



FINTECH

NOTES

Macrofinancial Implications of Foreign Crypto Assets for Small Developing Economies

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Contents

Executive Summary	v
I. Introduction	1
II. Crypto Assets and Macrofinancial Risks.....	5
III. Model Description	9
IV. Impact of the Foreign Stablecoin	12
V. Conclusions and Policy Responses	17
References.....	19

TABLES AND FIGURES

Figure 1. Crypto Asset Adoption	5
Figure 2. Determinants of Crypto Asset Adoption.....	6
Figure 3. Model Overview: Domestic Economy	10
Figure 4. Model Overview: Foreign Economy.....	11
Figure 5. Response of selected variables in the domestic economy to a negative 1 percent TFP shock .	13
Figure 6. Response of selected variables in the domestic economy to a contractionary foreign monetary policy shock.....	13
Figure 7. Response of selected variables in the domestic economy with CFMs to a contractionary foreign monetary policy shock.....	16

Executive Summary

Technological innovations in finance have created new private digital assets, both unbacked (e.g., Bitcoin) and backed by other assets (e.g., stablecoins). Such crypto assets have a short and tumultuous history but adoption remains significant and can increase rapidly, as highlighted by previous booms.

While innovation in digital money can lead to positive outcomes, it also creates risks. Digital money could make cross-border payments more efficient, but this in turn could accentuate the international transmission of shocks. Digital dollarization, or “cryptoization,” could result where households choose to substitute digital money for local currency, for instance in economies with volatile currencies, high inflation, and weak macroeconomic policy frameworks. Large usage of crypto assets for saving could meaningfully displace bank deposits in the domestic financial system, threatening financial stability and making monetary policy less effective. Finally, circumvention of capital controls is a key concern for emerging market and developing economies that seek to prevent capital flight but cannot readily constrain cross-border crypto flows.

To explore these risks, this Fintech Note simulates the hypothetical large-scale adoption of crypto assets in a model of a small open economy. The model highlights that a foreign-currency denominated stablecoin can amplify currency substitution and capital outflows in response to negative shocks. Monetary policy transmission is also weakened, forcing the central bank to adjust interest rates more aggressively in response to shocks. Capital flow management measures—if they do not constrain crypto flows—further incentivize households to hold foreign stablecoins for circumvention purposes, exacerbating the negative effects of crypto adoption on the macroeconomy. This underscores that widespread crypto adoption can weaken policymakers’ available options for mitigating external shocks and potentially increase cross-country spillovers.

The Fintech Note advocates for both broad and targeted policy responses. Broadly, a first-order defense is to maintain high-quality macroeconomic policy frameworks, guard against macro-financial vulnerabilities, and so minimize the preconditions for foreign currency substitution. Specific national, cross-country, and multilateral coordination on regulation and supervision of foreign stablecoins could also help mitigate the potential negative effects. The introduction of a domestic CBDC could reduce stablecoin adoption slightly in the steady state, but does not fully mitigate the role of the stablecoin in transmitting foreign shocks to the domestic economy.

I. Introduction

Developments in the international monetary system frequently spark concerns over spillovers to developing countries (Eichengreen, 2012; Rey, 2013), and new forms of digital money are no exception. Digitalization in finance has led to a proliferation of various forms of private digital assets, including unbacked crypto assets, such as Bitcoin and Ether, and crypto assets backed by other assets, such as stablecoins. Additionally, over the past few years more and more central banks have shown an interest in issuing central bank digital currencies (CBDCs).

Digital money may present opportunities but also pose threats in the absence of proper policy responses, particularly for small developing economies. Digital money can make cross-border payments cheaper and faster (for example, by shortening payment chains relative to correspondent banking), reduce the cost of currency switching, and promote competition. However, digital money can also accentuate the international transmission of shocks (Minesso, Mehl, and Stracca 2022) and constrain monetary policy (Benigno, Schilling, and Uhlig 2022). Where foreign digital money is readily accessible and more attractive than the domestic currency—for instance in small developing economies with volatile currencies, high inflation, and/or weak institutions—there is a risk of “digital dollarization” (Brunnermeier, James, and Landau 2021) or “cryptoization” (IMF 2021). If households prefer to save in foreign assets, banks could be disintermediated, weakening the transmission of monetary policy (IMF 2020, 2023; G20 2023).

All these risks are exacerbated if digital money can also fulfill an intention to circumvent capital controls (Graf von Luckner, Reinhart, and Rogoff et al., 2023). Many countries have not yet liberalized all their capital account flows to limit risks arising from sudden and volatile capital flows. Digital currencies are decentralized and operate on a global scale, making it challenging for governments to impose geographic restrictions on their use. Many crypto service providers, including fiat-to-crypto “on-ramps,” operate across borders, hindering supervision and enforcement of capital controls by national authorities. Although crypto exchanges may require a conventional bank account to receive local currency, the central bank and foreign exchange regulator may not currently have the power or sufficient information to block such services (He and others 2022). Those users with access to foreign currency through traditional methods of evading capital flow management measures (CFMs) can become net suppliers of crypto assets to the domestic economy, earning a premium while allowing for more circumvention (Graf von Luckner, Koepke, and Sgherri, forthcoming).

In this paper, we take a closer look at these concerns and explore a hypothetical downside scenario in which a foreign stablecoin is widely adopted in a small emerging market. Adoption of crypto assets in some emerging markets and developing economies (EMDEs) is currently substantial but not systemic. Previous waves of crypto adoption have highlighted the potential for rapid expansion in use. Experience has shown that currency substitution can begin gradually, with adoption of the foreign currency as a store of value, before accelerating to become a widespread medium of exchange (Ozbilgin 2012). We therefore

aim to elucidate the potential macrofinancial implications of widespread adoption to inform policy discussions on the need for—and forms of—preventive measures.

