

MONETARY DYNAMICS IN DOLLARIZED ECONOMIES: THE CASE OF ECUADOR

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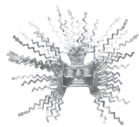
Abstract

This paper develops a conceptual balance-sheet framework to analyze monetary dynamics in dollarized economies, using Ecuador as a case study. It explores the interaction between balance of payments flows, central bank operations, and private credit creation, emphasizing the role of high-powered money in sustaining domestic liquidity. The paper highlights the risks from central bank balance sheet expansion and non-monetary mechanisms such as cross-holdings of claims between deposit-taking institutions and fiscal spending financed by domestic debt. It argues that monetary stability in dollarized regimes depends critically on institutional arrangements and reserve adequacy, offering insights for policymakers, analysts, and investors seeking to understand macroeconomic vulnerabilities in similar settings.

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DINÁMICA MONETARIA EN ECONOMÍAS DOLARIZADAS: EL CASO DE ECUADOR

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Resumen

Este estudio desarrolla un marco conceptual basado en balances para analizar la dinámica monetaria en economías dolarizadas, utilizando a Ecuador como estudio de caso. Examina la interacción entre los flujos de la balanza de pagos, las operaciones del banco central y la creación de crédito privado, destacando el papel del dinero de alto poder en el sostenimiento de la liquidez doméstica. El documento subraya los riesgos derivados de la expansión del balance del banco central y de mecanismos no monetarios, como los *cross-holdings* de derechos entre instituciones captadoras de depósitos y el gasto fiscal financiado con deuda interna. Sostiene que la estabilidad monetaria en regímenes de dolarización depende de manera crítica de los arreglos institucionales y de la suficiencia de las reservas, y ofrece elementos de análisis para responsables de política, analistas e inversionistas interesados en comprender vulnerabilidades macroeconómicas en entornos similares.

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1. INTRODUCTION

Money matters for how an economy functions. In a fully dollarized regime, the absence of a national currency changes the consequences of money creation, liquidity provision, and macroeconomic adjustment. This paper examines how dollarization works in Ecuador, one of the few fully dollarized countries with an operational central bank, and describes how monetary aggregates evolve when the central bank cannot issue a domestic currency.

The central question of this paper is: How does money creation operate in a dollarized economy, and what institutional and financial mechanisms determine its stability? In this context, the paper aims to make three key contributions. First, it proposes a conceptual balance-sheet framework, grounded in the money view literature, that adapts the concept of monetary hierarchies to dollarized settings. Second, it clarifies the distinction between high-powered money (HPM) and domestically generated liquidity, and defines leverage metrics that trace the transmission of liquidity across sectors. Third, it draws policy-relevant implications for equilibrium conditions, vulnerabilities, and the sustainability of dollarization.

The central bank's balance sheet will be the main tool to understand how the monetary system functions in Ecuador. It will be used to examine the basic equilibrium conditions for macroeconomic stability under dollarization, including the intrinsic link between the balance of payments and the domestic monetary system, as reflected in the relationship between primary and secondary money creation.

Methodologically, the paper combines a theoretical balance-sheet approach with detailed institutional mapping and empirical examples. The analysis relies on central bank accounting identities, leverage metrics, and the interaction between primary, external money creation, and secondary, domestic money creation.

The aim of this paper is to set the stage for further discussion on how dollarization functions under different institutional frameworks, using Ecuador as a blueprint. This discussion may be useful to better understand the functioning of other dollarized economies or to highlight key considerations for countries contemplating a transition to dollarization. Policymakers, investors, and analysts alike may benefit from a foundational framework on how dollarization works, understood through the lens of money flows. Understanding how and why monetary aggregates move and interact with the broader economy can help identify early vulnerabilities in the system. Policymakers may find useful concepts to help fine-tune policy decisions and obtain desired and predictable results. The same goes for multilateral institutions that strive to design support policies as part of broad financial arrangements. Investors may benefit from a deeper understanding of the nuances of the economy's monetary plumbing and the ways in which different risks are accumulated or addressed over time. A robust blueprint of the interlinkages between the balance of payments, and

the monetary and financial sectors may enhance the overall understanding of the economy and the identification of macroeconomic risk accumulation.

This paper seeks to define the plumbing beneath monetary dynamics within a dollarized economy, taking Ecuador as an example. It leaves important questions planted yet unaddressed. These future topics for discussion include different institutional arrangements of a dollarized economy, expanding the framework to understand the monetary impact of persistent fiscal deficits or sovereign defaults, or assessing the risks that could be associated with different levels of monetary leverage in the economy, to name a few.

This study's findings emphasize that monetary stability in dollarized economies depends on the relationship between high-powered money and domestic money, and highlight how domestic monetary leverage, driven by central bank credit, cross-holdings, and domestically financed fiscal spending, can decouple from external inflows and generate risks that traditional indicators may fail to capture.

Moving away from the rigid mechanics of the money multiplier ($M = Bm$) and the classical quantity theory, this paper dissects the monetary plumbing of a dollarized economy through a rigorous balance-sheet approach. Rather than modeling price levels via aggregates, the analysis maps the structural conditions under which liquidity is generated, absorbed, and leveraged across sectors. By adapting the money view framework, the study formalizes a critical hierarchy between “high-powered money” and “domestic money”. This distinction is vital to expose how secondary money creation can dangerously decouple from external inflows (seen in this paper as primary money creation), revealing systemic vulnerabilities that traditional metrics fail to capture.

The paper is organized as follows. Section 2 reviews the literature on money creation, financial hierarchies, and dollarized regimes. Section 3 presents Ecuador's institutional and monetary framework. Section 4 develops the accounting framework and the measures of monetary leverage indicators used to track monetary dynamics and applies the framework to Ecuadorian data and discusses the policy implications. Section 5 concludes.

2. LITERATURE REVIEW

2.1. The Creation of Money in the Modern Economy

Banks play a central role in the creation of money in the modern economy. Jakab and Kumhof (2015) describe the traditional intermediation of loanable funds (ILF) model, where banks are seen as intermediaries that facilitate the transfer of real savings from savers to borrowers. This process begins with banks collecting deposits from one party and concludes with the extension of these saved funds as loans to another. However, the reality of modern

banking operations diverges significantly from this view. The principal role of contemporary banks is not merely the redistribution of pre-existing savings but the creation of money. This is achieved through the issuance of loans that simultaneously generate corresponding deposits in the borrower's account.

When a bank issues a new loan to a non-bank customer, say customer *X*, it is essentially creating new money. This materializes with a new entry on the asset side of the bank's balance sheet representing the loan to customer *X*, coupled with a parallel entry of an equal size on the liability side, indicating a deposit in customer *X*'s name. This new money can be used by customer *X* to make any payments he needs in the real economy. This dual entry system illustrates that the bank generates deposits at the moment of lending, without the need for intermediating or reallocating existing real resources from other economic agents. Secondary money creation cannot go *ad infinitum*, however. Accounting rules, capital requirements, macroprudential regulations, reserve requirements, demand for credit, and risk management will create limits to secondary money creation.

Secondary money creation does not necessitate the diversion of resources from other uses or agents but merely requires the wider economy's acceptance of the newly created deposits as a valid form of payment for goods and services. The seamless acceptance of these bank-created deposits is underpinned by their status as the predominant medium of exchange in modern economies, effectively functioning as money. This money, however, has purchasing power only in internal transactions, and is not useful to make payments abroad. Thus, contrary to the ILF model's premise, banking involves the direct creation of new money, highlighting a significant departure from the traditional notion of financial intermediation.

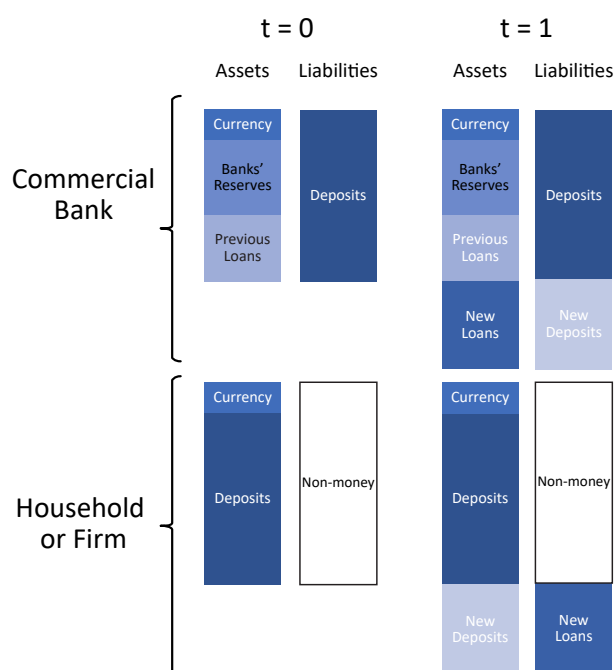
The understanding of how banks create money through their lending processes is recognized by central bank authorities and policymakers globally. Jakab and Kumhof (2015) highlight this concept by citing a variety of sources:

The fact that banks create their own funds through lending is acknowledged in descriptions of the money creation process by leading central banks and policymaking authorities. The oldest goes back to Graham Towers (1939), the then governor of the Central Bank of Canada: "Each and every time a bank makes a loan, new bank credit is created—new deposits—brand new money." Berry, Harrison, Thomas, and de Weymarn (2007), staff at the Bank of England: "When banks make loans, they create additional deposits for those that have borrowed the money." Keister and McAndrews (2009), staff economists at the Federal Reserve Bank of New York: "Suppose that Bank *A* gives a new loan of \$20 to firm *X*... Bank *A* does this by crediting firm *X*'s account by \$20. The bank now has a new asset (the loan to firm *X*) and an offsetting liability (... firm *X*'s deposit at the bank)." Bundesbank (2012) [translation by the authors]: "How is deposit money created? The procedure is equivalent to the creation of central bank money: As a rule, the commercial bank extends a loan to a customer and credits the corresponding amount to his deposit account... The creation of deposit money is therefore

an accounting transaction.” Mervyn King (2012), former Governor of the Bank of England: “When banks extend loans to their customers, they create money by crediting their customers’ accounts.” Lord Adair Turner (2013), former head of the UK Financial Services Authority: “Banks do not, as many textbooks still suggest, take deposits of existing money from savers and lend it out to borrowers: they create credit and money *ex nihilo*—extending a loan to the borrower and simultaneously crediting the borrower’s money account.” (p. 6)

When a bank grants a loan, such as consumer credit, it does not dispense cash but rather credits the borrower’s account with a deposit equal to the loan amount, effectively creating new money. This mechanism is depicted in a simplified manner in a hypothetical balance sheet (Figure 1), which illustrates the impact of new lending on various economic sectors (McLeay & Thomas, 2014). Figure 1 highlights that the issuance of a new loan results in an increase in both the assets (represented by additional deposits) and liabilities (due to the new loan) of the borrower, who may represent both households and companies. This simultaneous increase in assets and liabilities on the borrower’s balance sheet signifies the creation of new broad money. The commercial banking sector experiences a growth in its balance sheet, with parallel increases in new money (liabilities) and loans (assets).

The preceding does not mean that all the deposits available to the bank at a given point in time are created by lending. Deposits can increase when the bank attracts new clients or when existing clients receive transactions from other agents in the economy, such as the public sector or from abroad. These flows increase the bank’s liquid assets, either as cash, assets abroad, or reserves at the central bank. The additional liquidity enhances the bank’s capacity to extend further credit, thereby creating more deposits. Therefore, it’s crucial to recognize that the actual dynamics may lead to discrepancies between the volume of deposits and lending due to several influencing factors, which are elaborated upon in subsequent discussions.

Figure 1. Modern Understanding of Money Creation

The creation of new broad money does not immediately alter the quantity of central bank money, often referred to as *base money*. In developed banking systems, such as the U. S., the accumulation of deposits may require banks to increase their holdings of central bank money to meet potential customer withdrawals or facilitate interbank payments (Deutsche Bundesbank, 2017). In such settings, central bank reserves typically do not constrain bank lending or the creation of deposits, given that central banks supply reserves on demand in exchange for eligible bank assets. This financial-sector money is used by banks to meet liquidity requirements at the central bank, provide or lend liquidity overnight to other banks, or purchase financial assets. This dynamic diverges significantly in a fully dollarized economy, where the local central bank's ability to provide reserves in a foreign currency to private banks is inherently eliminated, thereby affecting the mechanics of money creation and banking operations. In a dollarized economy, bank reserves are real economy money and do bind the ability of private banks to increase credit.

