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Global money and the balance of payments: How do global banks drive cross-country US dollar credit conditions?

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Abstract

The US dollar is the most widely used cross-border means of payment. Countries require access to US dollars to pay for most of their balance of payments-related transactions, and restricted access to them can constrain their growth possibilities. Yet, the literature about the mechanisms behind the creation and distribution of US dollars across borders is fragmented. Based on the endogenous money and Minskyan perspectives, this paper theoretically explores how internationally accepted US dollars are created through global banks' credit operations. The credit conditions of these operations ultimately influence the countries' costs and ability to participate in cross-border transactions. In particular, this paper explores how global banks determine cross-country US dollar credit conditions based on two main factors: their general pricing decisions, determined by their desired balance sheet structures, and their assessments of the borrowers' creditworthiness, which are based on their expectations regarding borrowers' future access to US dollars. Fluctuations of these factors can act as exogenous sources of pressure for the balance of payments of countries across the world.

Keywords: US dollar, global banks, cross-border flows, balance of payments.

JEL codes: F32, G21, E12.

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1 INTRODUCTION

The US dollar is the most widely used cross-border means of payment. Cross-border US dollars largely take the form of deposit liabilities issued by a small group of globally active financial institutions. Countries require access to these US dollar deposits to pay for most balance of payments-related transactions, and restricted access can affect their growth and development possibilities (Vernengo and Pérez Caldentey, 2020). However, theoretical frameworks explaining how US dollar credit is created and distributed across borders remain incomplete. What are the relevant drivers of credit conditions for these transactions? Are certain institutions particularly relevant? What shapes the differential credit conditions between borrowers from different countries?

The centrality of the US dollar in the International Monetary System (IMS) and the role of financial institutions in cross-border financing have gained attention in recent literature (Maggiori, 2022; Miranda-Agrippino and Rey, 2022; Obstfeld and Zhou, 2023). Nonetheless, most of this work treats financial institutions as generic intermediaries, without distinguishing between banks and non-bank financial institutions. A few exceptions consider how banks create cross-border payment instruments (Borio and Disyatat, 2015), but do not explore the IMS asymmetries—where most transactions occur in one currency, and access is unequal across countries.

Post-Keynesians and other critical scholars have long emphasised the role of banks in creating money and purchasing power endogenously through credit (Dow, 1997; Lavoie, 2022; Mehrling, 2012; Minsky, 1986d; Sissoko, 2024). In this view, while central banks set the base rate and credit flows depend on borrower initiative, banks still shape lending spreads and credit restrictions (Wolfson, 1996)[1]. Nevertheless, so far, most open economy applications have focused on the effects of net cross-border flows on the stock of domestic money, and the ability of the central bank to set interest rates (Angrick, 2018a; Bozhinovska, 2025; Gerioni et al., 2023; Lavoie, 2021). Only a few authors have presented applications of the endogenous money theory to study, not the effects of cross-border flows, but their creation. Among these, Rossi (2007) and Kohler (2022) explore international payments and cross-border flows from an endogenous money perspective. For Kohler (2022), in line with Harvey (2019), cross-border bank credit creation is endogenous and demand-driven, explained by desired trade balances. Dow (1999) and, in more detail, Hawkins (2003) highlight the US dollar's role and the liquidity preference of international banks in shaping countries' participation in cross-border transactions[2]. Moreover, as

[1]These also include the size and maturity of the loan, requested collateral, guarantees, covenants, etc.

[2]Other post-Keynesian strands, such as the international currency hierarchy literature, have highlighted the role of global financial institutions and the US dollar in determining global financial conditions (Bonizzi and Kaltenbrunner, 2021; De Conti et al., 2013; Macalos, 2021). However, the special role of banks in the creation of monies with different positions in the hierarchy is underexplored in this literature (Deos and

Bouguelli (2025, p. 2) indicates, "post-Keynesians have not paid much attention to the international activity of banks".

Building upon this literature, this paper explores theoretically how the worldwide accepted instrument for cross-border payments —global money— is created through the credit operations from globally active banks, and how these institutions determine the relevant credit conditions for cross-border real and financial transactions[3]. For this, it follows a Minskyan perspective, which understands the countries' balance of payments as a matter of global money inflows and outflows. In turn, these "international dollars are created by the banking process" (Minsky, 1979, p. 17), by both US and non-US international banks (Minsky, 1986a). By situating the balance sheet, expectations, and preferences of the global money issuers—global banks—at the analytical core, this paper studies their role in shaping the US dollar credit conditions, which ultimately influence the countries' costs and ability to participate in cross-border transactions. Particularly, it explores how global banks determine these conditions based on two main factors[4]. First, their general pricing decisions, which depend on their desired balance sheet structures. Second, their assessments of the borrowers' creditworthiness, which are based on their expectations regarding borrowers' future access to US dollars. Fluctuations of these factors can act as exogenous sources of pressure for the balance of payments of countries across the world.

The rest of the paper is structured as follows. Section 2 examines the role of banks in driving credit conditions from an endogenous money perspective. Section 3 expands this framework to a global level, analyzing how global banks drive US dollar credit conditions when they try to shape their balance sheet structures and through their countries' creditworthiness assessments. Finally, Section 4 concludes.

2 AN ENDOGENOUS MONEY PERSPECTIVE ON BANK-DRIVEN CREDIT CONDITIONS

This section examines the role of banks in driving credit conditions from an endogenous money perspective, focusing on two key aspects. First, banks change their credit conditions when they try to shape their balance sheet structures. Second, banks assess the

Gerioni, 2023).

[3]In line with Keynes (1914, p. 49), here we consider that "there are two separate problems, namely, due provision for the internal currency and due provision for external payments, of which the second is in general the crucial one".

[4]Rochon (2006, p. 177) indicates that "a post-Keynesian theory of bank lending must focus simultaneously on the creditworthiness of borrowers, that is the 'financial profile' of borrowers (...), as well as the behavior of banks, who are responsible for defining and redefining the conventions used to established the creditworthiness of would-be borrowers".

creditworthiness of each borrower according to their current credit standards, setting borrower-specific credit conditions. Therefore, variations in both the banks' balance sheets and their creditworthiness assessments can create fluctuations in credit conditions, both across and within borrowers.

2.1 Banks' balance sheet structures and interest rate spreads

Even when the creation of money through banks' credit is driven by the creditworthy demand and initiative of borrowers, the banks' considerations about their desired balance sheet structures and profitability remain pivotal in determining credit conditions in post-Keynesian models (Chick and Dow, 2002; Dymski, 1992; Godley and Lavoie, 2006a; Le Heron and Mouakil, 2008). In most of these models, banks accommodate the creditworthy demand and portfolio choice of other sectors, being mainly price-makers (Sawyer, 2017). However, banks still try to shape their balance sheet structures, usually through two different channels: by increasing credit restrictions, modeled as a share of rejected notional credit demand (Dafermos, 2012; Nikolaidi, 2014), or through changes in their interest rate spreads (Godley and Lavoie, 2006a,b)[5]. Following the second option, it is possible to express the banks' price setting as a function of their targeted balance sheet structure and profitability (Dvoskin and Feldman, 2021)[6]. In line with post-Keynesian authors (Godley and Lavoie, 2006a; Minsky, 1986d; Wray, 1992b), I focus on two key ratios: a leverage and a liquidity ratio, which have both been associated with risk and liquidity preferences (Hawkins, 2003).

Equation 1 presents this pricing equation, where banks set their rates to target a Return on Equity equal to a desired excess profitability r over the base rate i_{CB}[7]. For this, they set their funding rates on liabilities L (time deposits and other) as the base rate minus a mark-down μ, and their lending rate on assets A as the base rate plus a mark-up σ_B:

$$r + i_{CB} = \frac{A\left(i_{CB}+\sigma_B\right) - L\left(i_{CB} - \mu\right)}{E} \tag{1}$$

We assume that banks set the mark-down μ to influence their clients' portfolio choice and shape their liquidity ratio (liquid assets over liquid liabilities)[8], $\phi = A^{liq}/L^{liq}$. In

[5] In the models of Godley and Lavoie (2006b), interest rate spreads change slowly with the gap between the endogenous observed balance sheet ratios, and the exogenous targeted ratios.

[6] A similar pricing equation, but with optimizing banks, can be found in Abadi et al. (2023).

[7] "In a world with explicit bank owners and compulsory capital adequacy ratios, banks need to make a definite amount of profits. They first need to cover the dividend payments, which their household shareholders view as desirable; secondly, they need to augment their own funds in line with the BIS rules on capital adequacy ratios" (Godley and Lavoie, 2006b, p. 9).

[8] "When banks have an insufficient amount of bills relative to their liquidity preference, they increase

this way, if banks aim to increase this liquidity ratio, they will reduce the mark-down and increase their funding rates: $\partial\mu/\partial\phi < 0$. Finally, defining the leverage ratio as $\lambda = A/E$, and using the accounting identity $A = L + E$, it is possible to express the general mark-up as a function of the targeted profitability and the balance sheet structure[9]:

$$\sigma_B = \frac{r - (\lambda - 1) * \mu(\phi)}{\lambda} \tag{2}$$

Desired balance sheets also change over time because of many factors, including changes in the banks' liquidity and risk preferences (Cerpa Vielma, 2022; Rochon, 1999)[10]. These, in turn, are tied to their subjective expectations and confidence regarding different types of risks related to their asset and liability positions (Dow and Dow, 1989; Lavoie, 1996)[11]. We summarise these behavioural factors in θ_B. In that sense, a higher θ_B is associated with a lower λ and a higher ϕ. In this way, Equation 2 highlights how changes in banks' desired balance sheet structures and profitability can create bank-driven shocks to credit conditions. An increase in the desired profitability, a decrease in the desired leverage, an increase in the desired liquidity ratio, or an increase in their liquidity preference and/or risk aversion, driving the last two, will imply a higher spread[12]:

$$\frac{\partial\sigma_B}{\partial\lambda} < 0, \quad \frac{\partial\sigma_B}{\partial\, r} > 0, \quad \frac{\partial\sigma_B}{\partial\phi} > 0, \quad \frac{\partial\sigma_B}{\partial\theta_B} > 0$$

In a more complex model, both the observed and the desired balance sheet structure of banks could be endogenized, in line with the approach of Nikolaidi (2014) and Dafermos (2018). Moreover, there is a myriad of other possible actions that banks can take to shape their desired balance sheets, such as reducing their dividend or buybacks, issuing new equities (Lavoie, 2019)[13], as well as reducing their position in tradable assets and wholesale funding[14]. However, this simple framework highlights the intrinsic connection between banks' desired balance sheet structures and the credit conditions they set.

