions and risk perceptions in global financial markets, at least in the short-run (Carrera 2018).

In this vein, we model the export price in domestic currency as the product of international price times the nominal exchange rate times a global risk factor. Equation (5) captures the argument:

$$p_x = E \cdot p_x^w \cdot (1 - \zeta \cdot risk) \tag{5}$$

where p_x is the export price in domestic currency, p_x^w is the commodity price quoted in international markets, E is the nominal exchange rate (defined as unit of local currency per unit of foreign currency; an increase means a nominal exchange rate depreciation), and ζ is an exogenous positive parameter, which shows the sensitivity of commodity prices to changes in global risk perceptions. Tight liquidity conditions and higher uncertainty in international financial markets lead to a fall in commodity prices. Import prices are exogenous and determined in international markets. When translated into domestic currency value, the equation is as follows:

$$p_m = E \cdot p_m^w \tag{6}$$

with p_m^w the price determined in international markets. This means that domestic conditions of competitiveness captured by the real exchange rate do not impact the performance of export

and import volumes, at least in the short run. This is compatible with the "dominant currency paradigm" of Gopinath (2016) and Adler et al. (2020): Imports and exports are denominated in US dollars and, in the case of commodity exporters, their price is determined in external markets.

Along with tradable goods, the economy produces non-tradable products with labor and imported inputs. Prices of non-tradable goods are set with a fixed markup over wages and imports:

$$p_{NT} = (1 + \pi).(a \cdot W + a_m \cdot p_m) \tag{7}$$

where π is the exogenous markup rate, W is the wage bill, and a_m represents the unit requirement of imports per unit final output.

Trade volumes are a function of domestic and external demand, as captured in Equations (8) and (9):

$$x = \theta_x \cdot Q_f^{\epsilon_x} \tag{8}$$

$$m = a_m \cdot Q \tag{9}$$

where Q_f refers to foreign real GDP, ϵ_x is a positive exogenous parameter that captures income elasticity of exports. In case of some EMDEs that export primary agricultural products, export prices also influence the consumption basket. Therefore, we model the price deflator as a weighted combination of export and non-tradable prices:

$$p_g = \prod_i p_i^{\beta i} \ \forall \ i = x; nt \tag{10}$$

where β is the share of i in the consumption bundle.

Real nominal wages of the formal sector are thus:

$$\overline{\omega_f} = \frac{w_f}{p_g} \tag{11}$$

Income Expenditure and Balances

Total nominal income of formal workers is:

$$Y_f = \overline{w_f} \cdot L_f + i_d.D_{t-1}^{hd} \tag{12}$$

While total nominal income of informal ones is:

$$Y_u = \overline{w_u} \cdot L_u + TR_d + TR_f.E \tag{13}$$

Formal workers consume a portion c of their income after taxes and save the rest, investing in domestic public debt (ΔD_t^{hd}). This saving rate rises with real depreciations (Gala and Rocha 2009; Frenkel and Rapetti 2015).[3] Informal workers consume all their income. Making use of Equations (3), (4), (12), and (13), nominal consumption is:

$$C = c(1 - \tau)\left[(\overline{w_f} \cdot (\mu_0(a \cdot Q)^{\mu_1} + i_d.D_{t-1}^{hd}\right] + b_1\overline{w_f}\left[a \cdot Q - \mu_0(a \cdot Q)^{\mu_1}\right] + TR_d + TR_f.E \tag{14}$$

In what follows, we present the government balance and the external balance. Starting by the former, we can count as expenditure the government spending on goods (G), transfers to

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[3]There exists some empirical evidence that proves that saving rates show a growing up tendency during the COVID-19 pandemic (Tiftik and Della Guardia 2020). Theoretical economic intuition frequently suggests that saving rates increase when fundamental uncertainty prevails, as seems to be the case of the COVID-19 pandemic at a global dimension, particularly in the case of EMDEs (OECD Economic Outlook 2020; Djankov and Panizza 2020). This increase in the households' savings precautionary motive is also explained by the fall in the private expenditures on final goods and services due to different lockdowns applied by public authorities (Lavoie 2020).

Table 3. Alternative policy regimes.

	Fixed nominal exchange rate (ER) regime ($\Delta R \neq 0$)	Flexible nominal exchange rate (ER) regime ($\Delta R = 0$)
BIS/MMT ($\Delta D_t^{cbd} \neq 0$)	1	3
IMF ($\Delta D_t^{cbd} = 0$)	2	4

Source: own elaboration.