This note summarizes the key findings and policy messages from Le and others (2023), which develops a two-country New Keynesian model to examine the impact on a small economy of a stablecoin issued in a large foreign economy. The model has a small domestic economy with a banking sector and financial frictions, as well as a large foreign economy, which hosts a stablecoin issuer that produces a global crypto asset backed by foreign cash and bonds. The stablecoin is useful to domestic households as both a means of payment and a non-domestic-currency store of value, generating endogenous currency substitution.¹

The availability of the foreign currency–denominated stablecoin amplifies currency substitution and capital outflows in response to negative shocks, magnifying output losses in the small economy. The stablecoin provides an additional alternative to domestic currency assets, reducing cash holdings and deposits into domestic banks. Banks face larger deposit outflows and a larger reduction in the banking sector’s net worth (profit), particularly in the case of a contractionary foreign monetary policy shock.

Monetary policy transmission also becomes less effective, and the central bank is forced to react more aggressively in adjusting interest rates. With widespread adoption of the foreign stablecoin, the domestic central bank setting monetary policy optimally reacts more strongly to inflation than when no stablecoin exists. Households’ reallocation of assets from domestic deposits to the stablecoin reduces the share of savings that the central bank can influence through interest rate changes. The reduction in deposits on commercial bank balance sheets, in turn, reduces credit provision and the impact of interest rate changes on the economy through lending. The transmission of monetary policy to investment, output, and the price level is weaker, forcing the central bank to increase interest rates by more than it would otherwise have in response to a given deviation of inflation from target.

When CFMs reduce access to foreign bonds, households are further incentivized to hold the stablecoin for circumvention purposes. CFMs are modeled following Davis and Presno (2017) as a tax on the return of foreign bonds, giving the central bank the ability to influence capital outflows through the traditional bond channel. We assume that these CFMs do not apply to the stablecoin. Evolving global crypto regulation may allow for restrictions on the use of stablecoins as a means to bypass restrictions (such as if they are issued by bank-regulated entities), but this is unlikely to cover stablecoins issued in all jurisdictions, and unbacked crypto assets by definition will also remain a vehicle for such circumvention. Therefore, the modeled outcomes of the paper remain instructive.

¹ A foreign CBDC could share some features of the foreign stablecoin but would also have important differences. If accessible to all in the domestic economy, a foreign CBDC could provide a convenient non-domestic-currency store of value and means of payment. However, this would not be the case if its design placed limits on access or usage in the domestic economy. The foreign CBDC issuer would have different objectives than the stablecoin issuer, resulting in different design choices and different macro-financial implications. The foreign CBDC—as a liability of the central bank—would not deviate from its par value, whereas the stablecoin may do so in response to shocks. Finally, the stablecoin issuer could default, but for tractability this risk does not feature in the model.

The macrofinancial impact of the foreign shock on the domestic economy with CFMs is more severe in the presence of the stablecoin than in its absence. CFMs boost the responsiveness of stablecoin holdings to a contractionary foreign monetary policy shock—that is, households shift more assets into the stablecoin in response to the shock than when capital is freely mobile. Intuitively, the more CFMs block the traditional diversification channel—namely, purchasing foreign bonds—the more households switch to the stablecoin. Crypto-asset-based circumvention of capital controls could thus undermine the controls’ potential to insulate small developing economies against spillovers from foreign shocks.

Turning to potential policy responses, the introduction of a domestic CBDC can reduce stablecoin holdings in the steady state but does not help mitigate the role of the stablecoin in transmitting foreign shocks to the domestic economy. It is important to note that guarding against and managing macrofinancial vulnerabilities is a first-order defense against the risks of cryptoization. Monetary policy credibility, safeguarding the quality of their institutions, and maintaining a sound fiscal position are important factors to disincentivize foreign currency use. Beyond that, many central banks, especially in EMDEs, are considering issuing a domestic CBDC (that is, a CBDC denominated in domestic currency and issued by a national authority) to guard against the potential displacement of their currencies by more appealing digital alternatives, such as stablecoins and foreign CBDCs that might gain widespread use in their economies (Das and others 2023). However, because a domestic CBDC remains denominated in domestic currency, unlike the stablecoin, it does not provide a hedge against domestic inflation or depreciation.

A hypothetical comprehensive stablecoin ban would be effective in limiting the effect of shocks but difficult to implement in practice. A ban that completely precludes any holding of the stablecoin in the domestic economy (though not the foreign economy) would almost entirely alleviate the currency substitution, capital outflows, bank disintermediation, and larger output losses described previously. However, achieving such a comprehensive ban would be far from straightforward: given the decentralized nature of the technology, policing a complete prohibition on the acquisition and use of the stablecoin for any purpose, including through peer-to-peer transfers, would be difficult in practice. In addition, blanket bans could have unintended consequences with respect to circumvention, enforcement leakages, and loss of innovation.²

Cross-country or even multilateral coordination could help mitigate the negative effects of domestic adoption of a foreign stablecoin. If the stablecoin issuer is headquartered in a large, foreign economy, as in our setup, the foreign government may have a greater ability to enforce compliance with regulation. The foreign stablecoin issuer may be more likely to impose restrictions on the use of its product by the domestic household if the instruction to do so comes from the legal authority of the country in which the firm and its workers are located. That said, if the stablecoin issuer is based “offshore” in third countries, effective regulation may be difficult and broader multilateral coordination would be required. Governments and international organizations must work together to establish clear regulatory standards and cooperation mechanisms that can ensure that foreign stablecoins operate in a manner that preserves

² IMF (2023) encourages authorities to have a comprehensive regulatory framework as a preferred policy option rather than introducing bans. Comprehensive regulations should address the specific features of crypto assets that generate externalities.

countries' macroeconomic policy autonomy and is consistent with the stability and security of financial systems globally. A coordinated approach is essential to harnessing the benefits of stablecoins while mitigating the risks they may pose.

