Currency Development Through Liquidity Provision

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Drawing on the experiences of the historical Eurodollar market and recent Chinese dollar bond issuances traded outside U.S. jurisdiction at negative spreads to Treasurys, we examine the conditions under which a parallel offshore dollar financial system that circumvents Western sanctions may emerge. We propose a model in which currency use is driven by liquidity provision and safe bond supply. We characterize three equilibrium regimes: high convenience yields emerge in both the initial sanctions-driven region and the final liquidity-driven region, separated by an intermediate region. Transitions between equilibria depend on safe-asset supply and liquidity technologies, in addition to endogenous dynamic complementarities.

Keywords: Sanctions, International Monetary System, Dollar Dominance, Liquidity.

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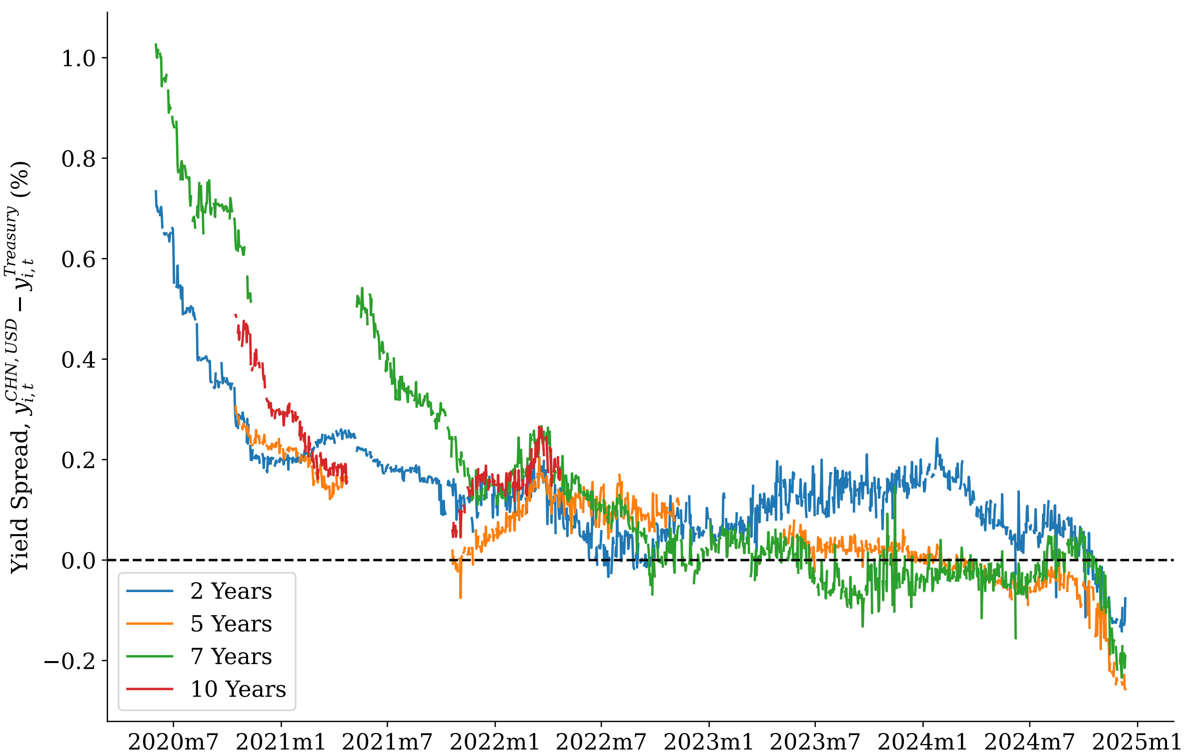
1 Introduction

The rise in geopolitical tensions over the last few years has raised the prospect of the emergence of a non-U.S. dollar international financial system that can operate outside the threat of sanctions, seizure, and secondary sanctions associated with the current U.S.-led dollar-based financial system. Much of this discussion has centered on the China-led offshore Renminbi system (CNH). Yet by most measures CNH financial activities are small and this system has not taken off on a large scale. Indeed, many parties express a preference for dollars. This article studies the following hypothetical questions: could an alternative dollar-based system that operates outside the purview of the Western financial system develop? What would be the signs of this development, and what forces might cause the international monetary system to evolve around two parallel dollar systems?

