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CAFÉ WORKING PAPER NO.25

Centre for Accountancy, Finance, and Economics (CAFÉ)

Pasinetti, Debt Sustainability and (Green) Structural Change at the Time of Global Finance: An Emerging and Developing Countries' Perspective

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December 2023

Pasinetti, debt sustainability and (green) structural change at the time of global finance: An emerging and developing countries' perspective

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Abstract

This paper studies the relationship between financial integration, external debt sustainability, and fiscal policy space in emerging and developing (EDE) countries. We do so by applying Pasinetti's "*geometry of debt sustainability*" to EDE countries and analysing how it is shaped by exposure to global financial cycles. Through the lenses of Pasinetti's theoretical framework, we study whether global finance opens "windows of opportunities" or creates more constraints for EDE countries in offering fiscal support for structural changes, including green structural transformations. This analysis is crucial for tackling the pressing issue of the climate crisis. We suggest EDE countries may face a "gridlock". Global finance and pressures to keep external debt sustainable make them struggle to maintain vital public investment and enact counter-cyclical fiscal actions. Lack of fiscal space in turn exacerbates technological backwardness, which feeds back in the form of more binding external constraints and tighter "surveillance" by international creditors. We support our theoretical analysis with an econometric study over a sample of 55 countries from 1980-2018. Capital controls and external macroprudential policy emerge as fundamental policies enabling EDE countries to adeptly manoeuvre through debt challenges without falling into the pitfalls of stagnation and enduring technological underdevelopment.

JEL Codes: F65, O23, O14

Keywords: Financial globalisation, fiscal space, structural change

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1. Introduction

The challenges developing countries are facing have become more daunting. On the one hand, given the economic costs of the pandemic first and the Ukraine war later, they must feed *sustained* economic growth to eradicate poverty and reduce inequality. On the other hand, sustained growth should be accompanied by external sustainability to avoid recurrent Balance-of-Payments (BoP) crises and the ensuing economic downfalls. On top of this, the risks posed by climate change bring to the forefront an additional objective: the imperative of ecological transition with the connected requirements of technological and structural change. Developed and developing countries alike increasingly gravitate towards environmental reforms, marking a conscious shift towards a more sustainable trajectory. However, these reforms come with challenges, necessitating economic diversification and presenting hurdles in technological advancement. Valdecantos (2021), in his analysis of Argentinian development bottlenecks, has rightly labelled the combination of sustained growth, external solidity and environmental sustainability as the "sustainability trilemma". Given the current status of most developing countries, Argentina included, they are mutually inconsistent. At best, only two out of three are jointly achievable unless a radical environment-friendly structural change of the economy takes place.

Steady growth consistent with environmental constraints also requires another type of sustainability: do countries have the financial capabilities to achieve all these goals simultaneously? In 2019, UNCTAD (2019) estimated that, without changes in Official Development Assistance (ODA), extra expenses required to achieve Sustainable Development Goals (SDGs) 1 – 4 would imply debt-to-GDP ratios between 100 and 150 percent of GDP by 2030 in low- and upper-middle-income countries. For low-income countries, such a ratio could increase up to 286 percent of GDP. There is little wonder that such levels of public debt are not sustainable in any way by emerging and developing (EDE) countries. When it comes to the green transition and policies aimed at adapting to and mitigating climate change, Ananthakrishnan *et al*. (2022) estimate that required green financial flows at the worldwide level might range from 3 to 6 trillion yearly until 2050 to accomplish the Paris Agreement goals (keeping global warming to 1.5 degrees). Current green funds stand at 630 billion dollars, i.e., a huge negative gap with respect to what is needed. Except for China, few existing green finance funds come from EDE countries. Given the high-risk profile of investment in green projects disincentivising private initiatives, public actors will keep on playing a crucial role in the provision of such funds (Lamperti *et al*., 2019), at least in the form of subsidies, risk

guarantees and equity-sharing with private investors. The previous question comes back again: do nations, EDE countries more specifically, have enough fiscal space to pursue environment-friendly, sustained and sustainable growth? In this sense, our main contribution aims to assess the shortfall in funds directed towards developmental objectives, exploring countries' fiscal capacity to achieve sustainability and energy transitions.

The academic landscape provides critical insights into these challenges. Luigi Pasinetti is mostly known for his masterpiece theoretical contributions describing and explaining economic development as a complex process of structural change and technological progress (Pasinetti, 1981; 1993). However, a perhaps less known part of Pasinetti's academic life was dedicated to analysing public finance sustainability instead. That is the case, for instance, of Pasinetti's seminal 1998 study (Pasinetti, 1998; 2000) published in the Cambridge Journal of Economics, which offers a deep dive into debt sustainability, especially within the context of the Maastricht Treaty. There, Pasinetti develops the "geometry of debt sustainability" framework, establishing under which conditions countries can combine and sustain higher debt together with long-run investment objectives. Building upon this foundation, Vaggi and Prizzon (2014) and Vaggi and Frigerio (2021) tailor these concepts to low-income countries. They shed light on the relationship between public spending and *external* indebtedness, which is central in the case of EDE countries. Their research spotlights how growth metrics and interest payments on external debt shape debt sustainability and, hence, fiscal choices related to human development goals. In this sense, developing economies face quite specific and unique challenges, especially for those countries deeply integrated into the global financial system with unsophisticated production structures. Such economies struggle to use fiscal interventions effectively due to international financial ties, making them vulnerable to external economic shocks. This entanglement of constraints results in a cyclical trap or "*gridlock"* of underdevelopment, wherein macroeconomic instability, fiscal policy limitations, and external vulnerabilities stifle growth, diversification, technological advancement, and any possible proactive use of fiscal policy for long-term development goals. Given such a scenario, how EDE countries could pledge considerable funds to support SDGs and Environment Sustainable Goals (ESGs), more specifically, appears even more problematic and questionable.

This paper contributes to the literature by linking Pasinetti's debt sustainability framework with the fiscal realities of structural change and ecological transition in EDE countries. In this way, we introduce novel theoretical lenses to understand the underdevelopment "gridlock" that seems to persistently hinder economic progress in several EDE countries, and that global financial integration may have possibly made more pervasive.

We apply Pasinetti's sustainability geometry to the case of EDE countries by presenting a modified version of the model of Vaggi and Prizzon (2014) and Vaggi and Frigerio (2021) by incorporating previously overlooked variables such as the exchange rate and the foreign reserve policies of central banks. Moreover, we analyse how external debt sustainability is fundamentally influenced by EDE countries' integration into international financial markets and exposure to global financial cycles. Periods of "bulls" and "bears" in international financial markets can modify the Pasinettian external-debt-to-GDP ratio safe zone, hence, EDE countries' space for SDG/ESG-oriented fiscal policies (read green public investment, for instance). We show how this happens via multiple channels: (i) by influencing the determination of interest rates and the evolution of the exchange rate, hence the cost and *burden* of foreign currency-denominated debt; (ii) by fostering (hampering) growth in times of booms (turbulences); (iii) by feeding domestic credit booms-and-burst dynamics, hence the net income position of the domestic private sector; (iv) by modifying the structural composition of the economy, hence the intensity with which current account deficits/surpluses respond to fiscal policy stances. In this sense, our analysis also merges Pasinetti's insights about debt sustainability with his contributions to technological progress and structural change. We show how more diversified economies could better reap the potential benefits of periods of financial "bonanza" whilst escaping the hardship posed by global financial turmoil. Three main points of our study are worth stressing:

1. Expansionary phases in the global financial cycle might potentially open "windows of opportunities" for SDG/ESG-oriented fiscal policies in EDE countries by expanding Pasinetti-type external debt's sustainability area via lower interest rates and appreciations (or smaller depreciations) of the exchange rate (among other factors). Such opportunities are more hypothetical than real, though. Surges in financial inflows to EDE countries often come with widening private sector's imbalances, signs of premature deindustrialisation, and larger current account deficits. Public spending, particularly public investment, may have to shrink to preserve debt sustainability.
2. Cuts to public spending to support green technologies, the green transition and structural change could become even more challenging if "bulls" are followed by "bears" in international financial markets. Reversal of international funds, as frequently triggered by monetary tightening in leading centre economies, can significantly narrow the area of debt sustainability. Such external-led push for current account surpluses may translate into the downsizing of public investment.

3. More diversified and technologically advanced productive structures make current account positions more solid (i.e., they exhibit lower deficits or larger surpluses). This, in turn, enables countries to have more margins of manoeuvre as to public investment and fiscal support for green policies. The opposite applies to countries with more fragile and less developed productive systems. Whilst the former may forge ahead in a virtuous cumulative process, the latter may remain stuck in a never-ending gridlock.

The paper is organised as follows. Section 2 presents Pasinetti's sustainability geometry when applied to EDE countries and shows how it is fundamentally shaped by financial integration and EDE countries' exposure to the global financial cycle. Section 3 connects Pasinetti-like sustainability analysis to the development of "gridlock". Section 4 presents an econometric analysis underpinning theoretical studies about the effects of international financial factors and domestic productive development over domestic fiscal space. Section 5 draws some policy implications, and Section 6 concludes.

2. Financial integration, structural change and fiscal policy space: A theoretical application of Pasinetti's sustainability geometry to EDE countries

International shocks such as the 2007-2008 Global Financial Crisis (GFC) and, more recently, the Covid-19 pandemic and the conflicts in Ukraine and Israel could lead to a prolonged downturn in private investment. Such events may have actually worsened an already gloomy scenario in several developing regions. In Latin America, for instance, in the 2010 decade, private investment has halved to about 80 – 90 per cent of its level in 2005 despite extraordinarily abundant capital inflows to the region (Perez Caldentey *et al.*, 2019). In a way, EDE may have presented some financial patterns typical of finance-led Minskyan cycles (Frenkel and Rapetti, 2009) but without experiencing any boom in the real side of the economy, in productive investment first and foremost (Chui *et al.*, 2016; Perez Caldentey *et al.*, 2019).

These short/medium-term issues also relate to long-term concerns. Think about tackling climate change and advancing the ecological transition. Indeed, addressing the impacts of climate change and meeting sustainable development objectives demand substantial private and public investment. Without such investment, feeding the structural change of EDE countries and achieving a transition to a zero-emission economy becomes unthinkable.

In such a dismal business climate, expansionary fiscal policy and public investment may be more important than ever to stimulate economic rebound out of short-run shocks, feed long-

run structural change, and support the ecological transition[1]. On the one hand, adequate fiscal space for anti-cyclical fiscal policies may help smooth business cycles and avoid excessive macroeconomic instability, which often harms irreversible investment in manufacturing sectors (Ocampo, 2011; Botta, 2017; Spinola, 2020). On the other hand, public investment may structurally improve the economy's long-term growth potential by raising its non-price competitiveness (Neto and Porcile, 2017).

Exploring financing for recovery and long-term development plans is essential, and the scholarly community has been investigating this issue. In that sense, Pasinetti (1998, 2000) serves as a foundation for understanding debt sustainability. His work focuses on the "geometry of debt sustainability", a framework that identifies conditions under which nations can maintain higher debt levels without affecting their economic health. This framework aligns debt with investment goals over the long run.

Sustainability becomes even more pressing when considering EDE countries. Vaggi and Prizzon (2014) and Vaggi and Frigerio (2021) extend Pasinetti's insights to more fragile nations such as low- and low-middle-income countries. Their research points to the interplay between financial elements and structural economic determinants that underpin external debt sustainability in EDE countries. According to their analysis, fiscal policy formulation gets even more complicated in EDE countries, given their need to jointly look after growth and payment commitments on hardly sustainable amounts of foreign debt.

Both Pasinetti (1998, 2000), Vaggi and Prizzon (2014), and Vaggi and Frigerio (2021) focus on the need for funds that support long-term growth without adding to debt dependency or making debt unsustainable. This observation becomes paramount when considering EDE countries' integration in financial markets, exposure to global financial cycles, and the risks of a finance-led growth pattern. Indeed, the economic literature mentioned above suggests that this growth strategy may induce increases in (external) debt not matched with productive investment, ultimately leading to possible financial crises. Unlike advanced economies such as the US and the EU, financial integration and volatile capital flows, when combined with EDE countries' weak productive structures, may set severe constraints more than opportunities for EDE countries' capability to implement public finance-led recovery and long-term development plans (Camara Neto and Vernengo, 2005; Neto and Porcile, 2017; Vernengo and Perez-Caldentey, 2020). When access to financial markets is volatile, and debt costs can take

[1] According to Serebrisky *et al.*, (2020), public investment in green and digital infrastructures in Latin America could have an income multiplier as high as 1.5 over a five-year time span.

up a large portion of public revenue, EDE countries can likely see their public sector's capacity to invest in services, infrastructure and green structural change restricted to the bones.

To delve into the relation between foreign debt, structural change and domestic economic policy, let's take Pasinetti's debt sustainability framework (see Pasinetti, 1998, 2000) and its extension to EDE countries by Vaggi and Prizzon (2014) and Vaggi and Frigerio (2021) as starting point of our analysis. Let's focus on external debt dynamics emerging from BoP national accounting. Equation (1) below describes the well-known relation between the current account (*CA*), the financial account (*FA*), and the variation in the stock of foreign reserves (*ΔFR*) held by the domestic central bank:

$$CA + FA - \Delta FR = 0 \rightarrow CA - \Delta FR = -FA \qquad (1)$$

Following Vaggi and Prizzon (2014) and Vaggi and Frigerio (2021), we define the non-interest Current Account (*NICA*) as the portion of the current account balance excluding factor payments such as interest payments. Assume, for the sake of simplicity, that there are no other forms of current income transfers, such as remittances or profit repatriations (see more on this in footnote 2), and that EDE countries have accrued external debt in the past so that they are obligated to make positive net interest payments. We have:

$$CA = (X - M) - iD \rightarrow NICA = CA + iD \qquad (2)$$

Where (*X*) and (*M*) are export and import flows, and (i) is the interest rate on accumulated net foreign debt stock (*D*), all variables being expressed in domestic currency. Let also assume the foreign debt is denominated in foreign currency, say US dollars, with (e) being the nominal exchange rate and (*F*) the stock of foreign debt in foreign currency (i.e., *D* = *eF*). By plugging equation (2) into (1), we get:

$$NICA - ieF - e\dot{R}^{CB} = -e\dot{F} \qquad (3)$$

Where $\dot{R}^{CB}$ is the variation of foreign reserves held by the domestic central bank and $\dot{F}$ is the variation of foreign debt in foreign currency[2]. After normalising both sides of equation (3) by EDE countries' nominal GDP (*Y*), we obtain:

$$c - id - \gamma^{CB} = -d\hat{f} \qquad (4)$$

Where $c = \frac{NICA}{Y}$; $d = \frac{eF}{Y}$; $\frac{e\dot{R}^{CB}}{Y} = \gamma^{CB}$ and $\hat{f}$ is the growth rate of the stock of foreign debt (in foreign currency).

