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External challenges to the economic expansion of emerging markets in the post-COVID 19 and post-COP26 era: A balance-of-payments constrained growth (BPCG) perspective

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Abstract:

The purpose of this study is to assess, from a Balance of Payment Constraint Growth (BPCG) theoretical perspective, current key challenges of developing countries that spring from two broad exogenous factors. These factors are: i) global shocks that affect the world economy, and ii) major economic policy changes in developed countries. The BPCG perspective helps to identify to what extent these challenges are rooted in the developing countries' vulnerabilities and structural weaknesses linked to their role in international trade and capital markets. To discuss the current uncertain global environment potential implications for developing economies – growing inflation, hawkish monetary policy, cross-border flows redistribution, as well as the geopolitical redefinition of international trade and global value chains, among others - the present work builds a BPCG model for the post-COVID era and applies it to evaluate challenges to growth in six countries: Chile, Colombia, Ghana, India, Mexico, and Turkey.

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1. Background: exogenous shocks and challenges for developing economies

The purpose of this study is to assess, from a BPCG theoretical perspective, today's key challenges of developing countries that spring from two broad exogenous factors. These factors are: i) global shocks that affect the world economy, and ii) major economic policy

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changes in developed countries. The BPCG perspective helps to identify to what extent these challenges are rooted in the developing countries' vulnerabilities and structural weaknesses linked to their role in international trade and capital markets.

Today, the world's economic and political orders are in turmoil, marked by high uncertainty. The pandemic that erupted in 2020 is not over. Asymmetries in policy spaces of developed and developing economies interact with macro-financial shocks with heterogeneous effects. Major economies enacted policy responses of unprecedented scale without the need to absorb external liabilities and are now beginning to unwind them. This change may trigger moderate pain in them but will have a major impact on balance-of-payments constrained (BPC) developing economies with large debt burdens. On top of that, the military invasion of Ukraine by Russia, plus the sanctions of the West on Russia, creates new obstacles to global expansion and stabilization.[1] The rise in energy costs is squeezing consumers' real income and pushing unit costs in the developed world, and the outbreak of new variants of the coronavirus delivers additional blows to international trade. Simultaneously with these shocks, household incomes are being squeezed and the business climate is becoming bleaker and bleaker, thus weakening investment all over (see Chowdhury and Sundaram, 2022). Adding to these complexities, climate change and global warming increasingly threaten social and economic life as we know it, imposing daunting challenges to policymakers.

The paper is organized in the following way. The next section presents a review of BPCG models that include capital flows and put forward a small theoretical model, built within this tradition, tailored to identify how certain financial and structural vulnerabilities of emerging economies condition the challenges presented by global shocks and policy changes in developed economies. In the third section, this analytical model is used for a comparative study of six selected BPC-economies to illustrate how key vulnerabilities – associated with their insertion in global markets or with their exposure to policy changes of developed economies – affect their growth path. The final section presents our conclusions. An appendix is included with statistical tables and additional figures.

2. Capital flows and the balance-of-payments constrained growth model

2.1. A brief and partial survey of the literature that considers capital flows

a) In the beginning

The canonical balance-of-payments constrained growth model (here referred to as the BPCG model) put forward by A.P. Thirlwall (1979) states that semi-industrialized economies face a binding external restriction on their long-term rate of expansion. This restriction is rooted in these economies' form of insertion in global, real, and financial, markets. In its basic version, the BPCG model states that an economy's foreign trade pattern, as reflected in the dynamism of its exports relative to its imports, sets a long-term upper boundary on the average annual rate of expansion of real GDP to avoid a critical balance-of-payments disequilibrium. Of utmost importance is that this upper bound is lower than the rate of expansion of GDP required

[1] As Stiglitz (2022) argues: "Putin's war in Ukraine is aggravating an already-worrisome increase in food and energy prices, with potentially severe ramifications for many developing countries and emerging markets, especially those whose debts have soared during the pandemic."

to, say, guarantee full employment of the labor force, given the economy's productive structure and pattern of fixed capital accumulation (see Singh, 1977).

In such a version, the BPCG model assumes that the long-term balance-of-payments equilibrium is defined as a zero commercial deficit. Given this assumption, the long-term rate of growth consistent with the BPC is given by the sum of, on the one hand, the rate of expansion of the world economy multiplied by the ratio of income-elasticities of exports and imports and, on the other hand, a weighted sum of price-elasticities of exports and imports. Capital flows are absent in this analysis, given the assumption that the economy is unable to maintain a persistent trade deficit, i.e., a persistent net inflow of foreign capital.

b) Introducing foreign capital flows: an initial approach

In practice, there are numerous examples of semi-industrialized economies that register trade deficits for long periods without detonating any type of balance-of-payments crisis, if the deficit does not significantly increase as a proportion of GDP. Motivated by these insights, McCombie and Thirlwall (1997) and Moreno-Brid (1998-99) introduced an extension of the BPCG model that allows for the possibility of a persistent trade deficit. Instead of the original assumption of a long-term zero trade balance ($X - M = 0$), they consider a long-term BP equilibrium defined in terms of a constant ratio of the trade deficit relative to GDP. Thus, they do allow for long-term foreign capital net inflows, i.e., by an accumulation of external debt.

Moreno-Brid (1998-99) could be summarized with four essential equations:

$$\dot{x} = \eta(\dot{p}_d - \dot{p}_f) + \pi\dot{z} \tag{1}$$

$$\dot{m} = \psi(\dot{p}_f - \dot{p}_d) + \xi\dot{y} \tag{2}$$

$$\dot{B} = 0 = (\gamma\dot{m} - (\gamma - 1)\dot{x} - \gamma(\dot{p}_d - \dot{p}_f)\text{-}\dot{y}) \tag{3}$$

$$\mu = \frac{\dot{p}_f m}{(\dot{p}_f m - \dot{p}_d x)} \tag{4}$$

Equations (1) and (2) are the conventional demand functions for exports and imports. Equation (3) defines the long-term balance-of-payments constraint – the constant trade deficit as a proportion of GDP, where such proportion is expressed by B. To facilitate the algebraic expressions, equation (4) is an identity that defines the proportion of imports relative to the trade deficit as μ. The solution of this model gives the following expression of $\dot{y}$, the long-term growth consistent with a trade deficit that is invariable as a proportion of GDP.

$$\dot{y} = \frac{[\mu\,(1+\psi+\eta)-\eta](\dot{p}_d - \dot{p}_f)}{\xi\mu - 1} + (\mu - 1)\frac{\pi\dot{z}}{\xi\mu - 1} \tag{5}$$

As in Thirlwall (1979), it can be reasonably assumed that the numerator is different from zero (see Moreno-Brid, 1998-99). In addition, given that θ is the initial ratio of the value of exports relative to imports (by assumption smaller than 1.0), then by construction:

$$\mu = \frac{1}{1-\theta}$$

$$\theta = \frac{p_d X}{p_f m}$$

Then equation (5) can also be expressed as:

$$\dot{y} = \frac{(1+\psi+\theta\eta)\ (\dot{p}_d - \dot{p}_f)}{\xi-(1-\theta)} + \theta\frac{\pi\dot{z}}{\xi-(1-\theta)} \quad (6)$$

According to equation (6), the balance-of-payments constrained growth rate $\dot{y}$ depends, inter alia, on the initial magnitude of the ratio of exports relative to imports.

c) Introducing foreign capital flows in the BPCG model: a brief survey of more sophisticated approaches

In recent years, efforts to incorporate international capital flows and debt sustainability into the BPCG model have led to more sophisticated approaches than the attempts of McCombie and Thirlwall (1997) and Moreno-Brid (1998-99). Reviewing them, we identified essentially three different perspectives: i) the internal/external imbalances approach, ii) the business cycles approach, and iii) the sustainability of the external debt approach.[2]

c.1) The internal/external imbalances view

The BPCG model traditionally assumes away the influence of other constraints rooted in internal imbalances, such as the budget deficit and public or private debt dynamics. To fill this gap, Soukiazis et al. (2012, 2014) put forward a theoretical model that introduces public finance's imbalances as a potential and additional restriction to long-term growth.

Their model is summarized in the following equations:[3]

$$\dot{m} = \pi_c\dot{c} + \pi_g\dot{g} + \pi_x\dot{x} + \pi_k\dot{k} + \delta_m(\dot{p^*} + \dot{e} - \dot{p}) \quad (7)$$

$$\dot{x} = \varepsilon_x\dot{y}^* + \delta_x(\dot{p^*} + \dot{e} - \dot{p}) \quad (8)$$

$$\dot{c} = \varepsilon_x\,\dot{y}_d \quad (9)$$

$$\dot{k} = \varepsilon_k\dot{y} + \varepsilon_k\dot{r} \quad (10)$$

$$G_n + iB_H + i^*B_Fe = tYP + D \quad (11)$$

$$\dot{g} = \frac{t\dot{y}}{w_G} + \left(\dot{d} - \dot{p}\right)\frac{w_D}{w_G} - \left[\Delta i + i\left(\dot{b}_H - \dot{p}\right)\right]\frac{w_{BH}}{w_G} - \left[(e\Delta i^* + i^*\Delta e) + i^*e(\dot{b}_F - \dot{p})\right]\frac{w_{BH}}{w_G} \quad (12)$$

$$XP + D_Fe - i^*B_Fe = MP^*e \quad (13)$$

Equations (7) and (8) are standard demand functions of imports and exports, but with the former capturing the individual influence of consumption, government spending, exports, and gross fixed capital formation. Equations (9) and (10) are simple expressions for consumption and investment demand; the former is determined mainly by disposable income and the latter by an accelerator mechanism and the real interest rate. Equations (11) and (12) introduce the government sector. Equation (11) introduces a fiscal constraint, and equation (12) presents the long-term growth of public spending in real terms considering the influence of the budget deficit as a proportion of GDP (w_D) and the government expenditure ratio (w_G). Equation (13)

[2] The purpose of this section is not to provide a comprehensive review of all relevant papers within the BPCG literature that account for capital flows but to identify, in our view, the most interesting approaches so far put forward.

[3] Where $\dot{x}, \dot{m}, \dot{p}, \dot{p^*}, \dot{y}, \dot{c}, \dot{g}, \dot{k}, \dot{r}, \dot{d}, \dot{b_H}, \dot{b_F}$ and $\dot{e}$ are the growth rates of exports, imports, domestic prices, foreign prices, domestic income, private consumption, government expenditures, investment, real interest rate, budget deficit, the public debt owned by home, foreign bond holders and nominal exchange rate, respectively. Additionally, w_D, w_B, w_M and w_X are, respectively, the ratios of budget deficit, public debt, imports, and exports on income. Finally, $(1-\xi)$ represents the percentage of public deficit financed by external markets.

introduces the condition of external equilibrium as reflected in the current account of the balance of payments. The left-hand side shows net external revenues as given by the sum of exports and non-resident acquisition of government bonds, minus net interest payments to foreign bondholders. On the right-hand side is the total imports.

Proceeding as in Soukiazis et al. (2014), the solution is the following expression:

$\dot{y} = \frac{A}{B}$, were

$$A = \left[\left(\varepsilon_x - \frac{w_M}{w_X}\left(\frac{P*e}{P}\right)\pi_x\varepsilon_x\right)\dot{y}^* + \left(\delta_x\left(1 - \frac{P*e}{P}\frac{w_M}{w_X}\pi_x\right) - \delta_m\frac{w_M}{w_X}\left(\frac{P*e}{P}\right)\right)(\dot{p}^* + \dot{e} - \dot{p}) + \left(\dot{p} - \frac{P*e}{P}\frac{w_M}{w_X}(\dot{p}^* + \dot{e})\right) + (1-\xi)\frac{w_D}{w_X}(\dot{p}^* - i^*) - (1-\xi)\frac{w_B}{w_X}(\Delta i^*) - \left(\frac{P*e}{P}\right)\frac{w_M}{w_X}\left\{\frac{(\Delta i - \Delta\dot{p})\xi w_B}{(1-t) + r\xi w_B}(\pi_c\varepsilon_c) + \pi_k\varepsilon_r(\Delta i - \Delta\dot{p}) + \pi_g\left[-\Delta i\frac{\xi w_B}{w_G} - \Delta i * e(1-\xi)\frac{w_B}{w_G}\right]\right\}\right]$$

and

$$B = \frac{w_M}{w_X}\left(\frac{P*e}{P}\right)\left\{\pi_x\varepsilon_x + \pi_k\varepsilon_k + \pi_g\left(\frac{t}{w_G} + \frac{w_D}{w_G} - \frac{i\xi w_B}{w_G} - i^*e(1-\xi)\frac{w_B}{w_G}\right)\right\} - (1-\xi)\frac{w_D}{w_X} \quad (14)$$

Though it is far from obvious, equation (14) states that the long-term growth rate of domestic income is determined by internal and external imbalances and key relative prices. Numerator A breaks down into several terms: the first one measures the impact of external demand on domestic growth; the second one reflects the substitution effect through the change in relative prices; the third one captures the trade volume effect, and the remaining terms account for the impact of domestic imbalances on growth. The denominator B essentially captures the effect of the import-elasticities of the demand components on domestic growth. In this way, Soukiazis et al. (2014) introduced the effect on long-term growth of the net inflow of foreign and domestic capital to buy government bonds and of the outstanding stock of public debt.

c.2) Integrating the business cycle in the BPCG model

Garcimartín et al. (2016) stand out by introducing a revised version of the BPCG model that allows for the influence of capital flows in the business cycle and distinguishes the effects in the short- and long-term rates of economic expansion, both constrained by the balance of payments. Their model essentially consists of the following equations[4]:

Long-term:

[4] Where X and M stand for export and import volumes; P and P^* represent the domestic and foreign price levels (in a common currency); Y^* and Y are world and domestic incomes; K denotes net capital inflows; Dx and Dm stand for short-run deviations for exports and imports; A and B are positive constants; $\eta < 0$ and $\gamma < 0$ are import and export price-elasticities; and $\pi > 0$ and $\varepsilon > 0$ are import and export income elasticities.

$$PX + T = MP^* \tag{15}$$

$$X = A\left(\frac{P}{P^*}\right)^{\gamma} Y^{*\varepsilon} \tag{16}$$

$$M = B\left(\frac{P^*}{P}\right)^{\eta} Y^{\pi} \tag{17}$$

$$\dot{y}_{lr} = \frac{\dot{z} + \varepsilon\dot{y}^*}{\pi} \tag{18}$$

Short-term:[5]

$$XPZ + K = MP^* \tag{19}$$

$$X = A\left(\frac{P}{P^*}\right)^{\gamma} Y^{*\varepsilon} e^{\varepsilon_2 K_r} D_x \tag{20}$$

$$M = B\left(\frac{P^*}{P}\right)^{\eta} Y^{\pi} e^{\pi_2 K_r} D_m \tag{21}$$

$$\dot{y}_{sr} = \frac{(s_x\dot{p} - \dot{p}^*) + (s_x\gamma + \eta)(\dot{p} - \dot{p}^*) + s_x\varepsilon\dot{y}^* + s_x\dot{d}_x + s_x\dot{z} + s_x\dot{k} + (s_x\varepsilon_2 - \pi_2)\dot{K}_r - \dot{d}_m}{\pi} \tag{22}$$

The first group of equations represents the long-term growth path of the economy, with equation (15) showing the balance-of-payments equilibrium, including unrequited transfers (T). Equations (16) and (17) are export and import functions which depend on relative prices and domestic or foreign income. Equation (18) gives the long-term rate of growth of the domestic economy constrained by the trade balance. This depends – in line with the BPCG tradition – on the dynamism of the "rest of the world", weighted by the ratio of the income elasticities of exports and imports and the rate of expansion of $Z = (PX + T) / PX$; this is a component that considers the evolution of transfers relative to exports.