Table 4. Policy reaction and impacts in different regimes.

	Regime 1		Regime 2		Regime 3		Regime 4	
	B.B. (15)	BOPs (16)	B.B. (15)	BOPs (16)*	B.B. (15)	BOPs (16)	B.B. (15)	BOPs (16)
G	+		−		+		−	
TR_d	+		−		+		−	
$i_d.D_{t-1}^d$	=		=		=		=	
$i_f.D_{t-1}^f.E$	=		=		+		+	
T	−		−		−		−	
ΔD_t^{hd}	−		−		−		−	
ΔD_t^{cbd}	+		0		+		0	
ΔD_t^f	−	−	−	−	−	−	−	−
ΔE	0		0		+		+	
$[E \cdot p_x^w \cdot (1 - \zeta \cdot risk)]$		−		−		?		−
$\theta_x \cdot Q_f^{\epsilon x}$		−		−		−		−
$E \cdot p_m^w$		?		?		?		?
$a_m \cdot Q$		−		−		−		−
$TR_f.E$		−		−		?		?
$i_f.D_{t-1}^f E$		=		=		+		+
ΔR		−		−		0		0
$\Delta D_t^f.E$		−		−		?		?

*Government expenditure falls until variations in reserves are null.
Source: own elaboration. B.B. expresses governments budget balances.

informal workers/households (TR_d) and interest payments on internal ($i_d.D_{t-1}^d$) and external public debt ($i_f.D_{t-1}^f E$). Its current revenues come only from tax collection (T). Therefore, the fiscal deficit must be financed by domestic (ΔD_t^d) or external public debt ($\Delta D_t^f.E$). Whatever domestic debt is left after households purchase public bonds, is acquired by the central bank. Nevertheless, one of the closures we will examine is when this possibility ("monetization of public deficit") is forbidden by law and/or restricted by commitments with IMF programs.[4] Interest rates are set exogenously, domestic interest rate by the central bank, external interest rate by international markets. Government balance is, therefore:

$$G + TR_d + i_d.D_{t-1}^d + i_f.D_{t-1}^f.E - T = \Delta D_t^d + \Delta D_t^f.E \tag{15}$$

It is time to present the equation describing the BOPs. The current account is composed of exports and imports, remittances, and interest payments. The financial account registers external debt flows and international reserves. Making use of Equations (5), (6), (8), and (9), we depict the balance of payments, expressed in domestic currency, as:

$$[E \cdot p_x^w \cdot (1 - \zeta \cdot risk)]\left(\theta_x \cdot Q_f^{\epsilon x}\right) - (E \cdot p_m^w)(a_m \cdot Q) + TR_f.E - i_f.D_{t-1}^f E = +\Delta R - \Delta D_t^f.E \tag{16}$$

One final item to introduce at this stage refers to external public debt. We assume that this variable is totally determined by exogenous external risk global perceptions, in line with Global Financial Cycle literature main contributions (Aldasoro et al. 2020; Miranda-Agrippino and Rey

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[4]Given that the model does not include a banking system, we have not included reflux mechanisms. Though a considerable omission, this does not affect the main results of this article.

2020; Kregel 2014). When conditions in international financial markets deteriorate, there is a lower appetite for risk/debt of EMDEs, and the opposite holds when global liquidity conditions ease. This may be reflected in prices (sovereign spreads, exchange rates) and quantities (flow of debt). Though interest rates are fixed, we will explore changes in exchange rates and financing alternatives (debt flows). At this stage, we just highlight that external debt financing is negatively related to global risk:

$$\Delta D_t^f = f(risk); \ \ with \ f'(.) < 0 \tag{17}$$

Closures

Variety of Closures and Regimes

As mentioned in the Introduction, the financial panic associated with the COVID-19 pandemic led to sudden, massive, and unprecedented financial outflows from EMDEs, in a truly short span of time. When entering the pandemic, these economies had different institutional and socioeconomic contexts. There are a few settings and norms that interest us in this article because they mold the policy space and the policy response to the sudden and abrupt recession that engulfed most countries.