Figure 1: Spreads of Chinese Sovereign USD Bonds to US Treasury Yields



China's $2 billion issuance in November 2024 of dollar-denominated bonds that settle and trade in Dubai and Hong Kong, markets that are outside the reach of the Western financial system, pushes these questions to the forefront. Remarkably, there were $40 billions of bids for these bonds, driving the yields on Chinese dollar-denominated bonds below even those of U.S. Treasury bonds of corresponding maturity. Figure 1 shows the spread between the traded yield on Chinese sovereign dollar-denominated bonds and the corresponding Treasury benchmark was -24 basis points at the 5-year maturity at the end of November 2024, down from $+24$ basis points in November 2020.[1]

The exceptionally low yields on Chinese sovereign dollar-denominated bonds are an indication of the strong demand by a significant set of investors to own offshore dollars. In the 1950s, the Eurodollar market grew out of Cold War tensions and a very similar impetus. While the Eurodollar market eventually merged with the onshore system, could a parallel dollar system today achieve sufficient scale to remain sustainably separate from Western financial infrastructure?

2 A Model of Currency and Liquidity

2.1 The Environment

Consider an agent that is choosing between an offshore dollar system that is free of Western sanction threats and onshore dollar system exposed to such threats. The agent uses the financial system for banking activities including holding safe and liquid assets, settling goods and financial transactions, and obtaining credit. We denote agent m's preference for offshore over onshore dollars by Δ^m. The mass of agents at valuation greater than or equal to a given Δ is given by the distribution $M(\Delta)$. The blue dashed line in Figure 2 plots a parametric example for the inverse distribution function, $\Delta(M)$, with Δ on the vertical axis and M on the horizontal axis. As M rises, the marginal agent's sanction concerns falls, turning negative at some M, indicating an agent that fears reverse sanctions.

Agents obtain liquidity services from the offshore dollar system. We let $t(M, \lambda)$ capture the liquidity services of the system conditional on M agents using the offshore dollar market. The scalar λ is a financial technology parameter that captures the speed and efficiency of settlement—e.g., the infrastructure of bond dealer networks, repo markets, and messaging software. The orange dashed line in Figure 2 plots t as an increasing and convex function of

[1] The spread is $s_{i,t} = y_{i,t}^{\text{CHN,USD}} - y_{i,t}^{\text{Treasury}}$, where $y_{i,t}^{\text{CHN,USD}}$ and $y_{i,t}^{\text{Treasury}}$ are constant-maturity series for the yields on Chinese sovereign USD-denominated bonds and U.S. Treasurys, respectively, with maturity indexed by i and day indexed by t. Hence, a negative spread implies a lower yield on the Chinese bonds. All data on traded yields are from Bloomberg. We find the same downward trend in the spread $s_{i,t}$—with the latest observations turning negative—across maturities i.

M. We normalize $t(0; \lambda)$ to be zero.[2] When there are more agents in a system, the market becomes more liquid because it is easier to find a trading counterparty for settling payments involved in borrowing, lending, or invoicing. See Coppola, Krishnamurthy and Xu (2023) for a model of $t(M, \lambda)$. Our formulation assumes increasing returns in a reduced form, which is crucial for modeling currency dominance (Krugman, 1984).

The financial system uses dollar bonds to facilitate financial transactions. Suppose that there is a supply L of offshore dollar bonds, exogenous to our model. The bonds are safe and have a face value of one dollar. Denote P_L as the price of the bond. As we will see, the bonds' price may incorporate a positive convenience yield, $P_L - 1 > 0$.

Suppose that agent m is obligated to pay \$10 million to m' in a unit of account of dollars. A financial institution purchases \$100 million of the L dollar bonds issued by the Chinese government. It issues \$80 million of deposits in units of dollars against the backing of these bonds. Agent m holds \$10 million in deposits and makes a transfer to m' of \$10 million to execute the transaction.

These offshore dollars can remain in the financial system as long as China rolls over its bonds. Prior to principal or interest payments on the \$100 million, China can issue another \$100 million of bonds to the financial institution, which credits China with a \$100 million deposit. This deposit is used to repay the maturing bond. Alternatively, settlement could be achieved through transfer of renminbi or consumption goods. The U.S. need not be involved via either financial or real goods trade, and this offshore dollar system can operate in a closed ecosystem.

Formally, a bank offers dollars to agents subject to the collateral constraint:

$$m^s \leq \theta l P_L, \tag{1}$$

with m^s as the supply of dollars issued by the bank, l as its holdings of dollar bonds, and θ as a collateral parameter.