The second group of equations represents the short-term growth path of the economy. Equation (19) sets the equilibrium condition of the balance of payments with the crucial characteristic that it allows for net capital inflows. Equations (20) and (21) are export and import functions, modified to allow for the possible direct impact of net capital inflows (K_r) as they expand the availability of foreign currency. Equation (22) represents the growth rate of the domestic economy consistent with the short-term constraint given by the trade balance and the inflow of foreign capital. The business cycle is captured by the difference between the short-term and long-term rates of growth of the domestic economy:

$$\dot{y}_{sr} - \dot{y}_{lr} = \frac{(s_x\dot{p} - \dot{p}^*) + (s_x\gamma + \eta)(\dot{p} - \dot{p}^*) + (s_x - 1)(\dot{z} + \varepsilon\dot{y}^*) + s_k\dot{k} - s_x\dot{d}_x - \dot{d}_m + (s_x\varepsilon_2 - \pi_2)\dot{K}_r}{\pi} \tag{23}$$

A key conclusion of the model is that variations in net capital inflows and trade shocks are the factors behind short-term deviations of the economy from its long-term growth path.

c.3) Long-term foreign debt sustainability approach

Another approach to the inclusion of capital flows within this theoretical perspective is that of Bhering et al. (2019), who do so by focusing on long-term debt sustainability. Their model is summarized by the following equations:

[5] Where K_r stands for net capital inflows in real terms $\left(K_r = \frac{K}{p^*}\right)$ and $s_x = \frac{PXZ}{PXZ+K}$; $s_k = \frac{K}{PXZ+K}$

$$BoP = X - M - R + F \tag{24}$$

$$F = M - X + R \tag{25}$$

$$D - D_{-1} = M - X + R \tag{26}$$

$$R = rD_{-1} \tag{27}$$

Equation (24) presents the balance of payments given by the sum of exports X, minus imports M, minus net income sent abroad R, plus net inflow of foreign capital F. Equation (25) sets the long-term equilibrium condition that net capital inflows must be equal to the current account deficit; in other words, there is no long-term net accumulation or depletion of foreign reserves. Equation (26) is the identity of the net accumulation of foreign debt, and equation (27) defines R as interest payments on outstanding external debt. In addition, foreign debt sustainability is defined in terms of the ratio of external debt to exports.

From equations (26) and (27), the current debt/exports ratio (d) is given by:[6]

$$d = \frac{M}{X} - 1 + \frac{1+r}{1+gx} d_{-1} \tag{28}$$

Introducing a maximum level of d given by, say, the view of international financial institutions, we have:

$$\frac{M}{X} = 1 + d_{max}\left(\frac{g_x - r}{1+gx}\right) \tag{29}$$

where d_{max} is the maximum value of d given by the limits to external debt financing set by international financial institutions:

$$d_{max}\left(\frac{g_x - r}{1+gx}\right) = b \tag{30}$$

where b is the proportion of imports to exports corresponding to the maximum level of indebtedness given by conditions of foreign credit restrictions. In this model, the long-term rate of BPC growth of domestic output is expressed as follows:

$$Y_{BP} = \frac{X(1+b)}{m} \tag{31}$$

A key result that emerges from the model is that long-term sustainable capital flows can positively affect output in the long term but will not have any effect on the growth rate compatible with the restriction of the balance of payments. Note that Bhering et al. (2019) take the debt/exports ratio as the relevant sustainability indicator, as they see exports as the source of cash flow in international currency to pay liabilities, in addition to introducing a foreign credit restriction.

2.2. A revised BPCG model for the post-COVID era

The evolution of BPCG models has been motivated by the need to address distinct aspects and circumstances that may alter the binding external constraints of developing economies. In this vein, we here put forward an additional version that, in our view, is tailored to capture pressing concerns of developing countries in the post-COVID global context. This version:

[6] Where g_x is the growth rate of exports.

i) Allows for net foreign capital inflows as a source of finance for a semi-industrialized economy's long-term current account deficit up to a given proportion k of GDP. As explained in the next point, such a 'given' proportion may be affected by changing circumstances such as global financial stress, changes in behavior of international investors, etc.
ii) Considers the possibility of sudden changes in international capital markets that may abruptly reduce the proportion k initially considered reasonable.
iii) Captures the impact of trade restrictions imposed by developed economies on semi-industrialized nations due to, *inter alia,* environmental cum labor considerations and policy decisions favoring in-sourcing key processes of global value chains.
iv) Considers the likely impact of free trade agreements (FTAs) on the dynamics of semi-industrialized economies in the face of adverse shocks in the global markets for goods and services.

Among the challenges that, in the current context, policymakers in emerging markets are already facing, we stress the following ones:

i) A reversal of QE and a persistent rise of interest rates by central banks in developed economies, thus exerting a contractionary impact on the cost of (domestic and external) finance in emerging markets and of their debt service,
ii) A premature return to fiscal austerity in selected countries, adversely impacting trade,
iii) Volatility in international short-term capital flows, marked by a "flight to quality", affecting finance for emerging markets and their exchange rates,
iv) Supply constraints on key global value chains that slow down international trade.

a) An algebraic formulation of the BPCG model for the post-COVID era[7]

We put forward a simple expression of the balance-of-payments constraint in equation 32, defined in terms of the maximum current account deficit – as a given proportion k of GDP – perceived by international capital markets that can be financed in the medium and long run without risking the sustainability of the foreign debt trajectory. The left-hand side of the equation is a simple version of the current account deficit measured in a common currency, tell US dollars.

$$\frac{(E)(M)}{Y} + \frac{(i)(E)(D^*)}{Y} - \frac{(E)(X)}{Y} \leq k \tag{32}$$

The notation is as follows: M, total imports of goods and services in US dollars; Y, GDP measured in units of local currency; E, nominal exchange rate defined as units of local currency per US dollar; D^*, total stock of outstanding external debt measured in US dollars; X, total exports of goods and services, also in US dollars; and k as defined above. If we assume that the interest rate i paid on the nation's outstanding stock of foreign debt is a function of the US-reference interest rate j^* plus a risk premium w, specific to the country, we have:

$$i = j^* + w \tag{33}$$

Introducing this expression in (32) gives us:

[7] In this parsimonious expression of the BP-constraint, net income from abroad (secondary and primary) is assumed to be composed of only net interest payments abroad. For some countries it is relevant to extend it to cover unrequited transfers or net profits remitted abroad.

$$\frac{(E)(M)}{Y} + \frac{(j^*+w)\,(E)(D^*)}{Y} - \frac{(E)(X)}{Y} \quad \leq k \tag{34}$$

Expression (34) does not consider external debt repayments. To account for this concern, one could add an additional term in the left-hand side that captures the requirement that a proportion, say f , of the outstanding stock of foreign debt ($(E)(D^*)$) must *a fortiori* be repaid in the period of analysis. As a result, one can assume that k is set by the consolidated aggregate of the current account deficit plus debt repayment obligations. With this twist, the BPC-constraint can be modified as follows:[8]

$$\frac{(E)(M)}{Y} + \frac{(j^*+w+f)\,(E)(D^*)}{Y} - \frac{(E)(X)}{Y} \quad \leq k \tag{35}$$

The magnitude of k for an individual country is historically contingent on many factors, exogenous and endogenous. Among them are the dynamism (or lack thereof) of the world's productive activity and trade, the degree of uncertainty of financial markets, the appraisal by credit-rating agencies and by international capital markets of the BPC country's debt-repayment and absorption capacities, its macroeconomic fundamentals, and social and political considerations. Clearly k is not a perennial constant, neither timewise nor cross-country wise. It can be swiftly, acutely altered by global shocks or by key changes in developed countries' economic policies that affect the world's liquidity, and by changing perceptions of international investors about both 'risk' and 'sustainability'.

Decomposing nominal values in prices and real values and substituting in (35):

$Y = y * P_y$

where y = GDP at constant prices with P_y its deflator in local currency

$X = (x)(E)(P_x)$

where x = exports in real terms, with P_x its deflator in US dollars

$M = (m)(E)(P_m)$

where m = imports in real terms with P_m its deflator in US dollars

$$\frac{(m)(E)(P_m)}{(y)(P_y)} + \frac{(j^*+w+f)\,(E)(D^*)}{(y)(P_y)} - \frac{(x)(E)(P_x)}{(y)(P_y)} \leq k \tag{36}$$

To simplify expression (36), define the import's share of real GDP $\left(\frac{m}{y}\right)$ *as* m_0 and the outstanding stock of external debt as a proportion of nominal GDP in local currency as d:

$$d = \frac{(E^*)(D^*)}{(y)(P_y)} \tag{37}$$

Define the ratio of the prices of imports ($E * P_m$) relative to the price deflator of GDP (P_y) as P_{my}; and the ratio of the prices of exports ($E * P_x$) relative to P_y as P_{xy}.

[8] As Rhodes and Lipsky (2022), among others, have argued, the response to the SARS-COVID shock left many developing countries in vulnerable situations regarding their foreign debt repayment capacities, and the "[…] events in Ukraine have made the prospect of a new sovereign debt crisis both more imminent and more damaging". As stressed by Gallagher and Kozul-Wright (2022), among others, the mechanisms to deal with sovereign debt stresses are grossly inadequate and in urgent need of replacement.

$$\frac{(E)(P_m)}{P_y} = P_{my} \tag{38}$$

$$\frac{(E)(P_x)}{P_y} = P_{xy} \tag{39}$$

Substituting equations (37), (38) and (39) in equation (36) gives a simpler expression of the BP constraint:

$$(m_0)(P_{my}) + (j^* + w + f)(d) - k \leq P_{xy}\left(\frac{x}{y}\right) \tag{40}$$

We assume that, if inequality (40) is satisfied, the economy's growth path will not be derailed by any balance-of-payments – for lack of a better word – disequilibrium. What happens if it is not satisfied? Then, we assume, a balance-of-payments crisis will ensue, marked by massive short-term capital outflows, the depletion of international reserves, a sharp rise in the country's risk premium, and a contraction of economic activity.

For simplification purposes, we adopt the following assumptions:

i) Real imports are constant as a share of GDP in both periods, i.e., m_0 remains unaltered.[9]
ii) The exchange rate management policy is such that the currency will nominally depreciate between t_0 and t_1 in the exact percentage necessary to fully compensate any increase in domestic prices (as measured by the GDP deflator, P_y). For example, if, from t_0 to t_1, P_y increases by 2%, then the nominal exchange rate will depreciate by exactly 2%, so that the ratio E / P_y does not alter in the period. Further analysis can easily explore in this model the effects of introducing a nominal exchange rate depreciation larger or smaller than domestic inflation.[10]
iii) The coefficient k is constant.
iv) The interest rate of reference in the world market j^*, the country's risk premium w, and the percentage f of external debt D^* that must be repaid all remain constant.

The assumption on nominal exchange rate policy implies that any variation of the prices of traded goods vis-a-vis the GDP deflator (in our notation P_{my} and P_{xy}) will exactly match the variation of prices of imports (P_m) and of exports (P_x) in US dollars, because the ratio E / P_y remains always constant in t_0 and in t_1. Such an exchange rate policy also implies that the foreign debt to GDP ratio d will vary between periods t_0 and t_1, if and only if, the stock of outstanding foreign debt valued in US dollars varies.

When the inequality is met, we assume the economy won't be derailed by balance-of-payments crises. To introduce comparative statics, we consider two periods t_0, t_1 and denominate g_y, g_x , g_{pmy}, g_{pxy}, g_{pm}, g_{px} and g_{py} as the corresponding rates of growth of real GDP (y), real exports (x), and of the price deflator of imports relative to GDP (P_{my}), of the price deflator of exports relative to GDP P_{xy}, and of the price deflators of imports (P_m), exports (P_x) and GDP (P_y).

Any variable, say y, in t_1 is expressed as y_{t_1}:

$$y_{t_1} = y_{t_o}(1 + g_y) \tag{41}$$

Based on this notation, the dynamic expression of equation (40) is the following:

[9] As Thirlwall suggested in a previous version of the paper, one could assume that $m_0 = 1.0$.
[10] Following Thirlwall (2011), we assume PPP holds, and that trade does not react to price changes.

$$(m_0)(P_{m_0})(1 + g_{Pm}) + (j^* + w + f)(d) - k \leq \frac{P_{x_0}(1 + g_{P_x})x_o(1 + g_x)}{y_o(1 + g_y)} \quad (42)$$

Equation (42) is the crux of the analytical model in this comparative statics version. It identifies key potential sources of turmoil in the growth path of emerging economies in the current global context rooted in vulnerabilities that – for them – make the balance of payments a binding constraint. In equation (42) it is evident that any shock that pushes up the value of the aggregate total of the left-hand side increases the probability of hitting hard against the BP constraint (i.e., of violating the binding inequality), unless such increase is compensated for by a favorable movement in the right-hand side (RHS) of the equation, namely by: i) a more rapid rise in the prices of the developing country's exports, or ii) a stronger expansion of exports in real terms. If neither of these occur, the only way in which the inequality will be satisfied is by a contraction in the rate of expansion of real GDP; in arithmetical terms, by a decrease in the denominator of the RHS of the equation. Another option, not here explored in the model, is to allow for a reduction in the share of imports relative to real GDP.

Expression (42) serves to highlight the main channels through which BPC economies may have their growth trajectories severely derailed by global shocks or by changes in the key policies of developed nations. These are, in our view, the following:

i) A sudden and drastic slowdown in the rate of growth of exports (g_x) if global activity and trade lose impetus. The specific extent to which a BPC economy's sales abroad decline depends on the specific basket of exports of goods and services as well as on the geographical composition of their main markets of destination. These two factors condition, too, the extent to which exports may be constrained by the introduction of environmental restrictions on certain products and commodities or of protectionist measures to favor *insourcing* of selected intermediate inputs and final products due to industrial policies or geopolitical considerations.

ii) Sudden and drastic changes in prices of the developing country's exports or imports in international markets (P_x and P_m). The current global context of high inflation has a very heterogeneous impact between and within developing countries, depending on the effects of their terms-of-trade.

iii) Increases in the benchmark interest rate (j^*) in the developed world, the implementation of contractionary monetary policies, and termination of QE.

iv) Higher country risk premiums (w) in developing countries, due to specific national/regional characteristics or shocks detonating a "flight to quality".

v) The excessive burden of foreign debt repayment, i.e., a rise in the coefficient f in the period of analysis may push the country to insolvency when its access to international credit is tightly rationed.

vi) A deterioration in the world financial markets' perception of the developing country's macroeconomic strengths and the likelihood of external debt repayment may make the balance-of-payments constraint painfully binding, suddenly slashing k. A major deterioration of "animal spirits" may push k to negative terrain; in other words, a net outflow of capital of the country is expected for it to pay back debt.

vii) Variations of the nominal exchange rate, for example a depreciation between period t_0 and t_1 over and above the increase in domestic prices. Indeed, in such a case, the sum of the current account deficit plus external debt repayments will increase as a share of nominal GDP measured in a common currency. This increase may be high enough so that the key inequality is violated (i.e., its LHS $> k$) and it may trigger a balance-of-payments crisis.