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the interest rates on deposits, and so induce households to trade their Treasury bills for bank deposits (mostly time deposits)" (Godley and Lavoie, 2006b, p. 5).

[9] Operational costs and competition will affect this mark-up (Seccareccia, 1996).

[10] They can change with regulation (Tymoigne, 2010).

[11] Banks' liquidity preference can change both "endogenously" with the macro environment and general expectations across banks or "exogenously" due to individual bankers' subjective considerations, animal spirits and disposition towards uncertainty (Dequech, 1999; Dow and Dow, 2011; Rochon, 2006).

[12] Differently from many post-Keynesian models, where the deterioration of firms' ratios deteriorates financial conditions, here the focus is on changes in the banks' desired ratios.

[13] However, these operations might not fulfill the objective in the short run or during turmoil periods. As Borio and Zhu (2012) indicate, banks show reluctance to issue new equity or cut dividends during financial turmoil, because it is perceived as a sign of weakness.

[14] Indirectly, selling assets can affect financial conditions through asset prices, and with them, the available collateral of some borrowers, reducing their creditworthiness (Ramskogler, 2011).

2.2 Creditworthiness assessment and borrower-specific credit conditions

The second major source of bank-driven credit fluctuations is changes in global banks assessments of borrowers creditworthiness. Based on these assessments, banks determine the terms of credit. It is important to distinguish between *credit conditions* and *credit standards/criteria*. Creditworthiness criteria refer to the banks internal guidelines for new loans and refinancing approvals, set prior to negotiationse.g., preferred sectors, regions, collateral, or financial performance. In contrast, credit conditions are the agreed terms applied to a specific loan, negotiated between the bank and the borrower (Burlon et al., 2019).

Given the creditworthiness criteria, it is in the assessment process that borrower-specific credit conditions are shaped. These depend on banks current knowledge and expectations about both idiosyncratic riskslinked to borrower characteristicsand common risksrelated to the macroeconomic environmentunder uncertainty (Hawkins, 2002, 2003; Rochon, 2006). Bankers must judge repayment likelihood amid uncertainty, guided by conventions with varying confidence levels (Wolfson, 1996). [15]. To do so, they apply techniques and heuristics to classify borrowers into risk categories (Lavoie, 2022). Based on these ratings and internal criteria, they then set credit conditionsor deny the loan altogether.

Wolfson (1996) develops a simple model showing how credit assessment shapes borrower-specific credit conditions, focusing on two key measures: interest rate spreads and credit restrictions. Considering separately the general and borrower-specific components of this spread, the lending rate i_B^j for borrower j depends on the base rate i_{CB}, the banks general mark-up σ_B, and the borrower-specific spread ρ_B^j:

$$i_{B,t}^j = i_{CB,t} + \sigma_{B,t} + \rho_{B,t}^j \tag{3}$$

The borrower-specific spread is typically associated with a risk premium "imposed by banks to cover default risks" (Lavoie, 2022, p. 2022)[16]. In this way, a higher risk

[15] In this way, credit conditions for particular borrowers are not necessarily only an outcome of asymmetric information, or asymmetric risk aversions between borrowers and bankers, but, in a world of fundamental uncertainty, of asymmetric expectations between them (Wolfson, 1996).

[16] For many post-Keynesians, risk premia are associated with cardinal probabilities, while liquidity premia with liquidity preference, which depends on the confidence uncertainty about those expectations (Cardim De Carvalho, 2015). However, Dow (2019) indicates that degrees of confidence allow to talk about degrees of uncertainty. In that sense, here is not possible to talk about probabilities with absolute confidence, since most of the sources of global money are contingent on an infinite possibility of social interactions (Dymski, 2013). Therefore, this "credit risk [is understood] as a special case of a broad-ranging liquidity risk" (Bianco and Sardoni, 2018, p. 175. Added parentheses).

premium is associated with characteristics that deteriorate the robustness of the borrower's creditworthiness (Rochon, 2006; Wray, 1992a), such as higher levels of indebtedness, in line with Kalecki's principle of increasing risk (Sawyer, 2001). For Wolfson (1996), this risk premium depends on two factors. First, it depends negatively on the banks' confidence in their expectations about borrowers' future cash flows $E_{B,t}\left[CF_T^j\right]$, which in turn depend on different borrowers' characteristics. Second, given their assessment about the borrowers' risk profile, it depends positively on the banks' risk aversion and liquidity preference θ_B (Dow, 1996; Lavoie, 2022)[17].

$$\rho_{B,t}^j = \rho\left(E_{B,t}\left[CF_T^j\right], \theta_B\right) \tag{4}$$

In turn, credit restrictions can be derived using a similar decision rule to Wolfson (1996) and Hyun (2023). Given the notional credit demand $C^{D,j}$ of the borrower j, and the lending rate $i_{B,t}^j$, the bank accepts the requested loan if its expectations about the borrower's future free cash flow $E_{B,t}\left[CF_T^j\right]$ cover the service of the loan (principal and interest payments). In line with Hyun (2023), we express the relationship as a minimum free cash flows to debt service ratio δ^{min}, including both the principal and the interest payments[18], which represents the current banks' creditworthiness criteria:

$$\delta^{min}\left(\theta_B\right) \leq \frac{E_{B,t}\left[CF_T^j\right]}{\left(1+i_{B,t}^j\right)C^{D,j}} \tag{5}$$

We assume that δ^{min} represents the banks' creditworthiness standards, which also depend on θ_B. Creditworthiness criteria vary across time with the perceived uncertainty about the future macroeconomic conditions and banks' preferences (Minsky, 1980; Rochon, 2006). In that sense, higher banks' risk aversion and/or liquidity preference will tighten credit standards, and in this particular model, the minimum required free cash flows to debt service ratio. Based on this inequality, the credit restrictions, as a share between zero and one of the notional credit demand, can be expressed as:

$$cr_t^j = 1 - \frac{E_{B,t}\left[CF_T^j\right]}{\delta^{min}\left(\theta_B\right)\left(1+i_{B,t}^j\right)C^{D,j}},\ where\ cr_t^j \in [0,1] \tag{6}$$

Where the effective credit demand is equal to the non-restricted notional credit demand $C^{ED,j} = C^{D,j}\left(1-cr_t^j\right)$. In this way, if the credit restrictions are binding, a deterioration of banks' expectations and confidence about the borrower's access to money in the

[17] "There is a range within which banks have the discretion to set the rate" (Rochon, 1999, p. 285).

[18] Wolfson only includes interest rate payments, while Hyun also makes explicit the role of the loan's tenor. For Wolfson, the state of confidence has to be "higher" than the bankers' risk aversion. Here we assume that risk aversion changes the value of δ^{min}

future (profitability, liquid assets, etc)[19], as well as higher interest rates[20], and higher creditworthiness criteria will imply that a lower proportion of the notional credit demand will be accepted by the banks:

$$\frac{\partial cr_B^j}{\partial E_B\left[CF_T^j\right]} < 0, \quad \frac{\partial cr_B^j}{\partial i_B^j} > 0, \quad \frac{\partial cr_B^j}{\partial \delta^{min}\left(\theta_B\right)} > 0$$

Given the components and determinants of the lending rate, this also implies that the factors that increase the lending rate might also increase the credit restrictions:

$$\frac{\partial cr_B^j}{\partial \lambda} < 0, \quad \frac{\partial cr_B^j}{\partial\ r} > 0, \quad \frac{\partial cr_B^j}{\partial \phi} > 0, \quad \frac{\partial cr_B^j}{\partial i_{CB}} > 0, \quad \frac{\partial cr_B^j}{\partial \rho_B^j} > 0$$

Since both the risk premium and the credit restrictions have common determinants (the expectations about the borrower and banks' liquidity preference and risk aversion), and the latter also depends on the former, credit conditions generally move together across time. As Wolfson (1996) highlights, they are usually affected by the business cycle and the observed and desired financial structures of borrowers and banks, which can change with each other endogenously. Because of this, the effective credit available can be highly volatile and cyclical, especially for borrowers considered less creditworthy. Consequently, fluctuations in these aspects can create exogenous fluctuations in credit accessibility from a borrower's perspective, regardless of the borrower's notional demand.

3 A GLOBAL MONEY FRAMEWORK: GLOBAL BANKS AS DRIVER OF BALANCE OF PAYMENTS CONDITIONS

The previous section explored how banks can drive credit conditions in a domestic economy, where their deposits are accepted as a means of payment and settlement. How does this change at the global level, where just one currency is used for most cross-border payments? What are the relevant credit conditions for these cross-border transactions? Are banks from all nationalities equally important in driving those? This section extends the

[19]Effective credit demand may also decline due to worsening borrower expectations and reduced notional demand, without an increase in credit restrictions. Credit and "expectations are bounded by what is considered to be reasonable/ normal by the most pessimistic economic sector." (Tymoigne, 2006, p. 5). Here we focus on what happens when banks' expectations are the lower bound: $E_B\left[CF_T^j\right] < E_j\left[CF_T^j\right]$.

[20]Interest rate changes may lead firms to adjust prices, making expected cash flows endogenous (Dvoskin and Feldman, 2021). Yet, financing costs can hurt smaller firms with limited pricing power and, at the macro level, reduce real wages and expected expenditure, lowering expected cash flows.