Let's assume that the domestic central bank pursues a specific *target* ratio (φ^{CB}) in the variation of domestic foreign reserves with respect to capital inflows $\dot{F}$, with $0 \leq \varphi^{CB} < 1$ for precautionary purposes against possible capital reversals and the risks of collapses in the exchange rate. We can write: $\frac{\gamma^{CB}}{d} = \frac{e\dot{R}^{CB}/Y}{eF/Y} = \frac{e\dot{R}^{CB}}{\dot{F}}\frac{\dot{F}}{eF} = \varphi^{CB}\hat{f}$

Finally, let's consider the dynamics in the stock of foreign debt once converted into domestic currency (*D*), which also includes the evolution of the nominal exchange rate, as stated in equation (5) below:

$$\dot{D} = \dot{e}F + e\dot{F} \qquad (5)$$

After a bit of algebra, by combining equations (4)-(5) together and studying the dynamics of the external debt-to-GDP ratio $d = (D/Y) = (eF/Y)$, we obtain the two intertwined equations (6) and (7) reported below:

$$c = (1 - \varphi^{CB})\left(\hat{e} + \frac{1}{1-\varphi^{CB}}i - g\right)d \qquad (6)$$

$$\dot{d} = \left(\hat{e} + \frac{1}{1-\varphi^{CB}}i - g\right)d - \frac{1}{1-\varphi^{CB}}c \qquad (7)$$

[2] In equation (3), we make the implicit assumption that all international financial flows are constituted by transactions in debt instruments, i.e., public and corporate bonds or international (bank) credit, whilst we neglect to consider FDI or investment in equities. This is obviously a simplifying assumption that makes our model more tractable without altering in any way its implications. Indeed, whilst FDI and foreign investment in the domestic stock exchange are different "animals" than foreign debt from a legal point of view, they could bear similar macroeconomic consequences such as transferring abroad part of domestic income via profit repatriation. Following Singh (2003), such transfers could simply add to international interest payments and make the BoP and foreign exchange constraints EDE countries have to deal with even more stringent.

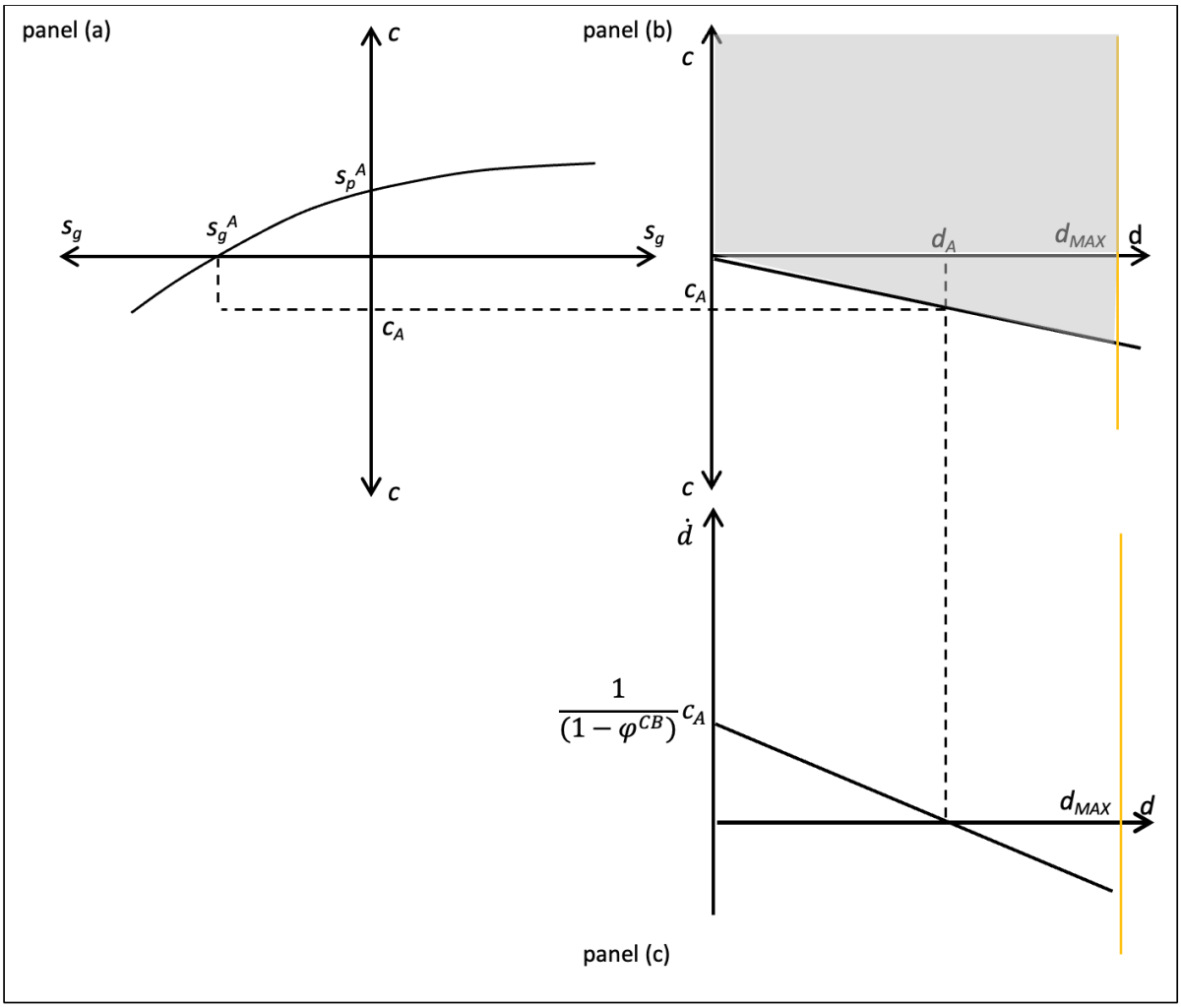
Equation (6) defines the value of NICA (as a ratio of GDP) "*c*" that, given a specific value of "*d*", would ensure the external debt-to-GDP ratio itself remains constant. Equation (7), instead, describes the dynamics of the external debt-to-GDP ratio over time, i.e., $(\dot{d})$. Both equations represent extensions of the analysis by Vaggi and Prizzon (2014) and Vaggi and Frigerio (2021). Differently from them, we explicitly model the role of the nominal exchange rates and the central bank's reserve policies in determining external debt sustainability. Under the reasonable assumption that (most of) EDE countries' external debt is denominated in foreign currency, any depreciation in the nominal exchange rate (i.e, $\hat{e} > 0$) would imply an increase in the (domestic currency) burden "*d*" of foreign debt "*f*". On the other hand, a depreciation of the exchange rate requires a more positive non-income current account balance "*c*" (i.e., lower deficits or larger surpluses) to keep "*d*" constant in equation (6).

Since the beginning of the 2000s, and even more intensely after the 2007-2008 financial shock outbreak, central banks in developing countries have built up large stocks of foreign reserves (at least more significant than what has historically been done). They did so to tame excessive monetary effects of surges in foreign capital inflows (too strong appreciations of the exchange rate, for instance) and to gain more margins of maneuverer against turbulences in financial and foreign exchange markets. The accumulation of foreign reserves has more frequently happened via swap credit lines with central banks in developed countries. Such a form of "official" credit does not come without costs, though, from an economic and political point of view[3]. Equations (6) and (7) clarify that the higher the foreign reserve target (φ^{CB}) pursued by the domestic central bank, the more positive non-income current account balance "*c*" must be to impede that "borrowed" foreign reserve cause an increase in the overall external liabilities of the economy.

Once equations (6) and (7) are defined, we can now apply Pasinetti's "geometry of debt sustainability" to the case of EDE countries' external debt. We do so in Figure 1 below.

[3] The economic costs of foreign reserves may consist in the net *positive* transfer of resources abroad due to usually *negative* interest rate differential on foreign assets' holding between peripheral and central economies (Akyüz, 2021). Sahasrabuddhe (2019), instead, provides evidence of the possible political costs of swap lines with US FED in the form of broader alignment with FED's political agenda and preferences in support of free capital mobility and financial account liberalization.

Figure 1. Pasinetti's "geometry of debt sustainability" and fiscal policy space in EDE countries.



The top-right panel (1.b) represents equation (6) under the assumption (at least for the time being) that nominal income growth "g" is positive and larger than $\left(\hat{e} + \frac{1}{1-\varphi^{CB}} i\right)$. "$d_A$" stands for the accumulated level of external debt (as a share of GDP), and "c_A" is the level of NICA (a deficit in this case) that is required to keep "d_A" constant. The grey area in panel (1.b) is Pasinetti's "sustainability area". For different levels of the initial debt stock "d", values of "c" inside such area (i.e., points located above or on the graphical representation of equation (6) – see black straight line) keep initial debt stable or make it decrease. On the right, the sustainability area is limited by "d_{MAX}", i.e., the maximum acceptable amount of debt that international financial markets allow EDE countries to accumulate[4].

[4] The economic literature does not provide any precise measure for "d_{MAX}" as it also varies from time to time according to changing sentiments and psychology on international financial markets – this is indeed a sign of EDE countries' exposure to global financial cycles. What empirical evidence offers though is the well-known stylized

The bottom-right panel (1.c) in Figure 1 reproduces the dynamic equation for the external debt-to-GDP ratio (see equation (7) above) that corresponds to the sustainability "threshold" portrayed in panel (1.b). It simply shows that for $c = c_A$, external debt would effectively converge and stabilise at $d = d_A$.

Finally, in Figure 1 we further extend Vaggi and Prizzon (2014) and Vaggi and Frigerio (2021) by providing a more formal and explicit analysis of the relation between public and private sector balances and NICA "*c*". We do this in the top-left panel (1.a). We know from national accounting that the current account balance mirrors both public and private sector balances, i.e., $S_g + S_p = NICA - ieD$, where S_g and S_p are nominal public and private savings, respectively. Since ieD are payments related to the accumulated debt stock, we can then express *NICA* – and its ratio to domestic income more precisely – as function of public and private savings, see equation (8) below (variables in small letter stand for ratios with respect to *Y*):

$$c = \rho(s_g, s_p) \text{ with } c'_{s_g} > 0;\ c'_{s_p} > 0 \qquad (8)$$

Equation (8) is graphically represented in panel (1.a) in Figure 1. It is represented as an upward-sloping curve in the ($s_g - c$) space since that larger public savings would normally lead to improving non-income current account balances. The position of equation (8) in turn depends on private savings (s_p). *Ceteris paribus*, larger (smaller) private savings will move $\rho(.)$ up (down). Last but not least, the shape of equation (8) may depend on various structural and cyclical factors. From a structural point of view, it is reasonable to expect that more (less) diversified, technologically advanced and structurally developed economies would feature more convex (concave) $\rho(.)$ functions. Indeed, due to higher capability to export and lower dependence on imports, more technologically advanced economies may likely generate lower (non-income) current account deficits or larger surpluses than backward economies for whatever public sector balance. When thinking of cyclical factors, periods of fast growth and/or exchange rate appreciation can reduce convexity (increase concavity) of $\rho(.)$, leading to relatively larger (non-income) current account deficits (lower surpluses) regardless of the

fact that EDE countries can usually afford much lower levels of external indebtedness than central economies, and that debt crises could unfold for debt levels that would be normally considered safe in developed countries (see Reinhart *et al.*, (2003), for instance).

possibly restrictive stance taken by the public sector[5]. Given such properties of $\rho(.)$, panel (1.a) matches "c_A" as determined on the right-hand part of Figure 1 with "sustainable" fiscal policy space (s_g^A) for a certain private sector balance s_p^A that we assume initially positive for the sake of our analysis (see more on this below).