Though not here analyzed, exchange rate variations in response to global shocks or developed countries' policy changes may affect BPC economies through their impact on balance sheets and flows-of-funds of the household sector, the business sector, the public sector, and state-owned enterprises. Currency mismatches in the asset and debit sides of these sectors make them vulnerable to jumps in the exchange rate.

Equation (42) summarizes the model, framed in the context of the BPCG analytical perspective, that we here use to identify key vulnerabilities that developing countries currently face, rooted in their form of insertion in global trade and financial markets. We stress that this equation is an inequality; thus, it is not a specification of an equilibrium condition with unique solutions. For any BPC economy and given k, there are many combinations of the evolution of its foreign commerce, debt repayments, terms of trade, exchange rate and growth rates that meet this inequality. In brief, it is less an analytical base for econometric projections of the effects of adverse external shocks than an accounting cum theoretical framework to identify how key vulnerabilities of developing economies condition how the balance of payments restricts their long-term expansion.

3. Exogenous shocks and current challenges of developing countries constrained in their growth by the balance of payments: a comparative study of selected countries

In this section, we apply the analytical model, presented above, to identify challenges to BPC countries' growth due to global shocks or policy changes in developed countries.

3.1. Selection of countries

We chose six countries: Chile, Colombia, Ghana, India, Mexico, and Turkey. All are balance-of-payments constrained but differ to various extents in their financial vulnerabilities and in their structural weaknesses linked to their role in world markets. Thus, though they face common exogenous challenges, the channels of transmission, scale and scope of their impacts are not homogeneous, neither their policy spaces and ability to respond to external shocks. We now describe the current international context of commercial and financial markets and changes in key policies of the West affecting developing economies.

3.2. The complex global context

The pandemic and its effects are not over; many economies are still implementing lock-down measures and restricting trade and activity. On top of this, we have the disruption of key commercial and financial markets because of Russia's invasion of Ukraine, with an increasing danger of escalation. In addition, developed countries' reversal of monetary policies – to try to reduce inflation – has resulted in an acute hike of interest rates globally. At the time of writing, the combination of supply chains disruption, energy costs and commodity price increases – worsened by the shocks brought by the Ukrainian war – have pushed global inflation close to two digits. The Federal Reserve has opted for four consecutive 0.75 percentage point increases to its benchmark policy rate. Similar interest rate hikes have been implemented in most

developed economies, inducing similar responses by central banks in emerging economies, to avoid major exchange-rate depreciation and capital outflow.

The significance for the developing world of such an about-face in the US monetary policy can't be overemphasized. It will impact US aggregate demand, push financial costs globally, and attract capital flows away from the developing world, while simultaneously pushing their domestic costs of borrowing, pressuring their exchange rates, and slowing down their economic expansion. Making "cheap money" history, destabilizing capital, and currency markets, and bringing about a global deflation will shock numerous BPC economies. The advanced economies' increasing imposition of trade protectionist measures on a wide range of imports on the grounds of enforcing climate change mitigation actions as well as industrial policies aimed at in-sourcing links of key global value chains may also weaken BPC economies. The impact on each of them will depend on their trade and productive structures, domestic linkages, and sources of foreign exchange revenue.

3.3. Current challenges of six selected BPC developing nations

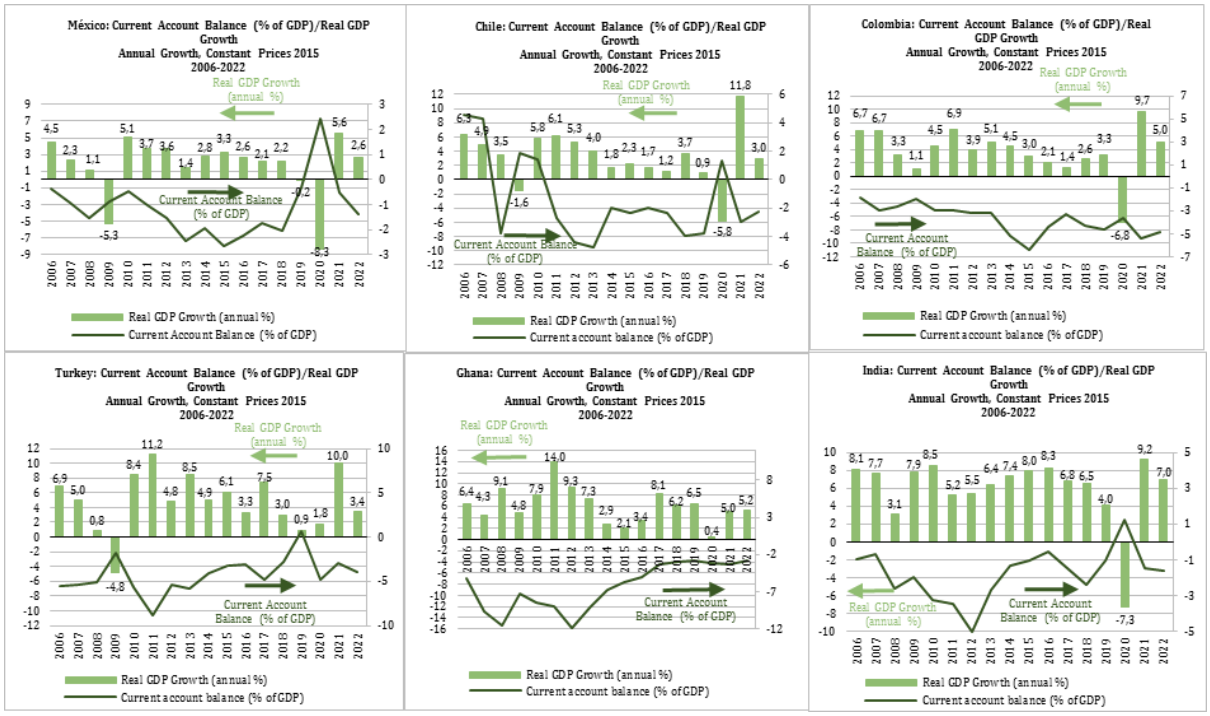
a) The balance-of-payments constraint: stylized facts and vulnerabilities

One conspicuous stylized fact of BPC economies is that their periods of high, sustained expansion of activity – their booms – are short-lived and accompanied by an increasing current account deficit as a proportion of GDP. Such booms are usually triggered by major improvements in their terms of trade and, when they deteriorate, a bust ensues with ballooning current account deficit, massive capital flight, loss of reserves, a collapse of economic activity and, sometimes, a debt moratorium or default. Another stylized fact of these nations is that they are, so to speak, stuck in traps of slow growth to keep their trajectories of foreign indebtedness on sustainable paths.

Figure 1 illustrates, for the six countries here selected, the evolution of the current account of the balance of payments – as a proportion of GDP – and the average annual rate of expansion of real GDP in 2006-2022.

During these 16 years, in the six cases examined, the current account was mostly in deficit. There were few exceptions for each country: 2020 in Mexico; 2006-07, 2009-10 and 2020 in Chile; 2019 in Turkey; and 2020 in India. The surplus for 2020 for Mexico, Chile, and India is explained by massive contractions of economic activity brought about by the pandemic: –8.1% in Mexico, –5.8% in Chile, and –7.3% in India. Colombia's current account in 2020, notwithstanding the 6.8% reduction of real GPD, was in deficit. That year, despite the pandemic, Ghana's and Turkey's real GDP expanded, albeit at a much more moderate pace than before. Turkey's current account surplus of less than 1% of GDP in 2019 is associated with the persistent slowdown that began early in the decade. Chile's performance in 2006-07 and in 2010 introduces the only discrepant note in the pattern of these nations where the current account is in surplus only in years of a contraction of GDP or of a significant slow-down of its expansion. Chile's results for 2006-07 are related to the nation's ability to profit from the 2003-08 commodity boom.

Figure 1 – *Economic growth and current account balance: selected countries, 2006-2022*



Note: Data for 2022 are estimates from the Economist Intelligence Unit dated February 2022.
Source: Authors' calculations based on data from the World Bank Group (2022).

It is worth noting the similarity of the three Latin American countries in the association, from a long-term perspective, between their current account and the pace of their economic expansion. Indeed, in the three cases, figure 1 depicts similar business cycles: 2006-09, 2010-20, and 2021 onwards. The first two periods are marked by slowdowns that culminate in an acute, short-lived contraction. These two contractions, in the three cases, were not caused by internal imbalances but by external shocks whose adverse impacts could not be fully canceled by stabilization policies. The recession of 2009 was brought about by the international financial crisis originated in the United States. That of 2020 was the result of the pandemic and its disruptive impact on the world economy. In the period here analyzed, the current accounts of these three nations show a long-term deterioration, though with some differences between them. In Mexico, the deficit is, in general, smaller – between 1% and 3% of GDP – than in Chile and Colombia – between 2% and 6% of GDP. This difference may be partially due to the fact that, in this period, the Mexican economy expanded, on average, at a slower pace than those of Chile and Columbia.

Turning our attention to the other cases, Turkey's growth path follows a cyclical behavior similar to that of the Latin American economies, with a downswing in 2006-09, a swift recovery in 2010-11 and a lost momentum from then onwards. It is now immersed in a trap of slow growth. Ghana's and India's trajectories do not show similar fluctuations and their activity was not heavily affected by the financial crisis of 2009. Indeed, that year, Ghana's GDP expanded by 4.8% – though at a rate four percentage points slower than in 2008 – and soon rebounded at annual rates above 7%. In 2009, India's real GDP expanded by 7.9%, doubling the rate of the previous twelve months. The pandemic hit both nations hard. Ghana's GDP, from expanding by

6.5% in 2019, grew by only 0.4% in 2020, while India's went from 4% in 2019 to –7.3% in 2020. Neither Ghana nor India shows any sign of a long-term slowdown. The Ghanaian economy was very dynamic from 2006 to 2011-12 and, though it slowed down in 2014-16, soon regained speed, registering annual expansions of 6%-8%. India's economy grew at high annual rates, between 5% and 9%, during practically the whole period.

In the non-Latin American cases, the current account deficit increased as a proportion of GDP from 2006 to 2012, a trend subsequently reversed. Note that India, in the last ten years, combined fast expansion with a three-point reduction of such a deficit relative to GDP. If this pattern is sustained, it may be due to a transformation of the country's productive structure that is alleviating its balance-of-payments constraint. This is strikingly different from Mexico, Chile and Colombia, whose current account deficits widened, notwithstanding their loss of economic impulse.

b) More on long-term economic growth in BPC economies

As Ajit Singh stated, a country is balance-of-payments constrained if the minimum long-term rate of growth of its GDP needed to absorb its increasing labor supply is associated with an unsustainable current account deficit.[11] In this light, the six economies here considered are thus constrained, as evidenced in their labor markets, which are plagued by informality, underemployment, and precarious earnings of a vast proportion of workers; all in all, this leads to unacceptable levels of poverty. Certainly, institutional factors, like ineffective regulations on labor rights and the role of trade unions, also contribute to such poor labor performance. To illustrate the comparative growth paths of the six nations, figure 2 depicts the evolution of their real GDP, in logarithms and long-term trends.

Clearly the Latin American economies expanded at a slower pace than their counterparts and registered a slowdown in the last four or five years. The other three economies showed no loss of stimulus pre-pandemic, and their contraction in 2020 was less harsh.

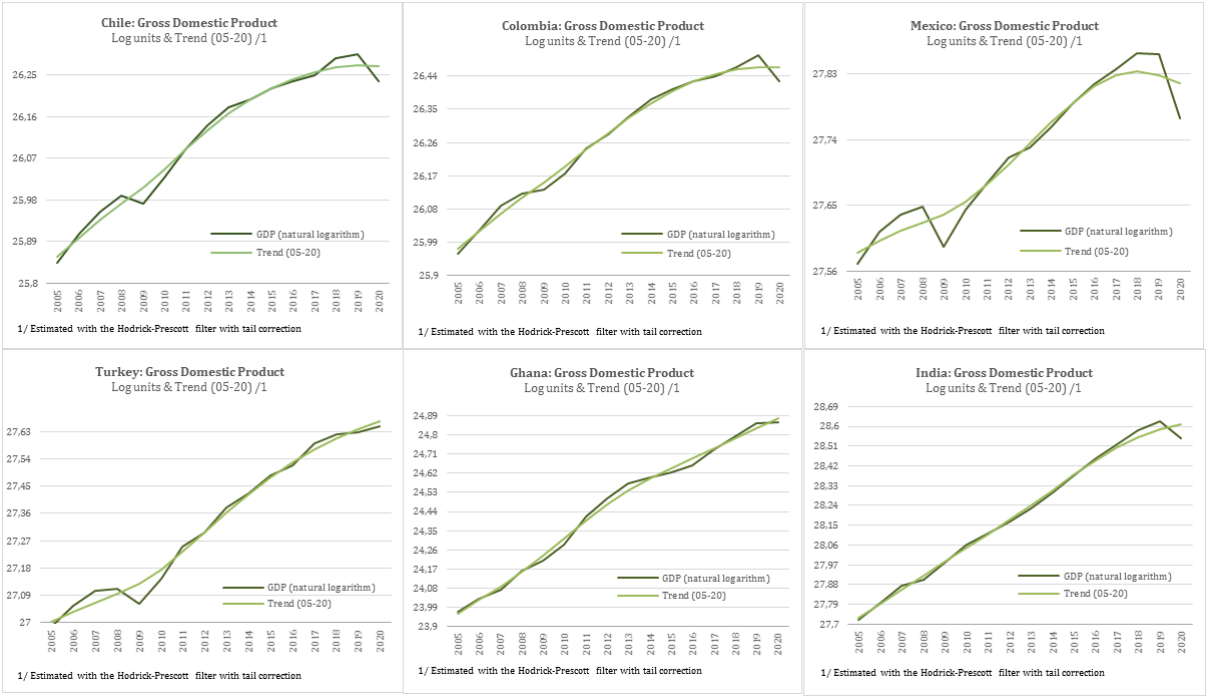
The previous analysis leads to some conclusions regarding the challenges faced by BPC economies. The first one is that the impact of global shocks on developing countries is not necessarily uniform. It depends on i) origin, intensity, and duration, ii) channels of transmission, iii) structural characteristics of the developing country's insertion in global markets, including – in BPC's terminology – the income and price elasticities of its foreign trade, and iv) the balance sheet vulnerability of the economy's private and public sectors; in particular, the currency mismatch of their assets and liabilities.

A second conclusion is that global shocks and major changes in policies of the industrialized world impact BPC economies, independently of whether they have so-called sound macro fundamentals, as reflected in low inflation and minimum fiscal deficit. Such fundamentals may serve, to a certain extent, to potentially widen the policy space to enact countercyclical strategies. Whether such, *a priori,* potentially easier access to financial support becomes, *a posteriori,* a reality is uncertain. Global shocks, by definition, simultaneously affect numerous developing nations, putting a vast majority in urgent need of massive emergency funding, and international financial agencies may not be able to respond as required. Moreover,

[11] See Singh (1977). Another way in which the balance of payments constrains the growth potential of developing economies is through the crucial dependence of their fixed capital formation on imported equipment. Upswings are accompanied by acutely rising imports of capital goods and a deterioration of the current account, which risks a sudden reduction of the k ratio identified in our analytical model, thus pressuring the stock of international reserves and foreign debt accumulation.

there are so-called contagion effects that affect the perception of capital markets of economies in the same region. Thus, BPC economies, with or without strong macro fundamentals, face restrictions in their access to emergency funds.