This note proceeds as follows. Section II provides background on crypto assets and surveys the broad range of macrofinancial risks that they may pose for small developing economies. Section III introduces the two-country New Keynesian model of Le and others (2023), which enables a more structured assessment of a subset of these risks—specifically, currency substitution (cryptoization), bank disintermediation, weaker monetary policy transmission, and more volatile capital flows. Section IV outlines the main impacts of foreign digital money in the model; Section V discusses potential policy responses.

II. Crypto Assets and Macrofinancial Risks

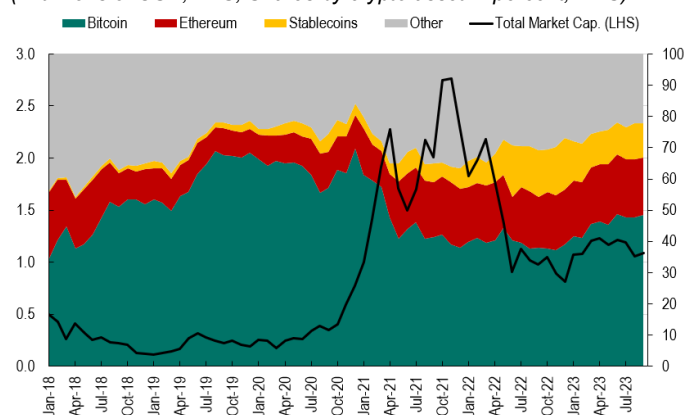
Crypto assets encompass a variety of assets with similar core characteristics. We define crypto assets as meeting two conditions: (1) privately issued digital representations of value that are cryptographically secured and (2) deployed using distributed ledger technology (DLT) or similar technologies. Bitcoin and Ether (the token of the Ethereum blockchain) are the two most widely used unbacked crypto assets. Stablecoins are a subset of crypto assets that aim to maintain a stable value relative to a specified asset (or a pool of assets). Stablecoins vary in their characteristics, such as their backing assets (or lack thereof, in the case of “algorithmic” stablecoins). Tether and USD Coin are the two largest stablecoins, and they aim to maintain a 1:1 exchange rate with the US dollar.

The crypto asset market has grown over the past 15 years but has been extremely volatile. Total crypto asset market capitalization has fluctuated substantially, peaking at around \$3 trillion in November 2021 before falling below \$1 trillion today, while the share constituted by stablecoins has risen (Figure 1). Adoption in many EMDEs is substantive but not yet systemic (G20, 2023). Previous booms, as in 2021, have seen rapid accelerations in adoption combined with similarly rapid declines.

Figure 1. Crypto Asset Adoption

Crypto Assets: Aggregate Market Capitalization

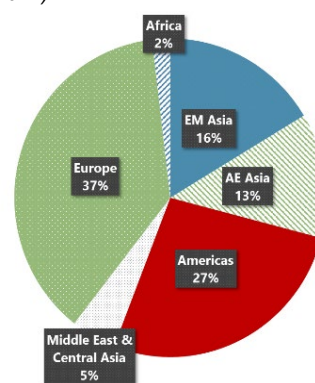
(In trillions of USD, LHS; Shares by crypto asset in percent, RHS)



Sources: Haver Analytics; and CoinGecko.

Total Crypto Asset Volume Received by Region

(2019 to 2021)



Source: Chainalysis.

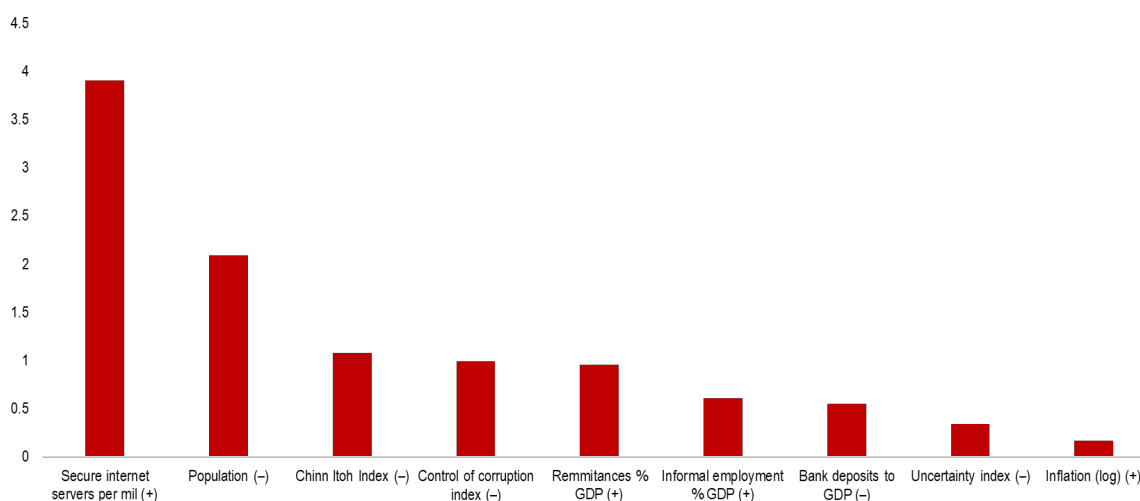
Note: AE = advanced economy; EM = emerging market.

Crypto adoption is generally higher in countries with higher digital penetration and weaker macroeconomic fundamentals. Furceri, Gonzalez-Dominguez, and Tawk (forthcoming; Figure 2) find that high inflation, a reliance on remittances, informality, and corruption are all associated with greater crypto trading volumes. As with dollarization, steady growth as well as stable inflation and exchange rates can

help protect countries' monetary sovereignty and reduce competition from private crypto assets. Furceri, Gonzalez-Dominguez, and Tawk (forthcoming) also find that capital controls are positively and robustly associated with higher crypto adoption.³ In countries with outflow controls, stress episodes can generate a rise in the Bitcoin premium (calculated as the markup on local currency–Bitcoin trades above the level implied by the combination of local currency–dollar and dollar–Bitcoin exchange rates), suggesting the use of Bitcoin as a vehicle to circumvent restrictions on the movement of capital, as well as reducing the effect that currency convertibility events may have on agents. Makarov and Schoar (2019) found similar results across a range of countries.