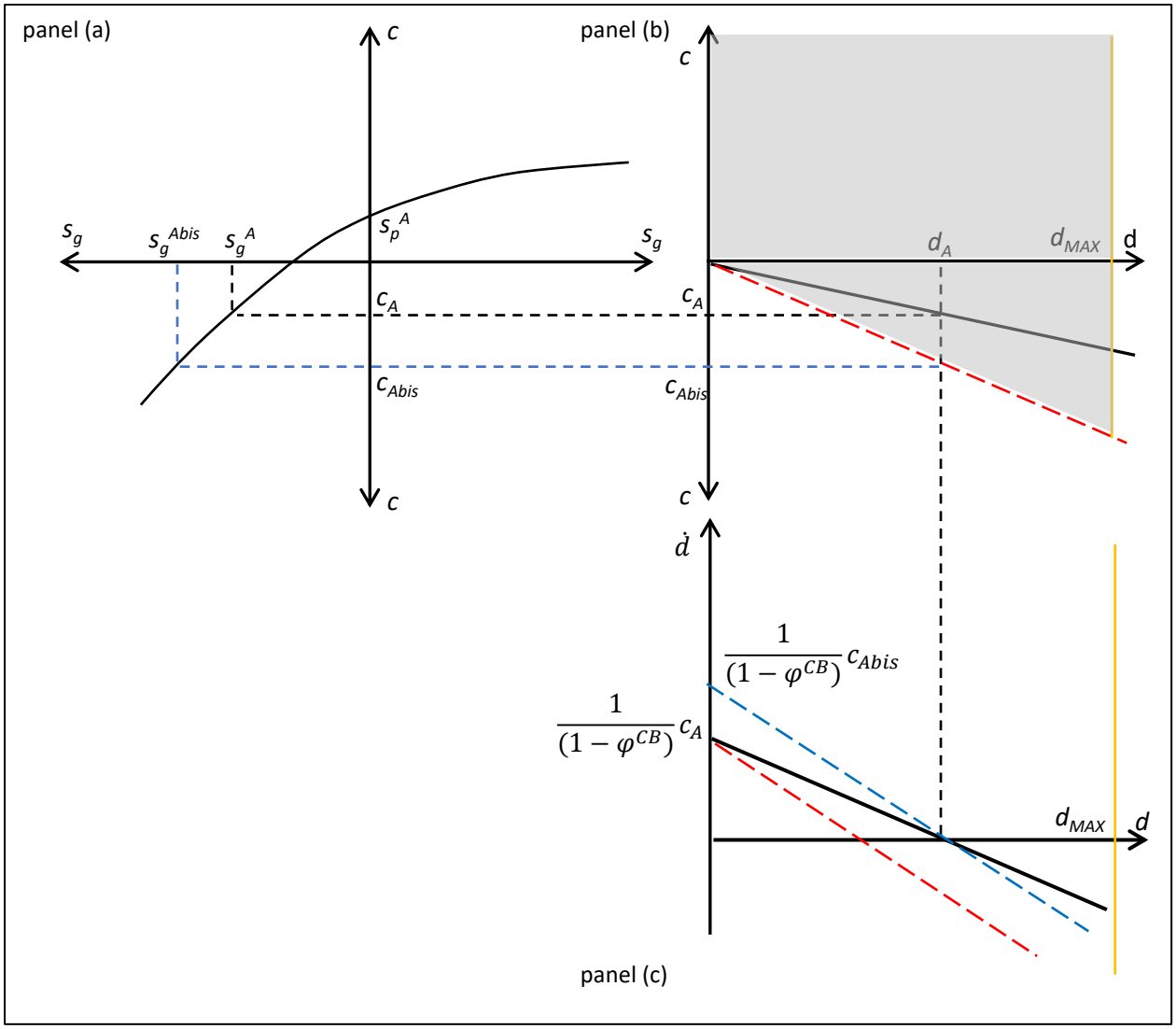
2.1 Financial integration: big opportunities in theory, more constraints in reality?

With all the pieces of the puzzle in place, we can now analyse how financial integration and the global financial cycle can benefit or challenge EDE economies via their implications over domestic fiscal policy and the dynamics of the external debt-to-GDP ratio. Let's assume that we are in an expansionary phase of the global financial cycle. There is plenty of cheap liquidity on international financial markets (perhaps due to expansionary monetary policy in centre economies), and investors' propensity to risk is high (as captured by low values of the VIX index). In such a scenario, EDE countries can easily get benefits from benevolent conditions on international financial markets: interest rate "*i*" declines, and the nominal exchange rate remains stable or even appreciates (i.e., $\hat{e} < 0$) thanks to abundant liquidity pouring into the economy. Economic growth "*g*" may get momentum. Figure 2 shows the implications of such a possibly temporary phase of international financial exuberance over Pasinetti's "geometry of debt sustainability". Equations (6) and (7) rotate clockwise in panels (2.b) and (2.c), respectively – see dashed red lines. In panel (2.b), the sustainability area expands. In panel (2.c), the initial non-income current account balance "c_A" now becomes consistent with a lower long-run stable value of the external debt-to-GDP ratio. The other way around, "bulls" on international financial markets seem to open *windows of opportunities* for EDE countries. On the one hand, as just said, EDE countries may decide to keep "*c*" at its current level (c_A) and hence prompt convergence versus a permanently lower stable value of "*d*". On the other hand, they may alternatively opt for exploiting more margins of manoeuvre and embark on public investment programmes spurring green transition, the eco-friendly structural change of the economy, and the development of green technology whilst keeping external indebtedness at "d_A". In Figure 2, the gap between s_g^{Abis} and s_g^A in panel (2.a) stands for the wider space for fiscal spending supporting structural change and green transition. "c_{Abis}", instead, represents

[5] In a way, the changing shape of function $\rho(.)$ is a clear indication of the highly complex non-linear and context-specific relation connecting s_g to c.

the new larger non-income current account deficit consistent with a stable external debt-to-GDP ratio "d_A" – see dashed blue line in panel (2.c).

Figure 2. Financial "bonanza" and windows of opportunities



According to Neto and Porcile (2017) and Valdecantos (2021), if effective, public investment plans could tackle the sustainability trilemma and ignite a virtuous cumulative process. Technological leaps towards green technology and structural change could make the economy's external balance structurally more solid and less sensitive to public and private spending. Function $\rho(.)$ gets increasingly convex. Whilst current account deficits may decline (or even turn positive) for whatever level of s_g and s_p, the initial boost in public spending may progressively rein in, both facts prompting a reduction in the long-run stable value of the external debt-to-GDP ratio. In such an ideal scenario, financial integration, periods of financial

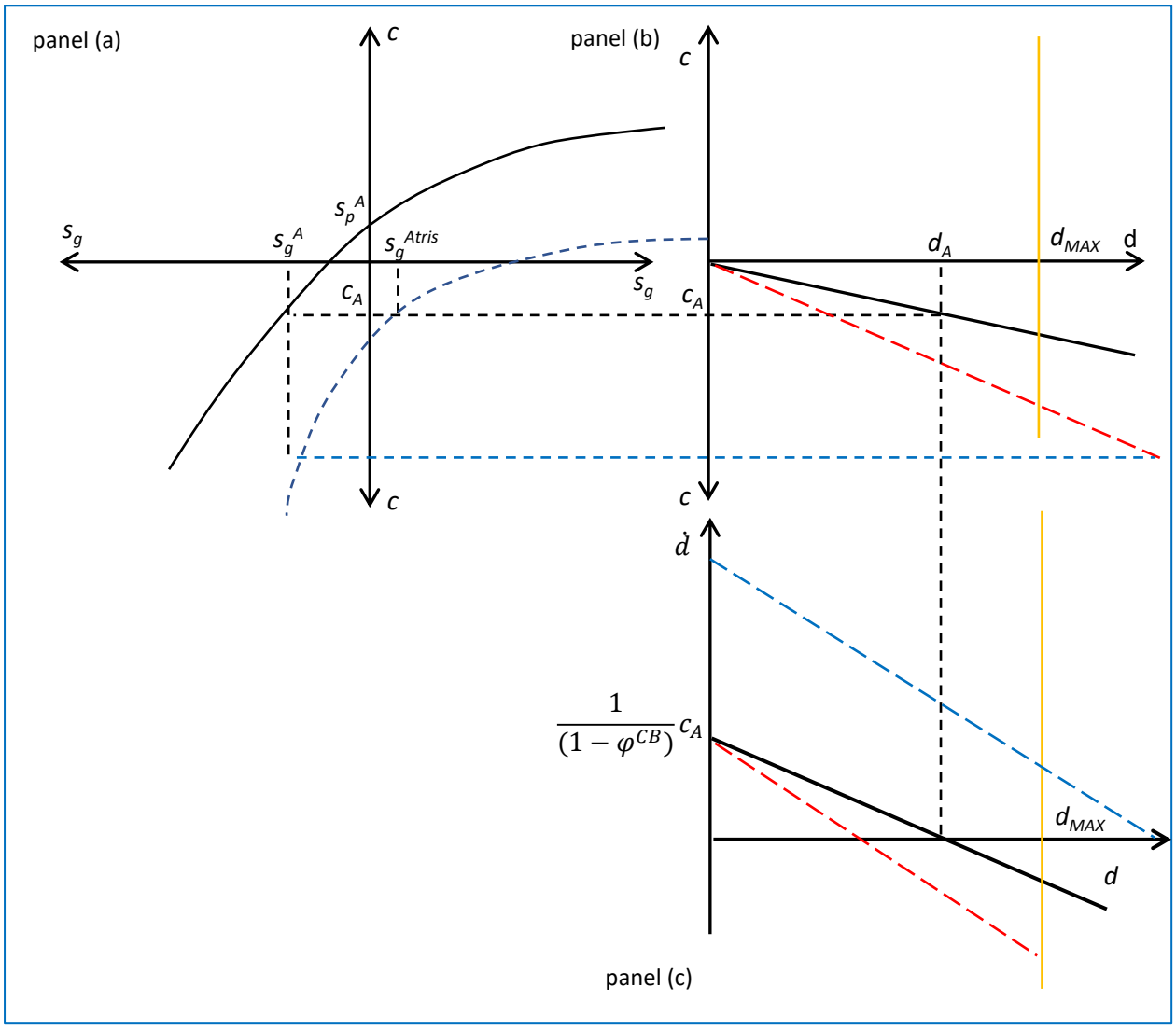
"bonanza", and surges in capital inflows may hypothetically favour the development of a structurally and technologically more advanced economy that comes along with lower long-run external indebtedness and stronger macroeconomic stability.

The reality tells us that things are not so simple and straightforward. Indeed, periods of financial bonanza can give rise to macroeconomic imbalances that may ultimately create more limits than opportunities to SDG/ESG-oriented public investment and to the green transition, at least for three reasons.

First, expansionary phases in the global financial cycle may easily lead to the deterioration of private sector balances (Taylor, 1998; Frenkel and Rapetti, 2009; Ocampo *et al.*, 2009). Function $\rho(.)$ moves downward in Figure 3 below (see dashed blue line in top-left panel (3.a)), so that a larger current account deficit would emerge for any given level of the public sector balance. *Ceteris paribus*, the space for fiscal expansions and public investment shrinks from s_g^A to s_g^{Atris} to maintain "*c*" equal to "c_A" and "*d*" stable to "d_A". One could refute this view by claiming that larger private sector imbalances may mirror investment booms, contributing to upscaling the economy's productive structure and financing the green transition. If private investors might "do the job", as international institutions suggest and hope (Ananthakrishnan *et al.*, 2022), the public sector might focus on preserving external debt sustainability and macroeconomic stability. Available empirical evidence tends to debunk such an "optimistic" view. The private corporate sector took advantage of favourable conditions in international financial markets. It led to the accumulation of EDE countries' external debt in the 2010s, prevalently invested in the non-tradable sector, in real estate first and foremost (Chui *et al.*, 2016; Perez Caldentay *et al.*, 2019). No signs of progress were registered regarding diversification and structural change of the economy, whilst signs of re-primarization emerged (see Bibi and Valdecantos (2023) about Peru, for instance). Green technologies and eco-friendly sectors were certainly not private investment targets in EDE countries.

Second, and consistent with the previous point, recent empirical evidence suggests that episodes of financial bonanza may cause *premature* deindustrialisation (Benigno *et al.*, 2015; Tregenna *et al.*, 2021; Botta *et al.*, 2023). This induces the productive system to become structurally more fragile. With finance-led cyclical factors such as temporary growth spurts and appreciating exchange rates, such *regressive* structure change makes EDE countries more prone to current account deficits (increasingly convex $\rho(.)$ function in Figure 3). In such a scenario, the macroeconomic need to keep external imbalances low and external debt sustainable makes room for green fiscal policy even smaller.

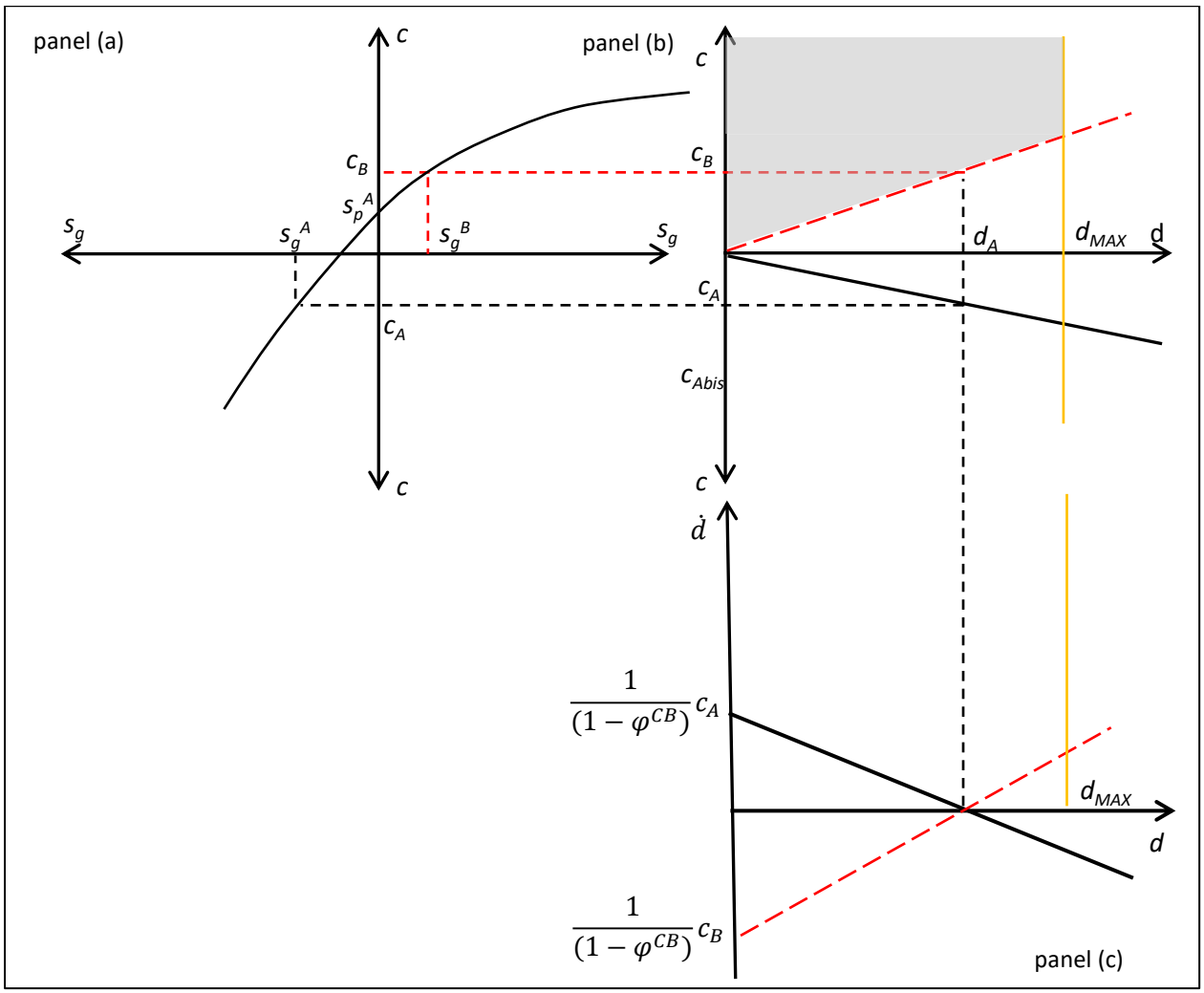
Figure 3. Financial bonanza, private sector imbalances and the quest for fiscal buffers



Third, periods of financial "bonanza" may progressively morph into and sometimes abruptly switch to periods of high-risk aversion by international investors and spread financial stress. Such "regime change" can be caused by the recent monetary tightening of leading central banks in developed economies or unexpected economic shocks, such as the Covid-19 pandemic and/or the Ukraine war. For whatever reason, EDE countries may suddenly pass from facing favourable external conditions on international financial markets to tackling much stricter ones. Implications for Pasinetti's "sustainability geometry" are depicted in Figure 4 below. On the one hand, pessimistic moods on international financial markets may cause interest rates to soar. Nominal exchange rates may face depreciation pressures. Economic growth may slow down if it does not become negative and give rise to a recession. All in all, the sustainability threshold in panel (4.b) will now rotate counter-clockwise (see red dashed line in top-right panel (4.b))

and possibly become positively sloped. The area of stability becomes considerably smaller (see grey area in Figure 4) and forces the country to run *NICA* surpluses instead of deficits. This is even more so if the reversal of the cycle in international financial markets also reduces the maximum acceptable level of the external debt-to-GDP ratio by international investors (i.e., a leftward move in the yellow line in Figure 4). The debt dynamics equation rotates counter-clockwise in panel (4.c) and becomes positive-sloped. The economy may thus enter a worrisome destabilising path where the debt-to-GDP ratio starts to increase and diverge until the economy is inevitably forced to default.