Figure 2 – *Real gross domestic product: selected countries 2006-2020*



Note: Estimated with moving averages.
Source: Authors' own calculations based on data from the World Bank Group (2022).

The current outlook looks grim for developing nations. The war in Ukraine, potential new waves of COVID-19, and the developed economies' shift towards monetary contraction and a premature return of fiscal austerity create strong headwinds. The appreciation of the dollar, combined with high interest rates, attracts capital funds and FDI to the North and pressures developing nations' foreign reserves and debt sustainability. Rising uncertainty and borrowing costs weaken investment, further complicating the panorama. All in all, tightening the BP constraint on developing countries, especially those that borrowed heavily in foreign currency, puts them in especially dire straits. For many it may prove difficult, or outright impossible, to meet their debt repayment obligations in the new scenario of tight monetary policies and recession. Current account trajectories cum, albeit moderate, economic recoveries that appeared sound can be abruptly derailed in the new context as debt-repayment obligations dwarf inflows of fresh funds and stress central banks' foreign reserves. If such a situation prevails, the global financial architecture may be under extreme duress, a dramatic proof that its upheaval is long overdue.[12]

[12] Gallagher and Kozul-Wright (2022) convincingly argue for deep reforms on the governance of global money, finance, and trade.

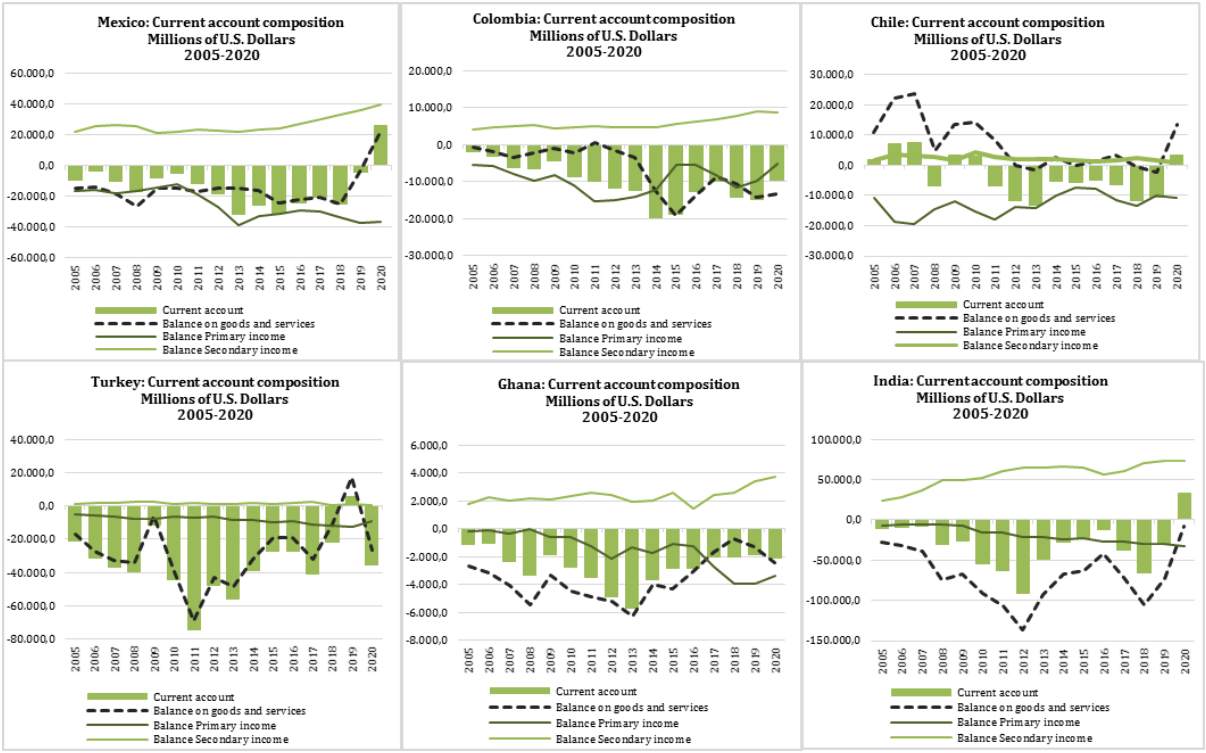
A third conclusion is that the BP constraint on developing economies has regional and historical determinants that help explain certain common traits of Mexico, Colombia, and Chile in matters of growth and trade performance. An admittedly superficial examination suggests that the challenge of the Latin American nations here analyzed in their quests to finance development is more daunting than Ghana's or India's. They are immersed in a growth slowdown and in need of substantial foreign finance to merely maintain a moderate pace, not to mention giving it a dynamic impulse.

A fourth conclusion is that the adverse global shocks in the period analyzed had major impacts on these economies, slowing them down and sometimes pushing them into deep recessions. Their fast rebounds were, to a great extent, due to the prompt implementation of massive countercyclical monetary and fiscal responses of the developed world. The same factors that cause the vulnerability of BPC economies to adverse global shocks explain their positive response to the West's expansionary policies.[13]

c) Current account composition: trade balance, primary and secondary income

The BPC analytical perspective originally focused on the trade balance. This approach was wanting for some developing nations where foreign remittances or, say, foreign interest is important. Figure 3 illustrates the evolution of the current account and its three components: the balances of trade, primary income, and secondary income.[14]

Figure 3 – *Current account composition: selected countries, 2005-2020 (millions of US dollars)*



Source: Authors' calculations based on data from the IMF Balance of Payments Statistics (2022).

[13] US macroeconomic policies in the early 1980s were instrumental in pushing Latin America into a deep recession, inaugurating "the lost decade" in its development.

[14] For the definitions of primary and secondary income in balance-of-payments, see IMF (2009).

In the six economies, the trade balance is the dominant component of the evolution of the current account. Secondary income, mainly composed of family remittances, is systematically in surplus, reaching important magnitudes in Mexico, Colombia, Ghana, and India. In Chile and Turkey, they are negligible. On the other hand, the net primary income – interest payments, profit transfers, inter alia – is always in deficit. In Turkey, India, and Ghana (up to 2017), its magnitude is not large relative to the current account deficit. But in Mexico and Chile for the whole period, and in Colombia (up until 2014), the deficit in primary income is larger than the overall current account net result.

An issue whose causes need to be explored is why non-Latin American countries' deficit in primary income shows, in general, a smooth, moderate increase all along the period of study. But in Mexico, Chile, and Colombia the pattern is very different. In fact, Mexico's deficit was rather constant during 2005-11, rapidly expanded the following two years, and then stabilized onwards around US $35 billion. Colombia's deficit increased rather quickly during 2005-11; it then declined until 2016 and subsequently fluctuated around $7.5 US billion. Chile's figures show a persistent reduction until 2015, when it subsequently stabilized at around US $12 billion.

The evolution of the current account of these six nations allows us to derive some very tentative conclusions on some of their vulnerabilities and strengths related to their insertion in the global markets. The first one is that, where outward migration has been a safety valve for the labor market, net flows of secondary income – mainly family remittances – may become an important source of foreign exchange that can be relevant as a countercyclical source to partly alleviate adverse impacts of external shocks. This was the case in 2009 in all six nations, as well as in 2020. Moreover, their impact multiplies considerably when measured in domestic currency, given the substantial exchange rate depreciation that accompanies macroeconomic stabilization packages. To the extent that recipient families tend to be poor, remittances have a relevant socioeconomic role in such hard times.

Another conclusion relates to the fact that the primary income is typically a drain on BPC economies' foreign exchange. As the experience of Mexico, Colombia, Chile, and Ghana shows, such net outflows can fluctuate sharply. In times of adverse shocks, the deficit on this account may acutely increase as borrowing costs rise and short-term capital – if not subject to effective controls – may abruptly leave to seek safer havens in developed economies. Such episodes may abruptly detonate a balance-of-payments crisis and turn booms into busts. Note too that major exchange rate depreciation may put extraordinary stress on the flows-of-funds and balance sheets of local governments, SOE, and private firms' sectors. In some cases, it may threaten the solvency of some economic or financial agents.

The persistent deficit in primary income reflects other financial vulnerabilities of these six economies. It reflects an important presence of foreign and transnational conglomerates that invest in developing countries (inward FDI), way over and above the outward FDI carried out by these nations. Net FDI has a short-term favorable impact that alleviates the balance-of-payments constraint but creates long-term unfavorable pressures via profit remittances. As the BPC literature argues, relying on external financial resources is ineludible in these nations in the face of their perennial quest of high economic growth without pushing their external indebtedness on an explosive path.

Indeed, global shocks may abruptly collapse an economy's export markets, deteriorate its terms of trade, and push it to default on its foreign debt obligations trajectory. A balance-of-payments cum debt crisis may suddenly crash an economy that recently seemed perfectly sound. Similar effects may occur due to changes in developed countries' policies that tighten global liquidity conditions, increase borrowing costs worldwide, and deteriorate the risk perception by credit-rating agencies. As an illustration, table 1 presents three indicators of the foreign debt track record for five countries in our sample.[15]

Table 1 – *Debt service, selected indicators: selected countries, 2006-2022*

i) Debt service to exports (%)						
	2010	**2016**	**2017**	**2018**	**2019**	**2020**
México	10	19	15	12	12	16
Colombia	20	33	41	40	32	50
Ghana	3	9	10	12	8	12
India	7	17	10	11	9	15
Turkey	37	37	38	35	34	41
ii) External debt stocks to exports (%)						
	2010	**2016**	**2017**	**2018**	**2019**	**2020**
México	76	104	99	92	93	105
Colombia	133	253	230	218	233	357
Ghana	88	119	108	101	102	137
India	81	102	101	93	99	111
Turkey	185	200	201	183	175	207
iii) External debt stocks to GNI (%)						
	2010	**2016**	**2017**	**2018**	**2019**	**2020**
México	24	40	39	38	38	45
Colombia	23	43	41	41	44	58
Ghana	26	39	39	36	41	44
India	18	20	20	19	20	22
Turkey	39	48	54	58	59	61

Source: Author's own calculations based on data from the World Bank Group (2022).

Note that the indicators – debt service to exports, external debt to exports, and external debt stock to gross national income – deteriorated in 2020, actually due to the combined result of: i) the reduction of the denominators (exports and GNI), ii) the depreciation of the exchange

[15] The source did not register data for 2021, and there is no information for Chile.

rate, and iii) the increase in the stock of foreign debt to fund countercyclical reactions. The deterioration in 2020 of the first indicator in Mexico, Ghana and India brought it to levels seen three or four years before. In Colombia and Turkey, such figures had not been seen in more than a decade. Similar is the evolution of the third indicator – debt to gross national income – in all five countries; its ratios for 2020 are unchanged in the whole decade.

We stress too that debt ratios that are considered satisfactory for one country by the financial community may be totally out of bounds for another country. These differences, within the restricted sample we have, do not seem to have a strong regional determinant. For example, Colombia's first and second indicators of foreign debt are three times higher than Mexico's. In any case, the information suggests that the developing world's financial vulnerabilities have increased in recent years, and, with them, the risks and challenges posed by current global shocks.

d) Exports and imports of goods and services

Having explored these countries' current accounts, we move to analyze the evolution of their external trade. Figure 4 shows the changing shares of exports and imports relative to GDP, based on data at constant prices, for 2005-20.[16] For the vast part of the period in the six cases, the share of exports in GDP was lower than the share of imports. In the case of Mexico, one of the semi-industrialized economies most open to international commerce, imports and exports increased practically every year as a proportion of GDP except for 2009 and 2020.

In this process, the share of imports climbed steadily from 32% of GDP in 2005 to its peak of 39% in 2018, and then fell to 37% in 2020. The share of exports increased from 27% of GDP in 2005 to 38% in 2020; thus, a trade deficit (in real terms) has become the norm.

In Colombia and Chile, the share of exports of GDP declined systematically; in the former case from 36% to 29%, in the latter from 27% to 23%. The impact of the 2009 and 2020 global shocks was reflected in a reduction in the share of imports of GDP in both countries. The response of exports in these two episodes does not show a systematic pattern. In Chile, in 2009, the share of GDP continued in the declining trend recorded since 2007. In 2020 it increased by one percentage point, to reach a level slightly over and above that of imports, thus registering a surplus in real terms for the first time in a decade.

The trade pattern of the other economies also shows a decline in 2009 of the shares of imports of GDP; this also happened in 2019 in Turkey and Ghana and in 2020 in India. Their trajectories are far from homogeneous. In Turkey they follow a declining trend, with fluctuations. In Ghana the import's share climbed nearly 20 points between 2005 and 2011 to reach 50% of GDP, but it subsequently fell and stabilized around 40%. Its export share steadily increased but never topped the share of imports. In India, both shares increased from 2005 to 2009-10 and then declined to reach the same levels registered at the beginning of the period. To complement this analysis, Table 2 reports, for each country, the average annual rates of growth of GDP, exports, and imports in real terms for 2006-2019.

[16] The corresponding trade ratios, calculated at current prices, are presented in the Appendix.

Figure 4 – *Exports and imports of goods and services, as a proportion of GDP: selected countries, 2006-2022 (percentages based on data at constant prices)*

Source: Authors' own calculations based on data from the World Bank Group (2022).