2.2. The Dynamics of Monetary Hierarchies in the Financial Ecosystem

Not all money is created the same. Different types of money have different hierarchies. This hierarchical structure of money plays a pivotal role in unraveling the complex network of interactions that characterize the financial ecosystem. This framework extends beyond mere currency and credit, encompassing a broad spectrum of financial instruments. Gurley and Shaw (1960) delve into the multi-layered organization of monetary systems. The aim is to

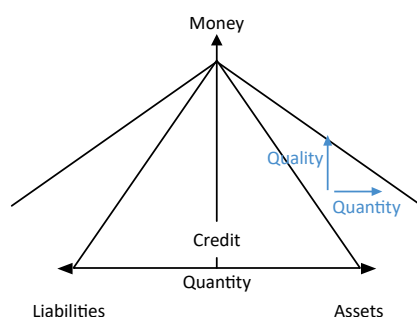
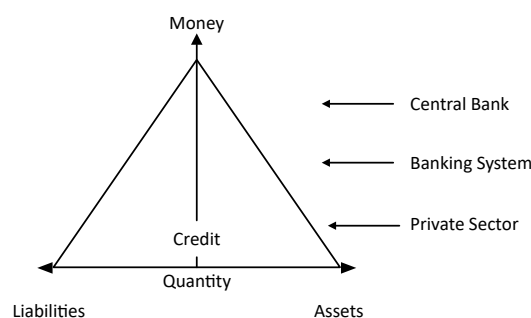
highlight the nuanced distinctions among various financial entities, between physical assets like gold and currency, and conceptual credit instruments. By examining these layers, the essential dynamics that drive monetary markets are revealed, emphasizing the critical balance between the palpable nature of monetary assets and the inherent flexibility of credit mechanisms. Consequently, a pivotal aspect of the monetary hierarchy is the delineation between money and credit. Pozsar (2014) recognizes that this distinction is far from academic; it bears significant implications for the realms of financial stability and policy formulation, with assets higher up the hierarchy being sought during times of financial uncertainty due to their lower associated risk and superior liquidity. In dollarization, understanding this distinction becomes essential to avoid the manifestation or proliferation of systemic risks for the stability of the entire monetary system.

Mehrling (2012) examines the structured layers of monetary systems in his analysis of financial hierarchies. At the high point of the monetary hierarchy stands gold, historically revered as the ultimate settlement medium in international transactions, particularly during the gold standard era. Its intrinsic value and universal acceptance secured gold's dominant position within the financial hierarchy, making it the benchmark against which all other forms of money and credit were measured. However, the ongoing evolution of finance has introduced new layers to this hierarchy, gradually eroding gold's once indisputable status. Directly beneath gold's esteemed position lies the realm of national currencies, the official legal tender within specific sovereign domains. These currencies owe their value and acceptance to the trust and authority conferred upon them by their issuing governments. Representing a more fluid and accessible monetary form, these currencies contrast sharply with the tangible value and rigidity of gold. Harari (2014) describes money as a collective fiction that exists because people believe in its value. Money is the most universal and efficient system of trust ever created, as it can be exchanged for almost anything at any time and place.

Descending further down the hierarchy, a diverse array of credit instruments is encountered, including bank deposits, bonds, and various securities. These instruments are pivotal in illustrating the deferred payment principle, which is fundamental to financial systems. They operate as binding commitments to future payment, thereby facilitating a smoother flow of transactions. This mechanism allows for economic activities to proceed without the immediate need for physical currency exchange, thereby broadening the scope of financial interactions and increasing overall market liquidity. The value and acceptance of these instruments are not merely a function of their face value but are intricately linked to the issuer's perceived credibility and the overarching stability and resilience of the financial system. This interdependence underscores the critical role of trust and confidence in the functioning of financial markets, making these instruments essential in bridging the gap between present obligations and future fulfillment.

Currency, as the ultimate means of settlement for domestic transactions, holds a special place in the hierarchy. For banks settling accounts at the end of the day, “high-powered money” is indeed the definitive means of settlement. However, this perspective changes as one moves down the hierarchy. For the average person or business, bank deposits often serve as the primary means of settlement, suggesting that deposits (and all above them) could be considered money, while securities might be viewed as promises of payment of a lower hierarchy. This is somewhat reflected in classic textbook treatments of the money supply (Mankiw, 2010), albeit with some ambiguity, as evidenced by the various definitions of money (M1, M2, M3). The perspective shifts again higher up the hierarchy. For countries settling international accounts, national currency has limited utility. Instead, other nations may prefer their own currency or an international means of settlement, such as gold under the gold standard, Special Drawing Rights (SDRs) in more modern contexts, or the U. S. dollar, granting it its position as the reserve currency of the world. Countries that are unable to settle international transactions in their own currency often need to maintain a stock of foreign currency or other instruments such as gold or SDRs and ensure the ability to acquire them for international settlements. These holdings represent a country’s international reserves.

The inherent dynamism and fluidity of the monetary hierarchy is a captivating aspect, as it reflects the capacity for change within the financial system. The positioning of various financial instruments within this hierarchy is not fixed but subject to fluctuations influenced by economic conditions, regulatory adjustments, and shifts in market sentiment. For example, during times of financial uncertainty, a “flight to quality” often occurs, where investors move their resources towards more secure, higher-tier forms of money (Inci et al., 2011). This phenomenon underscores the reactive nature of market participants to changing economic landscapes. Additionally, the cyclical nature of credit expansion and contraction plays a significant role in molding the economic environment. In periods of economic optimism, credit expansion can stimulate growth by enabling higher levels of investment and consumption. However, when credit growth occurs without adequate risk assessment or regulatory oversight, it can undermine financial stability. This often reflects the extension of credit to weak borrowers, the overvaluation of collateral, or shifts in market conditions that erode asset values. When the sustainability or quality of these assets is questioned, market corrections follow, as investors reassess their value and liquidity. This fluidity within the monetary hierarchy highlights the intricate interplay between stability and adaptability in the financial system (see Figure 2). It emphasizes the importance of supervision in monitoring and managing the dynamics of financial instruments to maintain economic stability while allowing for growth and innovation.

Figure 2. The Hierarchy of Money and Credit and its Expansion Mode

Source: Mehrling (2012)

This hierarchical structure is similar in a dollarized regime, although simplified. As discussed below, the dollarized nature of the economy simplifies the structure of the central bank's and private banks' balance sheets. The highest hierarchy of money will be represented by broad international reserves (defined later in this paper), while the lower hierarchy of money will be represented by domestic deposits (including those held by banks at the central bank). Credit-based money creation is undertaken by banks through loans and interbank investments, and by the government, when it funds fiscal spending with domestic debt.

3. MATERIALS AND METHODS

3.1. Institutional and Monetary Framework of Ecuador's Dollarization

3.1.1. Institutional Setup

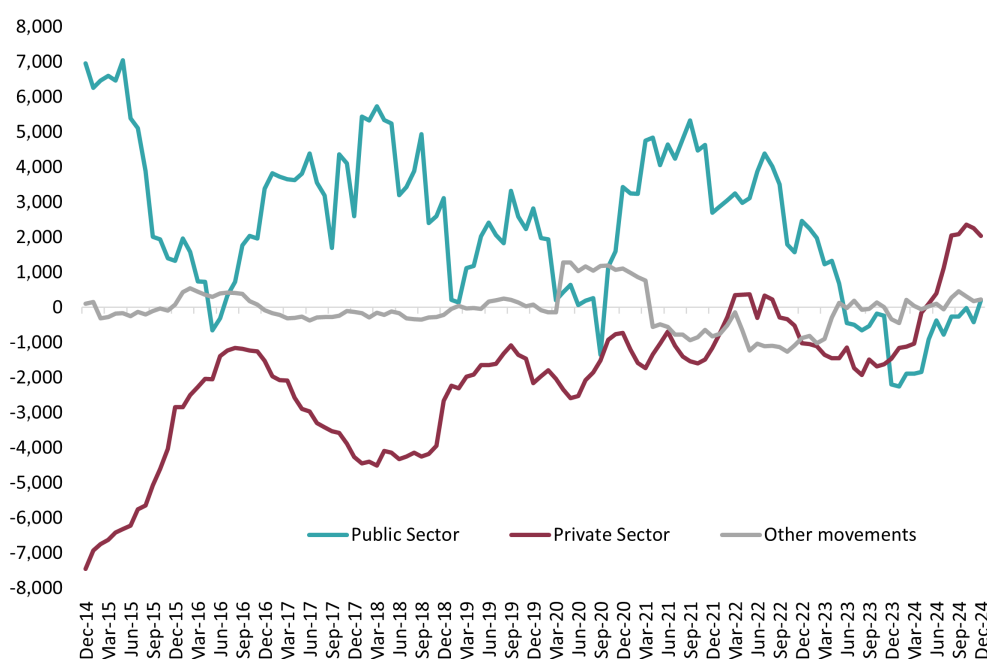
Dollarized regimes may have different institutional and regulatory setups that may affect the way these economies work. This institutional setup will determine the flow of dollars within the economy, the relationship between different

sectors, and the relationship between the country and the rest of the world. In the case of Ecuador, the main characteristics of its institutional setup, which are relevant to the way the monetary system works, are the following:

1. *Ecuador has a central bank* that holds deposits from both the public and private sectors on the liability side of its balance sheet. While public sector entities are required to maintain their funds entirely at the central bank, private financial institutions hold a fraction of their deposits there in the form of reserve requirements. Formal external transactions between the domestic economy and the rest of the world pass through the central bank, and the resulting net flow determines changes in the stock of official international reserves on its asset side.
2. *Some transactions with the rest of the world may not pass through the central bank.* Private banks have assets (available funds and investments) abroad, which may increase when a client receives a transfer, or which may be used to settle international transactions on behalf of their clients. When private banks use foreign accounts to settle these transactions, there is no impact on the stock of official international reserves, but there is an impact on the local deposit base. These external assets, however, are subject to a tax on foreign holdings, which acts as a disincentive to maintain liquidity abroad.
3. *Ecuador's main export product is oil*, and its commercialization is an exclusive faculty of the state, as per existing oil-related regulation. Even though there is private oil production, all oil exports, and hence all oil revenues, belong to the government.
4. *The public sector is mandated to keep its deposits onshore at the central bank.* This means that all the foreign flows generated by the public sector (external debt, oil exports, and others) must be brought onshore. Private banks have mandatory reserve requirements that must also be deposited at the central bank (bank reserves) and must meet other liquidity regulations, which also drive deposits to the central bank. All of these deposits are liabilities on the central bank's balance sheet and are used by the central bank to net out domestic transactions, or transactions with the rest of the world.
5. *Ecuador's financial system remains somewhat isolated from the global financial network*, leading to limited integration with international financial markets. As a result, foreign savings and investments do not seamlessly enter the country, restricting their availability to support and enhance domestic bank credit.
6. *Ecuador does not have developed capital and money markets*, so foreign inflows to invest in domestic securities, including public debt, are virtually non-existent.

7. The government has been, historically, the net supplier of dollars to official international reserves, through the inflows created by oil exports and public external debt. The private sector is, usually, a net user of official international reserve dollars. Since 2024, the contribution to international reserves by the private sector has been positive. It is still early to tell if this change is permanent or transitory (Figure 3).

Figure 3. International Reserves Movement
12-Month Rolling Accumulation. December 2014–December 2024



Source: CBE

This institutional setup is non-trivial, as it affects the way money-creating flows work between the economy and the rest of the world and leads to an intimate relationship between public and private sector liquidity. In Ecuador, official international reserves are centralized at the central bank, as are the deposits of both public and private sectors (bank reserves). International reserves are an asset on the central bank's balance sheet, and these deposits are its liabilities.

Dollars that flow from the rest of the world increase the stock of official international reserves and create domestic deposits in the financial system. Money that leaves the system through either public or private channels destroys domestic deposits and leads to a drawdown of international reserves. Local financial sector deposits can also be created without impact on the stock of official international reserves at the central bank, if recipient domestic banks

decide to leave foreign payments as assets abroad in a foreign financial institution.

For the purpose of this paper, the analysis treats deposits created by balance of payments flows as equivalent to primary money creation. But this is not the only way in which deposits are created in the financial system. The vast amount of deposits will actually be generated via secondary money creation, through bank credit. Deposits will also be created by public spending, and by investments between banks.

3.1.2. The Central Bank's Balance Sheet

The flow of money within the country and vis-à-vis the rest of the world can be understood by analyzing the central bank's balance sheet. That flow of money will determine the way the economy is functioning and could help explain macroeconomic trends and dynamics within the country. For this paper, the analysis divides the balance sheet into a basic structure of assets and liabilities, keeping equity accounts on the liability side of the balance sheet for simplicity.

Central bank assets can be divided into external and domestic assets. Domestic assets refer to the credit that the central bank has given to the treasury, public banks, regional governments, or the private sector. External assets are international reserves and other external assets, which usually incorporate the country's equity contributions to multilateral organizations.

On the liability side, the central bank keeps the deposits of the treasury, social security, regional governments, public enterprises, private financial sector (bank reserves), public financial sector, other private sector, central bank titles, and fractional coin.

The central bank's balance sheet must always be balanced. This means that any formal transaction that happens inside the economy, or between domestic and foreign agents, must lead to either a movement of central bank assets and liabilities in tandem, a movement between central bank liabilities, or a movement between central bank assets. In any case, the balance sheet must always remain balanced, respecting the double-entry bookkeeping principle. Importantly, this does not mean that assets and liabilities are the same, nor that assets are "made up of" liabilities. While there is a correspondence, central bank liabilities, such as treasury or banking sector deposits (bank reserves), should not be confused with central bank assets, such as international reserves. Official international reserves are the balance left on the central bank's balance sheet from the country's inflows and outflows of dollars, and have no "owner" per se. These are claims against non-residents (the U. S. Fed) held by the central bank. The deposits held at the central bank by public and private agents, on the other hand, are claims that residents have on the central bank.