Figure 4. Reversal in the global financial cycle and procyclical fiscal austerity



As said, the initial debt-to-GDP ratio is kept stable only if the economy now runs a large positive non-interest current account balance c^B. The public sector must cut fiscal spending and adopt strict austerity policies to achieve this. The public sector balance might have to move

from deficit s_g^A to large surplus s_g^B. In such a scenario, thinking about public investment and fiscal support for green structural change seems heroic.

3. Linking Pasinetti's "geometry of debt sustainability" to the economic gridlock

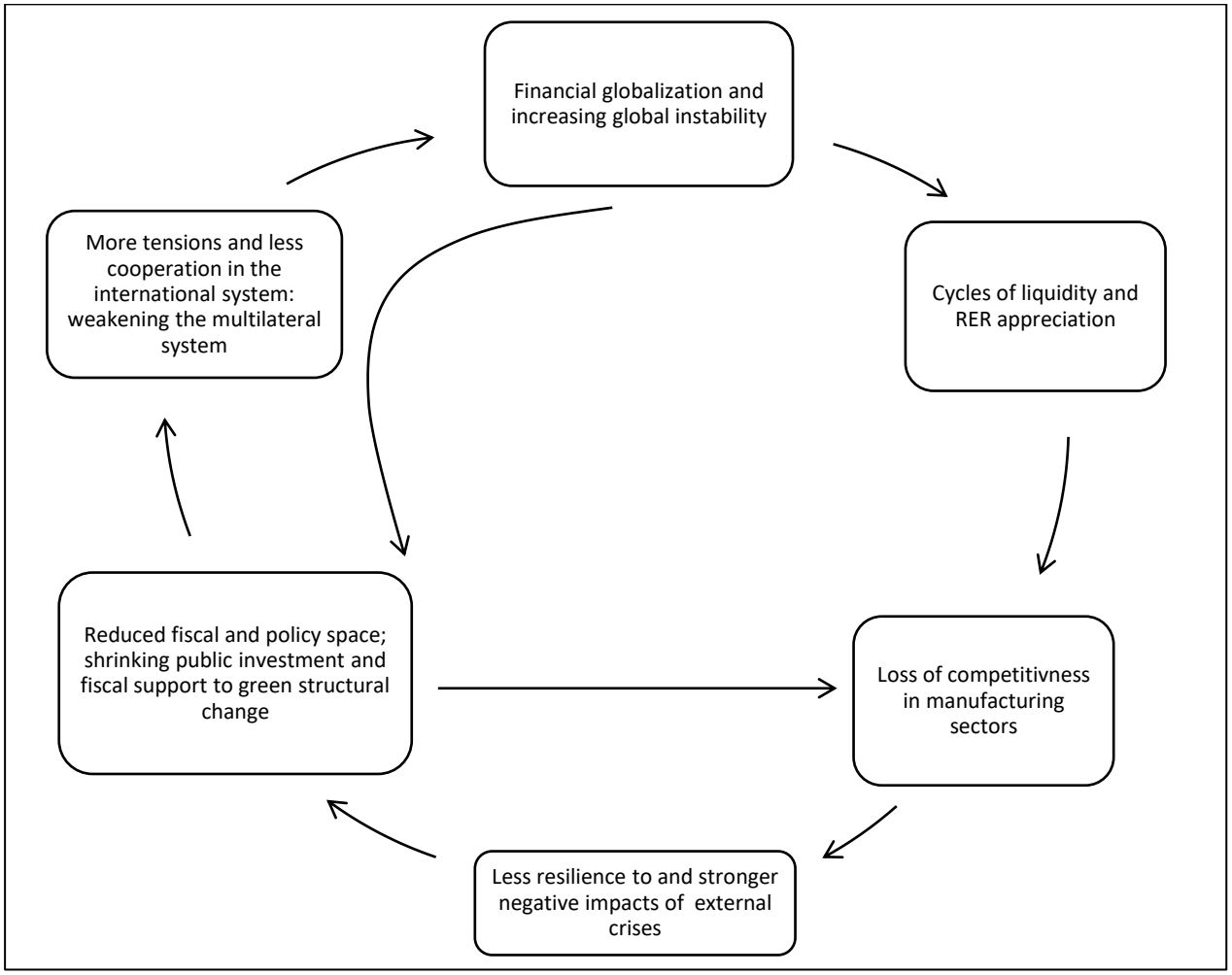
In section 2, we have applied Pasinetti's "debt sustainability geometry" to EDE countries to analyse how financial integration and exposure to the global financial cycle shape debt sustainability, fiscal policy space and, ultimately, the structural dynamics of their economies. We have emphasised the extraordinarily complex tasks EDE countries have to deal with when trying to combine public support with productive development and external debt sustainability. This is particularly true for countries that are deeply embedded in the global financial system and at lower ranks of the currency hierarchy (De Paula *et al.*, 2017), since restrictive fiscal stances are normally dictated by the need to ensure foreign debt commitments are met (Giron and Correa, 2021).

Our analysis suggests that all the ingredients for an underdevelopment trap regarding sustainable development in EDE countries seem to exist. They may be stuck in a "gridlock" as portrayed in Figure 5 below. The economic gridlock implies that the existing development path tends to reproduce or amplify slow growth and technological backwardness endogenously, giving rise to a self-reinforcing process of lack of structural change, narrowing space for long-term development policies and persistent vulnerability on international financial markets.

Financial liberalisation and financial booms can fuel (short-lived?) expansions and raise the risk of subsequent downturns (Calvo *et al.*, 1996; Reinhart and Reinhart, 2009; Palma, 2013). Fiscal policy is more often advocated to offset finance-led disarrays in the private sector by building up fiscal reserves during economic booms to be used in downturns. Yet, fiscal policy's action can be hindered when it is tasked with specific responsibilities, such as directing investment towards resilient industries and those crucial for the green transition. Open financial accounts and volatile capital flows may in fact narrow the space for pro-development fiscal policies in order to retain foreign (and domestic) private investors' confidence. Public investment in support of productive development is the type of public expenditure most likely to be cut to balance public finances. This heightens the trade-off between stabilisation of short/medium-term finance-led cycles and support to long-term productive development in EDE countries. An almost exclusive focus on stabilisation leads to forgetting that structural

change and technological progress are the most powerful, long-lasting remedies against macroeconomic vulnerability (Chang and Lebdioui, 2020).

Figure 5. The gridlock: Financial integration, fiscal austerity and productive backwardness



More than this, financial liberalisation and integration in the global financial market, when followed by surges in capital inflows, can *directly* jeopardise diversification towards manufacturing and green technologies. This can happen due to the negative impacts of short-term capital inflows over nominal and real exchange rates, hence the international competitiveness of EDE countries. Alternatively, this may take place when booming capital inflows direct credits towards speculation-prone sectors such as real estate that have little to do with productive diversification and technological learning. As said, financial booms may lead to phenomena of premature deindustrialisation.

What is worse is that lower productive diversification, poor technological capabilities, and reduced fiscal space interact and reinforce each other in a self-feeding perverse process (see

the "inner" circle at the bottom of the gridlock in Figure 5). Indeed, the lack of structural change and the creation of formal employment reduce governments' tax base and weaken its fiscal space even further. Domestic governments cannot create inclusive social security systems or provide enough funding for long-term investment. Fiscal policy becomes more procyclical and exacerbates (rather than taming) macroeconomic uncertainty. Lower resilience to economic crises, higher vulnerability to shocks, and narrower space for anti-cyclical (fiscal) policy all disincentivise innovation and productive investment in complex, more technologically intensive, and risky industries such as those connected to green technologies that also need long-term "patient" (often public) finance to develop (Lamperti *et al.*, 2019). Ultimately, the economy becomes less capable of building domestic technological knowledge and shortening the distance to the international technological frontier. The technology gap between developed and EDE economies endures, if not widens.

Last but not least, structural difficulties in the proper (anti-cyclical) fiscal policy management may lead economists and policymakers alike to wrongly diagnose fiscal dominance and identify fiscal policy as primarily responsible for heightened EDE countries' instability. Consistent with mainstream theory, this may provide (false) theoretical justifications for further financial liberalisation and integration rounds[6]. Moreover, serial defaults and more acute international disputes around debt litigations may hamper international cooperation and exacerbate intolerance against EDE country's debt.

Our concept of "gridlock" describes an economy caught in a detrimental spiral of stagnant growth, insufficient investment, and ingrained structural inflexibilities. From a theoretical point of view, the mechanisms of the gridlock stress once more the important insights emerging from Pasinetti's academic studies. They help to unveil the not-so-implicit connection between Pasinetti's analysis of debt sustainability and his more classical works on the evolution of economic structures and technological progress (Pasinetti, 1981, 1993). These two streams of Pasinetti's thought help us better appreciate the need to align fiscal policy with economic

[6] Mainstream economic theory has traditionally indicated fiscal policy and *fiscal dominance* as the main source of enduring instability in EDE economies (Polak, 1957; Miller and Russek, 1989). According to this view, (large) fiscal deficits reduce domestic savings, raise interest rates and crowd out private investment. On the one hand, declining private investment slow down productivity dynamics and deteriorate the international competitiveness of the economy. On the other hand, public deficits result in current account deficits (the well-known "twins") that may eventually lead to the excessive accumulation of foreign debt and pave the way to external debt crises. According to the literature on financial repression (McKinnon, 1973; Shaw, 1973), financial liberalisation is the remedy against fiscal policy-led instability. It can impose rigorous market-driven discipline over fiscal dominance, remove inefficiencies in credit allocation, and avoid the crowding out of private investment as well as the implementation of inflation-biased macro policies (Jafarov *et al.*, 2020).

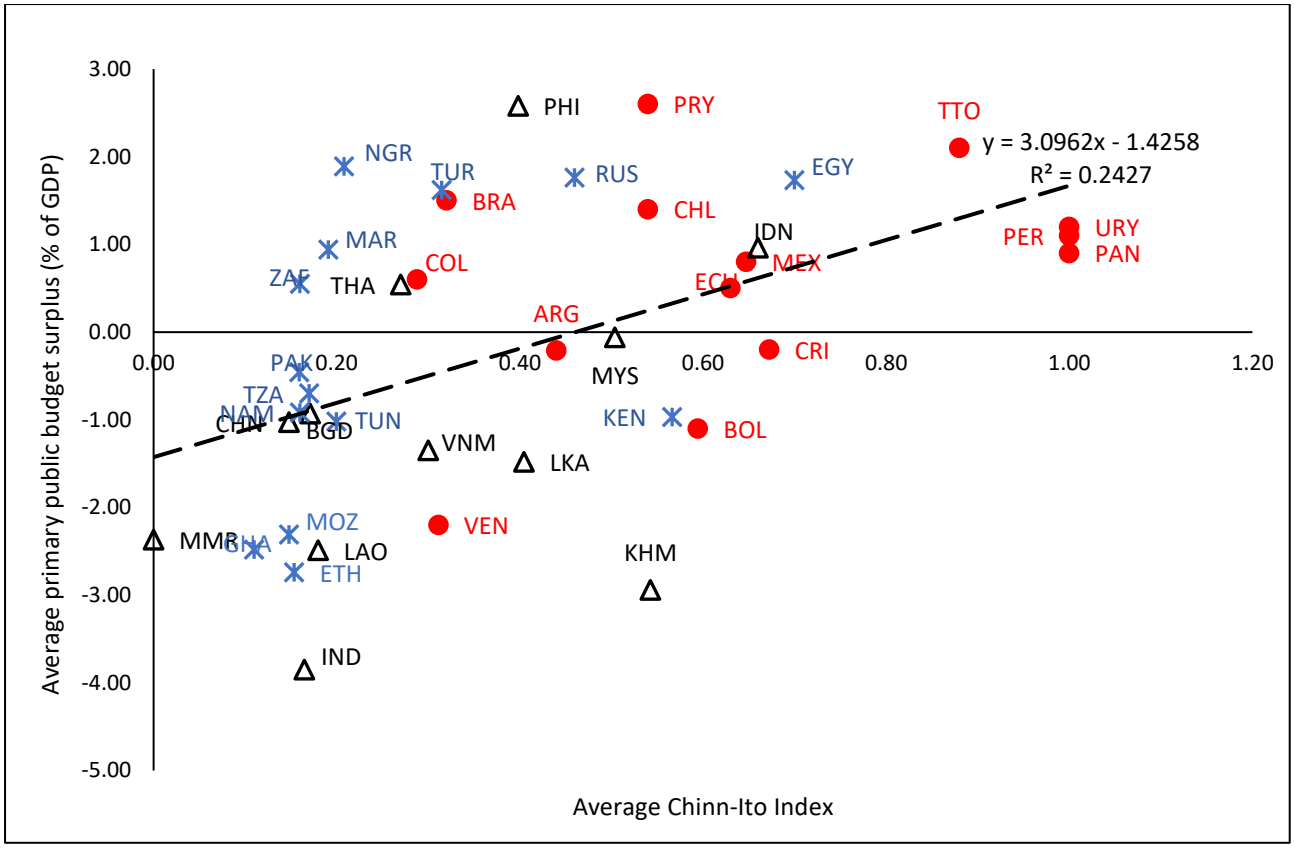
evolution and craft policies that promote and combine financial stability with support to sectoral shifts. Following Pasinetti (1998, 2000), merely reducing debt stock could be detrimental, as it might lead to austerity measures that further limit growth. Managing debt-related flows and framing fiscal policies to foster growth and structural transformation is crucial. For economies in the gridlock, there is a need to direct public spending towards areas like education, infrastructure, and R&D with increased emphasis on green technologies. Such investments can yield long-term benefits, promoting growth and facilitating debt service in the long run. They are crucial for transitioning to a more sustainable but also more resilient economy. Sound macroeconomic policies and financial stability are not just about weathering crises like the GFC or the Covid-19 pandemic, but also fostering a conducive environment to structural change and, now, green investment and technological learning for the ecological transition.