Table 2 – *GDP, exports, and imports: selected countries, 2006-2019 (Average annual rates of growth, %)*

Country	Variable	Average Annual Growth Rate of each variable for 2006-2019
	Real GDP Growth (annual %)	2.06
Mexico	Real Exports of goods and services (Annual Growth %)	4.53
	Real Imports of goods and services (Annual Growth %)	3.89
	Real GDP Growth (annual %)	3.27
Chile	Real Exports of goods and services (Annual Growth %)	1.3
	Real Imports of goods and services (Annual Growth %)	4.65
	Real GDP Growth (annual %)	3.92
Colombia	Real Exports of goods and services (Annual Growth %)	3.02
	Real Imports of goods and services (Annual Growth %)	6.97
	Real GDP Growth (annual %)	6.56
Ghana	Real Exports of goods and services (Annual Growth %)	14.23
	Real Imports of goods and services (Annual Growth %)	9.49
	Real GDP Growth (annual %)	4.68
Turkey	Real Exports of goods and services (Annual Growth %)	5.69
	Real Imports of goods and services (Annual Growth %)	3.07
	Real GDP Growth (annual %)	6.65
India	Real Exports of goods and services (Annual Growth %)	6.86
	Real Imports of goods and services (Annual Growth %)	7.45

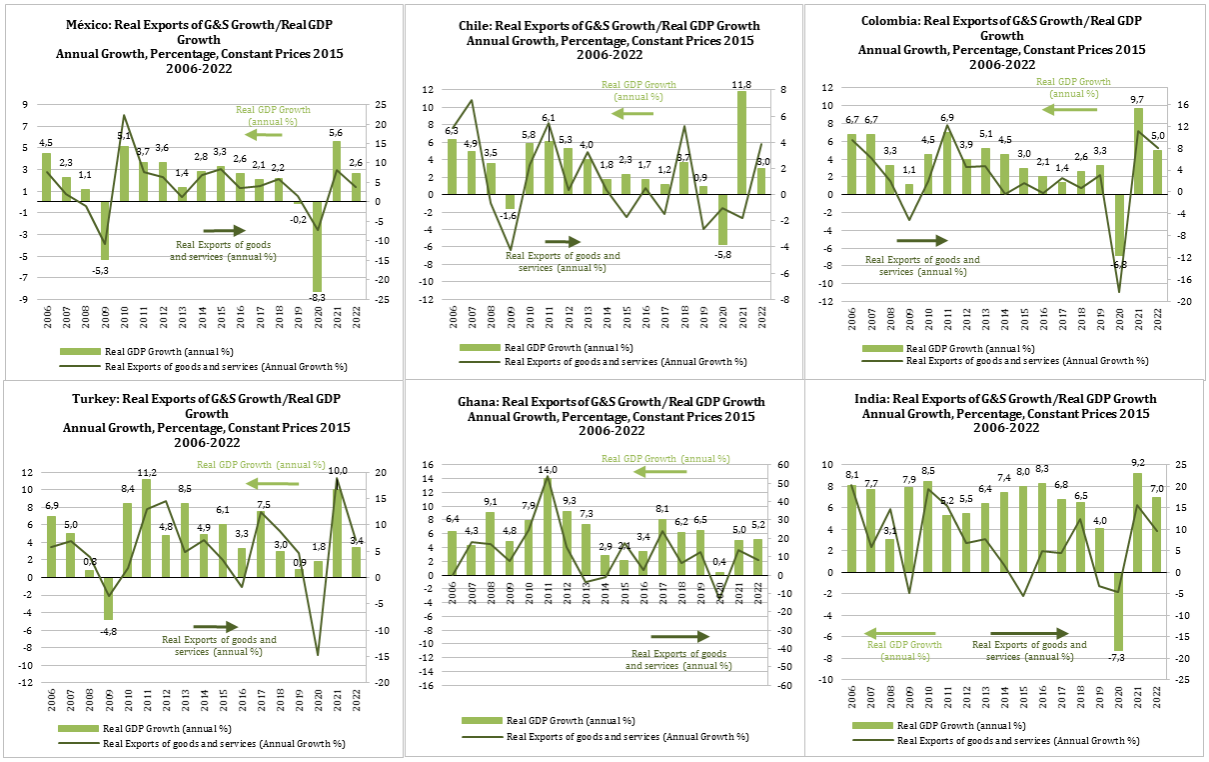
Source: Authors' calculations based on data from the World Bank Group (2022).

The data confirms that three Latin American economies grew, on average, more slowly than their counterparts. The Mexican economy – the most laggard one – expanded at an average annual rate of 2.05%, Chile at 3.3%, and Colombia at 3.9%. In contrast, Turkey grew at 4.7%, Ghana at 6.6%, and India at 6.7%.

The heterogeneity of these countries' trade paths is evidenced in their contrasting rates of expansion of exports and imports. In the Latin American cases, only in Mexico did exports expand faster than GDP, actually twice as fast. Its imports also grew rapidly, but by less than its exports. In Chile and in Colombia, imports expanded more quickly than exports. In Ghana, Turkey and India, exports increased at higher rates than GDP. In Ghana and Turkey – but not in India – the impulse of exports was stronger than that of imports. Care should be taken in deriving from the information on the previous table any generalization on the short-term relation between trade and economic growth. In particular, it would be erroneous to conclude from the data that there is no close relation between short-term changes in the dynamism of

exports and of GDP. In BPC economies, changes in them tend to be strongly correlated (see figure 5).

Figure 5 – *Real GDP and exports: selected countries, 2006-2022*
(Annual rates of growth, %)



Source: Authors' calculations based on the World Bank Group data for 2022. Data from 2022 are estimated by EIU.

The data suggests a strong coincidence between the direction – not the magnitude – of the annual changes of exports and of GDP. The only conspicuous exception was India in 2012-18. It seems safe to conclude that, in the current context, a key challenge of these nations is a slowdown in their exports that will not be fully compensated by weaker imports.

e) Main exports and imports: values, and countries of destiny and of origin

To deepen the analysis, we examined the composition of exports and imports – by type of product and country of destination/origin.[17] The comparative picture that appears is of a diversity in trade structures. Mexico specialized in the export of manufactures mainly to the United States. Its most important imports, mainly from the US and China, are manufactures and refined petroleum. Chile exports fundamentally minerals – copper – and natural-resources intensive products like fish, fruits, and wine. Its main client is China, followed by the US, Japan, South Korea, and Brazil. Crude petroleum, refined petroleum, gas, cars, and trucks have the

[17] For this purpose, we present in the Appendix data for 2019 for the 10 to 15 most important products traded by each country.

lion's share in its import basket; and its countries of origin are mainly China and the US. Colombian major exports are crude and refined petroleum, coke and coal briquettes, coffee, flowers, and farm products. Its main client is the US, followed at a distance by China, Panama, and several European countries. Its import basket, coming mostly from China and the US, is composed of refined petroleum and manufactures.

Ghana exports cocoa beans, butter and paste, gold, and farm products, selling to a wide variety of nations, with Switzerland, China, and India as the main clients. Its imports consist of manufactured goods from China, Nigeria, the US, the UK, and Europe. India has a much more diversified export mix, selling minerals, oil manufactures and farm products, mainly to the US, the United Arab Emirates, China, and other Asian countries. It imports crude and refined petroleum, gas, coal briquettes, and manufactured goods. Turkey essentially exports manufacture to a broad list of countries in Europe and to Asia and the US. It imports petroleum products and manufactures from Germany and China, as well as from Russia, the US, the UK, South Korea, and various European nations.

An adverse global shock's impact on these nations – through foreign trade – will depend on the evolution of their terms-of-trade and on their trade volumes. An additional complication could be the imposition of trade protectionist measures by the West on, say, environmental and policy considerations to nearshore key products, motivated by geopolitical reasons aimed at prioritizing resilience over costs.

In recent pre-pandemic years some countries – say, blessed by the commodity lottery – expanded their agricultural frontier to profit from a growing demand for food, minerals, and other raw materials. This over-exploitation of natural resources plus insufficient attention to climate change and global warning are finally leading the West to policy changes to meet carbon neutrality concerns. As a result, new regulations to make trade more environmentally sustainable have been recently emerging. There is a push, still not sufficient, for a "Green New Deal", with rules, regulations, standards, certifications, and requirements to reduce international trade's disruptions to the environment.

An example of this is the Zero Deforestation regulation proposal published by the European Commission (EC) in November 2021 and reviewed in August 2022. Recognizing that agricultural and livestock farming is a key driver of deforestation (Benhin, 2006) – and, thus, of global warming – the proposal aims to ban international trade of commodities if their production involved deforestation or forest degradation.[18] This proposal will prohibit import or "placing" into the EU of products that are not deforestation-free. Its implementation is designed to be based on a benchmarking system and due diligence obligations (Hargita et al., 2020). In its original version, the proposal covered only beef, soy, palm oil, timber, cocoa, and coffee. The EC recently extended it to several more commodities and their by-products. A similar policy, the Forest Act, is being discussed in the US Congress[19] and public pressure from civil society is rising in China and other countries for similar actions. The growing trend toward environmentally friendly regulations in Europe and the US will affect the international trade of agri-food commodities, further constraining the balance of payments of some emerging market economies (EMEs). Trade of agricultural products will likely suffer increased production costs associated with the due diligence process and certifications, as well as supply disruptions.

[18] For an exhaustive definition of deforestation and forest degradation, refer to https://www.fao.org/forestry/18222-045c26b711a976bb9d0d17386ee8f0e37.pdf

[19] FOREST Act of 2021, https://www.congress.gov/bill/117th-congress/senate-bill/2950/text?r=2&s=2

Some of the countries in our sample are key global players in the production and trade of some commodities that are set to be targeted by environmental regulations. For instance, Ghana is the world's second-largest exporter of cocoa beans. According to the Observatory of Economic Complexity (OEC, 2021), almost half of its exports are absorbed by the European Union (particularly by the Netherlands, France, and Switzerland) and around 10% by the US. Colombia's cocoa production increased by more than 60% between 2011 and 2021 (Statista, 2021), and the country is one of the top global producers and exporters of palm oil, just behind Indonesia and Malaysia (see United Nations Comtrade, 2022). Both commodities are under the spotlight of deforestation-free regulations.

3.4. Financial vulnerabilities: an analysis from the capital account perspective

Returning to the analytical construction we put forward in the initial sections of this paper, key elements to assess the vulnerability of a given economy's growth to the balance-of-payments constraint are the evolution and determinants of the k ratio introduced in the fundamental equation of the model. On this matter, practitioners point to specific characteristics of the domestic economy as attractors of capital inflows to any recipient countries, the so-called *pull factors* (BIS, 2021). Among them are the growth rate (observed and expected) of GDP, the rate of inflation, debt ratios, risk premiums, unemployment, financial deepness, and government stability, inter alia. Analysts also recognize exogenous forces that influence capital flows towards recipient countries, independent of their domestic conditions. These are the *push factors*, such as international liquidity and monetary policy (observed and expected), investors' propensity to risk, terms of trade, and commodity prices, inter alia (BIS, 2021).

In the aftermath of the Great Financial Crisis (GFC), expansionary monetary policies adopted in developed countries, such as quantitative easing (QE), marked a major structural break in global finance. Until then, US Federal Reserve polices affected pro-cyclically the flow of short-term capital to EMEs, triggering portfolio reshuffling across countries, out of EMEs into US equity and bond funds (Fratzscher et al., 2018;). This had two main consequences: i) global financial conditions became a crucial driver for capital flows to EMEs, even more than for advanced economies (Akyuz, 2017); ii) the types of cross border flows changed as extraordinary liquidity coupled with increasing financial sophistication (BIS, 2021). Thus, somewhat recent episodes of capital flights, such as the taper tantrum episode of May 2013, are critical to understand the modern behavior in practice of the k ratio of our analytical model. Indeed, there is consensus that the taper tantrum occurred because of an unexpected announcement of a Fed rate hike that abruptly made EMEs' assets less attractive, triggering in some of them massive capital outflows. This phenomenon underlies how modern financial architecture's complexity can cause sharp adjustments in EMEs' financial accounts, with severe destabilizing impacts on their real and monetary sectors. For example, Brazil, Turkey, India, Indonesia, and South Africa – at the time named the "fragile five" by the specialized press – suffered from massive capital outflows, sharp currency depreciation, rising inflation and credit rating downgrades.

In our view, in the aftermath of the financial crisis of 2008-09, the relevance of financial push factors (say, global risk aversion and rising international liquidity) in determining k has increased substantially (see Koepke, 2018, and the 2021 Bank Regulation and Supervision

Survey).[20] The relationship between debt flows to emerging economies and global risk aversion for countries such as Mexico, Brazil, South Africa, India, Turkey, and Chile over the last decade shows that global risk aversion tends to be more important in explaining capital flows, while idiosyncratic factors weigh relatively less (Alba et al., 2021). However, in periods of low financial volatility, idiosyncratic factors – such as spreads between domestic and foreign interest rates – influence more the dynamics of such capital flows. The effect of global risk aversion on the evolution of debt flows dramatically increased in March 2020, when the COVID-19 outbreak caused several financial markets to collapse.[21]

Table 3 – *Drivers of capital flows to emerging economies (2021)*

Type	Driver	Portfolio Equity	Portfolio Debt	Banking Flows
	Global risk aversion	---	---	---
Push	Mature economy interest rate	---	---	-
	Mature economy output growth	+	+	?
	Domestic output growth	+	+	+++
Pull	Asset return indicators	+	+	+++
	Country risk indicators	-	-	---

Source: Koepke (2018).

A further factor to account for is the co-movement of gross capital inflows across EMEs due to global push factors, especially in bank-related portfolios, bonds, and equities. Empirical estimates find that US monetary policy, global liquidity, and risk aversion explain such common dynamics (Cerutti, et al., 2019). In general, BPC economies with lower reserves, higher trade openness, and more flexible foreign exchange regimes tend to be more sensitive to global push factors. Financial market characteristics, such as liquidity in the recipient country and composition of the foreign investors, rather than macroeconomic or institutional fundamentals, help to explain such sensitivities.

The close relationship between capital flows and international financial drivers, intensified in the post-GFC era due to, among other things, (i) a shift from bank to non-bank funding, the rising importance of public sector borrowers, (iii) an increase in the complexity of flows, and (iv) increased regional integration among EMEs, generally for debt security holdings (see BIS, 2021).

Financial development and integration with global markets expanded the destabilizing effect of cross-border capital flows and led to the rising external vulnerabilities. Paradoxically,

[20] Survey carried out by the World Bank by interviewing financial institutions for 160 jurisdictions. More than 85% of respondents indicated that monetary policy in advanced economies is the main cause of cross-border movement of capital, followed by global risk aversion, pointed to by roughly 75% of respondents.

[21] Beirne et al. (2020) evaluate which pull and push factors contributed to financial market and capital flow dynamics during the COVID-19 pandemic. Among relevant domestic factors, they identified (in order of relevance): inflation, macro surprise index, industrial production, stock prices, exchange rate, QE, government bond yields, and policy rate. Among external factors that stand out are QE in advanced economies and the "VIX" index.

during the taper tantrum, EMEs with weaker macro-fundamentals and less financial sophistication were less exposed to massive capital inflows and, thus to the subsequent volatility triggered by QE. Larger emerging economies with deeper financial markets experienced more pressures despite their "macroeconomic fundamentals", as they were more exposed to investors' portfolio adjustments with more liquidity (Aizenman et al., 2014; Eichengreen and Gupta, 2014).