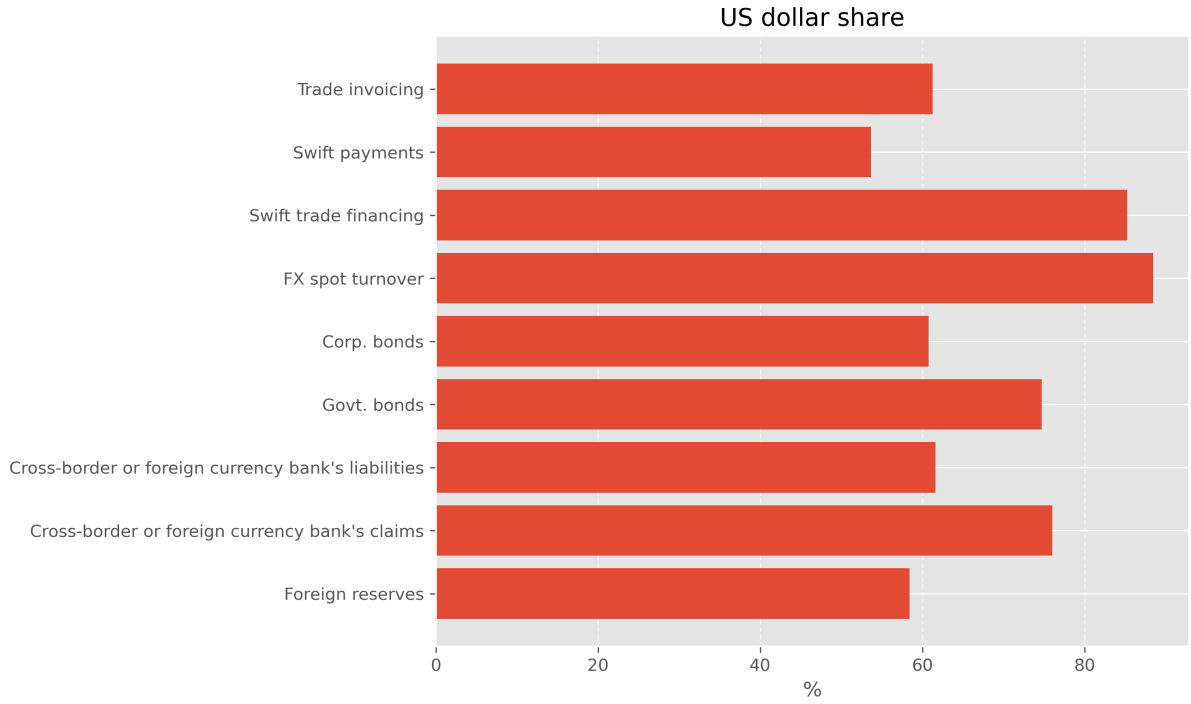

Figure 1: Global role of the US dollar. Shares (%). Source: own elaboration based on Federal Reserve notes, BIS, SWIFT, Maggiori et al. (2020)and Coppola et al. (2021). Latest data available.

previous framework to a global level, emphasizing two facts about our current International Monetary System: the US dollar is the most widely used cross-border means of payment and settlement—hereafter referred to, for simplicity, as global money—, and most of these cross-border US dollars are deposit liabilities of a reduced group of globally active financial institutions — hereafter global banks[21]—. These two facts are explored in this section before extending creditworthiness assessments to a cross-border context and analysing their implications.

3.1 Global money and the balance of payments survival constraint

Figure 1 shows the share of the US dollar in different cross-border related transactions and instruments. In all these usages, the US dollar represents the lion's share[22]. This implies that countries require access to US dollars to participate in most cross-border transactions.

In a world where cross-border transactions require global money, most gross

[21]While similar to Global systemically important banks classification by the Financial Stability Board, this paper focuses on banks central to the international US dollar system, not necessarily all G-SIBs.

[22]Second, while the Euro is included as an international currency in these indicators, its global use is more limited. The framework can accommodate multiple "global monies," especially since many key banks in cross-border Euro payments also operate in the offshore US dollar system.

flows in the balance of payments are global money flows by definition. Using Minsky's (1986c,1986d) balance of payments characterization and cash flow typology, we can express the global money flows of any particular borrower-country, highlighting the role of previous commitments of both interest and principal payments[23]:

$$0 = \underbrace{X_t - M_t}_{\substack{trade \\ flows}} + \underbrace{(p^A_{t-1} + i^A_{t-1})A_{t-1} - (p^L_{t-1} + i^L_{t-1})L_{t-1}}_{\substack{portfolio \\ service\ flows}} + \underbrace{\Delta L_t}_{\substack{new \\ external \\ liabilities}} - \underbrace{\Delta A_t}_{\substack{new \\ external \\ assets}} \tag{7}$$

A country requires global money for gross cross-border payments, both real and financial. These include imports M, the service of external liabilities $\left(p^L_{t-1} + i^L_{-1}\right) L_{-1}$ and the accumulation of new external assets ΔA[24]. The sources to acquire it are restricted to the country's exports X, the liquidation ∇A and amortization and return $\left(p^A_{t-1} + i^A_{-1}\right) A_{-1}$ of their previously accumulated external assets and their additional external borrowing possibilities ΔL (Terzi, 2006)[25]. This highlights the multiple sources of external vulnerability, related not only to trade deficits and external debt commitments, but also to surges in gross outflows and sudden stops in gross inflows (Cavallo et al., 2015). This aligns with the literature emphasizing the importance of the financial account for financial stability (Borio and Disyatat, 2015; Kregel, 1998; Pantelopoulos, 2024). This structural need for global money can be emphasized with the Minskyan concept of "survival constraint", where a unit "in order to survive, must satisfy the condition that the initial cash plus the receipts minus the costs payable to that date are greater than zero" (Minsky, 1954, p. 96). In this line, "the balance of payments is the international analogue of the survival constraint, requiring settlement in international money" (Mehrling, 2023, p. 3), and countries need to match daily global money expenditures and global money inflows to meet their external payment obligations (Angrick, 2018b). From this perspective, this balance of payments is not only a long-term constraint on growth, but it is also a short-term "matter of clearing and settlement" (Mehrling, 2022, p. 144).[26]. Since only a handful of instruments are accepted as global money, both external credit relationships and the cross-border transactions they allow strongly depend on the conditions set by the issuers of these instruments. Because of this, it is important to explore, firstly, how global money is created and which are the key institutions in play. And secondly, to discuss the factors that determine these

[23]As Kohler (2022) points out, financial flows are not truly gross in the balance of payments accounts. There, the new negative and positive inflows/outflows, as well as principal payments, are netted in the net acquisition of financial assets and net incurrence of liabilities for each item.

[24]The stock of foreign assets and liabilities also shifts with capital gains from asset prices and exchange rates. We could restate the equation in terms of changes in the International Investment Position, incorporating capital gains in the i^A and i^L, without affecting the current analysis.

[25]For countries, these operations can be decentralized—some units issue external liabilities, while others acquire global money to finance imports or accumulate external assets.

[26]Importantly, stable international demand for the external liabilities of countries issuing internationally accepted US dollars eases this constraint. This is especially true for the United States, where the global acceptance of its currency means the "external constraint does not bite" (Costabile, 2013, p. 191).

credit operations, ultimately influencing the ability of different countries to participate in cross-border transactions.

3.2 Global banks as global money issuers

As in most domestic economies, global money mainly comprises bank deposits (Rossi, 2007), most of them denominated in US dollars (Bertaut et al., 2021). In that sense, these "international dollars are created by the banking process" (Minsky, 1979, p. 17)[27]. Therefore, the global money supply is endogenous since it is mainly created as US dollar deposits by banks when they create loans in response to creditworthy demand. However, if domestic regulations allow it, any bank from any country can issue deposits denominated in US dollars [28], the problem is, paraphrasing Minsky (1986d, p. 228), to get these deposits accepted as a means of cross-border payment and settlement[29]. While non-US banks held $21 trillion each in US dollar assets and liabilities by 2023—plus off-balance sheet obligations estimated at twice that—most of these positions were concentrated in a few advanced economies (Binder, 2024; McGuire et al., 2024). Moreover, as Figure 2 illustrates, a small group of global banks represents the lion's share of all cross-jurisdictional bank positions reported to the Bank for International Settlements.

This paper argues that only the US dollar liabilities of these few global banks—headquartered in a handful of countries—are widely accepted as global money, a privilege not shared by banks from most countries. This acceptability is manifested in their hierarchical position within the network of correspondent banking relationships (Dörry et al., 2018; Rossi, 2007)[30]. In this network, only a few domestic banks maintain direct bilateral accounts with each other, but most have such arrangements with global banks (Arauz, 2021; Pantelopoulos, 2022). When cross-border payments between two units (or their banks) are made, global banks facilitate these payments by recording changes in the ownership of their liabilities (Arauz, 2021; Bindseil and Pantelopoulos, 2023). Thus, this role and observed concentration from Figure 2 are not merely a reflection of these banks' size, but also of the differential acceptability of their liabilities. While the reasons behind this acceptability are beyond the scope of the paper, its implications are central. First, if the liabilities of only a few banks are generally accepted as global money—while others are not—then access to those liabilities becomes essential for participating in cross-border

[27] If the global bank and borrower are in different countries, the operation generates gross cross-border inflows and outflows for both. Yet, nothing physically "flows" between countries—only a new set of claims is recorded, expanding both balance sheets (Kohler, 2022).

[28] "Banks can run a book in any unit — dollars, marks, cigarettes or fur-pelts" (Minsky, 1986a, p. 9).

[29] US dollar deposits issued by local banks might be accepted domestically, but not abroad. If the domestic units want to make a cross-border payment, the country will still require US dollar deposits with a global bank.

[30] "Almost all of the world's banks with international businesses have accounts at these megabanks" (Arauz, 2021, p. 231).

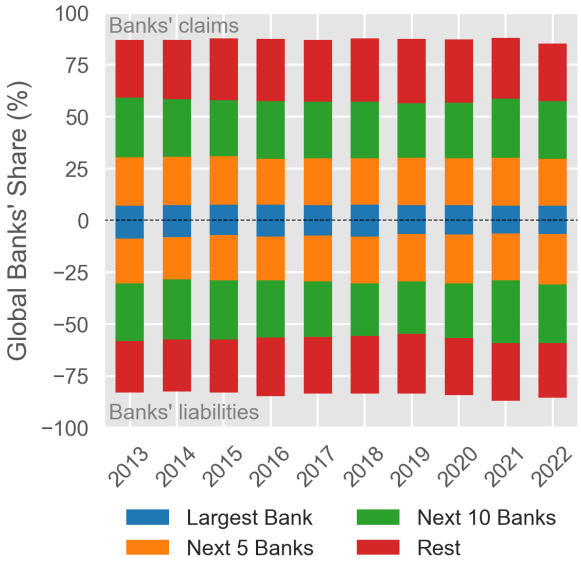

Figure 2: Share of the 25 global banks on cross-jurisdictional (XJ) bank positions. Source: own elaboration based on the Global Systemically Important Banks (G-SIB) data from the Basel Committee on Banking Supervision and the consolidated banking statistics from the Bank for International Settlements. Note: selection of 25 G-SIB with more than 1,5% average participation on the total cross-jurisdictional claims and liabilities between 2013 and 2022.

transactions. Second, this acceptability gives these institutions—and the credit conditions they set—a central role: they define the terms under which countries lacking sufficient global money can obtain it to make cross-border payments[31].