Figure 2. Determinants of Crypto Asset Adoption

Robust determinants of crypto asset adoption across countries, magnitude of effects (percent)



Source: Furceri, Gonzalez-Dominguez, and Tawk, forthcoming.

Note: Differential effect on crypto asset adoption of moving from the 25th to the 75th percentile of the distribution of each variable. – (+) denotes a negative (positive) effect on crypto asset adoption. Estimates based on weighted average least squares regressions using data from 152 countries. Coefficients shown only for those regressors considered “robust” (that is, having a *t*-ratio with an absolute value greater than 1). Higher values of the Chinn Itoh index imply a more liberalized capital account, so the robust negative relationship implies a positive association between capital controls and crypto adoption.

In this context, crypto assets can pose several threats to macrofinancial stability (IMF 2023):

- Crypto assets can weaken monetary policy effectiveness, particularly in nations with unstable currencies and fragile monetary systems. This “cryptoization” risk arises when businesses and households prefer saving and investing in crypto assets not linked to their domestic fiat currencies. These digital assets offer an alternative to holding and transacting in foreign currencies, potentially at a lower cost than traditional means like foreign currency bank accounts

³ This assessment was based on national adoption data compiled by Chainalysis using on-chain residency determination.

or physical cash. This trend is most likely to involve stablecoins tied to foreign currencies, which typically have lower price volatility than do other crypto assets.

- Due to their volatile prices, unbacked crypto assets and stablecoins lacking reliable backing can present risks to investor protection and financial stability. Sharp declines in crypto asset prices can harm investors and could spill over to the traditional financial system, particularly if major financial institutions were to offer credit to crypto asset service providers or accept crypto assets as collateral (Iyer and Popescu 2023). Furthermore, possible runs on stablecoins, especially without proper regulation, could lead to significant reserve liquidations and broader impacts on asset prices. These risks are compounded by factors like leverage, concentration, and interconnections among crypto asset holders. In 2022 following the failure of an algorithmic stablecoin, losses propagated rapidly through the crypto ecosystem and resulted in the collapse of several crypto-asset providers, intermediaries and a hedge fund. The effects of crypto failures have so far been limited to the crypto ecosystem, but in a hypothetical scenario of wider adoption (without correspondingly more comprehensive regulation) the effects could be more severe.
- Crypto assets could lead to more volatile capital flows. Digital money adoption could reduce transaction costs and frictions in international capital markets, increasing gross cross-border capital flows. Larger and more volatile capital flows have the potential to amplify shocks. Minesso Mehl, and Stracca (2022) showed that the presence of a foreign CBDC could amplify the international spillovers of shocks and increase international linkages. The magnitude of the effects depends crucially on the design of the CBDC. Popescu (2022) also found that the presence of a foreign CBDC, which acts as an international safe asset, may increase the risk of financial disintermediation in the domestic banking sector. Financial disintermediation of stablecoins can also occur by giving rise to alternative financial channels, such as via DeFi (decentralized finance).
- Digital money could make cross-border payments cheaper, but it risks fragmenting global payments. Cross-border transactions are intermediated by counterparties in different jurisdictions that rely on costly trusted relationships (Adrian and others 2022). Crypto assets could reduce intermediation in the existing cross-border payment transaction chain to lower costs. However, crypto asset networks are not easily compatible with one another and may lead to fragmentation.
- Crypto assets could raise competition for bank deposit funding. By virtue of offering an alternative store of value and means of payment, deposits into crypto assets may lead to a decrease in deposit funding available to banks. This shift away from bank deposits could be destabilizing and erode bank profits. Banks could replace deposit shortfalls with wholesale funding which may be more costly and less stable. The magnitude of this impact depends on the extent to which crypto assets are an attractive substitute for deposits.

The extent of the importance and applicability of each of these channels varies considerably, but the ability of crypto adoption to scale up rapidly (as in the past) suggests there is a need to understand the potential effects of crypto assets on macrofinancial stability.

In the remainder of this note, we focus on macrofinancial risks from foreign stablecoins with relatively stable prices to small developing economies. Other types of crypto assets could pose further risks, such as self-reinforcing bubble dynamics or fraud, money laundering, and fiscal risks (Baer and others 2023). However, these broader, well-recognized risks are not specific to small developing economies. Similarly, to focus on risks from macrofinancial linkages, we assume a well-operated foreign-currency denominated stablecoin that is fully backed by liquid cash and bonds. Further risks could result from design choices of some existing stablecoins that are subject to collapse or run risks but are not examined in this paper.

III. Model Description

Following Le and others (2023), the setup is a New Keynesian model with two countries: a small domestic economy and a large foreign economy. The small domestic economy has a banking sector with financial frictions (Figure 4). The banking sector allows funding from foreigners and faces endogenously determined balance sheet constraints. The large foreign economy, calibrated to the US economy for illustrative purposes, hosts a stablecoin issuer that produces a global crypto asset backed by foreign cash and bonds.⁴ The large economy is substantially larger than our small economy, roughly 70 times (typical output difference between a large advanced economy and an EMDE), such that the small economy is correspondingly far more exposed to international spillovers.