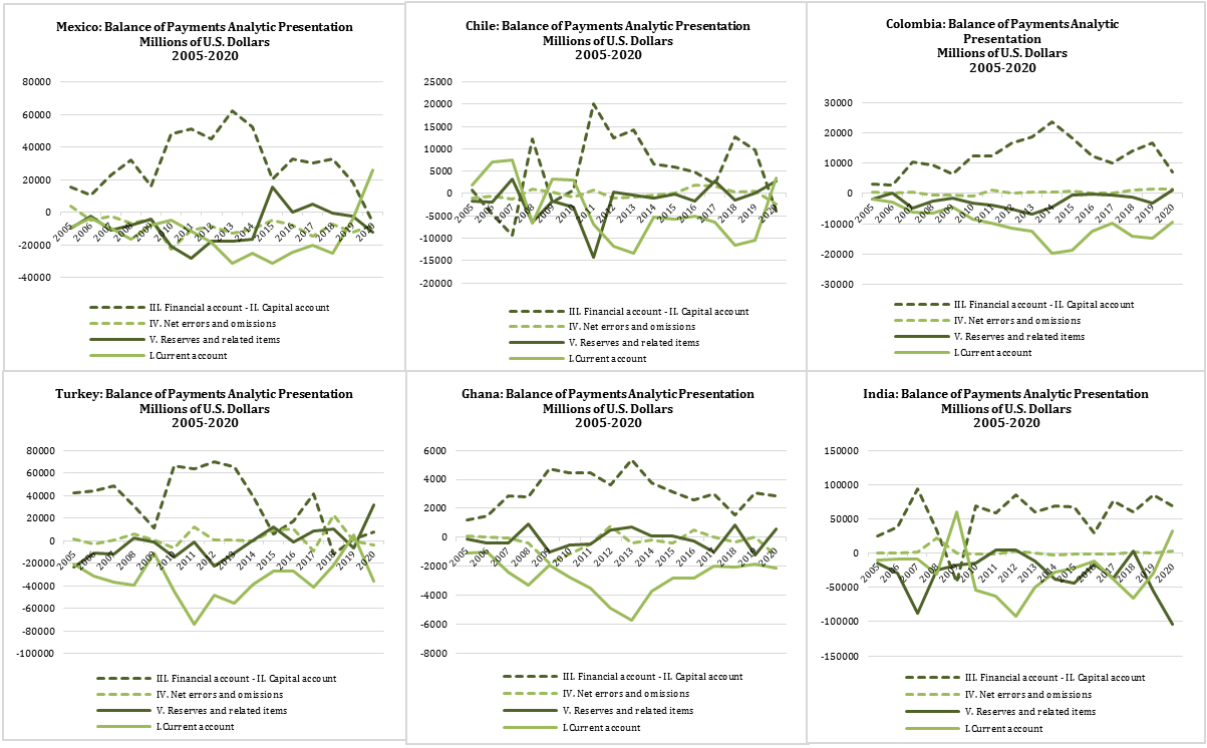
Financial market development (FMD) in EMEs has been associated with the following vulnerabilities: i) high foreign participation in local currency government bond markets; ii) a surge of non-financial corporate bond markets in foreign currency; and iii) the rise in derivatives turnover and offshore trading in currency markets (Cantu and Chui, 2021). Concerning (i), Carstens and Shin (2019) argue that EMEs suffer from the so-called *original sin*, linked to the relevant presence of foreign investors in the local currency bond market. When emerging-market bonds fall in value, the impact is amplified by currency depreciation, which can heighten global investors' risk perceptions and lead them to a sell-off of their assets. That, in turn, adds further downward pressure on the borrower's local currency. If the currency and bond prices both fall far enough, that can set off another round of sales by investors, especially noticeable when there is a substantial foreign investor participation in local currency bond markets (Beirne et al., 2021). The issue raised in (ii) is related to the problem of currency mismatches in the private sector, which may negatively affect investment through higher risk premium and collateral requirements (Krugman, 1999; Chang and Velasco, 1999). The last point (iii) is a potential source of exchange rate volatility (Nalin and Yajima, 2021, 2022).

The interaction between increasing and more volatile financial flows, more flexible exchange rate regimes, and significant external indebtedness of the government and of the non-financial corporate sector may, say, give rise to a *financial external constraint,* over and above the one rooted in the traditional trade mechanism. As included in our analytical model, this constraint may bind economic growth through several additional transmission mechanisms. Among them, one can identify: (i) higher sensitivity of bond prices to changes in interest rates; (ii) a positive and statistically significant correlation between nominal exchange rate variations and sovereign risk perceptions; iii) a positive and statistically significant correlation between sovereign and corporate risk perceptions; (iv) a positive correlation between risk and debt volumes; and (v) a non-linear relationship between leverage and investment (Perez et al., 2019, 2021).

When analyzing data for the countries selected, we recognize several features discussed in the above literature. A first one is that the evolution of foreign credit to finance the current account displays a cyclical behaviour, whose turning points are often provoked by external shocks, such as the taper tantrum (2013), the fall in terms of trade (2012-2014), and, more recently, the COVID-19 shock. A second feature is that, for all six countries in the aftermath of the GFC, we see an increasing reliance on short-term capital flows, a reliance that makes them more vulnerable to external financial shocks. In addition, short-term capital flows denominated in foreign currency grew at a faster pace in both the private and the public sector, resulting in more exposure of their balance sheets to exchange rate adjustments. And, finally, it is evident that global risk became a crucial factor behind currency fluctuations, as shown by the high correlation between changes in the Emerging Market Bond Index (EMBI) and exchange rate variations.

Figure 6 shows the evolution of the balance of payments and its components for the selected countries. In all of them, the current account is almost symmetrically mirrored by the evolution of the financial account.[22]

Figure 6 – *Balance of payments and its components: selected countries, 2006-2020 (millions of US dollars)*

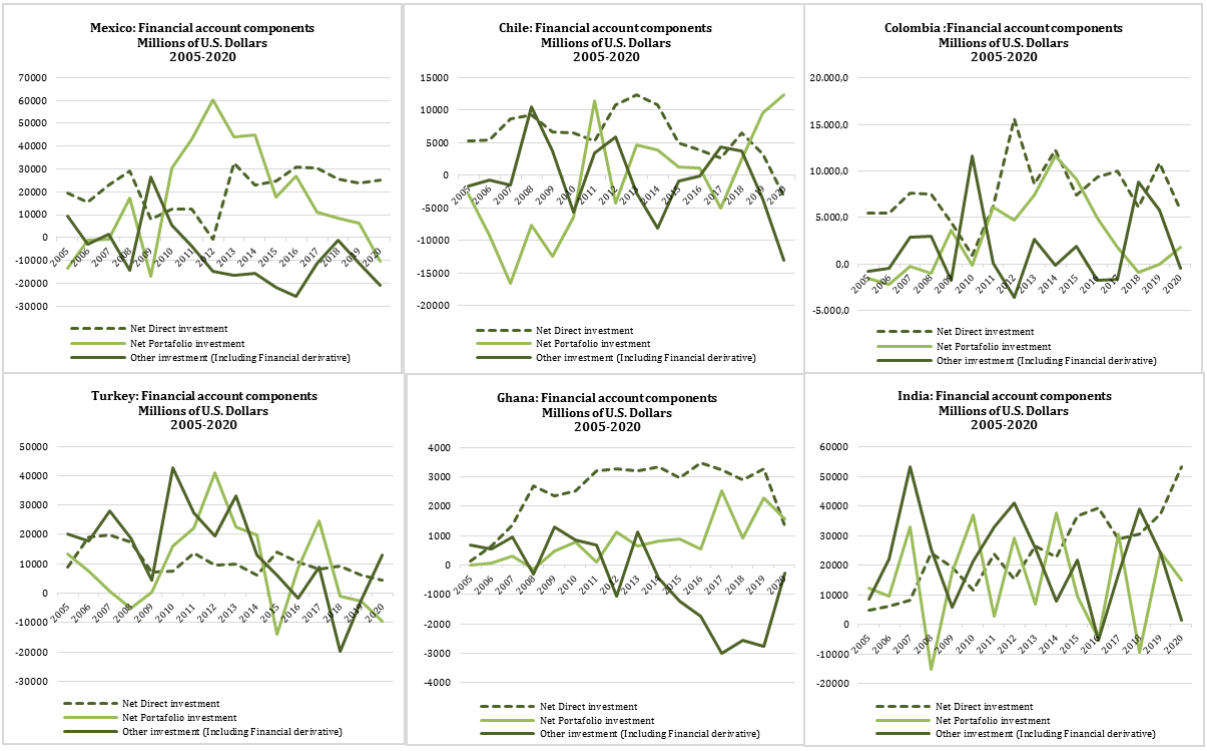


Source: IMF, *Balance of Payments Statistics* (2022).

The financial account follows two common patterns in all countries except India, which had a surge from 2005 until 2013, reflecting international investors' willingness to lend to EMEs. One factor behind this improvement of EMEs' terms-of-trade was the acute rise of oil and metal prices in world markets. Mexico, Chile, Colombia, and Ghana register a rapid increase of their financial account surplus, as the improvement of their terms-of-trade boosted their growth prospects, making them more attractive for international investors. As a result, their expanding current account deficit was easily financed. In 2013, right before the taper tantrum, these four economies plus Turkey were running the largest current account deficit in the period examined. Since then, their financial accounts have weakened due to lower international risk appetite and to the fall in commodity prices, with a subsequent deterioration of their terms-of-trade. For Mexico, Chile, and Turkey, this translated into red figures in the financial account balance, as net debt issuance declined.

[22] The financial account is reported net of the capital account. The former registers capital transfers receivable and payable between residents and non-residents, as well as the acquisition and disposal of non-producer, non-financial items. (https://www.imf.org/external/pubs/ft/bop/2014/pdf/BPM6_15F.pdf)

Figure 7 – *Financial account components: selected countries, 2006-2020 (Millions of US dollars)*



Source: IMF, *Balance of Payments Statistics* (2022).

EMEs often rely on short-run portfolio flows to finance their current account deficit. The volatility of these overall net flows should come as no surprise, with boom-and-boost cycles due to acute and abrupt portfolio reallocation by international investors. In India we register, say, dampening cycles. This country accounts for the highest number of negative portfolios net flows (2009, 2015, and 2017).[23] The different performance of the Indian and the Turkish economies in the aftermath of the taper tantrum lead us to the view that, in a "financialized" world, tightening monetary policy may provide some short-term relief to EMEs against massive net capital outflows, outflows that negatively affect their fixed capital formation and, thus, their growth potential.

As the tantrum hit, the Indian rupee fell by more than 15 per cent from peak to trough in three months, causing enormous damage to the Indian population's welfare. The Turkish Lira depreciated 20 percent over the same period. These two economies, Turkey, and India were already struggling to control inflation, a situation the exchange rate deprecation made worse. India responded to this shock by raising interest rates multiple times, a policy aimed at containing inflation at the expense of dampening its growth potential.

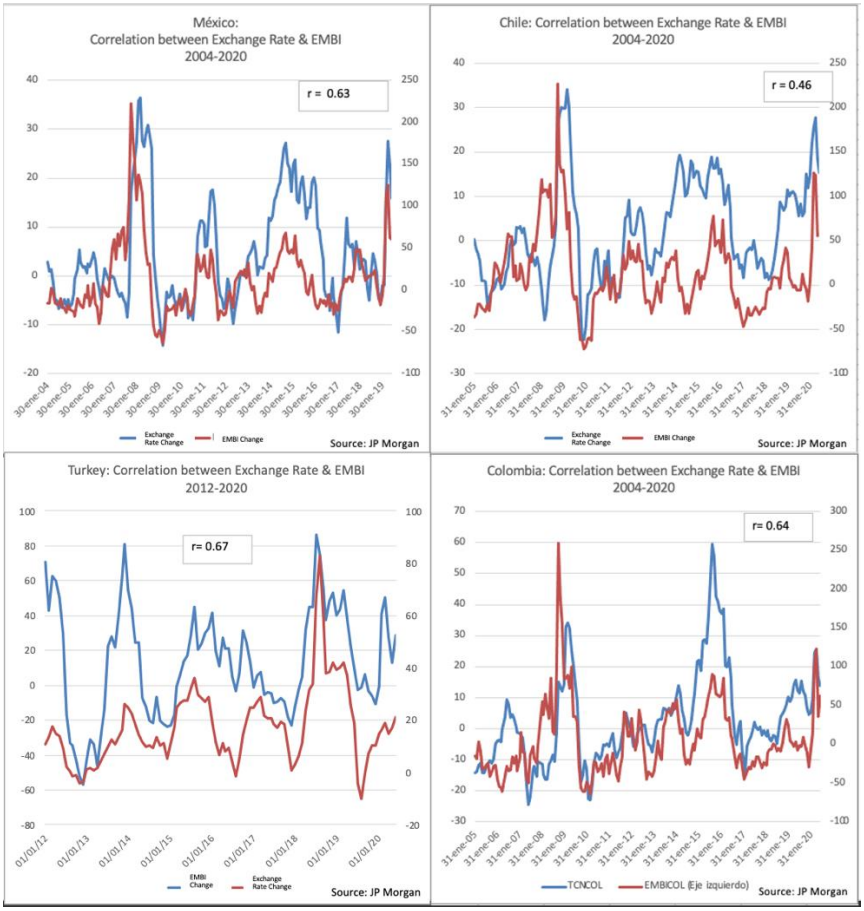
To avoid the negative impact of tightening monetary conditions for growth, Turkey adopted unorthodox monetary policies and lowered the benchmark interest rate despite higher inflation. As a result, inflation kept going up. International capital virtually disappeared

[23] Ghana registers a growing trend of portfolio flows, albeit its volume is, on average, six times smaller than in the other countries examined.

as real interest rates became negative, and further massive outflows led the financial account to negative territory from 2014 until the COVID-19 crisis in 2020. The Turkish lire continued depreciating, and by the second half of 2021 it was among the most devalued currencies in the world in the last ten years.

A crucial factor to pay attention to when evaluating the role of capital flows cum the financial restriction – in the BPC framework – is the behavior of the exchange rate and its close correlation with risk sentiment. For the countries analyzed in the present study, the correlation between these variables ranges from 0.4 to 0.6, suggesting that, when risk perception deteriorates, sharp corrections of the exchange rate follow.

Figure 8 – *Nominal exchange rate and emerging market bond index (EMBI): selected countries, 2006-2020 (annual variations, %)*



Source: Abeles et al. (2020).

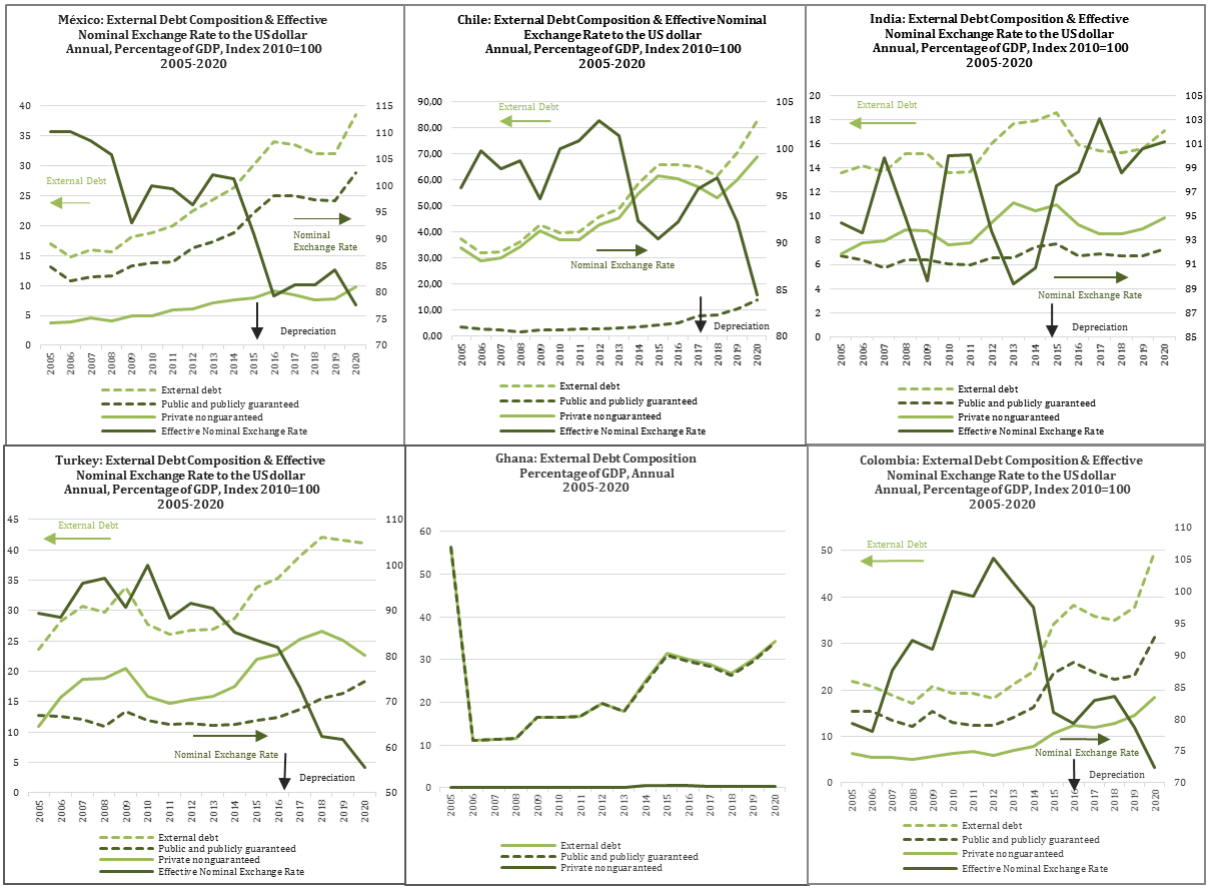
The exchange rate and risk premiums are important determinants in the evolution of foreign debt accumulation. Over 2005-2013 in Chile, Colombia, and Turkey, higher capital inflows were associated with an appreciating real exchange rate. In Mexico and India, the exchange rate remained rather stable. In all cases, the EMBI index reached its lowest level in years, pushing down, say, future borrowing costs. The appreciation of the exchange rate

improved the balance sheet positions by reducing the value (in local currency) of external liabilities as well as financial intermediation costs denominated in foreign currency. All in all, this created an incentive to issue more foreign liabilities.