4. Empirical analysis

What does empirical data tell us about the relationship between financial integration, debt sustainability, and fiscal policy space? Figure 6 offers some preliminary evidence about the conservative fiscal policy bias possibly instilled in EDE countries by increasing financial integration. The scatter plot shows the correlation between financial openness as captured by the average Chinn-Ito index[7] and the average *primary* public budget surplus (as a share of GDP) from 1970 to 2018. We consider a sample of EDE countries for which enough fiscal data are available, including Latin American countries, fast-growing Southeast Asian economies and "other" EDE economies from the Middle East and Africa. The complete list of countries, together with the time coverage of our data, is reported in the appendix.

Figure 6 – Financial Integration and primary budget surplus, selected EDE economies.

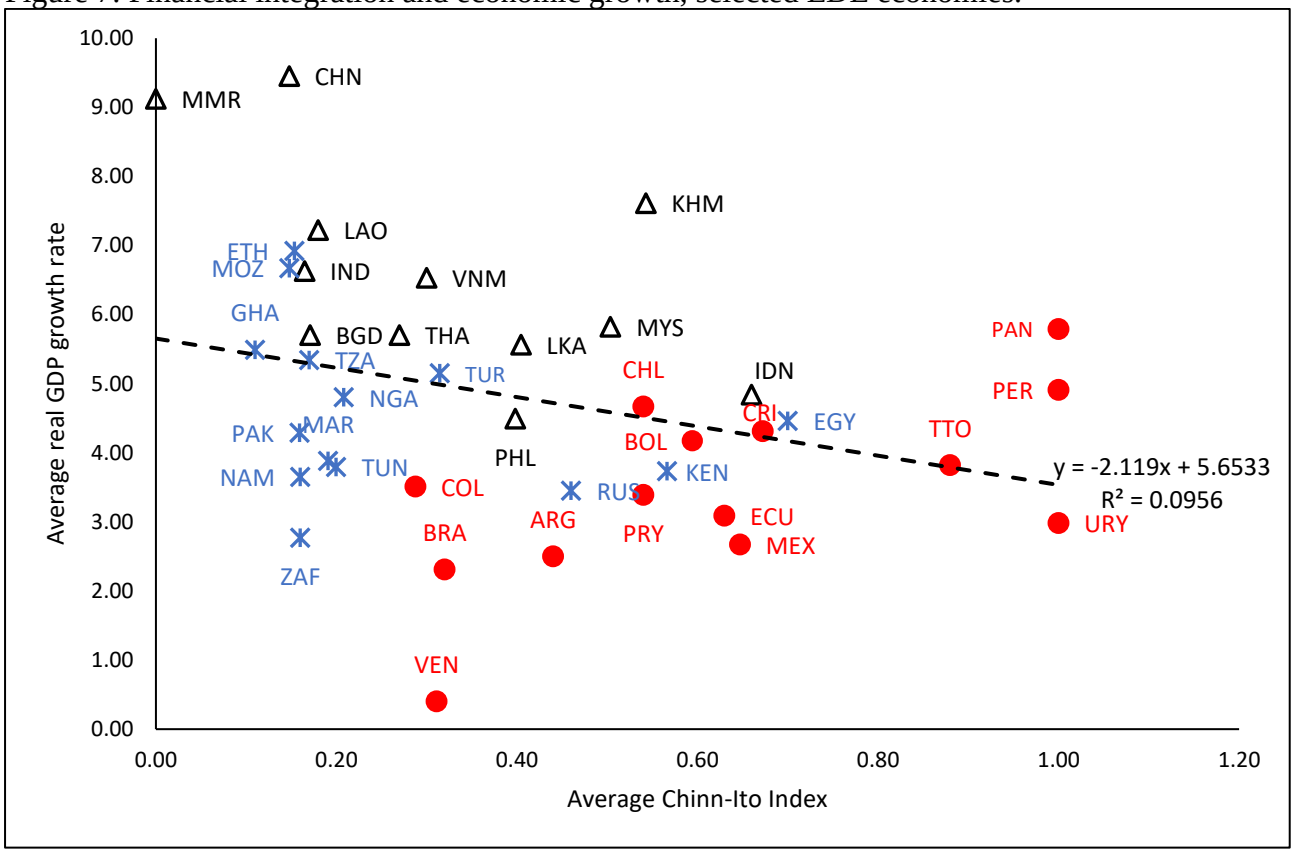
[7] Chinn-Ito index is a *de-jure* measure of financial integration that measures the degree of country's financial openness on the basis of country's restrictions to cross-border financial transactions. Its standardized value runs from "0" (no financial integration) to "1" (maximum integration in the global financial economy and no restrictions to international capital mobility). See Chinn-Ito database at https://web.pdx.edu/~ito/Chinn-Ito_website.htm.



Source: Author's computation based on the IMF World Economic Outlook and Chinn-Ito databases.

Figure 6 reveals that, *ceteris paribus*, there is a positive and quite strong correlation between the average Chinn-Ito index and primary fiscal surplus in EDE economies. The more financially integrated into the global financial system, the more likely it is that EDE countries run relatively restrictive fiscal policies and primary budget surpluses. Latin American and Southeast Asian countries are on opposite sides of the spectrum. Latin American countries record, on average, the highest degree of financial openness and tend to pursue restrictive fiscal policies. Southeast Asian countries, on the contrary, are generally less integrated into international financial markets and seem to have adopted more expansionary fiscal policies. Also note that the positive correlation between financial integration and primary fiscal surpluses in Figure 6 does not seem to be the "*spurious*" result of the effects that financial integration may bear over economic growth and, therefore, tax revenues. Figure 7 below suggests that there seems to be *no relation* between financial integration and growth, which is negative, if anything. Figure 7 is somehow consistent with Ostry *et al.* (2016), when they claim that "the impact of […] portfolio investment and banking and especially hot, or speculative, debt inflows – seems neither to boost growth nor to allow the country to better share risks with its trading partner" (Ostry et al., 2016, p.39).

Figure 7. Financial integration and economic growth, selected EDE economies.



Source: The author's computation is based on IMF World Economic Outlook and Chinn-Ito databases.

Despite such preliminary empirical evidence, we need a more articulated econometric analysis to better delve into the data about fiscal space, (external) debt sustainability and global finance. We take inspiration from Gosh *et al.* (2013), who provide a benchmark empirical study about fiscal space and debt sustainability for advanced economies. More specifically, we take the basic version of the econometric model by Gosh *et al*. (2013), and we extend it by including our variables of interest related to integration (and exposure) to global financial dynamics. We apply this model to a sample of 55 countries. We consider both developed and EDE countries to better appreciate possible *structural* differences between these two sets of countries. Equation (9) below formalises our estimation strategy:

$$pb_{i,t} = \gamma_0 + \gamma_1 b_{i,t-1} + \gamma_2 b_{i,t-1}^2 + \gamma_3 b_{i,t-1}^3 + \gamma_4 mansharegap + \gamma_5 r_{i,t}^{NR} + \gamma_6 tropen_{i,t} + \gamma_7 finopen_{i,t} + \gamma_8 V_{i,t} + \epsilon_{i,t} \quad (9)$$

As in Gosh *et al.* (2013), primary balance ($pb_{i,t}$) – government revenues minus expenditures, excluding interest payments on debt – is our dependent variable and the key indicator of

government's fiscal stance. Higher (lower) values of $pb_{i,t}$ stand for national governments running larger (smaller) fiscal surpluses either due to structural features of the economy or existing commitments to ensure debt sustainability. We also follow Gosh *et al.* (2013) by estimating a cubic relation between primary balance and *lagged* values of public debt stock (as a ratio of GDP) – i.e., ($b_{i,t-1}$). We do so in order to capture possible non-linear effects of debt variables over fiscal space.

Consistent with our theoretical analysis, we then regress ($pb_{i,t}$) against a wide range of monetary/financial and structural economic variables. We take the manufacturing GDP share *gap*[8] ($mansharegap$) as the main indicator of the level of productive development and technological complexity characterising the economy. The "natural resource rent" variable ($r_{i,t}^{NR}$), instead, measures how much primary commodity-related dynamics (the price of natural resources, for instance), influence public budgets in both developed and developing countries. When it comes to economic integration, a standard measure of trade openness ($tropen_{i,t}$) – the sum of export and import flows over GDP – captures trade integration in the global economy. We use three different measures of financial integration ($finopen_{i,t}$). On top of the Chinn-Ito index, we also try to estimate the role of global finance by either using the share of portfolio (and international credit) flows over GDP or the VIX index as alternative explanatory variables. The VIX index is a standard indicator of optimism (lower VIX values) or increasing aversion to risk (higher VIX values) on international financial markets (see Rey, 2018).

Finally, term ($V_{i,t}$) in equation (9) stands for a vector of control variables inspired by Gosh *et al*., (2013). It includes, among other macro variables, the output gap to isolate the effects that the business cycle may have on fiscal policy decisions by national governments (see Table A.2 in appendix for a detailed description of all variables in regression (9)). We run our regression using a Panel Corrected Standard Error OLS estimator (OLS-PCSE) to consider heteroskedasticity, autocorrelation and cross-sectional dependence in our data. Table 3 below presents our regression results for the full set of countries (see Table A.3 for descriptive statistics connected to the full sample).

The battery of regressions we run and report in Table 3 shows a clear negative pattern in the relation between the accumulated stock of public debt and fiscal stance. However, most of the estimated coefficients for ($b_{i,t-1}$), even in squared and cubic terms, are not statistically

[8] The manufacturing GDP share gap is the difference between current manufacturing contribution to nominal GDP and its trend level according to expected "inverted U-shaped" trajectory descripted in Rodrik (2016).

significant. This is particularly so when our regressions are expanded to include additional structural features of the economy and variables related to global financial dynamics. The same applies to control variables such as the output gap and the government expenditure gap.

What clearly emerges from Table 3, instead, is that a larger manufacturing sector is consistently linked to better primary balances. A more developed and technologically advanced productive system may structurally improve governments' fiscal positions, for instance, by raising fiscal revenues and improving tax collection from a larger formal economy. Consistent with our theoretical analysis, this relation could stay at the basis of a virtuous (perverse) self-feeding development (underdevelopment) mechanism. More (less) developed productive structures may open fiscal space for long-term strategic public investment (via stronger fiscal balances and less responsive external deficits to domestic spending), which in turn strengthen productive/technological capabilities further, green technologies, among others.

Revenue from natural resources and trade openness are also positively associated with primary balances. The positive link between the former and primary public budget may reflect fiscal advantages from investing in sovereign wealth funds[9], which EDE countries may use to tame natural resource-led boom-and-bust cycles (Alberola and Sousa, 2017) and, to a lesser extent, support long-term development projects.

[9] See Gelb *et al*. (2016) about the spread of Sovereign Wealth Funds and the range of goals they pursue.

Table 3. Econometric Models Comparing Primary Balance Determinants Across All Countries. 1980-2018.