Global banks behave differently from domestically oriented local banks because of their global reach and complexity, which expose them to a broader range of risks. First, as Acalin (2023) shows, the largest global banks exhibit both higher average leverage and greater leverage volatility over time compared to other large banks. As discussed in Section 2.1, this can lead to fluctuations in US dollar credit conditions. Second, and relatedly, global banks include both US and non-US institutions (Aldasoro et al., 2024; Binder, 2024; Murau et al., 2020). However, non-US global banks may not benefit from US deposit insurance, direct access to the Federal Reserve's balance sheet, or stable US-based deposit funding. This makes them reliant on balances and credit lines from US global banks—or on Federal Reserve swap lines with their local central banks—for dollar liquidity (Dafermos et al., 2022; Mehrling, 2015; Minsky, 1986a)[32]. Thus, the US dollar-based

[31]Similarly, Binder (2024) argues that since both US and non-US global banks can create US dollars, they play a key role in deciding who gets access to global money and under which conditions. Global Banks can affect domestic financial conditions by other channels not explored in this paper (Gabor, 2015).

[32]Kumhof et al. (2020, p. 8) indicate that "dollar credit can also be created by non-US banks, as long as they have adequate access to correspondent banking arrangements or central bank swap lines with the reserve currency economy". Similarly, He and McCauley (2012, p. 7) point out that "offshore markets in a currency can flourish if offshore financial institutions are able to maintain and to access freely clearing

international payment system operates as a three-tier banking system (Lavoie, 1992), requiring distinct settlement layers and interconnected infrastructures (Faudot, 2018).

As a result, the relevant base rate for cross-border US dollar credit includes various Federal Reserve policy rates i_{US}, including the rate for the central banks' swaps. As well, the general interest rate spread σ_{GB} is shaped by the balance sheet conditions of both US and non-US global banks, particularly their leverage and liquidity ratios λ_{GB}, ϕ_{GB}:

$$i_{GB,t} = i_{US,t} + \sigma_{GB,t}\left(\lambda_{GB}, \phi_{GB}\right) \tag{8}$$

Still, as with individual borrowers, their lending rate is not uniform across countries. The next section examines how global banks influence country-specific US dollar credit conditions.

3.3 Creditworthiness assessments and the balance of payments

As mentioned earlier, creditworthiness assessments reflect both borrower-specific and macroeconomic factors. In cross-border financing, however, they include an additional layer: the borrower-country's ability to access global money to meet future debt payments. While this may involve borrower-specific aspects (e.g. if the borrower is an exporter, or holds US dollars[33]), it is primarily based on expectations about the country's balance of payments, which global banks use to set country-specific credit conditions.

The connection between the cross-border creditworthiness assessments and the accessibility to US dollars through the balance of payments flows was repeatedly highlighted by Minsky:

> "International investments and loans depend upon the perceived prospects of payments, which mean that they reflect expectations of future dollar earnings. The ability to borrow dollars depends upon the belief that the dollars will be repaid; i.e., the borrower will earn dollars." (Minsky, 1984, p. 21)

> "Every liability (...) must be supported by cash flows (...) The same require-

balances in the currency with onshore banks". This was also acknowledged by Minsky (1986b, p. 8): "To a depositor in such an offshore bank the dollars on deposit in, say a 'German' based bank is as much a dollar as any deposit in a New York office of a U.S. charted bank. Thus the German charted bank must earn dollar income and hold dollar assets. In particular it must hold assets that give it a quick command of dollars in New York". Consequently, there is a continuous and time-varying hierarchy of global banks, based on the cross-border acceptability of these institutions' deposits, their access to credit from US banks, as well as their regulatory environment and their proximity to the lending from the Federal Reserve (Murau et al., 2022; Saeidinezhad, 2024).

[33]The balance of payments at the country level remains important in this assessment even for exporters. For instance, Local regulation might force these to sell the earned US dollars in the domestic exchange market.

ment that cash flows support asset values holds for international indebtedness, the only difference being that the supporting cash flows may be derived from income denominated in one currency while the payments are denominated in another. The peso-denominated income of a Mexican entity may need to be exchanged into dollars for a commitment to be validated. The terms upon which dollars are available for pesos then determines whether commitments can be fulfilled. The availability of foreign currency depends upon the balance of payments of the country and the character of national assets that can be sold or pledged to foreigners." (Minsky, 1986c, p. 5)

"For international financing, current lending reflects expectations of favorable balance of payment conditions for the borrowing country." (Minsky, 1986a, p. 11)

In this way, servicing most external liabilities depends on future access to US dollars. As a result, global banks assess a borrower's ability to obtain US dollars and under what conditions. This expected access, in turn, depends on anticipated balance of payments dynamics[34]. While banks can observe recent trends in a country's external accounts, future behavior remains uncertain. So how do global banks make such assessments under uncertainty?

Similar to the process described by Harvey (2009) and Kaltenbrunner (2011) for FX investors—and consistent with Section 2—global banks form expectations about a country's cross-border payment capacity based on conventions and shifting confidence in those conventions, categorizing countries into risk groups[35]. As with individual borrowers, cross-border creditworthiness assessments are shaped by both global (common across countries) and domestic (idiosyncratic) factors (Hawkins, 2003). In line with the decision rule outlined in Section 2, global banks will lend to a borrower-country if they expect that the country's future access to US dollars will exceed its external debt service obligations—interest and principal—by at least a minimum external debt service coverage ratio δ_{Ext}^{min}:

[34]If the country observes a surplus in other currencies, it will still have to be converted into US dollars, affecting the exchange rate given the accessibility conditions to US dollars and the demand for such currency (Toporowski, 2013).

[35]Similarly, Basel Committee on Banking Supervision (1982, p. 2) highlights that in the banks' assessment of country risk "(s)ince the key question is whether there will be impediments to the repayment of external indebtedness, the size, nature and maturity pattern of a country's current external indebtedness are particularly significant (...) The analyst will nonetheless wish to project a path for countries' external debt and to forecast their ability to service and repay, which means looking at the outlook for official reserves and other balance-of-payments items, terms of trade, exchange rates, inflation, the country's record in servicing and repaying external debt and other relevant factors. Given the complexities, it is no surprise that banks, particularly large banks with diversified portfolios, recognise that forecasting risks over the life of a bank's credit exposure entails a substantial measure of judgement".

$$\delta_{Ext}^{min} \leq \frac{X_{k,t+1} - M_{k,t+1} + \left(p_{k,t}^{A} + i_{k,t}^{A}\right) A_{k,t} - \left(p_{k,t}^{L} + i_{k,t}^{L}\right) L_{k,t} - \Delta A_{k,t+1} + \Delta L_{k,t+1}}{\left(1 + i_t^{US} + \sigma_t + \rho_t^k\right)\left(1 - cr_t^k\right) C_t^{D,k}} \quad (9)$$

Summarising the expected US dollar cash flows of the country as $E_t\left[BoP_T^k\right]$, Equation 9 can be rearranged to emphasise the drivers of US dollar credit conditions for the country k:

$$\underbrace{E_t[BoP_{t+1}^k]}_{\substack{Expected \\ access\ to\ USD}} \cdot \underbrace{1/\delta_{Ext}^{\min}(\theta_B)}_{\substack{Credit- \\ worthiness \\ criteria}} \geq \underbrace{(i_t^{US} + \sigma_t)}_{\substack{General\ lending \\ rate}} \underbrace{(1 + \rho_t^k)(1 - cr_t^k)}_{\substack{Country\ k \\ credit\ conditions}} \underbrace{C_t^{D,k}}_{\substack{credit \\ demand}} \quad (10)$$

The left side of the inequality in Equation 10 represents the expectations of global banks (and their confidence in these expectations) about the future access to US dollars of the country j, adjusted by their creditworthiness criteria, which depends on their risk aversion and liquidity preference (Hawkins, 2003). The right side of the inequality represents the US dollar commitments associated with current general US dollar lending rates, the country's notional credit demand, and particular credit conditions. This includes a country-specific risk premium ρ_t^k, which depends again on the global banks' risk aversion and liquidity preference, as well as the country's characteristics shaping its creditworthiness. For instance, a country with high volatility or negative trends in trade and income balances as well as in cross-border inflows and outflows will be less creditworthy in the eyes of global banks (Kregel, 2004).

It is important to highlight that $E_t\left[BoP_{t+1}^k\right]$ will also affect the expected depreciation of the local currency versus the US dollar and vice versa. Lower expected US dollar access will imply depreciation pressures in the exchange rate market. In turn, a higher exchange rate will imply that the borrower's income and holdings of local currency (and local currency assets) will buy a smaller quantity of US dollars, perhaps not enough to service the external liability[36]. Moreover, the borrower's local currency income can be negatively affected by the contractionary effects of the depreciation. Something similar happens when the external liabilities are denominated in local currency. If global banks do not want to maintain their position in the borrower country's liabilities (or buy exports from this country), they will exchange it in the exchange rate market, demanding US

[36]Similarly, "(i)n terms of validating external debts denominated in dollars it is not enough for debtor units to have a large cash flow in the domestic currency; they must also be able to transform the domestic currency cash flow into dollars" (Minsky, 1986a, p. 13). In the same line "(t)he cash flow commitments by such debtors to banks can be fulfilled only if their "profits" and "taxes" in the local currency can be transformed into dollars at favorable terms (...) These units need earn a sufficient income in their domestic currency and they need to be able to exchange these profits for dollars at an exchange rate that is consistent with the profitability of their business" (Minsky, 1984, p. 20,22)

dollars. Therefore, external liabilities in local currency do not completely eliminate the depreciation pressures on the balance of payments coming from the service of these liabilities (Dvoskin and Landau, 2023). However, local currency liabilities can reduce the country's external vulnerabilities. Since they move the currency risk from the balance sheet of the borrowers to the lenders, they can reduce the contractionary effect of the depreciation. Still, the lending behaviour of foreign units bearing the currency risk might be procyclical (Hofmann et al., 2020; Kaltenbrunner and Painceira, 2015), since there is an "additional layer of uncertainty" (Dow, 1999, p. 162).