Many EMDEs have adopted inflation targeting monetary regimes, prioritizing inflation control as the main (and in some cases only) aim of the central bank. This monetary policy regime included the outright prohibition of monetary financing of the public deficit. Furthermore, this is part and parcel of IMF conditional programs. Governments had to rely on market conditions for their financing, and the central bank was forbidden from intervening in domestic debt markets. Alternative views are associated with Modern Monetary Theory (MMT) and Post Keynesian approaches,[5] for instance. But recently, even the BIS has come forward in favor of central bank intervention in local currency (public) debt markets to attenuate instability, particularly in the context of high participation of foreign investors (Hofmann, Shim, and Shin 2020; Arslan, Drehmann, and Hofmann 2020). Woodford (2020) and Guerrieri et al. (2020) acknowledge the importance of fiscal policy during the COVID-19 pandemic, even in the context of IT monetary regimes, recognizing the limits of monetary policy in this context. Consequently, our two opposing closures will be one in which the central bank can acquire public debt, and one in which it is forbidden, and holdings of public debt do not change.

The main instrument to conduct monetary policy in inflation targeting regimes is the short-run nominal policy interest rate. Initial proposals for inflation targeting seemed to disregard the use of the exchange rate as an explicit instrument, policy tool or objective with an inflation targeting monetary regime (Clarida, Galí, and Gertler 1999). However, and unlike in advanced economies, the exchange rate has a significant importance in the dynamics of inflation, even though the pass-through decreased in recent decades (Cherkasky and Abeles 2019; Ha, Kose, and Ohnsorge 2019; Carriere-Swallow et al. 2016; Goldberg and Campa 2010). The importance of exchange rate stability for the practice of monetary policy in EMDEs has, however, been recognized theoretically (Ostry, Ghosh, and Chamon 2016) and in practice, if one observes changes in international reserves, for instance. In this article, we take fixed and flexible nominal exchange rate as two corner solutions regimes, though we acknowledge that interventions in the foreign exchange market and the pursuit of exchange rate stability vary from country to country. A flexible exchange rate regime implies that reserves are unchanged from period to period.

With two polar cases for exchange rate policy and two polar cases for central bank intervention in domestic public debt markets, we have four alternative policy regimes. The policy space

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[5]See the contributions of Lavoie (2013), Fullwiler (2020), and Tymoigne (2020).

for implementing a stimulus package through fiscal policy will vary according to each of these regimes. Table 3 sums up the four possibilities.

The situation in which we analyze these regimes is one in which global risk perceptions have tightened, global demand has fallen, and remittances have decreased, in line with the empirical stylized facts that we show in Section "COVID-19 Pandemic External Impact on EMDEs." The impact on domestic conditions comes through a variety of transmission mechanisms.:

A. Domestic production drops on account of falling external demand, and lower consumption by informal workers. These social actors see their income (remittances) and employment reduced, in a larger proportion than formal workers.
B. External situation deteriorates. Imports fall, but so do exports, both on price (because of lower commodity prices) and quantities (due to lower external demand). Together with the fall in remittances, there is an increase in current account deficit, even in the eventual case that the trade balance remains in equilibrium.
C. Government sees an increase in its budget deficit, because of the fall in tax revenues and the concurrent increase in its expenditures. The monetary policy regime will allow or constrain the policy space to counteract the recession.

The regimes in Table 4 are theoretical, extreme policy ones. Experience has shown a mix of responses, including some that we excluded by assumption, such as rising interest rates.

The narrative of the impact on the main variables and the policy reaction according to each of these regimes, in our relatively simple model, is as follows. Table 4 sums up the different effects according to each regime.

Regime 1: Because of a fixed ER regime, with a current account deficit and with capital outflows, international reserves are falling. Equally, while the domestic private saving rate is rising, private aggregate savings are falling due to lower domestic output and falling household incomes, while the government must counteract the recession and mounting unemployment. In this context, government expenditure (through public spending on goods and transfers to informal workers) rises to counteract falling private expenditure, in order to try to stabilize effective demand. However, the impact on savings rates and income inequality is different according to the type of public expenditure. Transfers to informal workers are consumed entirely increasing aggregate demand. Their effect on tax revenues is only indirect (by increased economic activity and retention of formal workers), and the same holds for private savings. It is interesting to notice that, in this case, household income falls by much less than domestic production because of government transfers. Public purchasing of goods, or policies designed to support employment in the formal sector, have higher leakages on taxes and savings (because of larger formal workers' income). Accommodating demand of public bonds by the central bank fills the financing gap, while reserves fall covering the BOPs deficit. This situation can go on if international reserves remain at a sufficient level. Decomposing domestic debt into its private and public (central bank) holders, we look at the government budget Equation (15) and the BOPs Equation (16). With the mentioned nuances about the effects of different types of government expenditure, Table 6 sums up the effects in terms of variables involved.