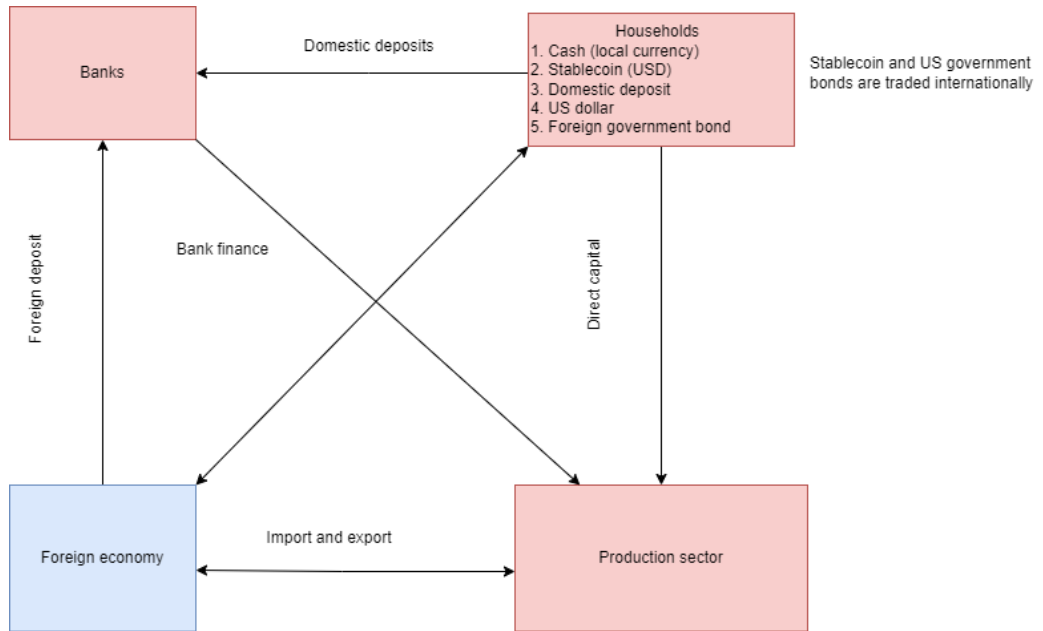
The stablecoin is useful to domestic households as both a means of payment and a non-domestic-currency store of value. Households choose which share of goods to purchase using domestic cash and which to purchase using other liquid assets—specifically deposits, foreign cash, and stablecoins. The stablecoin has a price that is determined by demand (for its liquidity and store-of-value properties) and supply (from the issuer, subject to the price of the backing assets), and can deviate slightly from its steady-state exchange rate versus the foreign currency in response to shocks.⁵

The model allows for rich currency substitution dynamics. The choice of payment instrument when purchasing goods and services is endogenously determined by households, comparing the expected opportunity cost of using domestic and foreign denominated currency. When the inflation rate is at moderate levels, foreign currency can be held as a store of value, but it has a very limited use as a medium of exchange. It is only when inflation reaches high rates that foreign currency starts to be used for a wider set of goods. Households therefore base their payment decisions on a forward-looking consideration of inflation, exchange rates, interest rates, the price of stablecoins, and the transaction cost of withdrawing non-cash assets for use in payments. In the steady state, the differing liquidity and store-of-value properties of the various available assets lead households to hold positive quantities of each.

⁴ Specifically, the issuer maximizes profits from issuing new stablecoins subject to a technology constraint that reflects their ability to convert foreign cash and bonds into new stablecoins.

⁵ It is important to note that an alternative specification would be to introduce an unbacked crypto asset instead of a foreign-currency denominated stablecoin, which would change the price dynamics, but still offer a store of value and potential payment use-case. In addition, this analysis does not consider scenarios where the stablecoin fails. Given that the price of the stablecoin may deviate considerably from its intended target price (especially during high volatility events), the currency substitution may be less pronounced in practice.

Figure 3. Model Overview: Domestic Economy



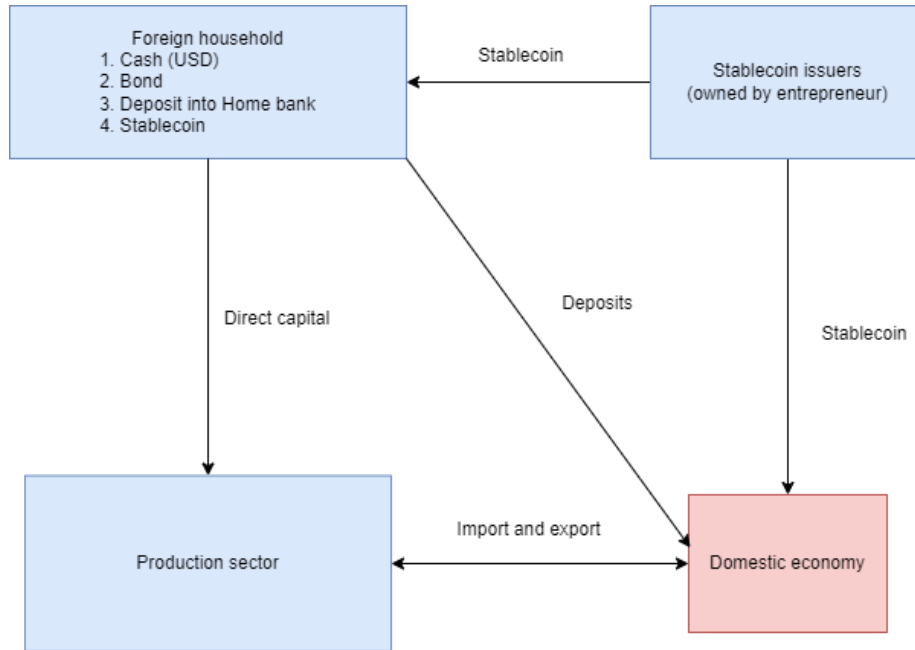
Source: Le and others (2023).

Firms in the production sector set prices for domestic goods in their own currency (producer currency pricing) and set prices for export goods in foreign currency (dominant currency pricing). Total output is an aggregate of differentiated intermediate inputs. Capital producers purchase final goods and nondepreciated capital to produce capital goods which are bought later by intermediate firms.