	(1)	(2)	(3)	(4)	(5)	(6)
	M1	M2	M3	M4	M5	M6
VARIABLES	All Countries	All Countries	All Countries	All Countries	All Countries	All Countries
govDebtLag	-0.185***	-0.193***	-0.0985**	-0.0648	-0.0988**	-0.0997**
	(0.0594)	(0.0596)	(0.0485)	(0.0509)	(0.0482)	(0.0507)
govDebtLagSqr	0.00132**	0.00111*	0.000341	-0.000190	0.000277	0.000309
	(0.000619)	(0.000622)	(0.000534)	-0.000598	(0.000525)	(0.000555)
govDebtLagCub	-3.06e-06*	-1.81e-06	1.15e-07	1.70e-06	3.58e-07	2.39e-07
	(1.81e-06)	(1.82e-06)	(1.59e-06)	(1.88e-06)	(1.55e-06)	(1.65e-06)
outputGap	-3.79e-10	2.25e-09	1.69e-09	8.43e-09	1.02e-09	2.96e-09
	(3.44e-09)	(3.20e-09)	(3.32e-09)	(1.00e-08)	(3.10e-09)	(3.13e-09)
govSpenditureGap	-6.28e-08*	-4.94e-08	-4.42e-08	-9.52e-08	-4.29e-08	-4.90e-08
	(3.29e-08)	(3.17e-08)	(3.19e-08)	(1.18e-07)	(3.13e-08)	(3.06e-08)
interestRateIMF	-0.0301	-0.0255	-0.0203	-0.0350	-0.0281	0.00630
	(0.0406)	(0.0387)	(0.0380)	(0.0336)	(0.0392)	(0.0369)
manufShareGDPgap	0.175***	0.120***	0.152***	0.108***	0.147***	0.157***
	(0.0401)	(0.0363)	(0.0402)	(0.0351)	(0.0378)	(0.0408)
tradeopenness		0.0385***	0.0384***	0.0474***	0.0418***	0.0367***
		(0.00598)	(0.00650)	(0.00565)	(0.00545)	(0.00655)
resourceRent			0.366***	0.286**	0.362***	0.376***
			(0.101)	(0.121)	(0.103)	(0.102)
portfShareGDP				0.00519		
				(0.00588)		
vix					-0.0604	
					(0.0377)	
chinItoIndex						0.493**
						(0.234)
Constant	1.949	-0.265	-4.201***	-5.012***	-2.986*	-4.708***
	(1.730)	(1.699)	(1.454)	(1.538)	(1.625)	(1.513)
Observations	760	760	760	390	723	760
R-squared	0.105	0.186	0.225	0.378	0.253	0.230
Number of country_code	55	55	55	41	55	55

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The positive effect of trade openness on the fiscal position of the economy can, in turn, indicate that trade integration may persuade national governments to adopt more conservative fiscal policies to avoid possibly larger external deficits and excessive accumulation of external debt. A similar indication comes when we look at the role played by those variables capturing financial integration. All three alternative measures of financial integration have the expected sign, albeit the Chinn-Ito index is the only one that is statistically significant. A positive correlation between the Chinn-Ito Index (or portfolio inflow share over GDP) and primary balances suggests that financial openness may induce national governments to pursue

conservative fiscal stances. This result is consistent with the finding by Furceri et al. (2011) and extends it beyond the case of OECD countries. Hence, financial integration may force countries to prioritise stabilisation tasks rather than pursuing long-term development goals, the green transition first and foremost. The "windows of opportunities" portrayed through Pasinetti's "debt sustainability geometry" in Figure 1 do not seem to be really there.

Some unclear results in Table 3 may be due to the mix of developed and EDE countries in the full sample analysis. Table 4 below presents the results of our study when we split the sample, acknowledging that different economic structures, levels of financial integration, and institutional frameworks can significantly influence the determinants of fiscal space (Tables A.4 and A.5 in the appendix provide descriptive statistical for the two different groups of countries). Several key differences now emerge between developed and EDE countries.

Accumulated debt stock has a much stronger (statistically significant) influence over fiscal stance in EDE countries than in developed ones. This is particularly so in regressions considering financial integrations among regressors. Moreover, this relationship follows a parabolic pattern opposite to the inverted U-shaped (statistically non-significant) one detected in advanced economies. In EDE countries, an increase in the public debt stock immediately leads national governments to pursue fiscal surpluses (and possibly curt spending). This is even more so when the economy is integrated into international financial markets (see regressions (11) and (12) in Table 4). The need to reassure foreign creditors about debt sustainability seems to be of primary importance here. After a certain threshold, debt that is too large may derail any attempt at fiscal stabilisation (see negative coefficient connected to the squared value of public debt), though. Fear of unstable debt dynamics may spread and convince international investors to leave the country so that fiscal stabilisation becomes impossible in the run-up to a financial crisis.

Developed countries display a different scenario. Here, the relationship between past government debt and fiscal stance is far less pronounced, often showing negative and non-significant coefficients. The impact of debt over fiscal space is not as clear, substantial or economically relevant as it is for EDE countries. All in all, this evidence supports our theoretical discussion about the much narrower space EDE countries may have for public support to (green) structural change.

Table 4. Econometric Models Comparing Primary Balance Determinants Across Developing and Developed Countries

	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
VARIABLES	Developing Countries	Developing Countries	Developing Countries	Developing Countries	Developing Countries	Developing Countries	Developed Countries	Developed Countries	Developed Countries	Developed Countries	Developed Countries	Developed Countries
govDebtLag	0.0610	0.0463	0.257**	0.219**	0.253**	0.261**	-0.208**	-0.226**	-0.114	-0.0571	-0.117	-0.124
	(0.143)	(0.137)	(0.128)	(0.102)	(0.121)	(0.130)	(0.0875)	(0.0890)	(0.0797)	(0.0727)	(0.0834)	(0.0808)
govDebtLagSqr	-0.00591**	-0.00523*	-0.00845***	-0.00681***	-0.00834***	-0.00857***	0.00149*	0.00148*	0.000567	-0.000130	0.000494	0.000675
	(0.00294)	(0.00278)	(0.00282)	(0.00210)	(0.00267)	(0.00288)	(0.000871)	(0.000881)	(0.000803)	(0.000802)	(0.000827)	(0.000813)
govDebtLagCub	4.90e-05***	4.23e-05**	5.79e-05***	4.39e-05***	5.66e-05***	5.88e-05***	-3.46e-06	-2.88e-06	-6.47e-07	1.26e-06	-3.33e-07	-9.39e-07
	(1.86e-05)	(1.76e-05)	(1.85e-05)	(1.34e-05)	(1.75e-05)	(1.91e-05)	(2.44e-06)	(2.46e-06)	(2.26e-06)	(2.42e-06)	(2.32e-06)	(2.29e-06)
outputGap	-2.31e-09	-5.92e-10	3.81e-10	1.54e-08	-1.60e-10	3.70e-10	3.27e-08	3.60e-08*	3.86e-08**	5.28e-08***	3.49e-08*	4.34e-08**
	(2.64e-09)	(2.60e-09)	(2.72e-09)	(1.77e-08)	(2.61e-09)	(2.74e-09)	(2.01e-08)	(1.98e-08)	(1.93e-08)	(2.00e-08)	(1.93e-08)	(1.93e-08)
govSpenditureGap	-5.16e-08	-4.37e-08	-5.12e-08	-2.27e-07	-4.77e-08	-5.03e-08	-2.45e-07*	-1.19e-07	-6.70e-08	-5.52e-08	-8.66e-08	-3.17e-08
	(3.31e-08)	(3.10e-08)	(3.15e-08)	(2.10e-07)	(3.26e-08)	(3.20e-08)	(1.44e-07)	(1.41e-07)	(1.29e-07)	(1.04e-07)	(1.35e-07)	(1.24e-07)
interestRateIMF	0.0332	0.0251	-9.85e-05	0.0194	0.00942	-0.00154	-0.0762	-0.0464	-0.0128	-0.0699	-0.0400	0.0305
	(0.0396)	(0.0389)	(0.0420)	(0.0221)	(0.0433)	(0.0409)	(0.0700)	(0.0683)	(0.0631)	(0.0684)	(0.0670)	(0.0686)
manufShareGDPgap	0.0826***	0.0822***	0.0820***	0.0792***	0.0854***	0.0799***	0.255***	0.161*	0.218**	0.0955	0.199*	0.211**
	(0.0205)	(0.0207)	(0.0225)	(0.0223)	(0.0219)	(0.0274)	(0.0949)	(0.0976)	(0.102)	(0.0829)	(0.103)	(0.105)
tradeopenness		0.0292**	0.0413***	0.0502***	0.0421***	0.0417***		0.0369***	0.0350***	0.0458***	0.0387***	0.0345***
		(0.0128)	(0.0118)	(0.00893)	(0.0113)	(0.0114)		(0.00790)	(0.00814)	(0.00677)	(0.00691)	(0.00847)
resourceRent			0.356***	0.436***	0.375***	0.356***			0.415***	0.280	0.398**	0.423***
			(0.0597)	(0.0691)	(0.0527)	(0.0602)			(0.160)	(0.176)	(0.169)	(0.158)
portfShareGDP				-0.0458						0.00329		
				(0.0574)						(0.00540)		
vix					-0.0849**						-0.0567	
					(0.0362)						(0.0394)	
chinItoIndex						-0.0472						0.581
						(0.229)						(0.419)
Constant	-0.348	-2.410	-8.462***	-9.603***	-6.997***	-8.509***	2.723	0.609	-3.900*	-4.983**	-2.330	-4.838**
	(2.322)	(2.680)	(2.248)	(2.101)	(2.145)	(2.244)	(2.441)	(2.435)	(2.296)	(2.206)	(2.654)	(2.339)
Observations	196	196	196	112	196	196	564	564	564	278	527	564
R-squared	0.287	0.321	0.419	0.598	0.462	0.416	0.105	0.164	0.209	0.343	0.236	0.209
Nr of country_code	24	24	24	22	24	24	31	31	31	19	31	31

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The role of the fiscal cycle also starkly differs in the two sets of countries. In EDE countries, the output gap neither shows a consistent effect nor significantly influences fiscal decisions. In line with our analysis, the fiscal stance in EDE countries seems to be a-cyclical. Fiscal policy is much less responsive to business cycles, and EDE countries still do not have automatic stabilisers that may help to smooth real economic fluctuations. A lack of automatic stabilisers can actually exacerbate economic fluctuations and give rise to an unfavourable environment for long-term investment and development. The relationship between the output gap and the primary fiscal budget is significantly positive in developed countries. This demonstrates that advanced economies can deploy anti-cyclical fiscal policy and adjust their spending in response to economic fluctuations, thus stabilising the economy during periods of volatility.

Regressions (7) – (18) in Table 4 tend to confirm previous findings about the effects of structural features of the economy, i.e., industrial development, trade integration and natural resources, over primary fiscal balance in both EDE and advanced economies. Variables related to international financial integration become insignificant in the case of developed economies. In EDE countries, instead, the *VIX* index remains significant and has a negative sign. The higher the risk aversion of foreign investors, the lower the primary surplus, which suggests that the fiscal stance of EDEs is more dependent on the international financial cycles than in developed economies. This is, therefore, a factor that heightens instability and uncertainty in EDEs, with a negative impact on both public and private investment, particularly in investments that demand a long-run horizon (as it is the case of those required by structural change). Consistent with our theoretical analysis, a sort of trade-off may emerge between EDE countries' short/medium-term need to address finance-led instability and their long-term priority of providing public support to (green) productive and technological development.

In regressions (10) and (12), the share of portfolio inflows over GDP and the Chinn-Ito index are insignificant and have the wrong sign. These results are mostly likely due to missing observations for such variables in the case of EDE countries.

In sum, the results obtained when developing and developed economies are analysed separately suggest that fiscal space tends to increase in countries that display a more diversified economic structure (as captured by the share of manufacturing in GDP) and are more integrated in international trade. At the same time, in the case of EDEs, the fiscal space is more vulnerable to changes in the mood of foreign investors and more prone to be affected negatively by an increase in risk aversion in the international financial markets.

5. Policy discussion

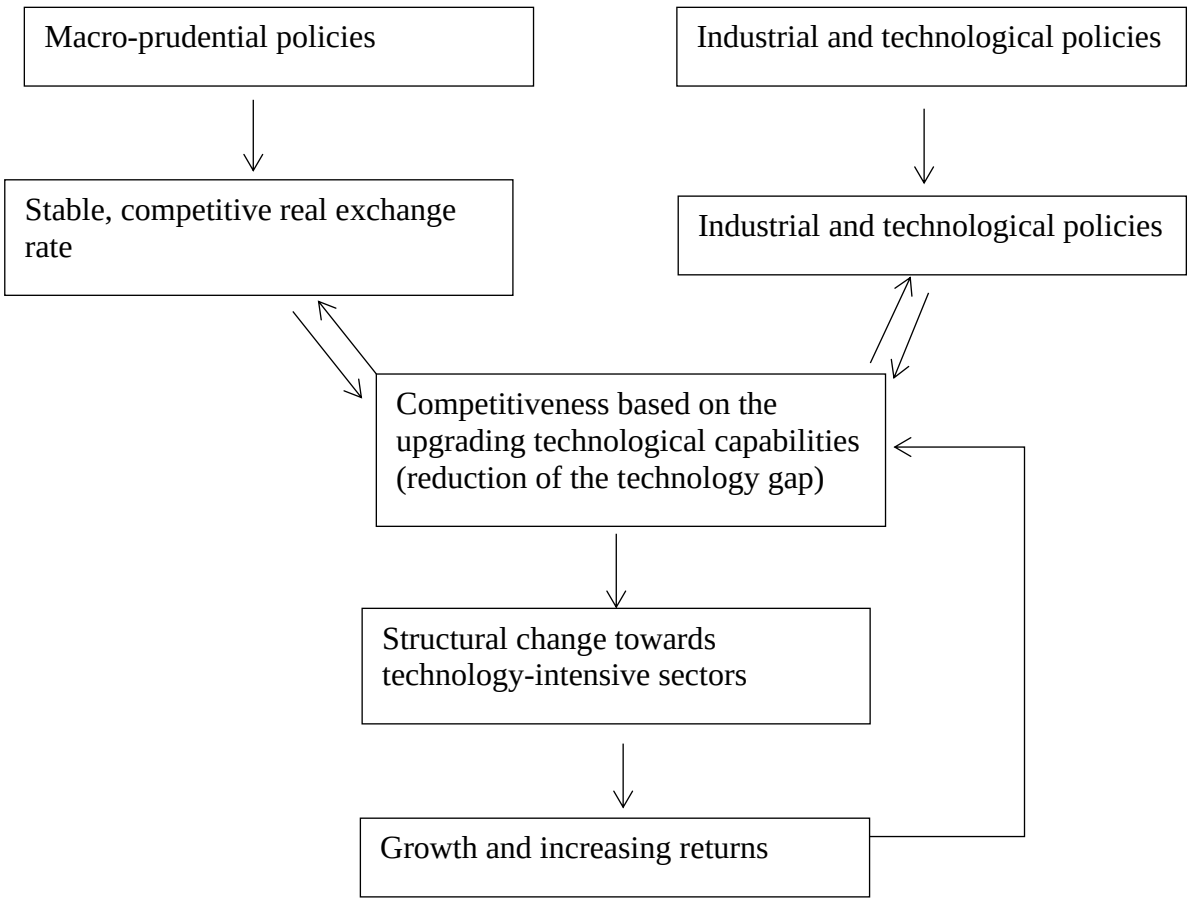
To overcome the gridlock and to face the challenges of green transition, EDE countries require a multifaceted approach, blending together various strategic policy interventions. Consistent with Pasinetti's masterpieces about economic development and structural change (Pasinetti, 1981 and 1993), the shift of investment focus from traditional, low-tech sectors to advanced manufacturing and green technologies is crucial. This shift certainly necessitates the implementation of counter-cyclical fiscal policies that may stabilise the economy and create a stable economic environment promoting long-term investment. However, this also requires public (fiscal) support for structural diversification and the accumulation and spread of technological knowledge. The development of green technologies and green industries, for instance, needs "patient" finance to develop. This can hardly come from private investors alone, given the high risks associated with such investment. The public sector has to play a leading role here. Better institutional capability to use revenues from natural resources for stabilisation purposes is certainly good news. But it is equally important to use them for financing long-term investments in education, infrastructure, and green technology (Chang and Lebdioui, 2020).