Regime 2: In this case, the central bank is forbidden from purchasing government debt, which must reduce its spending to prevent a budget deficit. Furthermore, if the aim is to defend the fixed nominal ER (or address some degree of stability in the exchange rate market), fiscal policy is the only policy instrument at hand to attenuate the fall in international reserves by sinking imports. In this sense, public expenditure becomes endogenous, and an inverse function of global risk perceptions, until reserves reach a stable position. Experience tells, however, that a successful reduction in fiscal deficits takes time, particularly if attempted through expenditure cuts (Ciccone

2013). With a limited, or even zero, amount of government transfers delivered to the informal sector, we should face a rapid increase in poverty and income inequality.

Regime 3: The tightening of global risk perceptions and liquidity conditions will cause a nominal ER depreciation, with several offsetting effects. On the one hand, while commodity prices in external markets will fall, the depreciation will increase the domestic price of foreign goods. It will also lead to a reduction in real wages and an increase in the private saving rate and compounding the fall in domestic demand (recall that the saving propensity of the formal sector is inversely related to the exchange rates).[6] Remittances for informal workers will fall, but then again, their domestic value will not fall as much due to the nominal ER depreciation. The increase in savings and the possibilities of the central bank to finance the government provides a secure market for government debt. The government has the domestic resources to implement a fiscal stimulus, and the fall in domestic demand is (at least partially) offset by government spending, so that imports do not fall by much. Barring government transfers to the informal sector, the only dampening to increased income inequality is the higher domestic value (due to nominal ER depreciation) of foreign remittances (which are nonetheless falling). Therefore, there are falling exports, falling remittances and larger capital outflows, on a magnitude greater than the fall in imports. This scenario is intrinsically unstable because it lacks an explicit anchor, other than an improvement in global risk perceptions conditions. The nominal ER will increase (depreciate) if external conditions are unfavorable, because no other element of the BOPs adjusts the emerging disequilibrium. And just as fiscal austerity may take time to reduce the budget deficit (if at all), the fall in the ER must be substantial to reduce imports and stabilize the foreign exchange market. But potentially fiscal expenditure may act against this reduction in imports. The only viable anchor is an improvement in global conditions that stabilize the exchange rate via dampening capital outflows. As will be mentioned in the next section, this was one of the effects of the intervention of the Federal Reserve in international capital markets.

Regime 4: The nominal ER depreciation due to capital outflows pressures will add a recessionary element to domestic conditions on top of falling external demand, as mentioned in the previous regime. In this case, however, the government is prevented from increasing its expenditure to stimulate the economy, and it must reduce it. The fall in domestic demand will be faster and deeper, and imports will contract. As in the previous case, the only dampening impact on inequality is that the domestic currency value of remittances does not fall as much and may even increase, though in the context of rising inflation. The nominal ER will increase (depreciate) if external financial conditions deteriorate and will only stabilize if external conditions improve.

Core Macroeconomic Model Features and Governments Responses to COVID-19 Pandemic

Governments responded in different manners to COVID-19 pandemic challenges. Following the schematic presentation in our model, in terms of fiscal policy one can regroup the response in terms of measures supporting household incomes, and measures supporting firms. The latter aimed at preserving employment and preventing generalized bankruptcies, while the former cushioned incomes of vulnerable households. Formal workers were the main beneficiaries of programs for firm support, while informal ones were the target of income support through cash transfers. Many countries implemented both types of measures. Table 5 reproduces a list presented in the BIS Annual Economic Report (BIS 2020), mentioning different types of measures in a selected group of EMDEs.

This table summarizes fiscal packages that have been announced at the national level in response to COVID-19 pandemic.

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[6]Nominal ER devaluations imply a transfer of income from wage-earners to firms, either through rising imported input costs, or through higher prices of tradable goods.

Table 5. Elements of fiscal packages in EMDEs.