Movements in assets and liabilities: When the public or private sectors transact with the rest of the world, and these transactions flow into or from

the economy through the central bank, central bank assets and liabilities will move in tandem. When money flows into the country, the central bank will receive funds in its international reserves and create a corresponding liability. When money flows out of the economy, the central bank will wire from international reserves and write off or destroy a domestic liability on its balance sheet, public or private. In the case of private sector inflows, the liabilities that the central bank creates (bank reserves) are an asset for a private bank, which will then also create a new deposit in the private bank's own balance sheet (a liability). In the case of private sector outflows, private banks will see a drawdown of bank reserves (an asset in their balance sheet) and write off the corresponding domestic deposit (liability) held at their own balance sheets. Private banks also have offshore liquid assets that can be used to complete transactions of their clients with the rest of the world. These transactions would not flow in or from the economy through the central bank and thus would not impact official international reserves nor central bank liabilities. A payment made to a private bank that is left offshore will lead to higher assets abroad and to the creation of a new domestic deposit in the private bank's liabilities. A payment made by a private bank by charging its international assets will lead to a drawdown of its external assets alongside a drawdown of domestic liabilities (a household or corporate deposit). Neither transaction would impact the central bank's balance sheet.

Movements in liabilities: every domestic transaction that happens between the private and public sectors leads to movements in the liability side of the central bank's balance sheet without an impact on its assets. When the private sector pays taxes to the public sector, for instance, the central bank transfers resources from bank reserves to the treasury's account at the central bank: bank reserves fall, and public sector deposits at the central bank increase. The opposite happens when the government pays salaries, for example, which leads to a decline in public sector deposits and an increase in bank reserves at the central bank.

Movements in assets: there are a few transactions that can lead to the asset side of the balance sheet to move without moving liabilities. The central bank can enhance the liquidity of its international reserves by doing swap operations with monetary gold. These transactions would take monetary gold out of international reserves and into other external assets and increase liquid assets within international reserves. Gold sales that realize a profit could have a similar effect.

The fact that the central bank's balance sheet must always remain balanced, although obvious, is a powerful concept to understand the monetary dynamics between sectors, and between the economy and the rest of the world. In fact, this allows the analysis to deconstruct the way "primary flows" create and destroy money within the economy. International reserves play a key role in explaining this.

Remembering the basic relationship between assets and liabilities also helps understand if basic monetary equilibrium is being upheld. Every transaction with the rest of the world that enters or leaves the economy through the central bank will generate a movement in international reserves alongside a movement in total liabilities. However, if the central bank is allowed to extend credit to either the public or private sectors (absorb a domestic bond on its asset side and create a new corresponding liability), domestic mechanisms to create and destroy money will impact domestic liabilities at the central bank's balance sheet without a corresponding move of international reserves, but rather, as a result of the change in the stock of the central bank's domestic assets. This was the case of Ecuador between 2009 and 2020—see Erráez and Reynaud (2022). In both cases, a powerful concept applies: the asset side of the central bank's balance sheet determines its liabilities, and not the other way around.

3.1.3. Bank Reserves in Dollarization

The quintessential difference in the way dollarization works in Ecuador relative to economies with their own currency is the way bank reserves are created or destroyed. In Ecuador, bank reserves (deposits of financial institutions at the central bank) are neither created nor destroyed by a discretionary economic policy decision of the central bank. Bank reserves at the central bank, under the Ecuadorian setup, will vary depending on balance of payments flows and government spending/collections. These reserves will be created, and eliminated, from the central bank's balance sheet, as money flows into the economy, or leaves the economy, through the central bank. Changes in reserve requirements, for instance, could force banks to deposit new funds at the central bank, but reserves would not be created by the central bank itself. Similarly, as the government spends (e.g., on salaries), bank reserves are created and subsequently reduced as the private sector transfers resources (e.g., through taxes) to the government. However, reserves are limited in the sense that the central bank lacks the capacity to create or destroy them at will.

This detail is key to understanding private sector transactions within the economy and the functioning of the financial system. If every bank in the system held only the exact amount of reserves required by the central bank, banks would be unable to continue lending without first injecting new reserves—either through cash deposits at the central bank or by onshoring resources (as discussed later, the powerful relationship between the balance of payments and the financial system in dollarization ahead). The central bank creates new bank reserves only when balance of payments flows materialize, as a counterpart to an increase in official international reserves, leading to excess reserves. Another example would be an increase in reserve requirements, which could force private banks to either use onshore resources or transfer cash to

the central bank. This would be the case if there are no excess reserves. If excess reserves exist, increasing reserve requirements would only immobilize a portion of these excess reserves, which are already at the central bank. The converse would hold when the central bank lowers reserve requirements, as this would create excess reserves in the system using resources already on its balance sheet.

Bank reserves created through the balance of payments have a strong multiplier effect, which will be equal to $1/(\text{reserve requirement rate})$. This is because banks are required to maintain only a portion of deposits (known as the reserve requirement rate) as mandatory bank reserves. Consequently, banks will immediately have excess reserves that they can use to comply with reserve requirements when they create new deposits via credit or move those excess reserves offshore. Excess reserves in the system also enable banks to perform other credit operations that expand monetary aggregates, such as interbank deposits and investments, or purchase internal public debt. The multiplier effect may, in practice, fall as banks prioritize high liquidity buffers in the absence of a lender of last resort.

Viewed like this, a dollarized economy is not a price taker in terms of an exchange rate that absorbs monetary and balance of payments dynamics. Rather, it becomes a quantity taker in the way secondary money creation evolves, constrained by primary money flows.

The ability or inability of the central bank to create bank reserves should not be confused with the monetization of fiscal spending. Central bank mechanisms such as quantitative easing in the U. S. are not equivalent to expanding the central bank's balance sheet to finance the government. Quantitative easing adds bank reserves to the system and affects the valuation of financial assets, but does not, in itself, lead to increased government spending (Roche, 2014). That would be an economic policy decision. Monetization of fiscal spending, on the other hand, fuels a domestic absorption cycle that is inconsistent with the balance of payments, as it directly adds treasury deposits that can be channeled to the private sector. In the absence of a national currency, money creation on the central bank's balance sheet to sustain fiscal spending will immediately generate balance of payments pressures, as it becomes the only mechanism to resolve the monetary disequilibrium introduced into the economy.

Finally, bank reserves are only a portion of the financial system's available liquid assets. Total liquid assets are: a) the funds and investments maintained by the banking system abroad, b) cash financial institutions hold in their vaults, and c) the portion of bank reserves that are covered by international reserves.

3.1.4. Monitoring Monetary Conditions Through the Central Bank's Balance Sheet

When dollarization was first implemented in Ecuador, a four-tier balance sheet accounting method was adopted to monitor equilibrium conditions within the economy. This is a feature exclusive to Ecuador, and not necessarily a requirement for any dollarized economy. This method mandated the central bank to guarantee that different tiers of its liabilities would be “covered” one-to-one by international reserves. The first tier belonged to local coin in circulation, the second one to financial sector deposits at the central bank, the third one to non-financial public sector deposits, and a fourth one for other transactions and operations of the central bank. These accounting metrics did not imply earmarking of reserves at the central bank. The central bank has always carried the obligation to provide international reserves when its depositors demand to settle international transactions.

A key feature of the relationship between international reserves and central bank liabilities is that, as long as central bank liabilities are created only via the balance of payments (as explained above), liability coverage by international reserves will always remain unchanged. Thus, the balance sheet accounting method can be seen as a warning bell for equilibrium conditions, which can be altered by either the monetization of public spending or using the balance sheet to perform market operations with the private sector (for example, repos).

Over time, these requirements have changed. Today, the first tier of the balance sheet incorporates coin and other depository corporations' deposits (mostly private banks), the second tier incorporates other financial corporations' deposits (mostly public banks), and the third tier belongs to non-financial public sector deposits plus in-transit transactions in the payment system within or across sectors (Table 1).

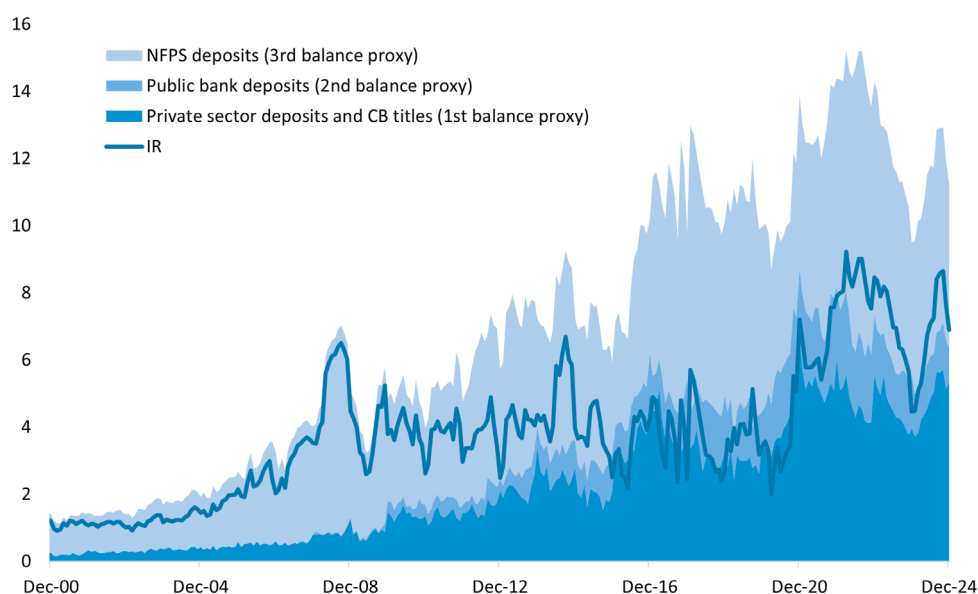
Table 1. Central Bank of Ecuador's Balance Rules

	Original Four Balance Rule	The New Four Balance Rule: COMYF 2021
Context	On March 13, 2000, “Ley para la Transformación Económica del Ecuador” (Law for the Economic Transformation of Ecuador) was published in the Official Gazette. Article 33 outlines the four-balance system backing dollarization by defining the initial fundamentals of dollarization and establishing the four balances that the CBE must follow.	On May 3, 2021, “Ley Orgánica Reformativa al Código Orgánico Monetario y Financiero para la Defensa de la Dolarización” (Reformatory Organic Law to the Monetary and Financial Code for the Defense of Dollarization) was published in the Official Gazette. Article 33 defines and reinstated the four-balance system backing rule.
First Balance	Includes the fraction of the monetary base (M1) of low denomination coins (1-5-10-25-50 cents) minted by the CBE. To balance these liabilities, an identical amount of international reserves must be recorded in the assets.	Liabilities of this balance include the national monetary species minted by the Central Bank of Ecuador that are in circulation, Central Bank Securities (TBC), any other direct obligation with the public and the deposits of other depository institutions, which include private banks, mutual banks, savings and credit cooperatives, and public banks with demand deposits. These liabilities must be covered one hundred percent with the assets of the international reserves.
Second Balance	Consists of deposits of public and private financial institutions. To balance these liabilities, an identical amount of international reserves must be recorded in the assets. The law requires that the first two systems must always be covered by international reserves of at least 100 %.	Liabilities of this balance include the deposits of other financial entities, including CFN, BIESS (Banco del Instituto Ecuatoriano de Seguridad Social), other public sector financial entities and financial intermediaries that do not take demand deposits from the public. These liabilities will be covered with the remaining reserve assets once the First Balance is covered and must be equivalent to one hundred percent of the liabilities in this balance.

	Original Four Balance Rule	The New Four Balance Rule: COMYF 2021
Third Balance	Comprises the deposits of the non-financial public sector (NFPS); this system does not require complete matching with international reserves.	The liabilities of this balance include deposits of the Non-Financial Public Sector (NFPS), deposits of authorized private legal entities in the Central Bank of Ecuador and transfers through the payments system pending settlement, as well as the CBE's own external indebtedness. These liabilities must be one hundred percent covered with the assets of international reserves, once the second balance has been fully covered.

Figure 4. Coverage of Central Bank's Liabilities by International Reserves

US\$ billions, Dec. 2000/Dec. 2024



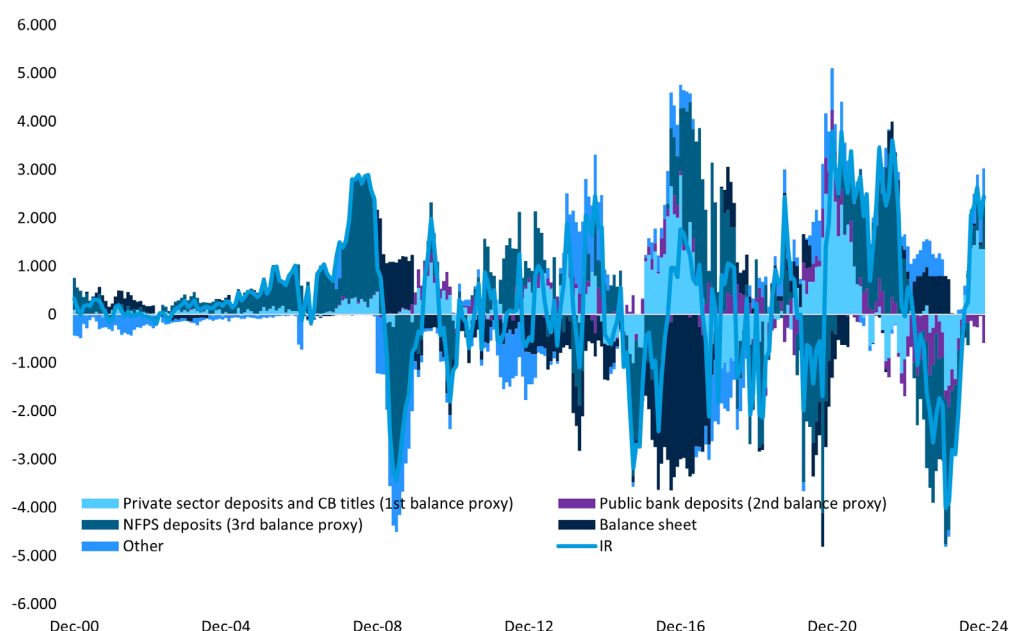
Over the years, the central bank has expanded its balance sheet to provide funding to public banks and to the treasury (see Figure 4). Monetization implies the creation of new liabilities in exchange for internal assets on the central bank's balance sheet. Liabilities created through domestic mechanisms and not through the balance of payments lead to a higher level of liabilities for

a given level of international reserves. This process leads to a deterioration in the international reserve coverage of the different liability tiers. Using the balance sheet to provide liquidity to the private sector would have the same impact. Consequently, the four-tier accounting method in its current form will bear witness to the tampering with basic equilibria in the system but not prevent the use of the balance sheet to generate new liabilities. What prevents the use of the central bank's balance sheet to provide credit to the government is legislation. Since the 2021 monetary reform, legislation prohibits both direct and indirect financing from the central bank to the government.