Domestic bankers have three sources of funding that they use to make their capital loans to producers: their own net worth, domestic deposits, and foreign deposits. Foreign deposits are converted into domestic currency at the prevailing exchange rate and are more expensive, as domestic banks in the emerging market must pay a risk premium to accumulate foreign debt. Businesses, in turn, can receive two sources of capital: directly from households, and from the financial sector.

The foreign economy is simplified for tractability. There is no foreign banking sector, but foreign households can save in the domestic banking sector (Figure 5). The foreign household can hold foreign cash and the stablecoin and save by investing in bonds. The foreign currency is dominant, so it does not allow for currency substitution, and firms price only in the foreign currency. Most importantly, the stablecoin issuer is based in the foreign economy and is owned by an entrepreneur.

Figure 4. Model Overview: Foreign Economy



Source: Le and others (2023).

CFMs are modeled following Davis and Presno (2017) as a tax on the return of the foreign bonds. This gives the central bank the ability to limit capital outflows through the traditional bond channel. Crucially, these CFMs do not apply to the stablecoin, which can thus be used to circumvent capital controls, increasing its utility to households.

IV. Impact of the Foreign Stablecoin

This section outlines the model simulations' key results and offers lessons for the interaction of policy variables, which can inform policy design. First, we consider baseline results in an economy without CFMs in the standard manner of examining the effects of incremental shocks to the variables of interest. At a second stage, we consider the results of the same shocks in an economy with CFMs, and we examine their effects. The model is calibrated such that approximately 2 percent of payment assets are held in the stablecoin (consistent with the global average) in the initial steady state prior to any shocks. Le and others (2023) present the full set of model dynamics and relationship between variables.

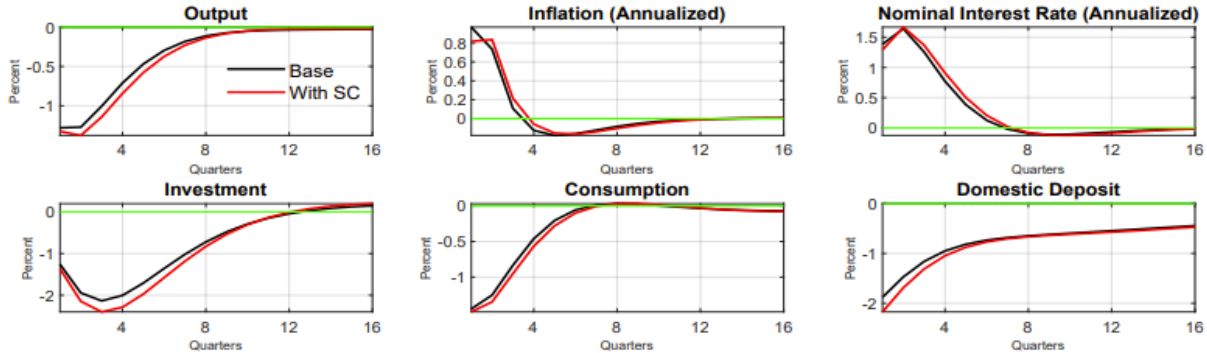
Baseline Setup without CFMs

The presence of the stablecoin worsens the impact of a negative domestic TFP shock (Figure 6). A 1 percent reduction in total factor productivity (TFP) of the domestic economy reduces output (through consumption and investment), and raises inflation temporarily, as expected. The TFP shock tends to amplify its effects on the economy when a stablecoin is available in the following way:

- The stablecoin provides an additional alternative to domestic currency assets, amplifying currency substitution and capital outflows in response to the negative shock. The shock drives inflation higher, which increases the relative attractiveness of non-domestic-currency assets, including the stablecoin. Households tend to reallocate toward the stablecoin when they expect its price to rise. The price of the stablecoin in domestic currency increases substantially as the exchange rate depreciates, and the anticipation of this effect in turn drives households' decisions. This result aligns with the concerns expressed in IMF (2021) and elsewhere that countries with weak monetary policy regimes and volatile prices may be particularly exposed to the adoption of crypto assets as a means of hedging against domestic inflation and depreciation.
- This leads to a larger slump in output, consumption, and investment, and a larger fall in domestic deposits indicating potential bank disintermediation.

The availability of stablecoins also magnifies the severity of increases in the domestic interest rate. There is a larger decrease in investment and a more pronounced reduction in cash, similar to the impact of the TFP shock. Banks' net worth falls by more and the credit spread widens by more. Overall, the model with a stablecoin predicts a slightly more severe recession, characterized by heightened currency substitution with a larger decrease in domestic cash.

Figure 5. Response of Selected Variables in the Domestic Economy to a Negative 1 Percent TFP Shock

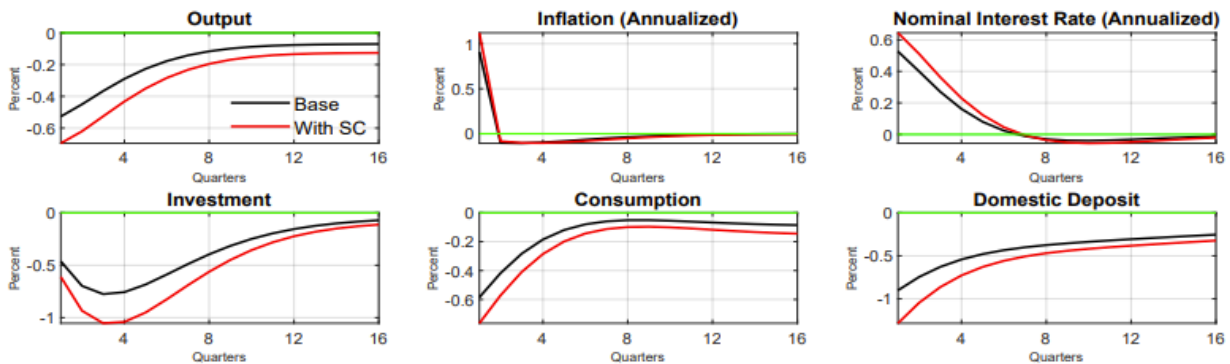


Source: Le and others (2023).