	EMDEs							
	Brazil (BR)	China (CN)	Indonesia (ID)	India (IN)	Korea (KR)	Mexico (MX)	Russia (RU)	South Africa (ZA)
Measures supporting households								
Targeted transfers[a]	*	*	*	*	*		*	*
Other labor income support[b]	*	*	*	*	*		*	*
Wage subsidies	*	*		*	*		*	*
Tax cuts		*	*	*	*		*	
Tax deferral			*	*	*			*
Measures supporting firms								
Tax deferral	*	*	*	*	*	*	*	*
Liquidity support[c]	*	*	*	*	*	*	*	*
Tax cuts	*	*	*	*	*		*	
Targeted transfers		*	*				*	*

Source: BIS Annual Economic Report June 2020. [a]includes cash and in kind-transfers to affected households; [b]includes extended unemployment and sick leave benefits; and [c]includes non-budgetary measures, such as equity injections, asset purchases, loans and debt assumptions or government guarantees and contingent liabilities.

Table 6. Selected central bank and prudential measures in EMDEs.

		EMDEs							
		BR	CH	ID	IN	KR	MX	TH[+]	ZA
Type of tool	Measures								
Interest rate	Policy rate cut	*	*	*	*	*	*	*	*
Lending/liquidity	Gen. liquidity provision[a]	*	*	*	*	*	*	*	*
	Specialised lending	*	*		*	*	*	*	
Asset purchases/sales	Government bonds			*	*	*		*	*
	Commercial paper					*			
	Corporate bonds					*		*	
	Other private securities[b]								
FX swap/intervention	USD swap line	*				*	*		
	FX intervention	*		*	*	*	*		
Prudential rules and regulations	Capital requirements	*	*	*	*	*	*		*
	Liquidity requirements	*	*	*	*	*	*	*	*
	Payout restrictions	*		*	*	*	*	*	*
	Market functioning[c]	*	*	*	*	*	*	*	*

Source: BIS Annual Economic Report June 2020 with [+] being Thailand. Also, [a]includes, for example, repo and reserve repo operations, standing facilities, modified discount window and lower reserve requirement ratio. [b]includes, for instance, asset and mortgage-backed securities, covered bonds, and exchange-traded funds. [c]includes, for example, short-selling bans and circuit breakers.

Nevertheless, the average size of fiscal packages in EMDEs was less than half the packages in advanced economies. Their size was negatively correlated with the pre-crisis sovereign yield, sovereign debt ratings, and with the change in credit default swaps spreads during the COVID-19 pandemic (Alberola et al. 2020). The external conditions weighted heavily in the fiscal space that countries had when dealing with the repercussions of the COVID-19 pandemic.

In terms of monetary policy measures, many countries were bounded by their institutional framework and monetary policy regime. For instance, inflation targeting regimes preclude the financial assistance from central banks to the Treasuries. However, at times of stress such as during the pandemic, many of these regulations and restrictions were lifted (Arslan, Drehmann, and Hofmann 2020). Table 6 shows the measures implemented by central banks, again drawing on the BIS Annual Economic Report 2020. All the countries in the list cut their interest rate and provided liquidity facilities for their financial systems. Other types of intervention varied from country to country.

It would seem, based on these results, that EMDEs had lax conditions to implement monetary packages and alleviate the financial constraints on fiscal policy. However, as Aguilar and Cantú (2020) show, the main explanatory variable for the conduct of monetary policy in EMDEs was

the eased financial conditions *after* the intervention of the Federal Reserve in international markets, providing global liquidity through different swaps agreements and facilities with numerous EMDEs' central banks. While central banks implemented liquidity programs one month after the outburst of the COVID-19 pandemic, the exchange rate in these countries had a strong depreciatory trend. It was only after the Federal Reserve stepped in that financial conditions in EMDEs eased and the exchange rate stabilized (Aguilar and Cantú 2020, 3–5). Then, central banks managed to reduce long-term interest rates in EMDEs and support fiscal policy, either directly or indirectly. In accordance with our model, the main anchor that helped to stabilize the impact on EMDEs was the easing in global risk perceptions abided by the intervention of the Federal Reserve.