Rearranging assets and liabilities of the central bank's balance sheet allows for mapping how international reserves and domestic liabilities are being created or destroyed. Understanding these dynamics is crucial for comprehending monetary pressures originating from the public sector, private sector, or both, and for recognizing the forces shaping the evolution of the monetary sector. Balance sheet expansion (monetization) and contraction (amortization) must be included to have a complete mapping of monetary dynamics in the economy (see Figure 5). This is because expansion and contraction are forces that either create or destroy domestic liabilities that cannot be mapped directly by international reserve movements on the central bank's balance sheet.

Figure 5. IR Movements at the Central Bank's Balance Sheet

US\$ millions, cumulative 12 months, Dec. 2000/Dec. 2024

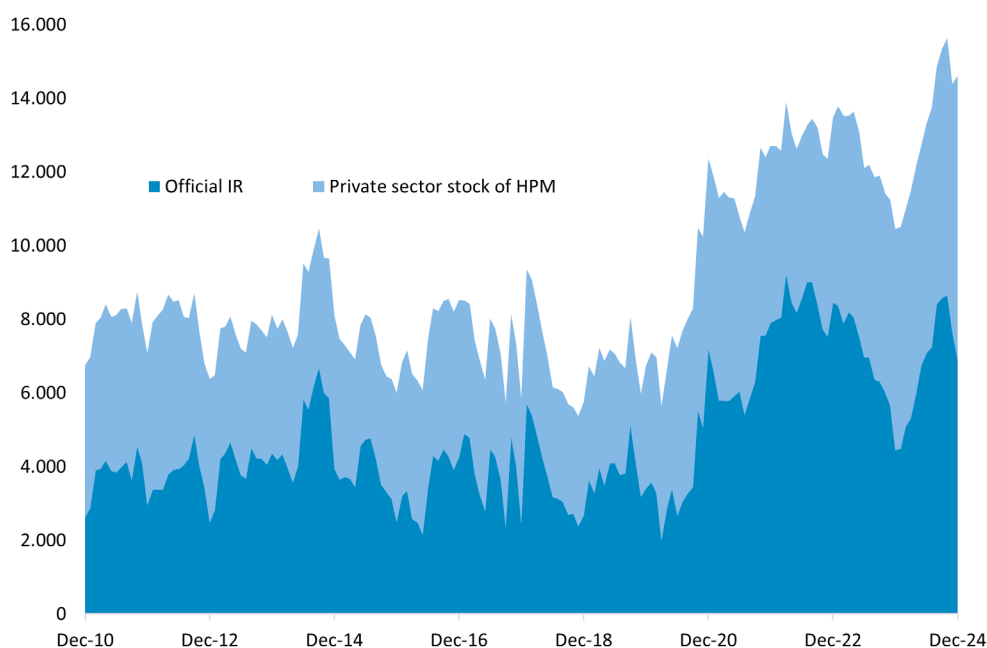


Source: CBE

3.1.5. Identifying the Sources of High-Powered Money in a Dollarized Economy

Monetary systems are based on confidence. Money is created mostly on the balance sheets of banks and will continue to exist as long as households and firms do not challenge this premise by simultaneously demanding to withdraw their deposits and exchange them for cash. This is true for dollarized or non-dollarized economies alike. The difference is that a non-dollarized economy will have a central bank that can actually print new bills and purchase currency in the market, for a price. A dollarized economy does not have the capacity to print bills or purchase international reserves. The money available to back demand for cash or the demand for outflows is a finite number, which exists in the vaults of private banks, in the international reserve account of the central bank (if one exists), and in deposits and investments held by financial institutions abroad.

In a dollarized economy, it is important to identify the sources of high-powered money in the system. In Ecuador's case, the highest hierarchy of money consists of the official stock of international reserves, external assets held by the financial system (including forced savings in the liquidity funds, which are pools of assets that financial institutions must keep abroad by law), cash in private banks' vaults, and currency in circulation. All these items are high-powered money. However, not all of them play the same role. Some of these items may fuel domestic money growth, while others are just liquidity buffers. This paper groups together the stock of official international reserves, the external assets held by the financial system, the cash balances held in the vaults of private banks, and label them as "broad international reserves" (see Figure 6). In the case of Ecuador, official international reserves represent around 52 percent of this stock and generally have a more volatile behavior than banking assets held abroad.

Figure 6. Broad International Reserves*US\$ millions, Dec. 2010/Dec. 2024*

Source: CBE

Domestic deposits are a lower hierarchy of money that can only be used to make transactions within the country. Seen like this, dollarization could be understood as a dual currency system, by having a domestic currency that is used for onshore transactions, and which needs access to high-powered money (broad international reserves) to transact with the rest of the world.

In dollarization, however, both the domestic and the external currency are called “dollars”, so they can be distinguished by using a hierarchy system. The dollars in international reserves, those kept by financial institutions abroad (to be used with the rest of the world), and the cash that the central bank, private banks, and citizens hold, have a higher hierarchy (high-powered money, HPM) than the dollars used for domestic transactions (domestic money, DM). Color coding could also work for didactic purposes. Think of HPM that can be used with the rest of the world as actual green dollars, while DM, used for domestic transactions, as yellow dollars are. Domestic deposits within the financial system represent yellow dollars, which serve local transactional needs. For this system to function, citizens must implicitly believe either that these deposits are actual U. S. dollars (green), or that banks hold sufficient U. S. dollar cash to redeem them upon request.

Yellow dollars can be created in two ways: as a counterpart of green dollars that arrived through the balance of payments, or via credit mechanisms of financial institutions, or public spending financed by domestic debt. Either of these mechanisms creates yellow dollars by generating a new deposit in the

financial system that previously did not exist. This distinction will be determinant in understanding the evolution of the monetary sector.

Official international reserves play a pivotal role in an economy's transactions with the rest of the world, serving as a critical budget constraint. Despite the level of deposits held by the public or private sectors in the liability side of the central bank, it is the stock of official international reserves, an asset to the central bank, that fundamentally determines the central bank's ability to facilitate payments abroad for the whole economy. This essential function underscores the central bank's capacity to engage in international transactions, highlighting the strategic importance of maintaining adequate reserve levels to ensure financial stability and operational efficacy in the global economic landscape. Assets held by private banks abroad play a similar role, but these are not available for the system as a whole, only for the institutions that own them.

3.1.6. Domestic Money Creation by High-Powered Money

For simplicity, this paper refers to the creation of domestic money through balance of payments flows as primary money creation. There are two ways this happens: through the central bank, or directly by private financial institutions.

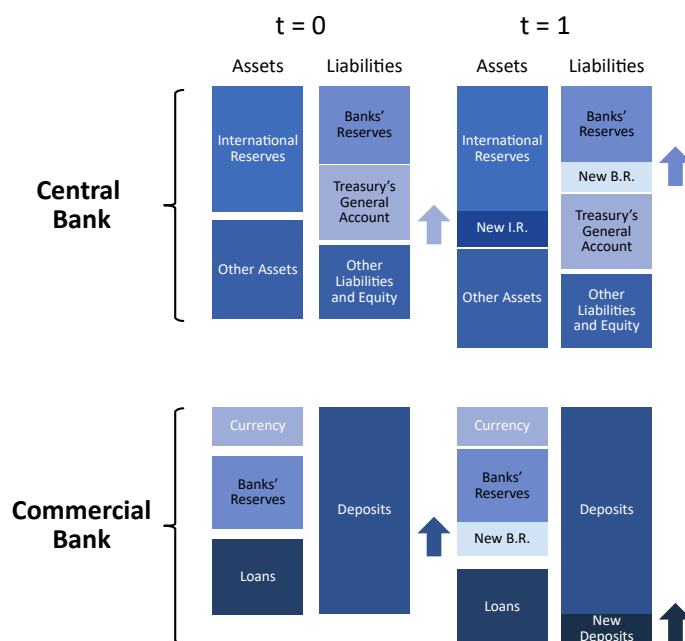
When dollars flow into the economy due to an international transaction, the central bank will receive a deposit in its international reserves (green dollars). This is an asset on the central bank's balance sheet that must be offset by a liability, so the central bank will create a new liability (yellow dollars) that previously did not exist (public or private).

If the inflow belongs to the private sector, the central bank will create bank reserves (yellow dollars) for the private bank to which such a transaction belongs. This is a similar process of bank reserves' creation in a non-dollarized economy. If the inflow belongs to the public sector, the central bank will create a new deposit (yellow dollars) in the account of the public sector at the central bank, in the Treasury's General Account (TGA). As a result, the central bank's balance sheet will be balanced with a new green dollar in its international reserves and a new yellow-dollar deposit on its liability side, belonging to either the public or the private sector.

The private bank's balance sheet, however, must also be balanced. As new bank reserves are created on the asset side of the private bank's balance sheet, it will create a new deposit (yellow dollar) on the liability side of its balance sheet, belonging to the corresponding client. These deposits are part of the system's money supply, or M2. Thus, assets and liabilities of the private bank (in this case, both yellow dollars) are balanced, and a new domestic deposit has been created. If the original balance of payments inflow belonged to the public sector, the conclusion is the same, with an extra step. When the public sector spends domestically, the central bank will transfer deposits from

the TGA to the accounts that private banks hold at the central bank, recording new bank reserves. These new assets that private banks now have in their balance sheet will lead to the creation of a new domestic deposit (see Figure 7).

Figure 7. Balance Sheet Dynamics



It's important to note that, regardless of the “owner” of the original balance of payments inflow, new bank reserves at the central bank were created as a counterpart to green dollars which arrived through the balance of payments. This characteristic is crucial to understanding the way primary money creation through the balance of payments modulates the speed at which secondary money can be created in the economy. An increase in international reserves is indicative of enhanced liquidity within the economy. If this liquidity reaches the private sector, credit growth and, consequently, economic activity could be stimulated.

Thanks to this correspondence between assets and liabilities, international reserves are, therefore, already inside the economy. Every dollar that arrived through the balance of payments, which led to an increase in international reserves, also created both new liquid assets for private banks and a new domestic deposit inside the economy (except for those still kept as TGA deposits). Conversely, when the economy transacts with the rest of the world, domestic money will be destroyed alongside a public or private sector liability at the central bank (the latter also an asset at the private bank's balance sheet), and the central bank will wire a payment from its international reserves, which will decline.

Primary money creation can also happen without impacting the stock of official international reserves. Private banks may receive wire transfers for their clients which they do not bring onshore. In such cases, there will be no impact on official international reserves. The bank would record a new asset which is kept in its accounts abroad (green dollars), but a yellow domestic deposit will be created on its liability side. In this case, a domestic deposit will still be created by green dollars originated from balance of payments flows, even if those did not fund official international reserves. To properly map primary money creation in a dollarized economy with Ecuador's institutional setup, it is necessary to look at broad international reserves, as described above.

There are two other sources of high-powered money that are part of the system but cannot be freely used and do not have a domestic-money creation capability. The first are the Liquidity Funds, which constitute savings kept abroad. This is a legal requirement that forces banks and credit unions to earmark high-powered money as domestic deposits increase. The contributions to the liquidity fund are recorded on the asset side of banks' balance sheets. These contributions are a function of the level of deposits banks hold. When banks feed the liquidity fund, this asset line will increase against available funds, leading to a reorganization of the asset side of private banks' balance sheets. Using the Liquidity Funds, on the other hand, could impact banks' liabilities if done through credit mechanisms. However, this would be a financial liability, not a deposit. Hence, even though this is a stock of high-powered money kept on the asset side of private banks, it does not contribute to the future creation of domestic deposits but is a result of the current stock of deposits at any point in time. The role of the liquidity fund is to serve as a liquidity buffer for private financial institutions and may not necessarily serve as a leverage for domestic money creation.

The second source is cash within the economy, specifically, U. S. dollar bills and coins held by households and firms. This constitutes another stock of high-powered money that does not contribute to domestic money creation unless deposited in a formal financial institution. Once deposited, the bill becomes an asset on the private bank's balance sheet, and a new deposit is created for the client. If banks subsequently transfer these bills to the central bank's vault, they become part of the stock of official international reserves and of the financial system's liabilities at the central bank. On the private bank's balance sheet, the asset side adjusts as cash holdings decrease and reserves at the central bank increase.