3.4 Global banks' US dollar credit conditions and balance of payments' vulnerabilities and constraints

Two important implications can be derived from the forward-looking assessment based on the balance of payments presented in Equation 10, both long emphasized by the Latin American structuralist and other literature. The first implication is that these credit conditions are a source of external vulnerabilities since they are strongly dependent on different external factors (Kohler, 2021; Ocampo, 2016)[37]. These credit conditions are vulnerable to changes in expectations and perceived uncertainty, as well as highly dependent on external factors that drive exports, other inflows, etc. Since all the sources of US dollars are related to international transactions, they are affected by global factors. These include changes in global activity affecting the price and volume of the trade flows and other global financial factors, such as the monetary policy of the Federal Reserve. Importantly, changes in global banks' liquidity preference and balance sheets can affect these US dollar credit conditions, as highlighted in the work of Dow (1999) and Hawkins (2003). Figure 3 summarizes the drivers of an individual country's US dollar credit conditions. Given the country-level external credit demand[38], credit restrictions and interest rates depend on the global banks' expectations about the country's balance of payments, the US base rate, the global banks' desired balance sheet structures, as well as their liquidity preference and risk aversion[39]. The effective credit demand is convex because of the effect of higher interest rates on the country's creditworthiness for a given

[37]This also relates to the local pull factors versus global push division classification in the literature on the drivers of cross-border flows (Calvo et al., 1996, 1993; Koepke, 2019), and most recent literature on the global financial cycle (Aldasoro et al., 2023; Bortz et al., 2022; Kaminsky, 2019; Miranda-Agrippino and Rey, 2022; Rey, 2013; Vernengo, 2023b). Particularly, to the empirical research on the effects of global banks' leverage on cross-border flows (Bruno and Shin, 2015a,b; Cesa-Bianchi et al., 2018).

[38]At the country level, external credit demand—like that of individual borrowers—can be interest rate insensitive or even upward sloping. Higher US dollar rates may lead some units to demand more, prompting others to increase credit demand as well, or to cover rising interest payments on past liabilities (Minsky, 1986a).

[39]Unlike the adverse selection literature in international finance—where external loan supply takes a backward-bending form (Folkerts-Landau, 1985)—here, credit restrictions appear as borrower-specific effective credit demand, which remains linked to notional credit demand.

expected US dollar access (Hyun, 2023).

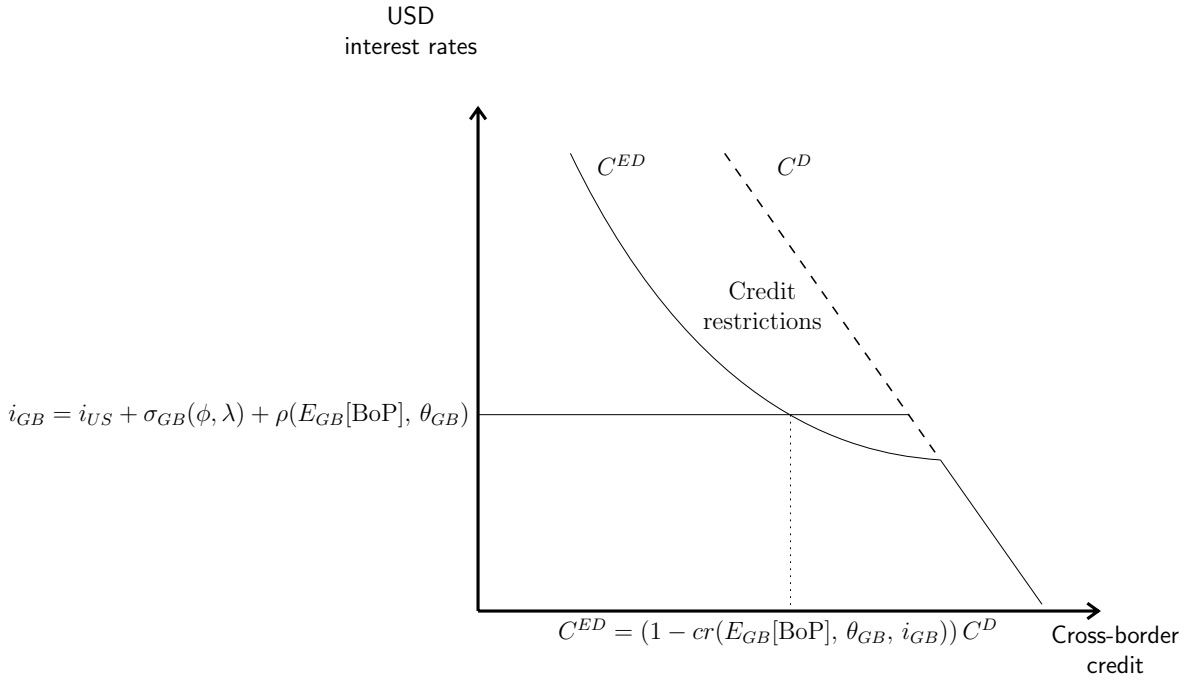

Figure 3: US dollar credit conditions.

The second implication is that, if expectations about the future of an economy are not shared with the global banks for a given lending rate, that economy will face tight credit restrictions and even become unable to access any external credit (Botta, 2021; Serrano and Summa, 2015)[40]. As Hawkins (2003, p. 136) indicates, a "country operating at the limit of its balance of payments is seen in the same light as an individual who is unable to exploit her creditworthiness further". In this way, this framework makes compatible an endogenous supply of US dollars at the global level, but "exogenously limited from the perspective" of an individual country (Oberholzer, 2023, p. 170). This will restrict their capacity to fund trade imbalances, accumulate external assets, and service external liabilities. While this creditworthiness assessment can change with global banks' expectations, confidence, and conventions, there are long-lasting conventions grounded on the country's economic, financial, and institutional structure, which are central to the stability of external funding (Vernengo, 2023a). If these structures also imply an inelastic minimum demand of US dollars for different levels of activity, the maximum external credit available is a balance of payments constraint on output (Bhering et al., 2019; Setterfield, 2012; Thirlwall, 1979; Vernengo and Pérez Caldentey, 2020)[41]. In this way, these creditworthiness assessments can shape the balance of payments constraints.

[40]Paraphrasing Keynes (1930, vol. I, p. 212), there is apt to be an unsatisfied fringe of the borrower-countries.

[41]The structuralist literature and others have challenged the idea that changes in relative prices and exchange rates alone can secure external balance and full employment through higher exports and import substitution (Vernengo and Pérez Caldentey, 2020). Sylla (2024) distinguishes between dependence on foreign real resources and international payment issues. A few countries can purchase foreign goods in

While there are many recent extensions of the balance of payments constraints models to include financial factors (Bhering et al., 2019; Coelho and Caldentey, 2018; Mason, 2014; Moreno-Brid et al., 2023; Moreno-Brid, 2003; Morlin, 2022; Pérez Caldentey, 2023; Pérez Caldentey and Vernengo, 2024), the present framework explicitly relates these to the balance sheets and expectations of international financial institutions[42].

Since the presented creditworthiness assessments affect both credit restrictions and risk premia, they create different tolerable indebtedness levels for each country (Bortz, 2021). Different from Bhering et al. (2019), where a fixed maximum ratio exists between external liabilities and exports, this framework allows that ratio to vary by country, given a minimum debt service coverage ratio[43]. Including future borrowing possibilities as a future source of US dollars helps explain why advanced economies—deeply integrated into the IMS—can sustain external borrowing, while exports remain crucial for countries not deemed creditworthy. As Kregel (2004) notes, some countries benefit from strong investor confidence, with lenders expecting debt service not only from future export earnings but also from continued access to external credit. This confidence allows such countries to maintain low risk premia and high external debt levels, as shown in Figure 3. Although the maximum debt tolerance and associated risk premia are not directly observable, similar patterns can be seen by comparing the spread between returns on external liabilities and assets with the ratio of external liabilities to exports, as in Figure 4.

Finally, if credit demand is normalized across countries, credit constraints and risk premia determine each country's position in what Hawkins (2003) calls "the spectrum of international provision", with exceptionally creditworthy countries in the top, and excluded ones in the bottom. Figure 5 shows this relationship. This aligns with the post-Keynesian literature on the currency hierarchy, which emphasizes the liquidity of different currencies — the ease of converting local currency into US dollars without loss—, and their ability to fulfill money's functions internationally (Bonizzi and Kaltenbrunner,

their own currency with limited exchange rate effects, but most cannot (Ehnts and Randall Wray, 2024). For these, the balance of payments constraint is a real resource constraint—reflecting limited capacity to meet domestic demand with local resources and technology—financially expressed as a lack of foreign finance (Vernengo, 2006).

[42]Recent post-Keynesian adaptations of the Mundell-Fleming framework introduce a vertical balance of payments curve in the domestic interest rate-output space (Dvoskin et al., 2024; Marins, 2023; Serrano and Summa, 2015). This framework could be extended to a two-country post-Keynesian Mundell-Fleming model, where higher US dollar rates tighten balance of payments constraints.

[43]Many authors have highlighted the role of exports and trade surpluses as sources of non-debt-generating US dollars (D'Arista, 2004), and the connection between the riskiness of external debt and the dynamics of the borrowers' exports (Cesaratto, 2020, p. 123). Minsky also indicates: "If bankers are financing balance of payment deficits they must be concerned about the ability of the deficit countries to generate a sufficiently favourable merchandise balance to at least service the growing outstanding debts" (Minsky, 1979, p. 22). Similarly, "(A) debtor has to be in 'surplus', if not now then expected over some relevant horizon, for payment commitments on debt are to be fulfilled (...) Ultimately, the availability of dollars to validate debt depends upon the balance of trade (...) not necessarily now but expected over a reasonable future is the basis of a debtor country's viability" (Minsky, 1986a, p. 13).

Figure 4: External liabilities over annual exports and spread between the implicit return on external liabilities and external assets. Source: own elaboration based on IMF data and Lane and Milesi-Ferretti (2018). Note: implicit returns are calculated as in yields in Curcuru et al. (2013), without including capital gains. Average values between 2000 and 2022. Excludes outliers.

2020, 2021; Fritz et al., 2018). According to Orsi et al. (2020, p. 23) "the determinants of the liquidity premium [and the positions in the hierarchy] are rather mixed in the literature" (added parenthesis), but exchange rate stability, current account dynamics, and external debt are commonly highlighted. Specifically, Kaltenbrunner (2011) argues that the liquidity premium depends on market participants' preferences and their views on a country's ability to meet external obligations. In sum, this literature roots the liquidity premium in expected external performance and investor preferences, in line with the framework presented here—though this framework broadens the focus to all external liabilities and highlights the role of global banks.