Note: The black line represents the model without the stablecoin; the red line, the model with the stablecoin. Impulse responses are in percent deviation from steady state, while inflation and the interest rate are annualized. SC = stablecoin; TFP = total factor productivity.

We observe substantially larger spillover effects from a foreign monetary policy shock in the presence of the stablecoin (Figure 7). Similar to the TFP shock, the responses of output, consumption, and investment are more pronounced here than in the scenario without stablecoins. The existence of the digital asset introduces a new arbitrage condition that intertwines the domestic interest rate, the exchange rate, and stablecoin prices.⁶ Cash and deposits decrease more in response to the foreign shock, and the domestic banking sector undergoes a period of stress—evident in both bank net worth and the credit spread. Holdings of the stablecoin and foreign bonds increase as domestic households reallocate away from domestic cash and deposits, and the exchange rate depreciates substantially.

Figure 6. Response of Selected Variables in the Domestic Economy to a Contractionary Foreign Monetary Policy Shock



⁶ For instance, in response to an expected depreciation of domestic currency, domestic households reallocate their assets until the marginal expected utility from holding more stablecoin (reducing exposure to the depreciation, while still providing some liquidity for payments) equals that from holding more domestic assets (which depends on the domestic interest rate).

Source: Le and others (2023).

Notes: The black line depicts the model without the stablecoin, and the red line depicts the model with the stablecoin. Impulse responses are in percent deviation from respective steady states, while inflation and the interest rate are annualized.

Overall, stablecoins can magnify both the extent of currency substitution and the severity of the macroeconomic environment's response to contractionary shocks. Stablecoins contribute to a minor form of bank disintermediation, characterized by a more pronounced decrease in domestic deposits at the onset of the shock. The marginal impact of the stablecoin is generally largest for the foreign monetary policy shock. Compared with the TFP shock, the foreign monetary policy rate hike appears to leave longer-lasting effects on several macroeconomic variables (output and consumption) as well as the domestic currency and holdings of stablecoins by domestic households. That is because the presence of the stablecoin introduces an additional channel of international linkage, which intensifies the already large spillover effects on our small domestic economy.

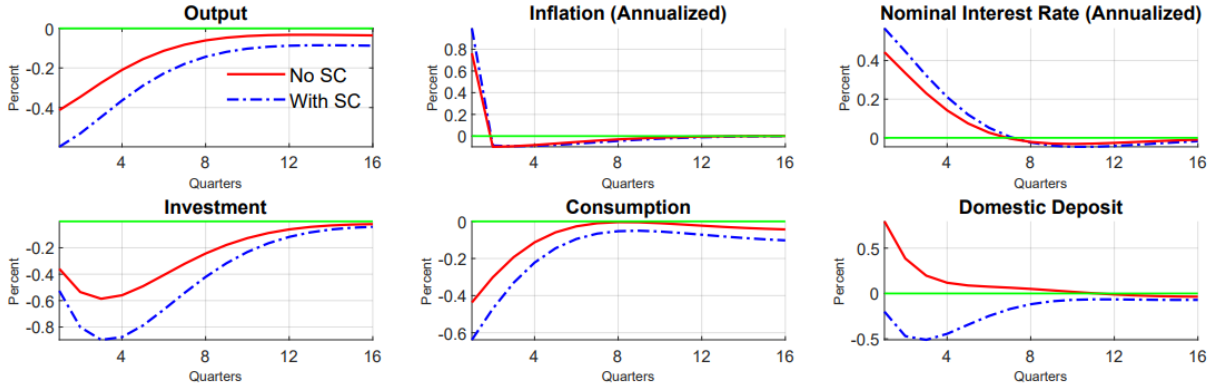
The presence of the stablecoin weakens monetary policy transmission. By examining how the optimal Taylor-type rule parameters change in the presence of the stablecoin, the model reveals that the central bank responds notably more assertively to inflation in the scenario incorporating the stablecoin. The loss function of the central bank is defined as a weighted sum of the unconditional variances of inflation, the change in interest rate, and output growth (see also Le and others, 2023). This more aggressive response to inflation is observed even when varying the emphasis placed on output and the exchange rate within the loss function.

Model Extension Including CFMs

CFMs could potentially mitigate the spillovers from the foreign shock by redirecting resources toward domestic assets. The presence of a tax on the return from foreign bonds (which is used to simulate the effect of CFMs) dampens the increase in the attractiveness of foreign bonds relative to domestic deposits, reducing capital outflows and ameliorating the depreciation of the exchange rate. With a smaller decline in domestic deposits, the negative impact on investment is reduced and the paths of output and consumption improve, along with banks' net worth and the credit spread. Importantly, the representative household does not reallocate from foreign bonds entirely into domestic bonds, since domestic bonds are exposed to depreciation. Instead, households also reallocate into the stablecoin. One nondomestic-currency asset (the foreign bond) is now less attractive, so households increase their relative holdings of another asset—namely, the stablecoin. The imposition of CFMs thus accelerates adoption of the stablecoin.

When we consider the effect of the stablecoin in an economy with CFMs, macroeconomic outcomes are generally worse in the face of shocks (Figure 8). The ability of domestic households to circumvent the CFMs leads them to reallocate away from domestic currency assets (cash and deposits) and toward the stablecoin. This shift is substantial, worsening the depreciation of the exchange rate and forcing the central bank to hike rates even more. Investment, output, and consumption worsen, and banks exhibit greater stress with lower net worth and wider credit spreads. This implies that crypto-asset-based circumvention of capital controls could undermine the effectiveness of the controls in insulating small developing economies against spillovers from foreign shocks. Recent empirical work (for example, Graf von Luckner, Reinhart, and Rogoff 2023) confirms that such circumvention is indeed taking place, albeit at a small scale; the model suggests that—if adoption continues to grow—such flows could potentially have harmful macroeconomic effects. This is particularly relevant when there are weak policies, low quality of institutions, and generally low confidence in the capacity of institutions to achieve macroeconomic stability; these are often preconditions for cryptoization, or for dollarization more broadly (IMF 2021).