3.1.7. The Relationship Between Primary and Secondary Money Creation

High-powered money plays a crucial role in the expansion of the domestic money supply through two channels. The first one is actual deposit creation, as described above. The second one, however, is more complex and more

relevant. High-powered money will determine the speed at which domestic banks can expand credit, and hence determine the speed at which secondary money creation can evolve and ultimately the economy's ability to grow by leveraging credit.

The mechanics of banking credit are as follows: new loans create new deposits on banks' balance sheets, which entail a potential demand for cash (for domestic transactions) and for green dollars to transact with the rest of the world. Both represent claims on the stock of high-powered money. This does not imply that every loan will generate such claims directly, but as the economy evolves and expands, its capacity to transact externally, through imports of goods and services and other flows, also increases.

In aggregate, primary money creation provides private banks with liquid assets they will need to face the increased demand for cash and currency that credit induces. At a private bank's balance sheet, primary money creation means that the counterpart for a new deposit on its liability side was a green dollar. Having more high-powered money available means a larger capacity to meet the demands that expanding its balance sheet through credit will produce. When a bank is unable to meet such demand, it must either slow the pace of credit expansion or seek alternative sources of funding. The same applies to the aggregate system.

Secondary money creation means that the new deposit in the bank's liability side was the correspondence of an increase in the banks' loans on the asset side. There is no increase in the bank's liquid assets, so it will need to use the existing stock of high-powered money to meet the demand for cash and currency that the new loan will create.

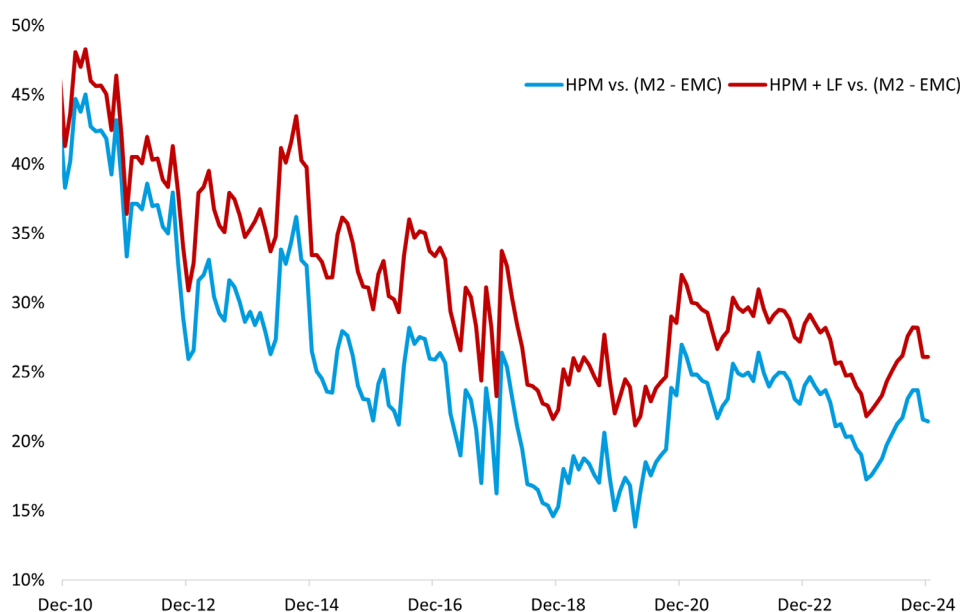
The continuous expansion of credit by banks is inherently constrained by the stock of high-powered money available to banks to meet the cash and currency demands spurred by credit growth. Essentially, without a steady influx of high-powered money, banks would be unable to indefinitely increase credit. Available liquid assets held by banks act as a safeguard, ensuring they can satisfy withdrawal requests and other demands for physical currency, which naturally arise as credit expands. This balance between credit growth and high-powered money underscores the delicate equilibrium financial institutions must maintain to support economic activity while ensuring financial stability.

Secondary money creation is not limited to bank credit. There are other credit operations within the economy that will also create new domestic deposits without the backing of high-powered money. One is the investments that domestic banks make in each other. The other is public spending financed by domestic debt issuance.

3.2. Leverage Without External Inflows: Other Channels Driving Monetary Expansion in Dollarization

In a dollarized economy, the monetary sector is inherently leveraged relative to its stock of high-powered money (HPM) (see Figure 8). Certain dynamics, such as fluctuations driven by domestic credit, can expand and contract without introducing significant distortions. However, other factors, such as central bank financing of the government, cross-holdings of deposits and investments between financial institutions, and the persistence of fiscal deficits, can introduce vulnerabilities if left unchecked. These elements are governed by forces that operate independently of primary money flows, making them potential sources of systemic fragility. Below, these dynamics are explored in detail.

Figure 8. Monetary Leveraging
Percent of HPM relative to M2¹, Dec. 2010/Dec. 2024



Source: CBE

3.2.1. Central Bank Balance Sheet Expansion, Private Credit, and the Balance Of Payments

Given Ecuador's current institutional setup, equilibrium conditions in the monetary market imply that the central bank cannot use its balance sheet

¹ It excludes the central bank's estimate of notes and coins in circulation.

to finance either the public or the private sector. Doing so would introduce important distortions to the way the monetary sector should behave.

Under normal conditions, banks will expand credit based on micro prudential regulations issued by supervisory agencies, and more importantly, on their capacity to meet the demand of cash and currency that new loans create, as explained in the previous section. The increase in bank reserves generally results from new balance of payments inflows, either originating from the private sector or reaching it through public spending funded with dollars from abroad. This implies that increases in bank reserves are mostly backed by green dollars—or high-powered money—held in international reserves. Bank reserves may also increase through government spending, as explained below.

Generally, the movements in the liability side of the central bank's balance sheet are a zero-sum game. If the government were to sell domestic debt to private banks in order to fund public spending, it would absorb liquidity from the private sector (through debt placements) to then replenish them (through spending), with no net impact on the total amount of central bank liabilities. If the government obtains domestic financing from the social security or public enterprises (SOEs), to then pay the private sector, public and private sector deposits at the central bank would also net out, with lower public sector deposits and higher bank reserves at the central bank.

Between 2009 and 2014, Ecuador implemented several legal and regulatory changes to allow the central bank to finance the government's deficit. This challenged the conventional thinking about the way a fully dollarized system works, which assumed that dollarization imposes fiscal discipline and that monetary financing is not possible in a fully dollarized regime as the central bank does not issue its own currency. In practice, however, it is not the monetary regime itself, but its legislation that prohibits a central bank from creating new deposits in favor of the government. Initially, in December 2009, the central bank began acquiring government bonds from public banks to enhance their ability to channel resources to the private sector. This mechanism was reconfigured in 2012, and the transactions assigned to public banks were triangulated to the Ministry of Economy and Finance (MEF) to support the budget (García, 2016). In 2014, this was formalized through a new Monetary and Financial Code, allowing direct credit operations between the central bank and MEF. These actions exposed the central bank to liquidity and credit risks, endangering the dollarization system by lowering international reserve coverage, thus increasing the probability of foreign default and financial crisis, given that the country would lack high-powered money to make payments abroad even though the government had resources in the Treasury General Account (TGA) (Erráez & Reynaud, 2022).

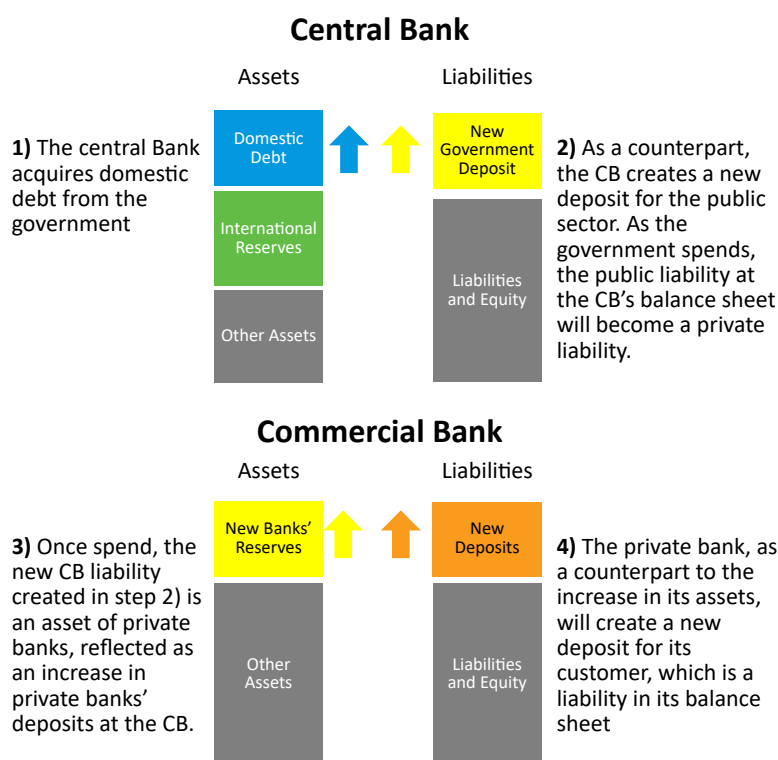
Monetary financing weakens the basic macroeconomic equilibria needed for the long-term stability of dollarization. But why is it different to create money in the balance sheet of private banks than on the balance sheet of the central bank? In a nutshell, because the creation of liabilities at the central

bank's balance sheet without a counterpart in the balance of payments enables secondary money creation beyond the capacity of the balance of payments to sustain. To understand this didactically, it is useful to employ our color-coded dollar identifiers.

Under monetary financing, the balance sheet of the central bank grows by virtue of an intentional decision to finance the treasury. The net increase in the domestic liquidity of the system (central bank liabilities) is matched by an increase in central bank's internal assets; this is unrelated to balance of payments inflows. The government will subsequently use such deposits to spend, passing those deposits to the private sector. Hence, the public sector liability originally created at the central bank's balance sheet becomes a private sector liability, and new deposits are created in the balance sheets of private banks. With more liquid assets (bank reserves), private banks can enhance lending. However, these new liquid assets were not created by green dollars, so the endowment of high-powered money available to the economy remains unchanged as domestic credit expands.

The private sector's balance sheet changes as a result of this new government expenditure. The new private sector liability at the central bank is an asset on the private bank's balance sheet, which appears as an increase in bank reserves. On the liability side, the private bank will create a new deposit, which belongs to the original payee of the public sector (bureaucrats, contractors, etc.).

Banks, however, do not distinguish between new assets created from the inflow of green dollars, which increase international reserves, and those generated through credit expansion on the central bank's balance sheet. In their balance sheets, they now have more available funds which banks would resort to in order to meet the demand of cash and currency that new loans would create, so credit growth would be able to accelerate (see Figure 9). Every new loan creates a new deposit on the liability side and contributes to the demand for cash and currency from banks, which banks meet using their liquid assets.

Figure 9. Credit Expansion and Deposit Creation

In this context, stronger domestic absorption created by the enhanced credit cycle will not be consistent with balance of payments flows. At a central bank's balance sheet level, there are now more liabilities for the same level of international reserves. At a private sector balance sheet level, secondary money creation will continue to expand under the premise that the central bank holds enough green dollars, or high-powered money, to support the increased demand for coin and currency that new loans create. This dynamic will eventually destabilize the monetary equilibrium within the economy that reigns under a pure dollarization scheme, as domestic liquidity will grow unmodulated by primary money creation. This will eventually lead to balance of payments pressures and accelerated international reserve loss.

The same way that monetization of fiscal spending can boost domestic demand growth, the repayment of the obligations placed on the central bank represents a process of monetary contraction and subsequent growth compression. This repayment involves the destruction of public sector liabilities at the central bank balance sheet and the corresponding write-off of internal assets. As a result, for the same level of international reserves, the central bank will now hold fewer liabilities. As the rollover of such maturities is currently forbidden, their mandatory repayment demands the generation of government savings (fiscal consolidation), the replacement of internal debt sources (placement of internal debt to repay central bank), or the acquisition of external debt to repay the central bank. The first two options will compress domestic

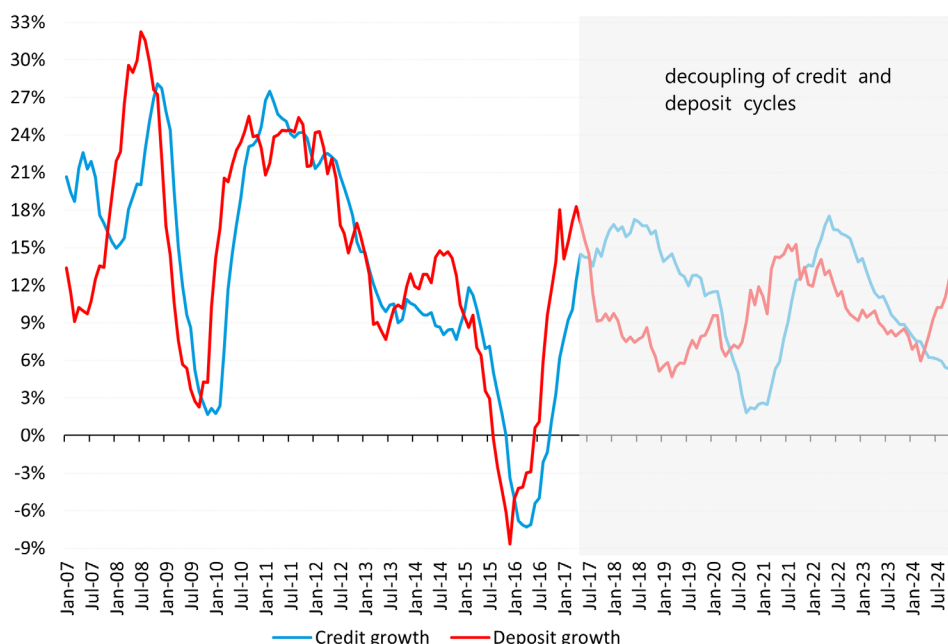
liquidity, while the third could keep domestic liquidity unchanged but increase external obligations of the government.