External debt (figure 9) shows an upward trend in Colombia, Mexico, Chile, Turkey, and India; from 2005 to 2020, it roughly doubled its value in all of them. Chile stands out as the country with the highest leverage ratio (85% of GDP), while India reports the lowest (16%). For Mexico, Colombia, and Turkey, the corresponding figures range between 35 and 50 points of GDP.[24]

Resorting to external financing implies an increase in BPC economies' exposure and vulnerability to shocks in the global capital markets, including changes in, say, risk perception and the willingness of international intermediaries to lend money. Shocks in these variables are transmitted to the domestic economy via the balance of payments and, thus, the exchange rate.

Figure 9 – *Debt ratios and nominal effective exchange rates: selected countries, 2006-2020 (millions of US dollars)*



Source: IMF, *Balance of Payments Statistics* (2022).

[24] Notice, however, that the composition of debt is not homogeneous. In Chile, Turkey, and India, private debt is higher than public debt. On the contrary, in Mexico, Colombia and Ghana the public sector is the main issuer of foreign debt.

Facing a significant exchange rate depreciation and depending on the net result of assets minus liabilities denominated in foreign currency, the balance sheet may suddenly and acutely worsen (Krugman, 1999). Colombia, Mexico, Chile, and Turkey report a close connection between nominal effective exchange rate (NEER) and the external debt relative to GDP. Columbia's and Mexico's NEER sharply depreciated in the second half of 2014 throughout 2015, pushed by the collapse of the international price of WTI crude oil, which plummeted from $103 USD to $30 USD per barrel from July 2014 to February 2015. In this context, both countries' foreign debt increased by almost 20% of GDP.

4. Conclusions

At the end of 2021 the developed world did a U-turn in its monetary policies, implementing a restrictive stance by rising benchmark interest rates and tightening international liquidity in response to rising inflation. The impact of such a U-turn on inflation has, so far, been rather weak, as the price acceleration is mainly driven by supply factors, inter alia, disruption in key global value chains, rising international shipping and energy costs, and soaring prices of some commodities in the aftermath of the COVID pandemic and the Russian invasion of Ukraine. The risk of a nuclear Armageddon is not negligible. In addition, inflation is also fueled by extraordinary pent-up demand as the lock-downs have been progressively lifted.

Additional turns of the screw towards more restrictive monetary policies are expected for 2022 and at least part of 2023. This shift is having brutal impacts on emerging nations' growth cum fiscal and financial sustainability in the short and medium terms, making the BP constraint dramatically binding. The outlook may turn grimmer if a premature and unnecessary return to fiscal austerity occurs in the West.

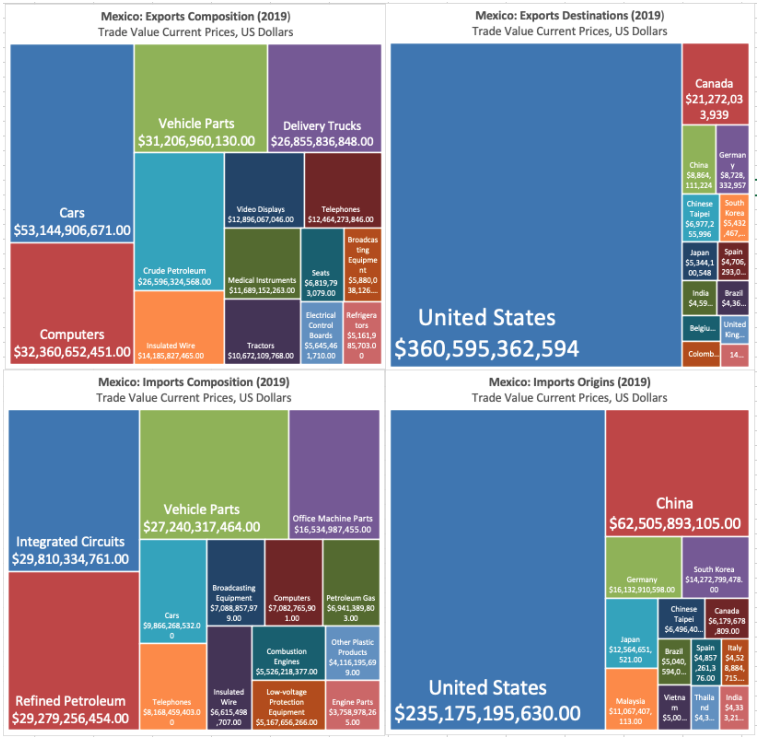
In addition, the West's imposition of commercial sanctions on imports of a variety of commodities and manufactured goods on environmental grounds is putting additional recessive pressure on developing economies' growth. The West's move towards in-sourcing back to the developed world of key links in global value chains is an additional obstacle for many BPC-developing economies. In the midst of these policy changes. the surge of new variants of the SARS-COVID virus can't be ruled out.

This quite adverse panorama for developing countries makes it urgent to identify their key exposures and vulnerabilities to such exogenous phenomena. In this paper we put forward an analytical model, built within the BPC tradition, to help with this task. The parsimonious model we presented captures key vulnerabilities and structural weaknesses of developing countries' trade and production structures that make their growth trajectories acutely bound by their insertion in the global real and financial markets. Based on this theoretical framework, we have carried out a comparative study of six developing nations to identify their challenges in the current global context. The study revealed similarities and crucial differences in their initial conditions, policy space and vulnerabilities; some of the latter are likely to become even more worrying soon. Our study was to provide inputs to the discussions on economic policy matters of BPC economies in the face of global shocks, as well as to the debate on the need for a new financial architecture, a new Bretton Woods, oriented to keep full employment, environmental sustainability, and a major reduction of the gaps between the haves and the have-nots within and between nations. Whether we have achieved this goal is for our readers to judge.

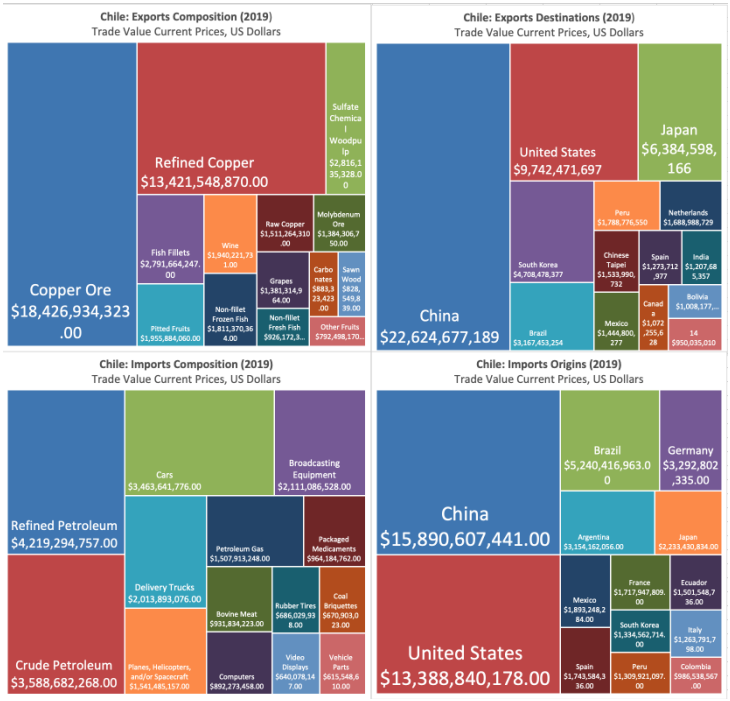
Appendix – Figures

Figure A.1 – *Composition of exports and imports by type of product and country of destination or origin: Selected economies, 2019*