Enduring underdevelopment traps in several EDE countries and the successful development experience of a few bunches of Asian/East Asian countries show that the gridlock is, to some extent, the result of policy choices. On the one hand, EDE countries' increasing integration into the global financial system since the beginning of the 1990s has frequently implied the adoption of institutions promoting "conservative" macro policies. This is the case of independent central banks that follow inflation-targeting strategies in flexible exchange rate regimes (Camara Neto and Vernengo, 2005; Giron and Correa, 2021). In such regimes, central banks have usually pursued relatively high interest rates to attract foreign capital, keep the exchange rate appreciated, and reduce "imported" inflation. Even the build-up of precautionary stocks of foreign reserves has come with its costs in terms of high interest rates induced by the sterilisation of foreign capital-led expansion of domestic credit. In these cases, the stability area in Pasinetti's "geometry of debt sustainability" may have significantly squeezed, and fiscal policy goals narrowed down to nothing else beyond mere debt service sustainability. On the other hand, insights from few more successful Asian/East Asian countries may suggest the adoption of a different policy mix. Such an alternative policy agenda recognises the importance of the synergy between capital controls, (external) macro-prudential policy and industrial policies in order to enable EDE countries to (hopefully) tackle the multiple challenges they are

currently facing at once. We try to schematise it to the role of macroprudential policy, in particular, in Figure 8 below. Two points are worth stressing here.

First, following Erten and Ocampo (2016), capital controls and (external) macroprudential policies may help to partially isolate the domestic economy from international financial dynamics, make monetary policy more independent from the global financial cycle (Rey, 2018), and also reduce a country's exposure to foreign capital-related instability (excessive external borrowing in foreign currency, for instance). In this environment, monetary authorities may gain significant degrees of freedom, lowering interest rates (if not "killing the rentier"), and pursuing more competitive real exchange rate levels. Contrary to the conservative monetary institutions described above, this alternative monetary framework expands the stability area in Pasinetti's "geometry of debt sustainability". The role and space for *developmental* fiscal policies is eased. Moreover, the combination of competitive real exchange rates and lower interest rates can boost private investment in high-tech ventures (Cimoli *et al.*, 2020), whilst disincentivising more speculative practices (carry trade, for instance), paving the way for sustainable growth and structural transformation.

Figure 8 – A virtuous circle: macroprudential policies and industrial and technological policies



Second, it makes a difference from the point of view of macroeconomic stability and productive development whether foreign capital fuels a real estate frenzy or finances investment in non-traditional manufacturing industries that could increase exports. Sources of foreign capital-related macroeconomic instability concentrate on the former, not the latter. The macroprudential policy should thus adopt a sector-specific approach that adjusts restrictions based on industry specificities. The macroprudential policy should apply penalty measures (non-interest-bearing deposit requirements and/or direct taxes on foreign borrowing) to those inward-oriented sectors more likely to undergo speculative waves and give rise to more profound currency mismatches. It should instead make relatively easier (external) financing of (new) manufacturing industries, strengthening the technological capability of the economy, widening the range of exported goods, and ultimately generating larger and more stable "hard currency" revenues. It is easy to see how macroprudential policies should coordinate with industrial policy to share the responsibility of favouring structural change and the emergence of a more diversified and resilient productive structure (Botta et al., 2023).

All in all, the combination of capital controls, macroprudential policies and industrial policies may ensure international competitiveness based on technical change, allowing EDE countries to capture a higher share of domestic and global effective demand. Diversifying production and accumulating capabilities, skills, and experience enable the economy to generate more income and strengthen the solidity of public finances. This will help the public sector widen, improve social security systems, and smooth business cycles. It will create more space for public investment and redirect the economy's resources towards fast-growing sectors. Higher and more stable economic growth will feed Kaldorian learning processes by closing the virtuous circle of growth, technological progress and structural change.

6. Conclusions

EDE countries are confronting increasingly daunting challenges. They need to combine sustained growth, external solidity, and green transition at once, i.e., what Valdecantos (2021) terms the "sustainability trilemma". The potential implications for the public budget are huge. It makes sense to wonder whether EDE countries have such fiscal capacity in the present context of globalised finance.

In this paper, we use Luigi Pasinetti's "geometry of debt sustainability" (Pasinetti, 1998, 2000) to analyse how EDE countries' fiscal stance is shaped by integration in the global financial system and how this influences EDE countries' capability to deal with the financial requirements of (green) structural change whilst keeping their debt position sustainable. We extend the model by Vaggi and

Prizzon (2014) and Vaggi and Frigerio (2021), who adapted Pasinetti's approach to low-income countries, to explicitly take into account how global finance may affect debt sustainability and fiscal stance via its effects on the exchange rate, the accumulation of foreign reserves, and the private sector balance, among other variables.

We argue that global finance might potentially open "windows of opportunities" for sustainable debt management and public support to structural change during (temporary) phases of financial booms. In reality, they more often give rise to deep private sector imbalances with little to do with structural change and that necessitate compensatory fiscal adjustments.We show, both theoretically and empirically, that EDE countries may find themselves stuck in a developmental "gridlock". Integration in global financial markets indeed forces governments to generally pursue conservative fiscal policies to tame possible finance-led macroeconomic instability. This narrows the space for fiscal support to (green) structural change, such as public investment in green technologies. Persistent productive and technological backwardness feed back into enduring restrictions to fiscal policy aimed at ensuring that binding external constraints are not violated. In such a context, there is very little space for structural change and technological progress that Pasinetti (1981, 1993) puts at the roots of economic development.

We finally note that overcoming the gridlock requires a concerted policy effort integrating capital controls, (external) macroprudential policy, and industrial and technological policies. Capital controls and macroprudential policies could tame (finance-led) cycles and, at the same time, open space for more active public support for (green) structural change. Such a policy mix may be fundamental for successfully addressing the sustainability trilemma.

References

Akyüz, Y. (2021) – "External balance sheets of emerging economies: low-yielding assets, high-yielding liabilities", *Review of Keynesian Economics*, 9(2), 232 – 252.

Alberola, E., and Sousa, R. (2017) – "*Assessing fiscal policy through the lens of the financial and the commodity price cycles*". BIS Working Paper no.638.

Ananthakrishnan, P., Loukoianova, E., Xiaochen Feng, A., and Oman, W. (2022) – "*Mobilising private climate financing in emerging market and developing economies*", IMF Staff Climate Note 2022/007.

Belb, A., Tordo, S., Halland, H. (2014) – "*Sovereign wealth funds and long-term development finance. Risks and opportunities*", World Bank Policy Research Working Paper no. 6776.

Benigno, G., Converse, N., and L. Fornaro (2015) – "Large capital inflows, sectorial allocation, and economic performance", *Journal of International Money and Finance*, 55(1), 60 – 87.

Bibi, S. and Valdecantos, S. (2023) – "*Minsky meeting Prebisch: The macroeconomic challenges of Peru in the 21st century*", SSRN Working Paper no. 4599012.

Botta, A. (2017) – "Dutch disease-cum-financialization booms and external balance cycles in developing countries", *Brazilian Journal of Political Economy*, 37(3), 459 – 477.

Botta, A., Yajima, G. T., and Porcile, G. (2023). Structural change, productive development, and capital flows: does financial "bonanza" cause premature deindustrialisation?. *Industrial and Corporate Change*, *32*(2), 433-473.

Calvo, G.A., Leiderman, L., and Reinhart, C,M (1996) – "Inflows of capital to developing countries in the 1990s", *Journal of Economic Perspectives*, 10(2), 123 – 139.

Camara Neto, A.F., and Vernengo, M. (2005) – "Fiscal policy and the Washington consensus: a Post Keynesian perspective", *Journal of post-Keynesian Economics*, 27(2), 333 – 343.

Cimoli, M., Ocampo, J.A., Porcile, G., and N. Saporito (2020) – "Choosing sides in the trilemma: international financial cycles and structural change in developing economies", *Economics of innovation and new technology*, 29(7), 740 – 761.

Chang, H-J., and A. Lebdioui (2020) – "*From fiscal stabilisation to economic diversification: A developmental approach to managing resource revenues*", WIDER Working Paper no.2020/108.

Chui, M., Kuruc, E., and Turner, P. (2016) – "*A new dimension to currency mismatches in the merging markets: non-financial companies*", BIS Working Paper no.550.

De Paula, L.F., Fritz, B., and Prates, DM (2017) – "Keynes at the periphery: Currency hierarchy and challenges for economic policy in emerging economies", *Journal of Post Keynesian Economics*, 40(2), 183 – 202.

Erten, B., and J.A. Ocampo (2016) – "Macroeconomic effects of capital account regulations", *IMF Economic Review*, 65(2), 194 – 240.

Frenkel, R., and M. Rapetti (2009) – "A Developing Country View of the Current Global Crisis: What should not be forgotten and what should be done", *Cambridge Journal of Economics*, 33(4), 683 – 702.

Furceri, D., and Zdzienicka, A. (2011). Financial integration and fiscal policy. *Open Economies Review*, 23(5), 1-18.

Ghosh, A. R., Kim, J. I., Mendoza, E. G., Ostry, J. D., and Qureshi, M. S. (2013) – "Fiscal fatigue, fiscal space and debt sustainability in advanced economies." *The Economic Journal*, *123* (566), F4-F30.

Girón, A., and Correa, E. (2021) – "Fiscal stimulus, fiscal policies, and financial instability", *Journal of Economic Issues*, 52(2), 552 – 558.

Jafarov, E., Maino, R., and M. Pani (2020) – "*Financial repression is knocking at the door, again. Should we be concerned?*", IMF Working Paper no. 19/211 (May 2020 updated version).

Lamperti, F., Mazzucato, M., Roventini, A., and Semieniuk, G. (2019) – "The green transition: public policy, finance and the role of the state", *Vierteljahrshefte zur Wirtschaftsforschung*, 88(2), 73 – 88.

McKinnon, R. (1973) – "*Money and capital in economic development*", Washington: Brookings Institution.

Miller, S. M., and Russek F.S. (1989) – "Are the twin deficits really related?", *Contemporary Economic Policy*, 7(4), 91 – 115.

Neto, A.S.M., and Porcile, G. (2017) – "Destabilising austerity: Fiscal policy in a BOP-dominated macrodynamics", *Structural Change and Economic Dynamics*, 43, 39-50.

Ocampo, J.A., Rada, C., and Taylor, L. (2009) – "*Growth and Policy in Developing Countries. A Structuralist Approach*", New York: Columbia University Press.

Ocampo, J.A. (2011) – "Macroeconomy for development: Counter-cyclical policies and production sector transformation", *Cepal Review*, 104 (August 2011), 7 – 35.

Ostry, J.D., Loungani, P., and D. Furceri (2016) – "Neoliberalism: Oversold?", *Finance and Development* (June 2016), 38 – 41.

Palma J.G. (2013) – "How the full opening of the capital account to highly liquid financial markets led Latin America to two and a half cycles of Mania, Panic, and Crash", in Wolfson H.M., and Epstein G.A. (eds) – *The Handbook of Political Economy of Financial Crises*, Oxford: Oxford University Press, 248 – 295.

Pasinetti, L.L. (1981) – "*Structural change and economic growth: A theoretical essay on the dynamics of the wealth of nations*", Cambridge: Cambridge University Press.

Pasinetti, L.L. (1993) – "*Structural economic dynamics – A theory of the economic consequences of human learning*", Cambridge: Cambridge University Press.

Pasinetti, L.L. (1998) – "The myth (or folly) of the 3% deficit/GDP Maastrict parameter", *Cambridge Journal of Economics*, 22(1), 103 – 116.

Pasinetti, L. L. (2000) – "On the concepts of debt sustainability: a reply to Dr Harck", *Cambridge Journal of Economics*, 24(4), 511 – 514.

Perez Caldentey, E., Favreau Negrot, N., and L. Mendez Lobos (2019) – "Corporate debt in Latin America and its macroeconomic implications", *Journal of post-Keynesian Economics*, 42(3), 335 – 362.

Polak, J. J. (1957) – "Monetary analysis of income formation and payments problems", *Staff Papers-International Monetary Fund*, 6(1), 1 – 50.

Reinhart, C.M., Rogoff, K.S., and Savastano, M.A. (2003) – "Debt intolerance", *Brookings Papers on Economic Activity*, 34(1), 1 – 74.

Reinhart, C.M., and V.R. Reinhart (2009) – "*Capital flow bonanzas: An encompassing view of the past and present*", NBER Working Paper no.14321.

Rey, V. (2018) – "*Dilemma not trilemma: The global financial cycle and monetary policy independence*", NBER Working Paper series no. 21162.

Rodrik, D. (2016) – "Premature deindustrialisation", *Journal of Economic Growth*, vol.21 (1), 1 – 33.

Sahasrabuddhe, A. (2019) – "Drawing the line: The politics of federal currency swaps in the global financial crisis", *Review of International Political Economy*, 26(3), 461 – 489.

Serebrisky, T., Brichetti J.P., Blackman, A., and M. Mesquita Moreira (2020) – "*Sustainable and digital infrastructure for post-Covid-19 economic recovery of Latin America and the Caribbean: A roadmap to more jobs, integration and growth*", Inter-American development Bank report.

Shaw, E. (1973) – "*Financial deepening in economic development*", New York: Oxford University Press.

Singh A. (2003) – "Capital Account Liberalization, Free long-term Capital Flows, Financial Crises and Economic Development", *Eastern Economic Journal*, 29(2), 191 – 216.