Monetary financing in Ecuador also had a structural impact on domestic funding conditions for banks. In equilibrium, credit and deposit cycles must be synchronized, as every credit operation creates a new deposit. According to our framework, secondary money creation is also modulated by primary money creation, which happens through balance of payments flows. In equilibrium, and without credit from the central bank to the government, these monetary dynamics self-regulate and do not create imbalances. The stronger primary money flows are, the more credit can expand, leading to greater domestic absorption and outflows. As a result, the system remains in balance.

The decoupling of credit and deposit cycles reflects an imbalance in the monetary system. If deposits are not growing at the same pace as credit, it indicates that new deposits are leaving the system. Conversely, if deposits grow faster than credit, it suggests that new deposits are entering the system. This phenomenon, exacerbated in Ecuador in 2017 (see Figure 10), can be interpreted as a side effect of the destabilizing dynamics triggered by the monetary financing of the deficit, as explained above.

Figure 10. Financial Sector Total Deposits and Credits

Growth rate YoY. Jan. 2007/Dec. 2024



Source: CBE

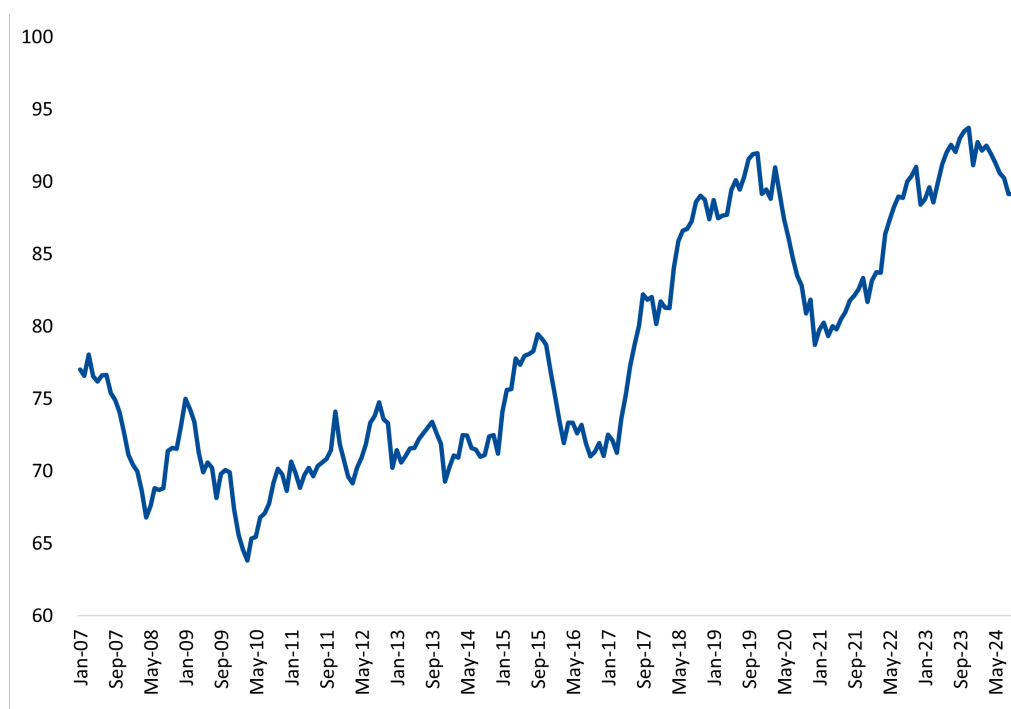
When new bank reserves are created at the central bank's balance sheet, private banks' balance sheets will see a higher capacity to expand credit (as per our explanation above). Domestic absorption will grow, and outflows will

be intensified, even if balance of payments inflows were absent. Outflows mean that high-powered money will decline as internal demand increases. As a counterpart, domestic deposits are written off. This divergence can continue until banks are less capable of responding to payments abroad or the increased demand for cash and currency created from the credit cycle. This, in part, will be determined by the speed at which high-powered money has declined, which will have a counterpart in reduced liquid assets from banks.

The separation of credit and deposit growth, however, can also have longer lasting consequences. As credits grow faster than deposits, the balance sheet relationship between private banks' assets and liabilities will also change. Loan to deposit ratios increase, leading to a scarcity of domestic funding for new credit. In Ecuador, the financial intermediation ratio in private banks averaged 72 percent from 2007 to 2017. The ratio averaged 87 percent between 2018 and 2024, and consequently, credit as a percentage of total assets increased from 55 % in 2005 to 65 % in 2024. (see Figures 11 and 12).

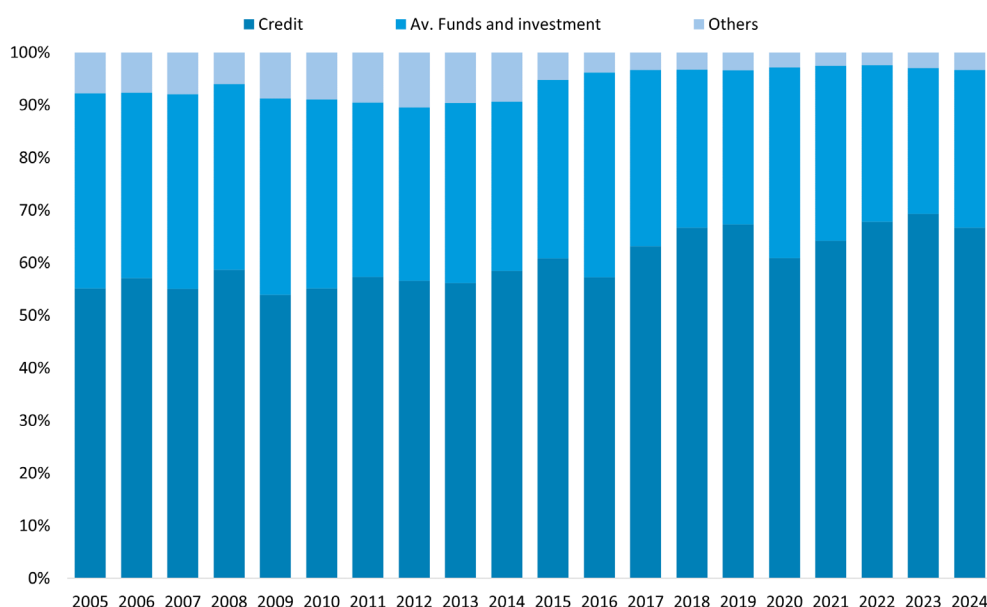
Figure 11. Loans to Deposits Ratio

Private banks. Jan. 2007/Dec. 2024



Source: SB

Figure 12. Private Banking System Assets
Percentage of total, 2005/2024



Source: SB

3.2.2. Cross Holdings Between Financial Institutions

Cross-holdings constitute a banking practice that, although technically simple, has significant implications at both the microeconomic and systemic levels. These transactions increase the stock of deposits in the financial system, contributing to M2 growth in a non-trivial way. In essence, when one bank invests in a certificate of deposit issued by another, the recipient bank's balance sheet expands, with higher reserves on the asset side and greater deposits on the liability side. Reciprocity and risk management decisions, such as additional lending based on the stronger deposit base that results from these transactions, can amplify this effect, weakening the link between high-powered money and domestic money and raising concerns about contagion risk across the system. One reason this practice persists is the limited depth of the domestic capital market, which restricts alternative investment options for excess liquidity within the banking system.

In the following paragraphs, a didactic example of cross deposits between two banks is used to describe the associated accounting movements and evaluate their implications on bank balances, financial indicators, and economic stability.

Initial Movements: The Case of Banks A and B

At the initial moment ($t=0$), the balances of banks *A* and *B* reflect their baseline financial situation. Each bank shows a balanced distribution of assets and liabilities. The assets include bank reserves at the central bank (CB), local and foreign investments, loans, and other assets. The liabilities comprise demand and term deposits, debt, other obligations, and equity. We assume that the legal reserve requirement is 10 percent of deposits, so both bank *A* and bank *B* have excess reserves at $t=0$ (see Table 2).

Table 2. Initial Movements: The Case of Banks A and B

$t=0$

A				B					
Assets		Liabilities		Assets		Liabilities		A	B
Cash	100	Demand deposits	3.000	Cash	200	Demand deposits	5.500	Reserves at BCE =	18.2 % 19.0 %
BCE reserves	1.000	Time deposits	2.500	BCE reserves	2.000	Time deposits	5.000	Excess reserves at BCE =	450 950
Abroad reserves	500	Debt	500	Abroad reserves	1.000	Debt	1.500	Liquidity =	29.1 % 30.5 %
Local investments	300	Other liabilities	200	Local investments	600	Other liabilities	500	Loans/Deposits =	90.0 % 95.2 %
Loans	5.000	Equity	800	Loans	10.000	Equity	1.500	Total deposits =	16.000
Other assets	100			Other assets	200				
TOTAL	7.000	TOTAL	7.000	TOTAL	14.000	TOTAL	14.000		

Moment $t=1$: Bank *A* decides to make an investment of 200 in bank *B*. This transaction implies:

1. Bank *A*:

- Reduces its reserves at the CB by 200, going from 1.000 to 800.
- Increases its local investments from 300 to 500.
- Its balance sheet stays the same size.

2. Bank *B*:

- Increases its deposits by 200, recorded as an additional liability on its balance sheet (M2 increases).
- Raises its reserves at the CB by 200, from 2.000 to 2.200.

- Its balance sheet increases in size by 200.

It is important to note that system-wide bank reserves at the central bank remain unchanged, only reconfigured (see Table 3).

Table 3. Reconfiguration of Balance Sheets

$t=1$

A				B					
Assets		Liabilities		Assets		Liabilities			
Cash	100	Demand deposits	3.000	Cash	200	Demand deposits	5.500		
BCE reserves	800	Time deposits	2.500	BCE reserves	2.200	Time deposits	5.200	Reserves at BCE =	14.5 % 20.6 %
Abroad reserves	500	Debt	500	Abroad reserves	1.000	Debt	1.500	Excess reserves at BCE =	250 1.130
Local investments	500	Other liabilities	200	Local investments	600	Other liabilities	500	Liquidity =	25.5 % 31.8 %
Loans	5.000	Equity	800	Loans	10.000	Equity	1.500	Loans/Deposits =	90.9 % 93.5 %
Other assets	100			Other assets	200			Total deposits =	16.200
TOTAL	7.000	TOTAL	7.000	TOTAL	14.200	TOTAL	14.200		

Moment $t=2$: Bank *B* carries out a reciprocal operation and invests 200 in bank *A*. The movements are analogous:

1. Bank *B*:

- Reduces its reserves at the CB by 200, going from 2.200 to 2.000.
- Increases its local investments from 600 to 800.

2. Bank *A*:

- Increases its deposits by 200, recorded as an additional liability (M2 increases).
- Raises its reserves at the CB by 200, from 800 to 1.000.
- Its balance sheet now increases by 200.

On aggregate, deposits in the system have increased by 400, and system-wide bank reserves remain unchanged (see Table 4).

Table 4. Reciprocal Operations*t=2*

A				B					
Assets		Liabilities		Assets		Liabilities			
Cash	100	Demand deposits	3.000	Cash	200	Demand deposits	5.500		
BCE reserves	1.000	Time deposits	2.700	BCE reserves	2.000	Time deposits	5.200	Reserves at BCE =	17.5 % 18.7 %
Abroad reserves	500	Debt	500	Abroad reserves	1.000	Debt	1.500	Excess reserves at BCE =	430 930
Local investments	500	Other liabilities	200	Local investments	800	Other liabilities	500	Liquidity =	28.1 % 29.9 %
Loans	5.000	Equity	800	Loans	10.000	Equity	1.500	Loans/Deposits =	87.7 % 93.5 %
Other assets	100			Other assets	200			Total deposits =	16.400
TOTAL	7.200	TOTAL	7.200	TOTAL	14.200	TOTAL	14.200		

Impact on Deposit Growth Within the System

The immediate effect of these transactions is an increase in deposits recorded in both banks. At bank *A*, deposits rise from 2.500 to 2.700, while at bank *B* they go from 5.000 to 5.200. Adding up the individual balances, a total increase of 400 in system-wide deposits is recorded, even though there was no associated increase in high-powered money.

This increase in deposits is exclusively the result of an accounting redistribution between the banks. Bank reserves at the central bank, which fund these transactions, shift from one bank to another without altering the total stock of bank reserves in the system. Yet, financial institutions increase both assets and liabilities in their balance sheets through these reciprocal operations.

*Microeconomic Implications***Illusory Liquidity:**

The increase in deposits creates the appearance of greater resources available in banks' balances, which could influence the decisions of investors, regulators, clients, and banks themselves (as described below), generating a distorted perception of financial stability and balance sheet health.