However, fiscal packages were much smaller in EMDEs as compared to high-income countries (Alberola et al. 2020). Though many EMDEs show substantial increments in their public debt to GDP ratio (Aguilar and Cantú 2020, 5), most of this evolution is explained by the fall in GDP and the fall in tax revenues. Alberola et al. (2020) show that budgetary fiscal support in EMDEs were, on average, a quarter of the amounts in high-income countries as percentage of GDP. Funding measures (loans), in turn, represent a higher share of fiscal measures in EMDEs than in advanced economies. Though many EMDEs implemented income transfers, the duration of these measures is on average up to three months (Gentilini et al. 2020). However, a major characteristic of cash transfer implementation in EMDEs during the COVID-19 pandemic was not only the increase in measures, but also the increase in coverage. The rates of increase in coverage reached 8,684% in Myanmar (with new 21 million individuals included), 1,054% in Nigeria (9.3 million), 990% in the Congo Republic (0.4 million); 484% in Costa Rica (1.4 million). One can also mention the cases of Bolivia (322% increment with new 11 million included), Egypt (312%, 18.5 million), Colombia (285%, 13.2 million), Bangladesh (163%, 24.1 million) and Indonesia (111%, 83.2 million). Gentilini et al. (2020, 5) affirm that cash-based transfers have benefited 1.2 billion people, while if we include increased coverage of already existing programs, administrative adaptation measures and in-kind transfers, the number of beneficiaries rises to 1.7 billion. There were 179 new cash-transfer measures (58% of total cash transfer measures).

We can draw the following conclusions from of this summary, within the framework of the model that we developed:

- The external situation of EMDEs stabilized only after the intervention of the Federal Reserve through swap lines and liquidity provision. That ended the FX run that affected several EMDEs, as well as the decline in commodity prices, which reverted with the recovery in China and other Asian countries.
- With the stabilization of nominal ER, central banks in EMDEs provided widespread liquidity support for their financial system, broad access to credit for the non-financial private sector, and many implemented policies to curb the yields on domestic public debt, supporting the implementation of fiscal policy.
- Fiscal policy packages in EMDEs were much reduced (as a percentage of GDP) than in advanced economies. Countries with more restricted and expensive access to international financial markets had the smallest programs, in accordance with the more restricted policy regimes in our model.
- The heterogeneity in the labor force and the share of informal labor conditioned the type of fiscal support on EMDEs. The share of liquidity provisions to firms as percentage of total fiscal measures was higher than in advanced economies. However, most EMDEs (and several LICs) had to implement outright cash transfers and increase the coverage of social assistance programs because of the large share of the population that was excluded from formal channels (firms, banks, *et cetera*). A quarter of these measures, however, were implemented in a one-off time.

Final Thoughts

The COVID-19 pandemic was a major shock to advanced and EMDEs, but its impacts differed in both. When observing this from a BOPs angle, the main transmission channels came through the sudden, fast, and unprecedented capital flight; the fall in commodity prices; the fall in global demand; and the fall in remittances. This article developed a Keynesian open economy macroeconomic model to analyze the feedbacks between these contemporaneous shocks.

We also provide a framework to understand the policy space in EMDEs. These countries had significantly smaller fiscal packages in response to the shock of the COVID-19 pandemic. We argue that their external situation provides one explanation for this difference. Capital flight had a multiple impact through abrupt nominal ER depreciations, and stringent financing possibilities in the context of institutional frameworks (i.e., cyclically balanced fiscal rules and inflation targeting monetary regime) that constrain the policy space of EMDEs. The lack of an international lender of last resort that provides external finance adds to the institutional restrictions on the involvement of central banks in countries that adopted these fiscal and monetary regimes frameworks. EMDEs' governments are, therefore, coerced into reducing stimulus packages and withdraw this stimulus at the first sign of aggregate demand stabilization. Absent capital controls, the availability of international reserves becomes then the ultimate liquidity fund to cushion the external shock. Relief has to wait for external financial conditions to stabilize.

The intervention of the Federal Reserve in late March precisely proved this point. It provided dollar liquidity to international investors and to several central banks in EMDEs, through currency swaps and repos. These eased uncertainty and risk concerns in peripheral economies. Exchange rates stabilized and central banks in EMDEs were able to provide increased support to their financial system and fiscal policy, through intervention in domestic debt market and also through direct financing of government expenditure.

The COVID-19 pandemic shock called into question the restrictions on the intervention of central banks in public debt markets in EMDEs. Fiscal and monetary coordination is back on the table. The indispensable role of the central bank in stabilizing domestic financial markets requires the lifting of the restrictions on "monetary financing" and participation in public debt markets. Equally important is the design of a global mechanism that assures external finance in the direst situations when uncertainty and tightened risk perceptions ripple through the BOPs of subordinated and underdeveloped economies. Otherwise, external and domestic shocks will magnify and intensify, producing large and lasting economic contractions. Several EMDEs and LICs face external debt restrains, and an eventual second wave of COVID infections will require sustained external support for coping with its impact.

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