Spinola, D. (2020). Uneven development and the balance of payments constrained model: Terms of trade, economic cycles, and productivity catching-up. *Structural change and economic dynamics*, *54*, 220-232.

Taylor, L. (1998) – "Capital market crises: liberalisation, fixed exchange rates and market-driven destabilisation", *Cambridge Journal of Economics*, 22(6), 663 – 676.

Tregenna, F., Nell, K., and C. Callaghan (2021) – "Determinants of industrial development", in: Alcorta, L., Foster-McGregor, N., Verspagen, B., and Szirmai, A. (eds.) – "*New perspectives on*

structural change. Causes and consequences of structural change in the global economy", Oxford: Oxford University Press.

UNCTAD (2019) – "*Trade and Development Report 2019*", New York and Geneva: United Nations Press.

Vaggi, G., and Prizzon, A. (2014) – "On the sustainability of external debt: is debt relief enough?", *Cambridge Journal of Economics*, 38(5), 1155-1169.

Vaggi, G., and Frigerio, L. (2021) – "Debt sustainability and human development in Sub-Saharan Africa", *Il Pensiero Economico*, 41(1), 15 – 62.

Valdecantos, S. (2021) – "*Grasping Argentina's green transition: insights from a stock-flow consistent input-output model*", MaMTEP Working Paper Series no. 4/2021.

Vernengo, M., and E. Perez Caldentey (2020) – "Modern Money Theory (MMT) in the Tropics: Functional finance in developing countries", *Challenge*, 63(6), 332 – 34

Appendix.

Table A.1 – List of countries included in the correlation analysis between financial openness and fiscal space

Country	Country code	Data coverage	Average Chinn-Ito index	Average public primary surplus	Average RGDP growth rate
Argentina	ARG	1993-2018	0.44	-0.21	2.50
Bolivia	BOL	1990-2018	0.59	-1.10	4.17
Brazil	BRA	1996-2018	0.32	1.50	2.31
Chile	CHL	1990-2018	0.54	1.40	4.67
Colombia	COL	1990-2018	0.29	0.60	3.51
Costa Rica	CRI	1990-2018	0.67	-0.20	4.31
Ecuador	ECU	1995-2018	0.63	0.50	3.09
Mexico	MEX	1990-2018	0.65	0.80	2.67
Panama	PAN	1994-2018	1.00	0.90	5.79
Paraguay	PRY	1990-2018	0.54	2.60	3.39
Peru	PER	2000-2018	1.00	1.10	4.91
Trinidad&Tobago	TTO	1990-2018	0.88	2.10	3.82
Uruguay	URY	1999-2018	1.00	1.20	2.98
Venezuela, RB	VEN	1990-2018	0.31	-2.20	0.40
Latin America Chinn-Ito index			0.63		
Bangladesh	BGD	1990-2018	0.17	-0.93	5.70
Sri Lanka	LKA	1990-2018	0.40	-1.48	5.56
India	IND	1990-2018	0.16	-3.85	6.63
Indonesia	IDN	1993-2018	0.66	0.96	4.84
Malaysia	MYS	1990-2018	0.50	-0.06	5.82
Philippines	PHL	1990-2018	0.40	2.58	4.49
Thailand	THA	2000-2018	0.27	0.54	5.70
Vietnam	VNM	1998-2018	0.30	-1.35	6.53
China	CHN	1990-2018	0.15	-1.03	9.45
LAO	LAO	2000-2018	0.18	-2.49	7.22
Myanmar	MMR	1998-2018	0.00	-2.37	9.12
Cambodia	KHM	1996-2018	0.54	-2.94	7.61
Southeast Asia Chinn-Ito index			0.31		
Pakistan	PAK	1993-2018	0.16	-0.46	4.29
Turkey	TUR	2000-2018	0.31	1.62	5.15
Russia	RUS	1997-2018	0.46	1.76	3.45
Egypt	EGY	1999-2018	0.70	1.73	4.46
South Africa	ZAF	2000-2018	0.16	0.55	2.77
Mozambique	MOZ	1990-2018	0.15	-2.31	6.67
Ethiopia	ETH	1990-2018	0.15	-2.74	6.92
Kenya	KEN	1990-2018	0.57	-0.97	3.73
Nigeria	NGA	1990-2018	0.21	1.89	4.80
Tunisia	TUN	1991-2018	0.20	-1.02	3.79
Morocco	MAR	1990-2018	0.19	0.94	3.88
Ghana	GHA	1990-2018	0.11	-2.48	5.49
Namibia	NAM	1994-2018	0.16	-0.92	3.65
Tanzania	TZA	1991-2018	0.17	-0.70	5.34
Other emerging economies Chinn-Ito index			0.26		

Table A.2. Key economic indicators and sources

Variable	Explanation	Data Source
PrimaryBalance	Difference between a government's revenues and expenditures, excluding interest payments on debt, and is often used in economic analyses and reports to assess a country's fiscal health.	World Bank's World Development Indicators
govDebtLag	Government debt from the previous period as a percentage of GDP.	World Bank, IMF's World Economic Outlook
govDebtLagSqr	Squared term of the government debt from the previous period, to capture nonlinear effects.	Calculated from govDebtLag data
govDebtLagCub	Cubed term of the government debt from the previous period, to capture further nonlinear effects.	Calculated from govDebtLag data
outputGap	The difference between actual GDP and potential GDP, indicating the economic performance relative to capacity.	IMF's World Economic Outlook, OECD
govSpenditureGap	The deviation of government expenditure from its trend level.	IMF's World Economic Outlook, National Statistical Agencies
interestRateIMF	The average interest rate set by the national central bank or monetary authority.	International Monetary Fund
manufShareGDPgap	The deviation of the manufacturing sector's share of GDP from its trend level.	UNIDO, World Bank
tradeopenness	The sum of exports and imports as a percentage of GDP, indicating the level of integration into global trade.	World Trade Organization, World Bank
resourceRent	Revenue generated from natural resources as a percentage of GDP.	World Bank's World Development Indicators
portfShareGDP	Portfolio investment as a share of GDP, reflecting the level of portfolio investments in the country.	World Bank, IMF's Balance of Payments Statistics
vix	The Volatility Index, which measures market expectations of near-term volatility conveyed by stock index option prices.	Chicago Board Options Exchange
chinnItoIndex	An index measuring a country's degree of financial openness.	Chinn-Ito Index (University of Oregon)

Table A.3. Descriptive statistics, full country sample, 1980-2018.

VARIABLES	N	mean	sd	max	min
PrimaryBalance	2,045	-4.909	9.149	61.70	-203.7
govDebtLag	2,841	56.84	37.71	289.6	0.514
govDebtLagSqr	2,841	4,652	7,244	83,842	0.264
govDebtLagCub	2,841	517,072	1.499e+06	2.428e+07	0.136
outputGap	1,777	3.668e+06	3.157e+07	5.014e+08	-2.189e+07
govSpenditureGap	1,606	393,623	2.422e+06	4.050e+07	-882,426
interestRateIMF	1,266	6.040	6.382	58	0
manufShareGDPgap	3,116	0.384	8.026	32.53	-19.78
tradeopenness	2,925	78.88	51.37	437.3	1.921
resourceRent	3,078	5.766	9.448	67.84	0
portfShareGDP	965	82.39	1,064	25,967	0
vix	2,428	19.21	5.793	32.70	11.09
chinItoIndex	3,054	0.464	1.588	2.311	-1.927
Number of country_code	55	55	55	55	55

Table A.4. Descriptive statistics, EDE country sample, 1980-2018.

VARIABLES	N	mean	sd	max	min
PrimaryBalance	801	-4.398	4.976	19.48	-30.95
govDebtLag	1,393	57.94	39.55	289.6	0.971
govDebtLagSqr	1,393	4,920	7,847	83,842	0.943
govDebtLagCub	1,393	575,906	1.605e+06	2.428e+07	0.916
outputGap	752	6.187e+06	4.733e+07	5.014e+08	-2.891e+06
govSpenditureGap	604	548,874	3.520e+06	4.050e+07	-882,426
interestRateIMF	536	8.345	6.819	45	0
manufShareGDPgap	1,527	-2.383	8.607	32.53	-19.78
tradeopenness	1,428	65.79	34.15	220.4	1.921
resourceRent	1,539	7.082	8.093	63.73	0
portfShareGDP	422	1.594	2.785	32.84	0
vix	1,192	19.16	5.790	32.70	11.09
chinItoIndex	1,506	-0.450	1.294	2.311	-1.927
Number of country_code	24	24	24	24	24

Table A.5. Descriptive statistics, developed country sample, 1980-2018.

VARIABLES	N	mean	sd	max	min
PrimaryBalance	1,244	-5.238	11.02	61.70	-203.7
govDebtLag	1,448	55.79	35.83	284.0	0.514
govDebtLagSqr	1,448	4,395	6,605	80,632	0.264
govDebtLagCub	1,448	460,472	1.387e+06	2.290e+07	0.136
outputGap	1,025	1.820e+06	8.802e+06	7.845e+07	-2.189e+07
govSpenditureGap	1,002	300,039	1.385e+06	1.306e+07	-133,655
interestRateIMF	730	4.348	5.456	58	0
manufShareGDPgap	1,589	3.043	6.381	27.12	-14.94
tradeopenness	1,497	91.36	61.04	437.3	15.81
resourceRent	1,539	4.450	10.47	67.84	0
portfShareGDP	543	145.2	1,416	25,967	0
vix	1,236	19.25	5.798	32.70	11.09
chinItoIndex	1,548	1.353	1.320	2.311	-1.927
Number of country_code	31	31	31	31	31

Table A.6. Correlation Table of Fiscal Indicators and Economic Variables

Variables	*Primary Balance*	*govDebt Lag*	*govDebt LagSqr*	*govDebt LagCub*	*outputGa p*	*govSpen ditureGa p*	*interestR ateIMF*	*manufSh areGDPg ap*	*tradeope nness*	*resource Rent*	*portfSha reGDP*	*vix*	*chinItoIn dex*
PrimaryBalance	1												
govDebtLag	-0.270***	1											
govDebtLagSqr	-0.190***	0.925***	1										
govDebtLagCub	-0.131***	0.792***	0.959***	1									
outputGap	0.033	-0.084***	-0.051**	-0.029	1								
govSpenditureGap	0.049*	-0.084***	-0.035	-0.003	0.886***	1							
interestRateIMF	-0.103***	-0.188***	-0.153***	-0.109***	0.019	0.005	1						
manufShareGDPgap	0.058***	-0.022	-0.061***	-0.063***	0.136***	0.199***	-0.093***	1					
tradeopenness	0.119***	0.032*	-0.001	-0.027	-0.065***	-0.079***	-0.212***	0.054***	1				
resourceRent	0.175***	-0.097***	-0.011	0.023	0.006	-0.005	0.146***	-0.371***	-0.008	1			
portfShareGDP	-0.066*	0.095***	0.065*	0.033	-0.008	-0.013	-0.114***	0.059*	-0.031	-0.036	1		
vix	-0.036	-0.065***	-0.054**	-0.044**	-0.038	-0.023	0.056*	-0.005	0	0.012	0.037	1	
chinItoIndex	0.081***	-0.035*	-0.046**	-0.046**	-0.060**	-0.077***	-0.479***	0.172***	0.272***	-0.044**	0.076**	0.013	1

**** p<0.01, ** p<0.05, * p<0.1*

Table A.7. 1 – List of countries included in the econometric analysis

Country	Region	Income Level	Country	Region	Income Level
Australia	East Asia and Pacific	Developed	Portugal	Europe and Central Asia	Developed
China	East Asia and Pacific	Emerging and Developing	Romania	Europe and Central Asia	Developed
Indonesia	East Asia and Pacific	Emerging and Developing	Russian Federation	Europe and Central Asia	Emerging and Developing
Japan	East Asia and Pacific	Developed	Spain	Europe and Central Asia	Developed
Korea, Rep	East Asia and Pacific	Developed	Sweden	Europe and Central Asia	Developed
New Zealand	East Asia and Pacific	Developed	Switzerland	Europe and Central Asia	Developed
Philippines	East Asia and Pacific	Emerging and Developing	United Kingdom	Europe and Central Asia	Developed
Singapore	East Asia and Pacific	Developed	Belize	Latin America and Caribbean	Emerging and Developing
Thailand	East Asia and Pacific	Emerging and Developing	Brazil	Latin America and Caribbean	Emerging and Developing
Albania	Europe and Central Asia	Emerging and Developing	Chile	Latin America and Caribbean	Developed
Austria	Europe and Central Asia	Developed	Colombia	Latin America and Caribbean	Emerging and Developing
Belarus	Europe and Central Asia	Emerging and Developing	Costa Rica	Latin America and Caribbean	Emerging and Developing
Belgium	Europe and Central Asia	Developed	Mexico	Latin America and Caribbean	Emerging and Developing
Bulgaria	Europe and Central Asia	Emerging and Developing	Paraguay	Latin America and Caribbean	Emerging and Developing
Denmark	Europe and Central Asia	Developed	Peru	Latin America and Caribbean	Emerging and Developing
Finland	Europe and Central Asia	Developed	Israel	Middle East and North Africa	Developed
France	Europe and Central Asia	Developed	Jordan	Middle East and North Africa	Emerging and Developing
Georgia	Europe and Central Asia	Emerging and Developing	Saudi Arabia	Middle East and North Africa	Developed
Germany	Europe and Central Asia	Developed	Bangladesh	South Asia	Emerging and Developing
Greece	Europe and Central Asia	Developed	India	South Asia	Emerging and Developing
Hungary	Europe and Central Asia	Developed	Nepal	South Asia	Emerging and Developing
Iceland	Europe and Central Asia	Developed	Ghana	Sub-Saharan Africa	Emerging and Developing
Ireland	Europe and Central Asia	Developed	Mauritius	Sub-Saharan Africa	Developed
Italy	Europe and Central Asia	Developed	Senegal	Sub-Saharan Africa	Emerging and Developing
Kazakhstan	Europe and Central Asia	Emerging and Developing	South Africa	Sub-Saharan Africa	Emerging and Developing
Netherlands	Europe and Central Asia	Developed	Canada	North America	Developed
Norway	Europe and Central Asia	Developed	United States	North America	Developed
Poland	Europe and Central Asia	Developed			