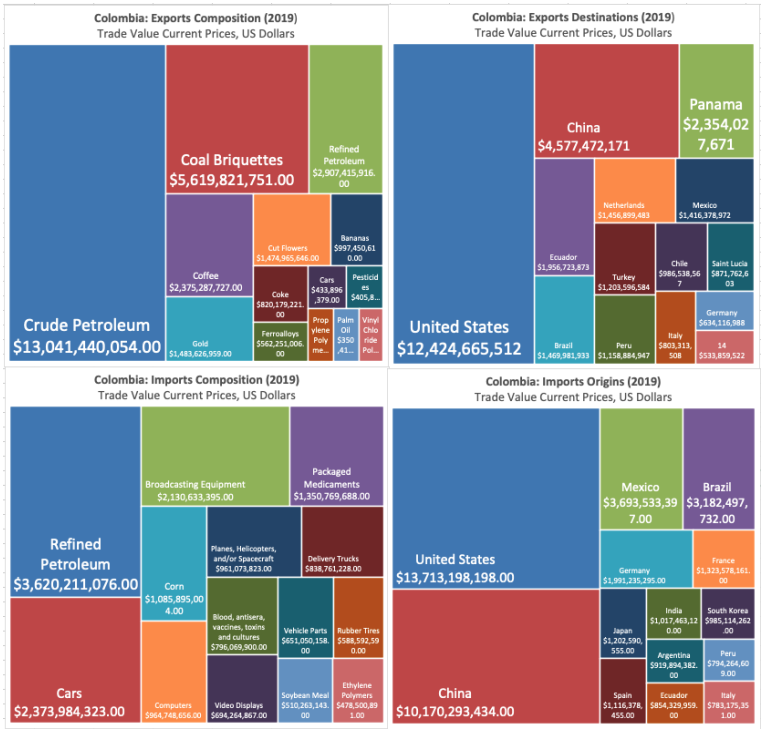
A. Mexico



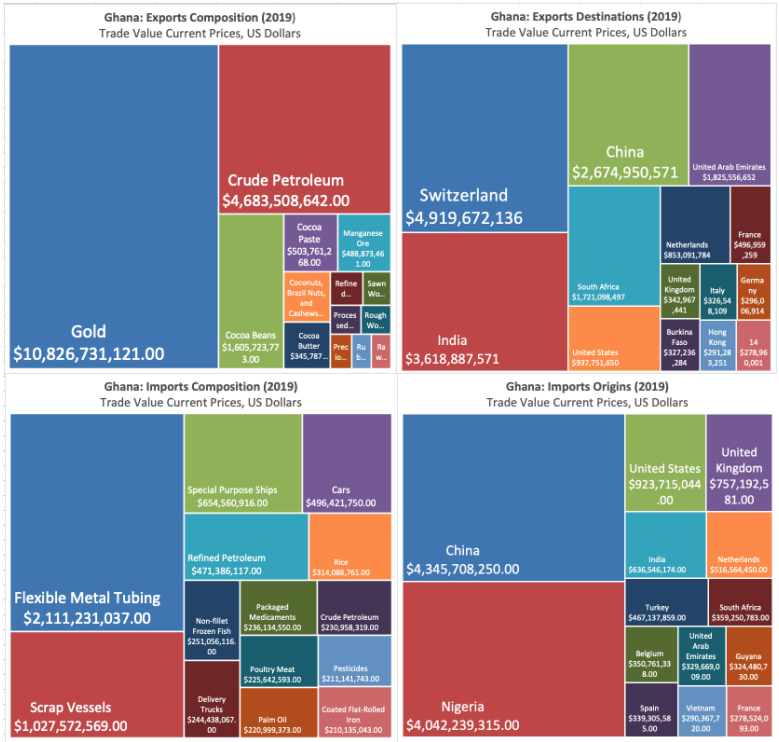
B. Chile



C. Colombia

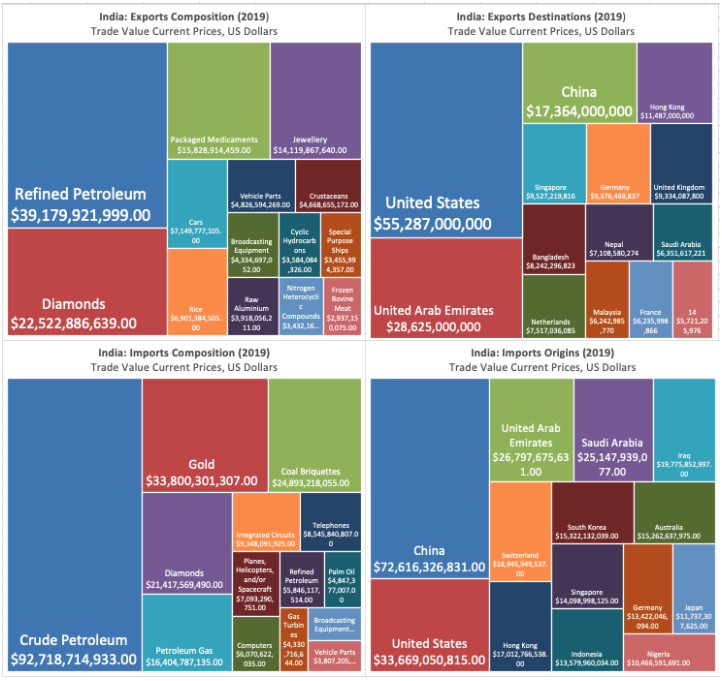


D. Ghana



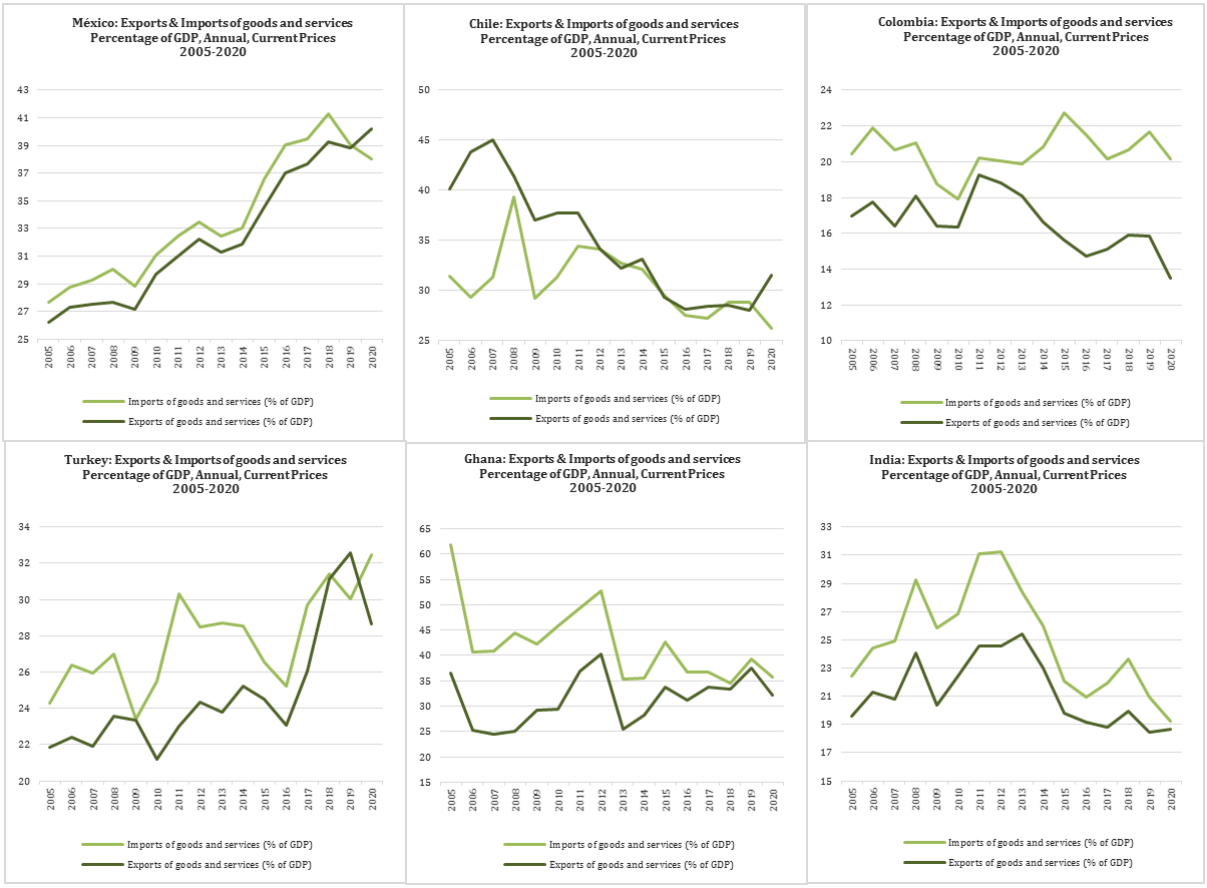
E. Turkey

F. India



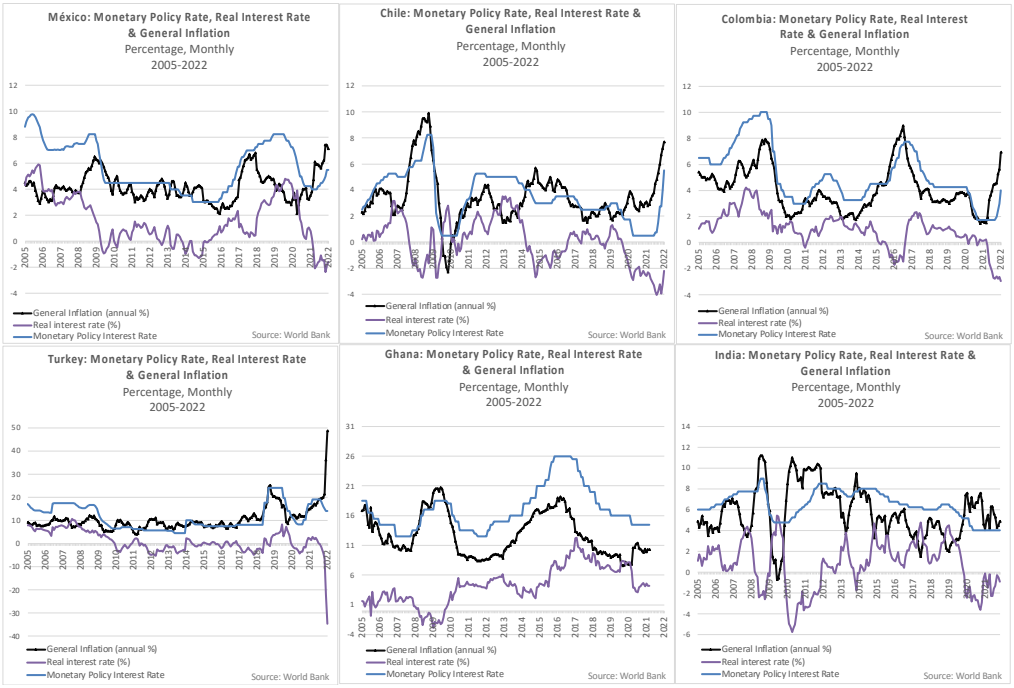
Source: Author's own calculations based on data from the IMF, Balance of Payments Statistics (2022).

Figure A.2 – *Exports and imports of goods and services, as a proportion of GDP: selected countries, 2006-2022 (percentages based on data at current prices)*



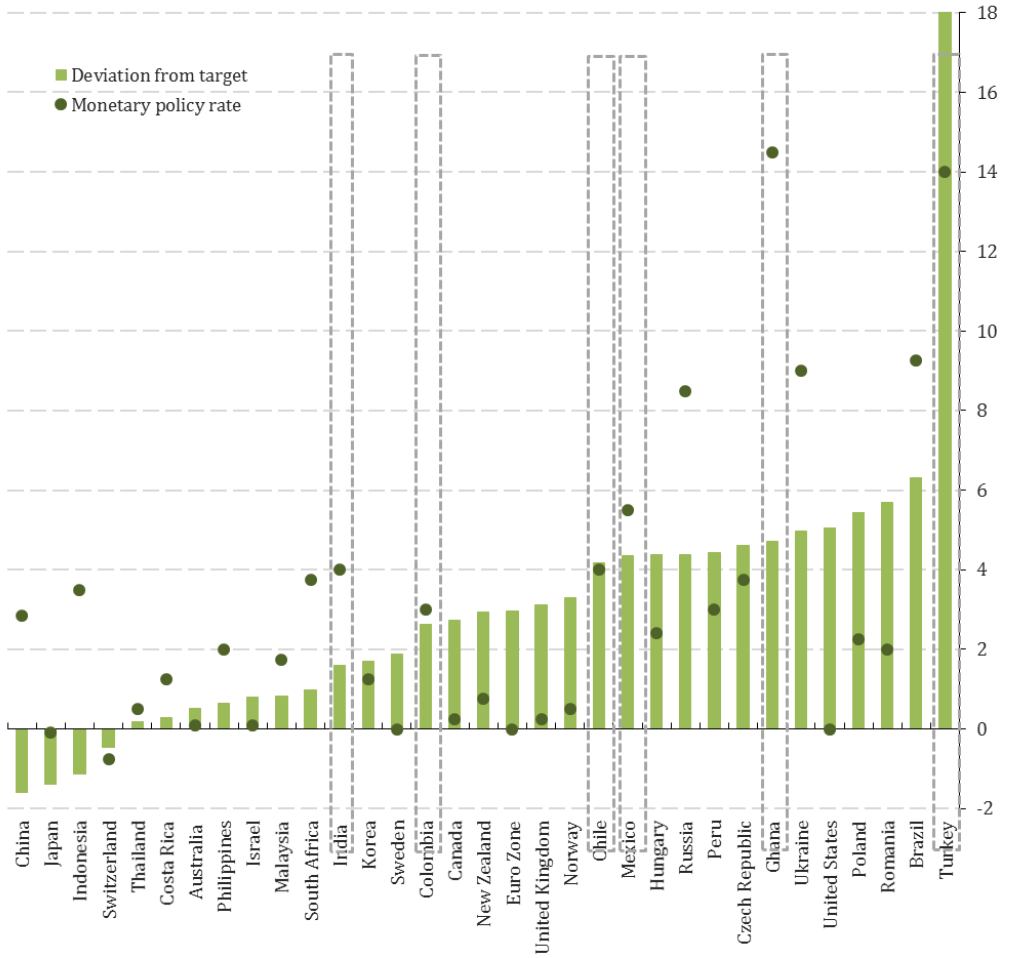
Source: WBG (2022).

Figure A.3 – *Monetary policy rate, real interest rate, and inflation: selected economies, 2006-2022 (percentages, monthly)*



Source: BIS (2022a).

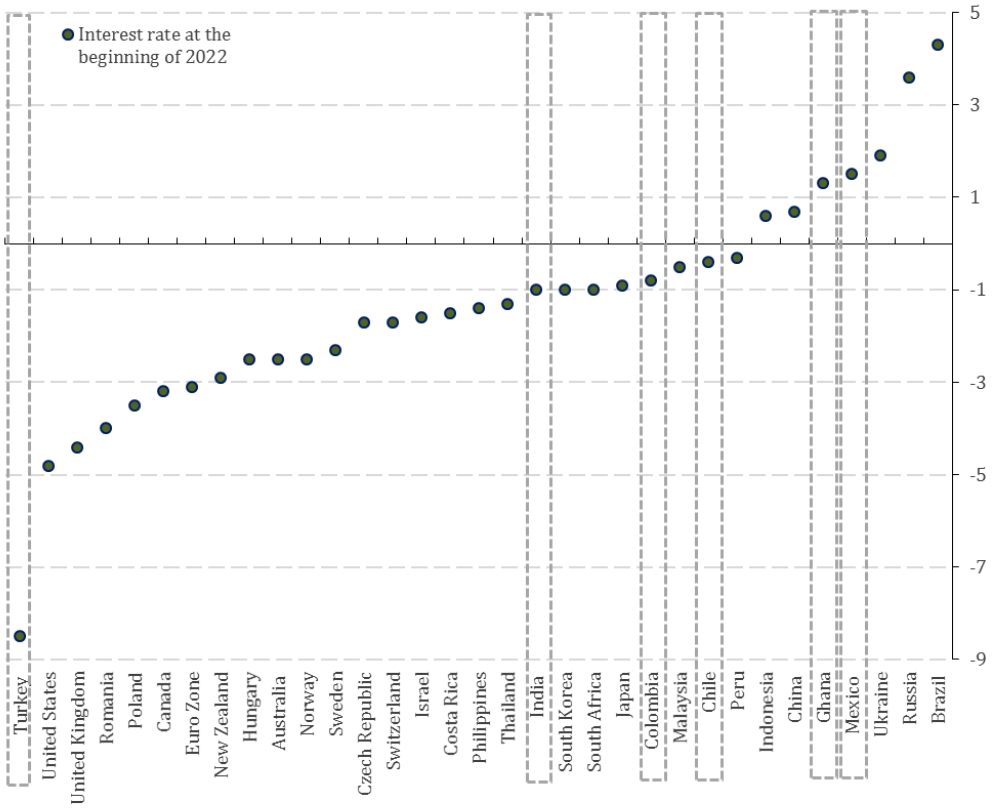
Figure A.4 – *Deviation of headline inflation from its target at the beginning of 2022: selected countries (percentages)*



/1 Inflation rate for November or December of 2021, depending on data availability.

Source: Graph included in the presentation "The Mexican Economy in 2022: Outlook and Challenges" Gerardo Esquivel Hernández, Deputy Governor, Bank of Mexico. HSBC's 10th Annual Mexico Opportunities Forum, February 28th, 2022.

Figure A.5 – *Ex-ante real interest rate at the beginning of 2022: selected countries (percentages)*

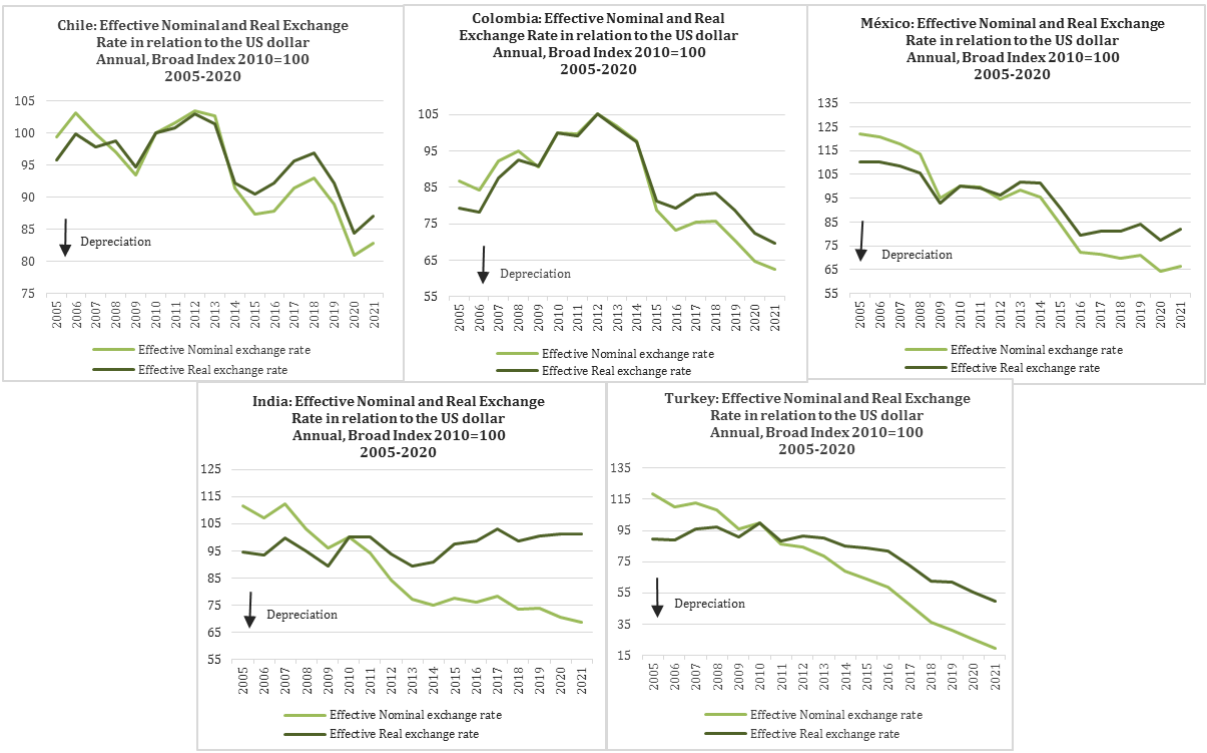


Source: Graph included in the presentation "The Mexican Economy in 2022: Outlook and Challenges" Gerardo Esquivel Hernández, Deputy Governor, Bank of Mexico. HSBC's 10th Annual Mexico Opportunities Forum, February 28th, 2022.

Figure A.6 – *Financial market depth index: selected countries, 2000-2019 (index FDM)*

Source: IMF, *Balance of Payments Statistics* (2022).

Figure A.7 – *Effective nominal and real exchange rate in relation to the US dollar*



Source: BIS (2022b).

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