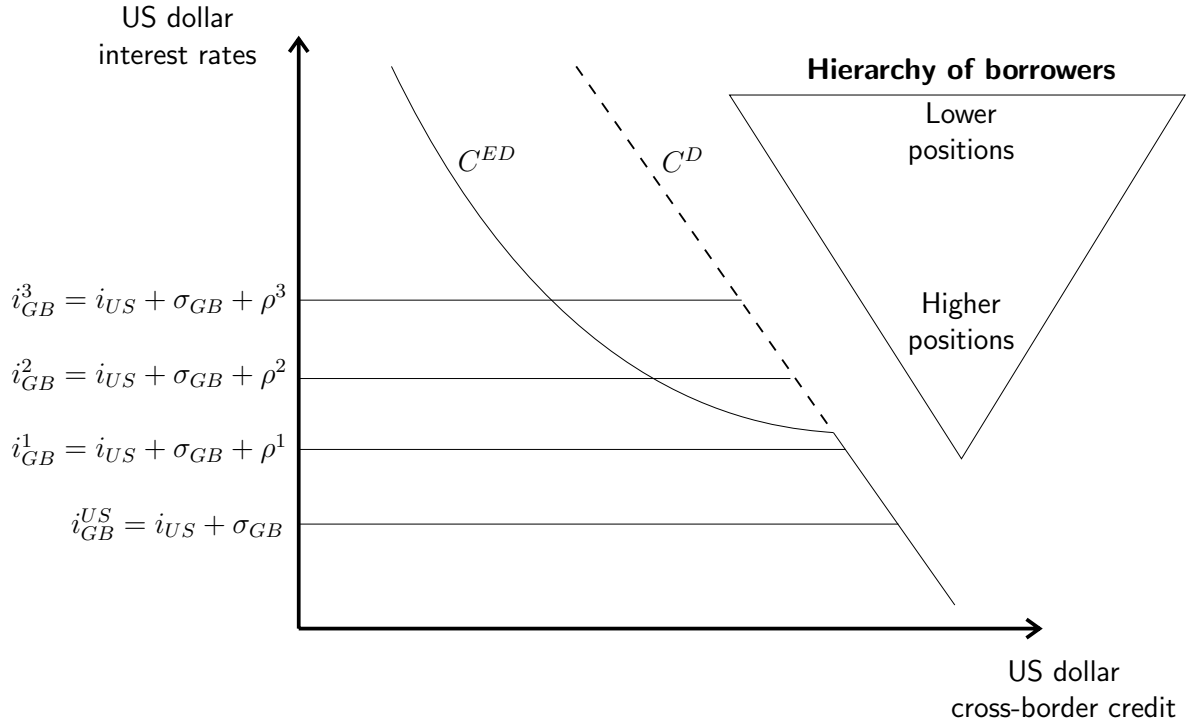

Figure 5: Credit restraints, risk premia, and the hierarchy of borrowers. Source: own elaboration.

4 CONCLUSIONS

Drawing on the post-Keynesian endogenous money theory and the Minskyan tradition, this paper develops a simple framework to understand the role of global banks in shaping the US dollar credit conditions that drive countries' balance-of-payments dynamics.

Cross-border credit is fundamentally demand-driven, but whether that demand is judged creditworthy and on what terms depends on global banks' evolving considerations. In this way, two global bank-related factors shape these credit conditions: their balance sheet dynamics and their assessment of countries' external creditworthiness. The latter is based on expectations about a country's future access to global money—via trade surpluses,

foreign assets, or borrowing potential. These expectations, however, are not static, shifting over the cycle, with both domestic and global developments. Notably, changes in creditworthiness assessments can restrict access to external credit even without any alteration in the borrower's underlying economic fundamentals. Furthermore, global banks constantly adjust credit conditions to manage their balance sheet structures, influenced by liquidity preferences, regulations, and macro conditions in advanced economies. These dynamics can create external pressure on countries' balance of payments, triggering financial stress even if their economic conditions remain stable.

Global banks are not neutral intermediaries, but creators of international purchasing power that countries need to engage in cross-border transactions. While borrower economies can implement policies to improve their balance of payments and creditworthiness, local factors are just a part of the story. The expectations of these institutions can shift quickly due to global factors unrelated to the borrower's idiosyncrasies. Moreover, various external factors can affect the balance sheets and preferences of these key institutions.

Importantly, with the rising role of Non-Bank Financial Institutions (NBFIs) in international finance (Aldasoro and Ehlers, 2018; Goldberg, 2022), one might question the theoretical and empirical relevance of the framework. While NBFIs are important drivers of financial and economic conditions, the endogenous money perspective highlights the hierarchical and distinct role of banks as issuers of money (Bouguelli, 2020; Michell, 2024; Sissoko, 2024). In this sense, global banks—as issuers of global money—remain central to US dollar conditions, even in a world where NBFIs account for much of the cross-border flows. This is because NBFIs must first borrow from global banks or collect US dollar deposits created by them (Davidson, 1978)[44]. This includes non-US NBFIs borrowing US dollars via FX swaps to invest abroad and hedge local currency liabilities McGuire et al. (2021). Thus, global banks set both borrowing conditions and the returns on competing investments for NBFIs[45]. The framework can be extended to include NBFIs, with global banks remaining key to US dollar credit conditions (Section 3.2), while their assessments of leveraged NBFIs—and the latter's assessments of borrower countries—also become relevant (Section 3.3).

[44]Or less commonly, a non-global US bank.

[45]The NBFI categorization might be too broad to include the different activities in a simple but useful theoretical framework.

References

Abadi, J., Brunnermeier, M., and Koby, Y. (2023). The reversal interest rate. *American Economic Review*, 113(8):2084–2120.

Acalin, J. (2023). The global financial cycle meets global imbalances. Report, mimeo.

Aldasoro, I., Avdjiev, S., Borio, C., and Disyatat, P. (2023). Global and domestic financial cycles: variations on a theme. *International Journal of Central Banking*.

Aldasoro, I. and Ehlers, T. (2018). Global liquidity: changing instrument and currency patterns. *BIS Quarterly review September*.

Aldasoro, I., Mehrling, P., and Neilson, D. H. (2024). On par: a money view of stablecoins. *Journal of Financial Market Infrastructures*, 11(4):47–64.

Angrick, S. (2018a). Global liquidity and monetary policy autonomy: an examination of open-economy policy constraints. *Cambridge Journal of Economics*, 42(1):117–135.

Angrick, S. (2018b). Structural conditions for currency internationalization: international finance and the survival constraint. *Review of international political economy*, 25(5):699–725.

Arauz, A. (2021). The international hierarchy of money in cross-border payment systems: Developing countries regulation for central bank digital currencies and facebooks stablecoin. *International Journal of Political Economy*, 50(3):226–243.

Basel Committee on Banking Supervision (1982). Management of banks' international lending: Country risk analysis and country exposure measurement and control. Report, Bank for International Settlements.

Bertaut, C., Curcuru, S. E., and von Beschwitz, B. (2021). The international role of the us dollar. Technical Report 2021-10, Federal Reserve Board.

Bhering, G., Serrano, F., and Freitas, F. (2019). Thirlwall's law, external debt sustainability, and the balance-of-payments-constrained level and growth rates of output. *Review of Keynesian Economics*, 7(4):486–497.

Bianco, A. and Sardoni, C. (2018). Banking theories and macroeconomics. *Journal of Post Keynesian Economics*, 41(2):165–184.

Binder, A. (2024). Outsourcing empire: International monetary power in the age of offshore finance. *International Studies Quarterly*, 68(4):sqae123.

Bindseil, U. and Pantelopoulos, G. (2023). *Introduction to payments and financial market infrastructures*. Springer Nature.

Bonizzi, B. and Kaltenbrunner, A. (2020). Critical macro-finance, post keynesian monetary theory and emerging economies. *Finance and Society*.

Bonizzi, B. and Kaltenbrunner, A. (2021). A minskyan framework for the analysis of financial flows to emerging economies. In *Emerging Economies and the Global Financial System*, pages 43–55. Routledge.

Borio, C. and Disyatat, P. (2015). Capital flows and the current account: Taking financing (more) seriously. BIS Working Paper 525, Bank for International Settlements.

Borio, C. and Zhu, H. (2012). Capital regulation, risk-taking and monetary policy: a missing link in the transmission mechanism? *Journal of Financial stability*, 8(4):236–251.

Bortz, P. (2021). Global financial flows in kaleckian models of growth and distribution: A survey. In *Emerging Economies and the Global Financial System*, pages 197–213. Routledge.

Bortz, P., Michelena, G., and Toledo, F. (2022). The global financial cycle and external debt: effects on growth and distribution in emerging and developing economies. *Journal of Post Keynesian Economics*, 45(3):476–502.

Botta, A. (2021). Financial liberalisation, exchange rate dynamics and the financial dutch disease in developing and emerging economies. In *Emerging Economies and the Global Financial System*, pages 181–196. Routledge.

Bouguelli, R. (2020). Is shadow banking really akin to banking? a critical analysis in light of monetary theory. *Journal of Post Keynesian Economics*, 43(1):1–27.

Bouguelli, R. (2025). The blind spot of endogenous money: global banking and the eurodollar market. *Cambridge Journal of Economics*, page beaf013.

Bozhinovska, S. (2025). Central bank balance sheets under foreign exchange accumulation: insights from endogenous money theory and monetary policy implementation. *Cambridge Journal of Economics*, 49(1):127–142.

Bruno, V. and Shin, H. S. (2015a). Capital flows and the risk-taking channel of monetary policy. *Journal of monetary economics*, 71:119–132.

Bruno, V. and Shin, H. S. (2015b). Cross-border banking and global liquidity. *The Review of Economic Studies*, 82(2):535–564.

Burlon, L., Khler-Ulbrich, P., Drahonsky, A.-C., and Dimou, M. (2019). What does the

bank lending survey tell us about credit conditions for euro area firms? *Economic Bulletin Articles*, 8.

Calvo, G. A., Leiderman, L., and Reinhart, C. (1996). Capital flows to developing countries in the 1990s: Causes and effects. *Journal of Economic Perspectives*, 10(2):123–139.

Calvo, G. A., Leiderman, L., and Reinhart, C. M. (1993). Capital inflows and real exchange rate appreciation in latin america: the role of external factors. *Staff Papers*, 40(1):108–151.