Risks in Credit Expansion:

Financial institutions may be incentivized to expand their loan portfolios based on deposit growth driven by these transactions. However, this could weaken balance sheet stability due to a mismatch between new credit and a volatile funding source, complicating efforts to unwind such transactions or reinforcing incentives to increase them further.

Macroeconomic Implications

Distortion in Aggregate Indicators:

- The increase in deposits affects indicators such as the money supply (M2), which includes bank deposits. This could complicate macroeconomic analysis and lead to errors in monetary policy formulation.
- Higher domestic deposits mean a larger monetary leverage of the economy relative to high-powered money, which should be the prime modulating factor in domestic money growth.
- A tool to avoid these distortions is the use of consolidated balances instead of aggregated balances. Consolidated balances would eliminate transactions between banks, such as cross holdings, ensuring that the increase in deposits reflects only real customer activity.

Potential Impact on Financial Stability:

- The higher the amount of cross holdings in the system, the greater the contagion risks between financial institutions. As these transactions provide the mirage of increased liquidity, banks could face real liquidity problems, exposing systemic vulnerabilities, in situations of financial stress that require institutions to shore up liquidity to meet client demands. This could be particularly worrisome as financial institutions with weaker regulatory frameworks, risk management practices, and balance sheet positions, increase their cross holdings in the system.

Operation Limit

As mentioned, this operation is only possible in a context of excess reserves at the central bank. At the initial moment, bank *A*'s reserve ratio was 17,5 percent and bank *B* was 18,7 percent, with excess reserves reaching 450 and 950, respectively. Each round of this operation reduces these excess reserves,

redistributing them as local investments. The operation ends when the bank with the smaller surplus (in this case, bank *A*) exhausts its excess reserves at the central bank.

The maximum possible leverage on excess reserves for these transactions is determined by the factor $1/r$, where r is the reserve requirement ratio. In this example, with a reserve requirement of 10 percent, deposits could grow up to 10 times bank *A*'s initial excess reserves (450), reaching an increase of 4.500 in each bank. If the reserve requirement were 5 percent, this capacity would rise to 20 times (see Table 5). In the specific case of Ecuador, r should be understood as the sum of all regulatory requirements that compel financial institutions to hold deposits at the central bank.

Table 5. Final Changes in Balance Sheets

$t=n$

A				B					
Assets		Liabilities		Assets		Liabilities			
Cash	100	Demand deposits	3.000	Cash	200	Demand deposits	5.500		
BCE reserves	1.000	Time deposits	7.000	BCE reserves	2.000	Time deposits	9.500	Reserves at BCE =	10.0 % 13.3 %
Abroad reserves	500	Debt	500	Abroad reserves	1.000	Debt	1.500	Excess reserves at BCE =	- 500.0
Local investments	4.800	Other liabilities	200	Local investments	5.100	Other liabilities	500	Liquidity =	16.0 % 21.3 %
Loans	5.000	Equity	800	Loans	10.000	Equity	1.500	Loans/Deposits =	50.0 % 66.7 %
Other assets	100			Other assets	200			Total deposits =	25.000
TOTAL	11.500	TOTAL	11.500	TOTAL	18.500	TOTAL	18.500		

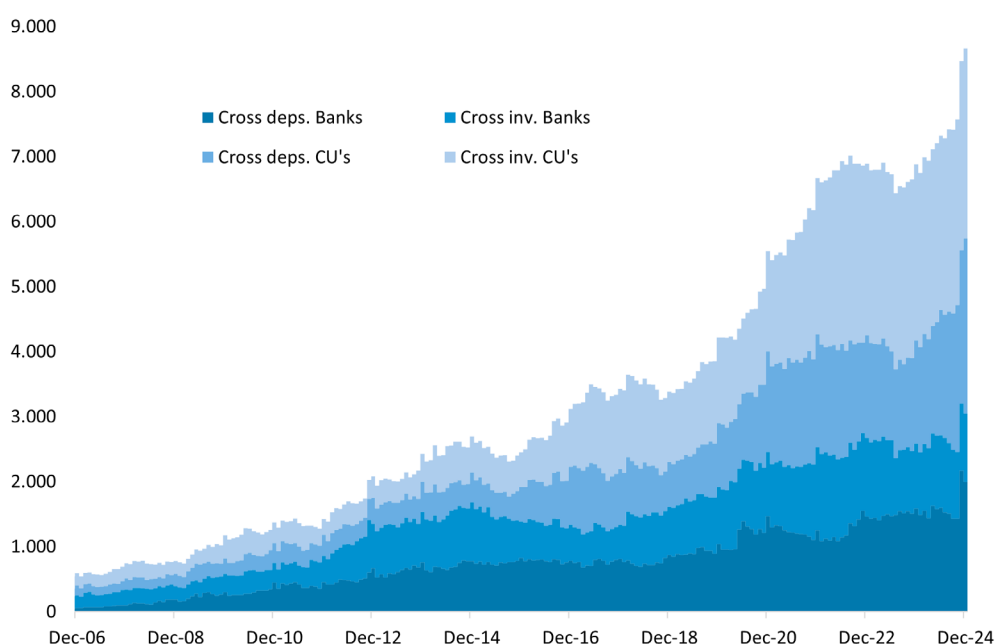
Cross holdings, while legally allowed, represent a practice that could generate significant risks to the financial system if not adequately monitored and regulated (see Figure 13). These operations alter bank's balance sheets and the stock of the money supply (yellow dollars), without the backing of actual economic activity or flows of high-powered money. Therefore, an increase in deposits does not necessarily imply an improvement in the health of the financial system or the stability of dollarization.

Although these operations may have strategic uses, they also pose risks if not managed prudently. Regulatory oversight and accounting transparency are essential to preserve confidence and stability in the financial system, mitigating contagion risks and moral hazard. From a macroeconomic standpoint, the sustainable expansion of domestic money should be aligned with the flow of high-powered money, as the origin of deposits matters. Only dollars generated through the balance of payments ("green dollars") can support lasting

credit growth. At the same time, the prevalence of these operations partly reflects the regulatory constraints on liquidity management in the Ecuadorian financial system.

Figure 13. Cross Holdings of Banks and Cooperatives

U. S. \$ million, Dec. 2006/Dec. 2024



Source: CBE

3.2.3. Public Spending Financed by Domestic Debt Issuance to the Financial System

Funding public spending by raising internal debt also has a money-creation feature, without a correspondence in high-powered money. When the government issues a domestic bond, banks will use bank reserves to purchase the security. The asset side of private banks will change (from available funds to investments in government securities), without a change in liabilities. At the central bank's balance sheet, bank reserves will decline, and the deposits of the government will increase. This process reshapes central bank liabilities without an impact on its asset side.

Increased public sector deposits, however, enable the government to spend and make payments to the private sector. As a result, government deposits at the central bank will decline again, while bank reserves rise. This process leads to a growth in the balance sheet of private banks. Private banks will see their assets increase as the government spends (pays salaries, contractors, etc.), which must be matched by new deposits that banks must create

for the recipients of the government's payments. This way, public spending financed by domestic debt issuance also creates new money in the economy. The converse will also be true: fiscal consolidation carried out by a contraction in fiscal spending or an increase in domestic revenues via taxation has a contractionary impact on the monetary balances of the economy, all else constant. This relationship highlights the deep interconnection between the fiscal and monetary sectors, underscoring the relevance of fiscal dynamics for monetary stability.

Internal debt placements with the BIESS, which manages Ecuador's Social Security Funds (SSF), have a slightly different effect. As an asset manager, BIESS allocates funds either to credit for the private sector (such as short-term loans and mortgages) or to government bonds. Credit operations generate new deposits in the financial system, as BIESS does not receive deposits from the private sector. Consequently, the balance sheets of recipient financial institutions expand, reflecting new deposits on the liabilities side and higher bank reserves on the assets side. However, given BIESS's role as an asset manager, funds allocated to one type of investment cannot be used for another. Therefore, when BIESS purchases government bonds, it forgoes the opportunity to issue new loans. As government spending increases, financed by debt placed with BIESS, bank balance sheets expand and new deposits are created. However, the deposits that would have otherwise been generated through BIESS's mortgage and short-term lending will not materialize. Assuming perfect substitution, M2 growth resulting from government spending financed through domestic debt held by BIESS would merely displace M2 growth that would have been generated by BIESS's credit operations.

4. RESULTS AND LIMITATIONS

Analyzing the monetary framework of Ecuador's economy within its institutional structure raises pertinent questions and provides insights into key issues that will gain significance in the coming quarters and years. Below, a few are highlighted.

4.1. Sustainability (Public Sector Flows and Monetary Leveraging)

A key question arising from this analysis is how sustainable it is for Ecuador's dollarization to depend on public external debt flows. The current balance of payments structure indicates that, at least since 2014, the public sector has supplied HPM for use by the private sector. In 2024 and 2025 this pattern shifted, but it remains unclear whether the change is permanent or transitory.

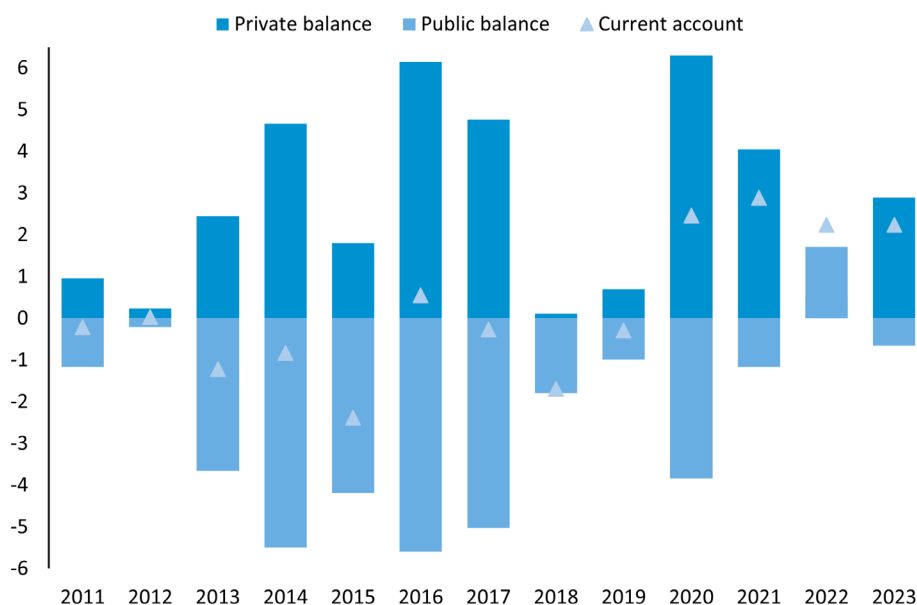
If the government moves toward a surplus, however, the provision of HPM to the economy would need to adjust, requiring the private sector to

either increase inflows or reduce outflows to maintain monetary equilibrium. Boosting inflows would help maintain current monetary equilibria, while reducing outflows would bring a new equilibrium based on monetary contraction.

A monetary scheme that relies on public sector debt inflows highlights important macroeconomic imbalances. Following the traditional savings-investment vs. current account balance framework ($CA = (S_p - I_p) + (S_g - I_g)$), in Ecuador, the private sector is a net saver, while the public sector runs a persistent deficit. Yet, from a flow perspective, the public sector finances its deficit with external debt, while private savings become a claim against the rest of the world. These flows are illustrated in Figure 14.

Figure 14. Savings-Investment Balance

U. S. \$ bn. 2011-2023



Source: CBE

A public-sector deficit ($S_g - I_g < 0$) must be financed either by a domestic private-sector surplus ($S_p - I_p > 0$) or by net borrowing from the rest of the world, which shows up as a liability-creating inflow in the financial account. In a dollarized economy, the composition of inflows matters for balance-sheet dynamics: private sector surpluses increase residents' foreign assets (including official and broad international reserves) and increase resident liabilities issued to domestic agents, such as deposits at a financial institution. Meanwhile, liability-creating inflows, such as public external debt, expand external indebtedness even if domestic liquidity also rises.

Put in a different way, episodes with current-account surpluses associated with export receipts, remittances, and other transfers raise residents' net external claims, some of which are held as international reserves or as

foreign assets of banks and firms. When fiscal deficits are financed externally, the counterpart is an increase in public external liabilities rather than an improvement in the net position. Hence, the macroeconomic implications of balance of payments flows differ depending on whether the underlying flow is current-account or liability-creating.

A structure that depends heavily on foreign debt flows is inherently inefficient and vulnerable. All else equal, external debt imposes a negative intertemporal burden on international reserves. Every dollar of foreign borrowing that increases the official reserve stock will eventually flow out, together with the accrued interest. As dependence on external debt grows, the system becomes trapped in a negative feedback loop, requiring even more debt to prevent reserves from falling (again, all else equal). Over time, this dynamic can also undermine fiscal sustainability. Moreover, the greater the monetary system's reliance on external debt, the higher the risk that a public sector credit event could destabilize the broader monetary system.

The next layer of this assessment involves evaluating the use of public debt flows. Debt flows directed toward activities that increase dollar inflows in the long term should be considered sustainable and preferable to those that do not. For instance, investments in infrastructure that enhance the export capacity of both the public and private sectors are more desirable. In practice, however, external debt flows may be allocated to a wide range of purposes. Therefore, prudent management and strategic use of external debt are essential to mitigate potential risks and ensure the long-term sustainability of the monetary system.