Figure 7. Response of selected variables in the domestic economy with CFMs to a contractionary foreign monetary policy shock



Source: Le and others (2023).

Notes: CFMs are active in both cases. The red line represents the model without the stablecoin; the blue line, the model with the stablecoin. Impulse responses are in percent deviation from steady state, while inflation and the interest rate are annualized. SC = stablecoin; CFMs = capital flow management measures.

V. Conclusions and Policy Responses

The lessons of dealing with digital money, particularly crypto assets, are still being learned. Despite the significant decline in their market capitalization, crypto assets (and other digital money) still generate considerable general interest from the broad public and policymakers. The crypto ecosystem evolved rapidly in recent years and adapted after many failures and market swings, so this paper examines possible macrofinancial repercussions through a model for a small, open economy. Other forms of digital money, such as CBDCs, may provide alternative uses for related technological advances. Nevertheless, the model explored in this note implies that a domestic CBDC alone is not a promising defense against cryptoization risks, while a ban of foreign stablecoins could play a role but would be hard to enforce. There is a need to improve the monitoring of crypto assets and the regulation and supervision of crypto-related entities and providers. A combination of appropriate regulation and international cooperation is most likely to minimize potential macrofinancial harms while still allowing some room for innovation in payments.

Reducing the Incentives of Cryptoization

Guarding against and managing macrofinancial vulnerabilities are a first-order defense against risks. As argued in IMF (2021), crypto assets on their own do not invite dollarization (or cryptoization), but the technological advances of crypto assets can accommodate it at a rapid scale by reinforcing the incentives of currency and asset substitution. Countries need to strengthen monetary policy credibility, safeguard the independence of their central bank or monetary authority and the quality of their institutions, maintain a sound fiscal position, and adopt effective legal and regulatory processes to disincentivize foreign currency use.

Domestic Central Bank Digital Currency

Central banks have shown interest in introducing CBDCs, in part to guard against the potential displacement of their currencies. Central banks are closely watching the emergence of more appealing digital alternatives, such as stablecoins and foreign currency CBDCs, that might gain widespread use in their economies (Das and others 2023).⁷ That said, while a domestic CBDC can potentially reduce holdings of the stablecoin in the absence of shocks, it does not mitigate the role of the stablecoin in amplifying the transmission of foreign shocks to the domestic economy. A domestic CBDC, unlike the foreign currency stablecoin, does not provide a hedge against domestic inflation or depreciation. An economy with volatile inflation and exchange rates would continue to see significant stablecoin use even in the presence of a well-designed domestic CBDC. In addition, when faced with a contractionary foreign monetary policy shock (and depreciation), domestic households would have an incentive to purchase more of the foreign stablecoin—resulting in worse macroeconomic outcomes. The presence of CFMs that the stablecoin can evade (again, unlike the CBDC) further strengthens these results.

⁷ For example, Bank Indonesia states in a white paper that Project Garuda, its CBDC initiative, is “a contribution brought by Bank Indonesia to the nation in a struggle to safeguard Rupiah sovereignty in the digital era.” The idea is that a domestic CBDC could play a defensive role, reducing demand for the stablecoin by substituting an alternative asset.

Ban on Stablecoin Payments

A unilateral domestic ban on holding the stablecoin returns the economy almost to the “no stablecoin” outcome.⁸ The ban thus substantially dampens the amplification effect of the stablecoin, reducing the negative impacts on consumption, investment and output and reducing the stress in the banking sector. The ban also helps to preserve the effectiveness of any pre-stablecoin CFM regime.

The feasibility and desirability of such a ban in practice are open questions, and the answers are likely to vary across countries. IMF (2023) encourages authorities to have a comprehensive regulatory framework as a preferred policy option rather than introducing bans. Comprehensive regulations should address the specific features of crypto assets that generate externalities. A fully comprehensive ban would also be difficult to enforce. For instance, merchants in the informal sector could still have an incentive to evade a legal prohibition by accepting the stablecoin, if it had other advantages such as anonymity coupled with low transaction costs. Cross-country coordination could improve the effectiveness of a ban: because the stablecoin issuer is headquartered in the foreign economy, the foreign government may have greater ability to enforce compliance. That said, if the stablecoin issuer were based in non-cooperating third countries, effective regulation would be challenging. Moreover, complete bans of crypto assets could come at the cost of foregone financial innovation.

Other Policy Options

A combination of policies and appropriate regulation could improve on these two options. A domestic CBDC could be combined with other policies, particularly if there are other reasons for introducing it (for example, financial inclusion, more efficient payments) beyond an attempt to “defend” against adoption of a foreign stablecoin. A less-than-comprehensive ban could in some cases be preferred to attempting a complete ban. For instance, allowing access to crypto assets only on regulated exchanges (mainly off-chain) could encourage more activity to take place within the regulatory perimeter, and the cooperation of such regulated exchanges could allow for compliance with CFMs. Such measures could also improve the ability to enforce know your customer (KYC) and anti-money laundering (AML) requirements or to implement consumer protection measures. Where CFMs are in place, sound macroeconomic policies and a reduction in imbalances that enable capital account liberalization would, in turn, reduce demand for foreign digital money as a means of circumvention. In all cases, given the distributed multi-country nature of crypto asset networks and service providers, cross-country coordination is likely to enable more effective policy implementation.

⁸ Some small differences remain because the stablecoin still circulates in the foreign economy.

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