Cardim De Carvalho, F. J. (2015). *Liquidity preference and monetary economies*. Routledge.

Cavallo, E., Powell, A., Pedemonte, M., and Tavella, P. (2015). A new taxonomy of sudden stops: Which sudden stops should countries be most concerned about? *Journal of International Money and Finance*, 51:47–70.

Cerpa Vielma, N. A. (2022). *Institutional Foundations of Subordinate Financialisation: Banking Transformation in Latin America*. PhD thesis, Leeds University Business School.

Cesa-Bianchi, A., Ferrero, A., and Rebucci, A. (2018). International credit supply shocks. *Journal of International Economics*, 112:219–237.

Cesaratto, S. (2020). *Heterodox Challenges in Economics: Theoretical Issues and the Crisis of the Eurozone*. Springer Nature.

Chick, V. and Dow, S. (2002). Monetary policy with endogenous money and liquidity preference: a nondualistic treatment. *Journal of Post Keynesian Economics*, 24(4):587–607.

Coelho, D. G. and Caldentey, E. P. (2018). Neo-kaleckian models with financial cycles: A center-periphery framework. *PSL Quarterly Review*, 71(286):309–326.

Coppola, A., Maggiori, M., Neiman, B., and Schreger, J. (2021). Redrawing the map of global capital flows: The role of cross-border financing and tax havens. *The Quarterly Journal of Economics*, 136(3):1499–1556.

Costabile, L. (2013). The international circuit of key currencies and the global crisis. is there scope for reform? In *The Global Economic Crisis: New Perspectives on the Critique of Economic Theory and Policy*, pages 187–200. Routledge Taylor & Francis Group.

Curcuru, S. E., Thomas, C. P., and Warnock, F. E. (2013). On returns differentials.

Journal of International Money and Finance, 36:1–25.

Dafermos, Y. (2012). Liquidity preference, uncertainty, and recession in a stock-flow consistent model. *Journal of Post Keynesian Economics*, 34(4):749–776.

Dafermos, Y. (2018). Debt cycles, instability and fiscal rules: a godleyminsky synthesis. *Cambridge Journal of Economics*, 42(5):1277–1313.

Dafermos, Y., Gabor, D., and Michell, J. (2022). Fx swaps, shadow banks and the global dollar footprint. *Environment and Planning A: Economy and Space*, pages 949–968.

D'Arista, J. (2004). Dollars, debt, and dependence: the case for international monetary reform. *Journal of Post Keynesian Economics*, 26(4):557–572.

Davidson, P. (1978). *Money and the real world*. Springer.

De Conti, B., Biancarelli, A., and Rossi, P. (2013). Currency hierarchy, liquidity preference and exchange rates: a keynesian/minskyan approach. *Congrès de lAssociation Française déconomie Politique, Université Montesquieu Bordeaux IV*, pages 1–22.

Deos, S. and Gerioni, E. (2023). Macroeconomic policy under a managed floating exchange rate regime: A critical appraisal of the international currency hierarchy literature. In *Monetary Policy Challenges in Latin America*, pages 16–32. Edward Elgar Publishing.

Dequech, D. (1999). Expectations and confidence under uncertainty. *Journal of post Keynesian economics*, 21(3):415–430.

Dörry, S., Robinson, G., and Derudder, B. (2018). There is no alternative: Swift as infrastructure intermediary in global financial markets. *Financial Geography Working Paper Series*, ISSN 2515-0111.

Dow, S. (1996). Horizontalism: a critique. *Cambridge Journal of Economics*, 20(4):497–508.

Dow, S. (1997). Endogenous money. In Harcourt, G. C. and Riach, P. A., editors, *A 'Second Edition' of The General Theory*, pages 61–78. Routledge, London.

Dow, S. (1999). International liquidity preference and endogenous credit creation. In *Foundations of International Economics*, pages 163–180. Routledge.

Dow, S. (2019). Risk and uncertainty. In *The Elgar Companion to John Maynard Keynes*, pages 255–261. Edward Elgar Publishing.

Dow, S. and Dow, A. (1989). Endogenous creation and idle money balances. *New Directions in Post-Keynesian Economics, Edward Elgar, Aldershot*, pages 147–164.

Dow, S. and Dow, A. (2011). Animal spirits revisited. *Capitalism and Society*, 6(2).

Dvoskin, A. and Feldman, G. D. (2021). On the role of finance in the sraffian system. *Review of Political Economy*, 33(2):261–277.

Dvoskin, A., Feldman, G. D., and Landau, M. T. (2024). The argentine economy through the lens of an adapted Mundell–Fleming model for small open peripheral economies. *Review of Keynesian Economics*, 12(2):239–264.

Dvoskin, A. and Landau, M. T. (2023). Limits to fiscal and monetary policy in small open economies. *Review of Political Economy*, pages 1–28.

Dymski, G. A. (1992). A new view of the role of banking firms in keynesian monetary theory. *Journal of Post Keynesian Economics*, 14(3):311–320.

Dymski, G. A. (2013). Disembodied risk or the social construction of creditworthiness? In *New Keynesian economics/post Keynesian alternatives*, pages 251–271. Routledge.

Ehnts, D. H. and Randall Wray, L. (2024). Revisiting mmt, sovereign currencies and the eurozone: A reply to marc lavoie. *Review of Political Economy*, pages 1–15.

Faudot, A. (2018). The us dollar and its payments system: architecture and political implications. *Review of Keynesian economics*, 6(1):83–95.

Folkerts-Landau, D. (1985). The changing role of international bank lending in development finance. *Staff Papers-International Monetary Fund*, pages 317–363.

Fritz, B., de Paula, L. F., and Prates, D. M. (2018). Global currency hierarchy and national policy space: a framework for peripheral economies. *European Journal of Economics and Economic Policies: Intervention*, 15(2):208–218.

Gabor, D. (2015). The IMF's rethink of global banks: critical in theory, orthodox in practice. *Governance*, 28(2):199–218.

Gerioni, E. M., Rolim, L. N., Omizzolo, J. A., and Schiozer, N. A. v. d. B. (2023). Monetary policy autonomy and foreign reserves accumulation in brazil: a compensation view. *Cambridge Journal of Economics*, 47(1):113–132.

Godley, W. and Lavoie, M. (2006a). Features of a realistic banking system within a post-keynesian stock-flow consistent model. *Complexity, Endogenous Money and Macroeconomic Theory: Essays in Honour of Basil J. Moore*, pages 251–268.

Godley, W. and Lavoie, M. (2006b). *Monetary economics: an integrated approach to credit, money, income, production and wealth*. Springer.

Goldberg, L. S. (2022). Global liquidity: Drivers, volatility and toolkits. Report, Federal Reserve Bank of New York.

Harvey, J. T. (2009). *Currencies, capital flows and crises: A post Keynesian analysis of exchange rate determination*. Routledge.

Harvey, J. T. (2019). Exchange rates and the balance of payments: Reconciling an inconsistency in post keynesian theory. *Journal of Post Keynesian Economics*, 42(3):390–415.

Hawkins, P. (2002). Banks liquidity preference and financial provision. *A Post Keynesian Perspective on Twenty First Century Economic Problems*.

Hawkins, P. (2003). *The Open Economy and its Financial Constraints*. Edward Elgar Publishing, Cheltenham.

He, D. and McCauley, R. N. (2012). Offshore markets for the domestic currency: Monetary and financial stability issues. *The Evolving Role of China in the Global Economy*, page 301.

Hofmann, B., Shim, I., and Shin, H. S. (2020). Original sin redux and policy responses in emerging market economies during the COVID-19 pandemic. In Djankov, S. and Panizza, U., editors, *COVID-19 in Developing Economies*, volume 1, vox ebook chapter 1, pages 353–361. Centre for Economic Policy Research (CEPR), 1 edition.

Hyun, H. D. (2023). A financial frontier model with bankers' susceptibility under uncertainty. *Metroeconomica*, 74(1):94–118.

Kaltenbrunner, A. (2011). *Currency internationalisation and exchange rate dynamics in emerging markets: a post Keynesian analysis of Brazil*. PhD thesis, SOAS, University of London.

Kaltenbrunner, A. and Painceira, J. P. (2015). Developing countries changing nature of financial integration and new forms of external vulnerability: the brazilian experience. *Cambridge journal of economics*, 39(5):1281–1306.

Kaminsky, G. L. (2019). Boom-bust capital flow cycles. Report, National Bureau of Economic Research.

Keynes, J. M. (1914). The City of London and the Bank of England, August, 1914. *The Quarterly Journal of Economics*, 29(1):48–71.

Keynes, J. M. (1930). *A Treatise on Money*. Macmillan, London.

Koepke, R. (2019). What drives capital flows to emerging markets? a survey of the empirical literature. *Journal of Economic Surveys*, 33(2):516–540.

Kohler, K. (2021). Post keynesian and structuralist approaches to boom-bust cycles in emerging economies. In *Emerging Economies and the Global Financial System: Post-Keynesian Analysis*, pages 56–69. Routledge.

Kohler, K. (2022). Capital flows and geographically uneven economic dynamics: A monetary perspective. *Environment and Planning A: Economy and Space*, 54(8):1510–1531.

Kregel, J. (2004). Can we create a stable international financial environment that ensures net resource transfers to developing countries? *Journal of Post Keynesian Economics*, 26(4):573–590.

Kregel, J. A. (1998). East Asia Is Not Mexico: The difference between balance of payments crises and debt deflations. Working Paper 235, Levy Economics Institute of Bard College.

Kumhof, M., Rungcharoenkitkul, P., and Sokol, A. (2020). How does international capital flow? Staff working paper no. 884, Bank of England.

Lane, P. R. and Milesi-Ferretti, G. M. (2018). The external wealth of nations revisited: international financial integration in the aftermath of the global financial crisis. *IMF Economic Review*, 66(1):189–222.

Lavoie, M. (1992). *Foundations of post-Keynesian economic analysis*. New directions in modern economics. Edward Elgar, Aldershot.

Lavoie, M. (1996). Horizontalism, structuralism, liquidity preference and the principle of increasing risk. *Scottish journal of political economy*, 43(3):275–300.

Lavoie, M. (2019). Advances in the post-keynesian analysis of money and finance. In *Frontiers of Heterodox Macroeconomics*, pages 89–129. Springer International Publishing, Cham.

Lavoie, M. (2021). Two post-keynesian approaches to international finance: The compensation thesis and the cambist view. In *Emerging Economies and the Global Financial System*, pages 14–27. Routledge.