As the government transitions into fiscal surpluses, necessary for long-term macroeconomic sustainability, its net contribution of high-powered money into the system would naturally decline, potentially leading to a monetary contraction. If this happens, it will become necessary for the private sector to provide high-powered money to sustain the monetary system. Public sector policy decisions on debt management may also be considered if the government wishes to keep a stable endowment of HPM into the economy by keeping net positive external debt flows, for instance.

Either way, a purposeful transition necessitates strategic coordination, to ensure the stability of the monetary system and promote sustainable economic growth. By fostering a collaborative environment, both sectors can contribute to a resilient and dynamic economy. Fiscal surpluses strengthen government finances, reduce reliance on debt, reduce the cost of capital for the economy as a whole, and enhance investor confidence, thereby creating a healthier environment for private-sector investment and sustainable economic growth.

But sustainability should also be assessed in monetary terms. One extension to this paper would be to properly assess the risks associated with the leveraging of the domestic monetary system relative to the stock of high-powered money available. In this topic, not all money-creation mechanisms in

the economy are the same: inflows, credit, interbank investments, and fiscal spending all carry different implications.

4.2. Role of the Central Bank

The existence of a central bank in a dollarized regime needs to be understood alongside the many other elements within the structure of the economy. In Ecuador, the central bank plays several roles. The main two roles are to guarantee the supply of bills to the economy and to be the main paying agent for the economy in its transactions with the rest of the world. It also defines the interest rate methodology, sets reserve requirements, administers international reserve assets, and manages the centralized securities depository and domestic payments' system. Every formal transaction with the rest of the world that involves the domestic payments channel goes through the central bank. The central bank keeps in its liability side bank reserves and deposits of the public sector. On its asset side, it holds international reserves and public domestic debt, inherited from previous years of balance sheet expansion to finance public spending.

The main sources of positive contributions to international reserves have historically been public external debt and oil exports, both driven by the public sector. This means that the dynamics of monetary expansion or contraction in Ecuador are largely dependent on, or at least closely interconnected with, public sector flows. While this may seem like a strong conclusion, it is simply what the data indicates. Even when accounting for the accumulation of foreign assets by private banks, most of the high-powered money (HPM) available to the Ecuadorian system is held in the stock of official international reserves.

In the absence of a central bank, public sector deposits would have to be kept either in the private financial system or in public banks. This would create a dramatic change in monetary dynamics for two reasons. First, given its size, the public sector would become systemic to the private financial system. Total public sector deposits at the central bank reached U. S. \$ 6,0 bn in February 2025, which represents 8 percent of the stock of deposits held by the private financial system.

Second, the private financial sector may need to undergo a sharp adjustment. Pooling international assets on the central bank's balance sheet provides all domestic banks and the public sector with access to high-powered money (HPM). Without this centralized pool, each bank would need to manage its own stock of HPM to meet the cash and foreign trade demands of its clients. Liquidity management would become more complex, and large banks with greater exposure to foreign trade would likely gain an advantage over those focused primarily on the domestic market.

Given Ecuador's institutional setup, the absence of a central bank would demand the establishment of an institution capable of performing critical

financial-market functions, particularly a compensation mechanism to execute payments between the public and private sectors, either domestically or abroad. Without such an institution, government payments would need to be cleared abroad, and only banks with direct access to international counterparts would be able to receive such payments, excluding a significant portion of smaller financial institutions. To mitigate this risk and ensure broader participation, a domestic clearing system would be required.

Alternatively, a state-owned institution, similar to the National Bank of Panama (BNP), could assume this role. In Panama's fully dollarized economy, the BNP not only serves as the government's treasurer and manager of public funds, but also plays a critical role as a correspondent bank for smaller institutions, granting them access to payment and settlement systems that would otherwise be out of reach (IMF, 2024). In such a case, however, careful consideration must be given to the institution's capacity to expand its balance sheet to avoid balance-of-payments pressures and monetary imbalances akin to those associated with central bank financing.

4.3. Earmarking on the Use of Official International Reserves

A key characteristic of Ecuador's institutional setup, as explained above, is that even though the net endowment of HPM in the economy is provided by the public sector, the existence of a central bank allows a system-wide access to international reserves to transact with the rest of the world. Earmarking the use of international reserves would, de facto, eliminate this possibility, introducing rigidities in the use of high-powered money by the public and private sectors.

The repercussions of such earmarking would depend on how the broader institutional setup changes. On one end, earmarking could be implemented by limiting the use of international reserves to the owners of such flows. This setup would bring forth systemic changes in banks in the way we described in the discussion about the existence or not of a central bank, while increasing the reliance of the entire monetary sector on the decisions made by the government on how to spend its HPM endowment.

On the other end, earmarking could be done on the basis of priorities in the use of international reserves based on the current four-tier accounting mechanism. This would imply limiting the use of international reserves for the external payments of either the private sector (Tier 1), public banks (Tier 2), or the public sector (Tier 3), to the amount of international reserves available in each balance-sheet tier after the previous one has been fully covered. For example, if international reserves are just enough to be equivalent to bank reserves, then neither public banks nor the public sector would be able to wire payments to the rest of the world, as there would be no international reserves available in their respective tiers. If international reserves were equivalent

to only Tier 1 and 2 liabilities, then the government would be unable to wire payments abroad. In order for the government to be able to make payments abroad (oil derivatives imports, external debt, etc.), then international reserves would have to be high enough to cover Tiers 1 and 2, and at least a portion of Tier 3.

Earmarking of reserves in this fashion could hinder the proper functioning of the monetary sector, especially if the relationship between public and private sector liabilities at the central bank, and hence the incentives behind the economic decisions of their respective economic agents, are ignored. For example, when the government increases international reserves via debt disbursements, Tier 3 liabilities would increase alongside international reserves. As liabilities on Tiers 1 and 2 are unchanged, there are more international reserves available for the government for its external payments. If the government, however, proceeds to spend such resources on domestic payments to the private sector, Tier 3 liabilities would decline and Tier 1 liabilities would increase, reducing the amount of international reserves available for the government to use.

From this standpoint, given the reigning shortfall in international reserve coverage relative to central bank liabilities, the higher bank reserves are, the higher the risk that the government would be unable to use international reserves to make payments abroad. As the process to strengthen the central bank balance sheet continues through the amortization of internal debt, the coverage of Tier 3 liabilities will strengthen. Once the process ends and official international reserves once again cover all of Tier 1, 2, and 3 liabilities, the system should remain properly funded perpetually, unless monetary financing is once again permitted.

Ignoring how money flows between public and private sectors and the relationship with the stock of HPM could have meaningful repercussions on the monetary sector.

4.4. Reserve adequacy in a dollarized framework

Reserve accumulation is a debated topic for dollarized economies. Determining the appropriate level of international reserves for such economies involves specific challenges, as highlighted extensively by the IMF's Adequacy of Reserves Assessment (ARA) framework and recent analyses of Ecuador's economy (IMF 2024). The suitability of different metrics, such as import coverage, short-term external debt coverage, or broader liquidity measures, is critical and remains an open question, as is the definition of "international reserves", to be considered for the analysis: looking at broad international reserves as defined in this paper may be more relevant than looking at the stock of official international reserves, for instance. Given the characteristics of dollarization, traditional adequacy benchmarks used in non-dollarized economies may not

fully capture the nuances of reserve needs, thus warranting a tailored approach that considers broader definitions of foreign liquidity, as well as comparisons with regional and credit-rating peers.

Official international reserves function differently and serve distinct purposes in dollarized economies compared to countries with their own currencies. In dollarization, the central bank cannot purposefully accumulate or sell reserves (except for the non-monetary gold buying program). Consequently, the central bank has no ability to alter the level of official international reserves through independent policy decisions, as this is entirely dependent on external flows.

Reserve accumulation is not always a reflection of healthy dynamics in the balance of payments or in the economy as a whole. During 2020, international reserves increased significantly as lockdowns were imposed, domestic transaction volumes declined sharply, imports contracted, and multilateral lending expanded (see Figure 15). Conversely, reserve deaccumulation is not always a reflection of stronger economic activity, nor intensified outflows, for instance. During 2023, international reserves declined severely as external debt inflows dried up and oil flows declined, which also led to a weakening of economic activity, and a cooldown of credit and deposit cycles. A deeper understanding of the balance of payments and the monetary system would enhance policymakers' ability to assess macroeconomic conditions and apply the proper policies, as well as improve analysts' assessment of the macroeconomic reality.

Figure 15. Contribution to International Reserves Variations

In \$U. S. millions. 2014-2024



Source: CBE

Concepts of international reserve sufficiency, or adequacy, should be debated more comprehensively. The virtue of keeping a robust level of high-powered money available to the system to face balance of payments shocks is straightforward. A high stock of broad international reserves should provide the economy with more time to face and overcome balance of payments shocks. Conversely, the lower the stock of high-powered money available to the system, the faster a balance of payments shock would lead to a monetary contraction within the economy. Their relevance for public sector transactions, however, is more nuanced.

Official international reserves are, indeed, one of two important binding constraints for the public sector to transact with the rest of the world. The other is the deposits held at the TGA. Both concepts must work together to assess the government's ability to use international reserves for external payments. For example, if the government has enough deposits at its TGA to pay an international bond, but the stock of international reserves is lower than that number, then the central bank would not be able to make the complete payment. Alternatively, if there are enough international reserves at the central bank but the government does not have enough deposits at the TGA, the government would not have enough deposits to fulfill its payment. Having money in the TGA is a necessary but not sufficient condition to make payments abroad.

Understanding Ecuador's economy, and thus any dollarized economy, as a dual monetary system is also relevant when thinking about public debt composition and the role that international reserves may play in safeguarding debt sustainability. Ecuador's domestic debt is denominated in "dollars", but these are yellow dollars. Internal debt settlements happen with the stock of domestic deposits without any impact on international reserves. Consequently, balance of payments transactions matter little for the government's ability to meet internal debt payments. As, or if, the domestic market develops and international investors start participating in the market, these holdings should be looked at as a balance of payments vulnerability related to the reversal of capital flows. This is no different from any non-dollarized economy, and a healthy stock of high-powered money available to mitigate such risks would be desirable.

Based on the framework presented above, the monetary sector and the balance of payments are codependent and should self-regulate over time. Conceptually, balance of payments surpluses would lead to higher broad international reserves and strengthen the monetary sector, enhancing the capacity of banks to increase credit. Stronger credit growth should lead to increased economic activity and higher domestic absorption, which in turn would generate outflows and reduce broad international reserves. Thus, greater inflows of high-powered dollars tend to be matched by corresponding outflows. From this perspective, stable international reserves may indicate a balanced steady state. Consequently, policymakers and analysts should perhaps place less

emphasis on specific static adequacy metrics and focus more on understanding the dynamics underlying reserve accumulation and depletion.

5. CONCLUSIONS AND DISCUSSION

This study offers a first comprehensive analysis of monetary dynamics in a dollarized economy, with a specific focus on Ecuador. By examining the creation and circulation of money within this framework, it seeks to clarify the complex interplay between primary and secondary money creation. In dollarized contexts, the absence of an autonomous monetary policy and the dependence on external flows to regulate domestic liquidity pose distinct challenges. The proposed framework emphasizes the central role of the balance of payments in sustaining monetary equilibrium, highlighting that primary money creation through external transactions fundamentally shapes the capacity for domestic credit expansion and, by extension, economic growth.

The distinction between high-powered money and domestically created deposits is crucial in a dollarized context. While private banks' ability to create secondary money via credit expansion is essential for economic activity, it is inherently constrained by the availability of high-powered money. This relationship underscores the importance of maintaining an adequate stock of high-powered money to meet the banking system's liquidity needs, particularly during periods of increased domestic absorption or external shocks. Although institutional arrangements differ across dollarized economies, the framework presented in this paper provides a basis for understanding the key monetary relationships that shape economic dynamics.

Institutional arrangements play a significant role in shaping monetary stability in dollarized economies. Practices such as cross-holdings among financial institutions and public spending financed through central bank credit can expand the money supply without a corresponding increase in high-powered money, thereby accelerating the leveraging of the domestic monetary sector. These actions may introduce systemic risks by distorting financial indicators and undermining the monetary equilibria that underpin long-term stability.

One of the main risks identified in this framework is the use of the central bank's balance sheet to finance fiscal deficits, as occurred in Ecuador between 2009 and 2020. This practice, whereby the central bank created domestic liabilities without a corresponding inflow of high-powered money from the balance of payments, exposed the monetary system to significant liquidity and credit risks. Monetary financing reduced the reserve coverage of central bank liabilities, weakened monetary equilibria, heightened vulnerability to external shocks, and undermined confidence in the stability of the dollarized regime.

The sustainability of relying on public sector flows—particularly external debt—to supply high-powered money raises critical concerns. As Ecuador pursues fiscal consolidation and reduces its dependence on external borrowing and oil revenues, the private sector must assume a greater role in generating foreign currency inflows to sustain monetary equilibrium and provide the financial system with the high-powered money needed for growth. This transition poses several challenges, including the need for structural reforms to strengthen private exports and attract foreign investment. More broadly, however, the fiscal and monetary sectors are also highly interconnected, and persistent fiscal imbalances could undermine the sustainability of the monetary sector.

Strengthening regulatory oversight to mitigate risks associated with unsustainable credit expansion and interbank exposures is crucial. Future research should explore optimal monetary leverage levels, assess the impacts of various institutional setups on dollarization outcomes, and identify strategies to diversify sources of high-powered money. Such efforts would contribute to reinforcing the robustness of the monetary system against external shocks and ensuring sustainable economic growth within a dollarized system.

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