Lavoie, M. (2022). *Post-Keynesian economics: new foundations. Second Edition*. Edward Elgar Publishing.

Le Heron, E. and Mouakil, T. (2008). A post-keynesian stock-flow consistent model for

dynamic analysis of monetary policy shock on banking behaviour. *Metroeconomica*, 59(3):405–440.

Macalos, J. P. S. (2021). *Global liquidity cycles and exchange rate policies in developing and emerging economies: an analysis of the Brazilian experience*. PhD thesis, cole Doctorale rasme, Université Paris-Nord-Paris XIII.

Maggiori, M. (2022). International macroeconomics with imperfect financial markets. In Gopinath, G., Helpman, E., and Rogoff, K., editors, *Handbook of International Economics*, volume 6, book chapter 5, pages 199–236. Elsevier.

Maggiori, M., Neiman, B., and Schreger, J. (2020). International currencies and capital allocation. *Journal of Political Economy*, 128(6):2019–2066.

Marins, N. (2023). *Short-run open economy macroeconomics and external constraints: going beyond the trilemma framework*. PhD thesis, Instituto de Economia, Universidade Estadual de Campinas.

Mason, J. (2014). Balance of payments constraints, the us current account deficit and the crisis of 2008. https://jwmason.org/wp-content/uploads/2015/05/US-CA-Deficit-and-Crisis-of-2008.pdf.

McGuire, P., Shim, I., Shin, H. S., and Sushko, V. (2021). Outward portfolio investment and dollar funding in emerging asia. *BIS Quarterly Review, December*.

McGuire, P., von Peter, G., and Zhu, S. (2024). International finance through the lens of bis statistics: the global reach of currencies. *BIS Quarterly Review*, pages 1–16.

Mehrling, P. (2012). The inherent hierarchy of money. *Social fairness and economics: Economic essays in the spirit of Duncan Foley*, 169:394.

Mehrling, P. (2015). Elasticity and discipline in the global swap network. *International Journal of Political Economy*, 44(4):311–324.

Mehrling, P. (2022). *Money and Empire*. Cambridge University Press.

Mehrling, P. (2023). Exorbitant privilege? on the rise (and rise) of the global dollar system. INET Working Paper Working Paper 198, Institute for New Economic Thinking.

Michell, J. (2024). Theorising non-bank financial intermediation. *Review of Keynesian Economics*, 12(2):181–196.

Minsky, H. P. (1954). *Induced Investment and Business Cycles*. PhD thesis, Harvard University.

Minsky, H. P. (1979). Financial interrelations, the balance of payments, and the crisis of the dollar. The Minsky Archives 239.

Minsky, H. P. (1980). Capitalist financial processes and the instability of capitalism. *Journal of economic issues*, 14(2):505–523.

Minsky, H. P. (1984). The potential for financial crises. In *The Future of the International Monetary System*, pages 91–110. Lexington Books, Massachusetts.

Minsky, H. P. (1986a). Conflict and interdependence in a multipolar world. *Studies in Banking and Finance*, 4(1):3–22.

Minsky, H. P. (1986b). The crises of 1983 and the prospects for advanced capitalist economies. *Armonk, Marx, Schumpeter and Keynes: A Century Celebration of Dissent. NY: ME Sharpe*.

Minsky, H. P. (1986c). *Global consequences of financial deregulation*. Department of Economics, Washington University St. Louis, MO.

Minsky, H. P. (1986d). *Stabilizing an unstable economy*. A Twentieth Century Fund report. Yale University Press, New Haven.

Miranda-Agrippino, S. and Rey, H. (2022). The global financial cycle. In *Handbook of International Economics*, volume 6, pages 1–43. Elsevier.

Moreno-Brid, J. C. (2003). Capital flows, interest payments and the balance-of-payments constrained growth model: A theoretical and empirical analysis. *Metroeconomica*, 54(2-3):346–365.

Moreno-Brid, J. C., Nalin, L., and Pérez-Medina, E. (2023). Current external challenges to the economic expansion of emerging markets: A balance-of-payments constrained growth perspective. Working Paper Working Paper No. 201, Institute for New Economic Thinking.

Morlin, G. S. (2022). Growth led by government expenditure and exports: public and external debt stability in a supermultiplier model. *Structural Change and Economic Dynamics*, 62:586–598.

Murau, S., Pape, F., and Pforr, T. (2022). International monetary hierarchy through emergency us-dollar liquidity: A key currency approach. *Competition & Change*, pages 495–515.

Murau, S., Rini, J., and Haas, A. (2020). The evolution of the offshore us-dollar system: past, present and four possible futures. *Journal of institutional economics*, 16(6):767–783.

Nikolaidi, M. (2014). Margins of safety and instability in a macrodynamic model with minskyan insights. *Structural Change and Economic Dynamics*, 31:1–16.

Oberholzer, B. (2023). Managing the balance-of-payments constraint: Dilemmas and perspectives. *Imperialism and the Political Economy of Global Souths Debt*, 38:165–191.

Obstfeld, M. and Zhou, H. (2023). The global dollar cycle. Report, National Bureau of Economic Research.

Ocampo, J. A. (2016). *Balance-of-payments dominance: implications for macroeconomic policy*, pages 211–228. Columbia University Press.

Orsi, B., Kaltenbrunner, A., and Dymski, G. A. (2020). Currency hierarchy and the nature of the internationalisation of peripheral currencies. Report, Mimeo.

Pantelopoulos, G. (2022). Cross-border payments, global imbalances and involuntary constraints. *Journal of Post Keynesian Economics*, 45(2):301–328.

Pantelopoulos, G. (2024). Can external sustainability be decoupled from the NIIP? *International Economics and Economic Policy*, 21(1):89–116.

Pérez Caldentey, E. (2023). *Apertura financiera, fragilidad financiera y políticas para la estabilidad económica: un análisis comparativo entre regiones del mundo en desarrollo*. Comisión Económica para América Latina y el Caribe (CEPAL), Santiago.

Pérez Caldentey, E. and Vernengo, M. (2024). A financially driven business cycle for latin america and the caribbean. *International Economics/Economia Internazionale*, 77(1).

Ramskogler, P. (2011). Credit money, collateral and the solvency of banks: A post keynesian analysis of credit market failures. *Review of Political Economy*, 23(1):69–79.

Rey, H. (2013). Dilemma not trilemma: The global financial cycle and monetary policy independence. *Federal Reserve Bank of Kansas City Economic Policy Symposium (2013)*.

Rochon, L.-P. (1999). *Credit, money, and production: An alternative post-Keynesian approach*. Edward Elgar Publishing.

Rochon, L.-P. (2006). Endogenous money, central banks and the banking system: Basil moore and the supply of money. In Setterfield, M., editor, *Complexity, Endogenous Money and Macroeconomic Theory: Essays in Honour of Basil J. Moore*, pages 220–243. Edward Elgar, Cheltenham and Northampton.

Rossi, S. (2007). *Money and payments in theory and practice*, volume 39. Routledge.

Saeidinezhad, E. (2024). A hierarchical-dealer-centric model of fx swap valuation. *Journal of Accounting & Finance*, 24(4).

Sawyer, M. (2001). Kalecki on money and finance. *European Journal of the History of Economic Thought*, 8(4):487–508.

Sawyer, M. (2017). Endogenous money and the tyranny of demand and supply. In *Advances in Endogenous Money Analysis*, pages 227–244. Edward Elgar Publishing.

Seccareccia, M. (1996). Post keynesian fundism and monetary circulation. In *Money in motion: The post Keynesian and circulation approaches*, pages 400–416. Springer.

Serrano, F. and Summa, R. (2015). Mundell–Fleming without the lm curve: the exogenous interest rate in an open economy. *Review of Keynesian Economics*, 3(2):248–268.

Setterfield, M. (2012). The remarkable durability of Thirlwalls Law. In *Models of Balance of Payments Constrained Growth: History, Theory and Empirical Evidence*, pages 83–110. Palgrave Macmillan UK.

Sissoko, C. (2024). Banks are different: why bank-based versus market-based lending is a false dichotomy. *European Journal of Economics and Economic Policies*, 1(aop):1–22.

Sylla, N. S. (2024). Revisiting the foreign debt problem and the "external constraint" in the periphery: An mmt perspective. Working Paper Working Paper No. 1067, International Development Economics Associates (IDEAs), Dakar. Originally issued as EDI Working Paper No. 16, March 2024.

Terzi, A. (2006). International financial instability in a world of currencies hierarchy. In *Monetary and Exchange Rate Systems. A Global View of Financial Crises*, pages 3–22. Edward Elgar.

Thirlwall, A. P. (1979). The balance of payments constraint as an explanation of international growth rate differences. *BNL Quarterly Review*, 32(128):45–53.

Toporowski, J. (2013). International credit, financial integration and the euro. *Cambridge Journal of Economics*, 37(3):571–584.

Tymoigne, e. (2006). Dynamics of the minskyan analysis and the financial fragility hypothesis. Working Paper Working Paper 453, Levy Economics Institute of Bard College.

Tymoigne, É. (2010). Financial stability, regulatory buffers, and economic growth: Some post-recession regulatory implications. Working Paper Working Paper 637, Levy Economics Institute of Bard College.

Vernengo, M. (2006). Technology, finance, and dependency: Latin american radical political economy in retrospect. *Review of Radical Political Economics*, 38(4):551–568.

Vernengo, M. (2023a). A framework to interpret macroprudential policies in an era of financialization. In *Financial Openness, Financial Fragility and Policies for Economic Stability: A Comparative Analysis Across Regions of the Developing World*, LC/TS.2022/139, pages 305–324. ECLAC, Santiago.

Vernengo, M. (2023b). Savings glut, secular stagnation, demographic reversal, and inequality: beyond conventional explanations of lower interest rates. *Central Banking, Monetary Policy and Income Distribution*, pages 57–80.

Vernengo, M. and Pérez Caldentey, E. (2020). Modern money theory (mmt) in the tropics: functional finance in developing countries. *Challenge*, 63(6):332–348.

Wolfson, M. H. (1996). A post keynesian theory of credit rationing. *Journal of post Keynesian economics*, 18(3):443–470.

Wray, R. (1992a). Alternative approaches to money and interest rates. *Journal of Economic Issues*, 26(4):1145–1178.

Wray, R. (1992b). Commercial banks, the central bank, and endogenous money. *Journal of Post Keynesian Economics*, 14(3):297–310.