We suppose that competitive financial institutions charge a fee of f for the use of offshore dollar banking services. Then, a bank chooses (f, m^s, l) given the bond price P_L to maximize profits π, given by

$$\pi = f\, m^s - l(P_L - 1), \tag{2}$$

subject to the collateral constraint (1). That is, banks buy bonds at P_L, suffering the cost of the convenience yield of $P_L - 1$, to generate profits of $f\, m^s$. Competition implies that profits

[2] We can also set this to be negative, indicating illiquidity. Without loss of generality, we can redefine $\Delta(0)$ to also include this illiquidity effect.

equal zero in equilibrium. Market clearing requires that,

$$m^s = M \quad \text{and} \quad l \leq L, \tag{3}$$

The aggregate supply from banks depends on if the collateral constraint (1) binds in equilibrium. If it does, then $l = L$ and the supply curve (f, M) solves:

$$f\,M - L(P_L - 1) = 0 \tag{4}$$

If the collateral constraint does not bind in equilibrium, $M < \theta L P_L$, then banks supply M elastically at $f = 0$.

On the demand side, agent m with preference Δ^m takes (f, M) as given and decides to enter the offshore market, where entry generates utility of:

$$V^m = \Delta^m + t(M, \lambda) - f. \tag{5}$$

Then, M, which is the equilibrium entry level, solves,

$$\Delta(M) + t(M, \lambda) = f. \tag{6}$$

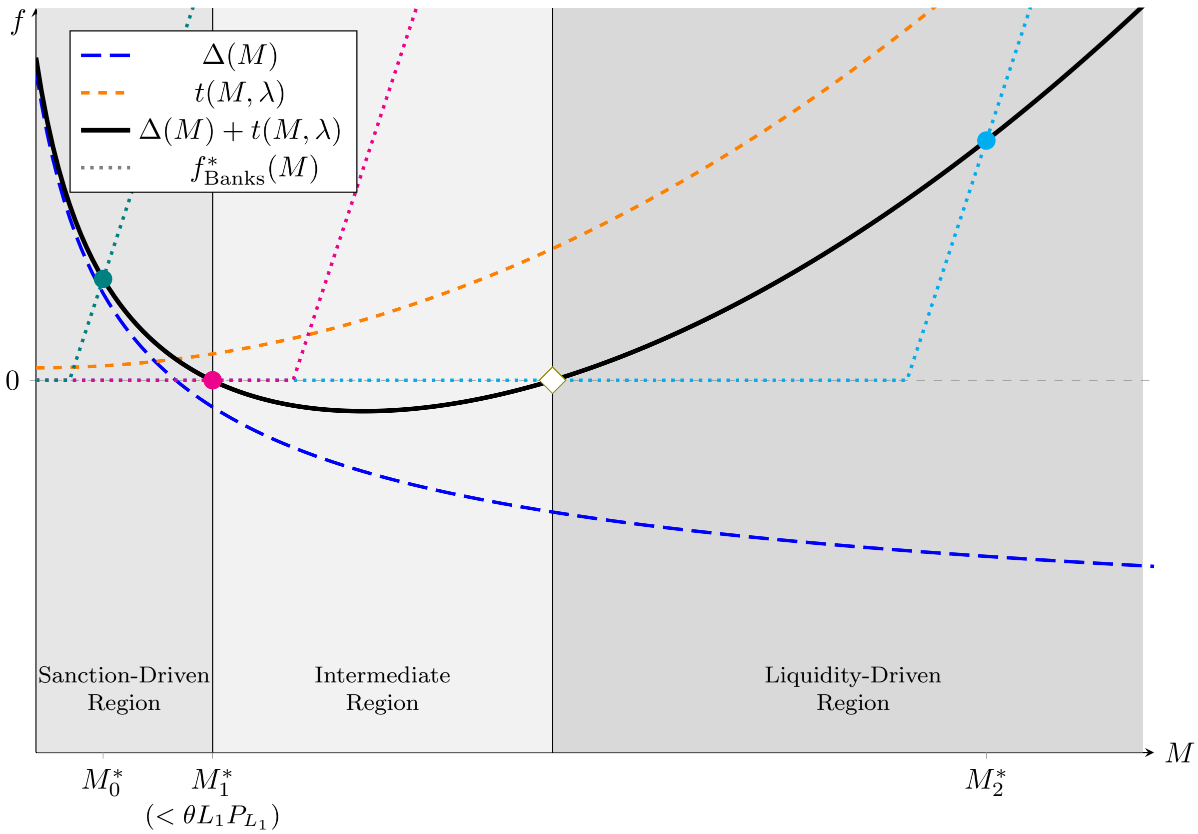
2.2 Equilibrium Properties

An equilibrium is defined by (f, M, P_L) given an exogenous L. We illustrate the equilibrium in Figure 2, with parametric shapes for the functions Δ and t. The chosen shape gives that the demand curve $f = \Delta^M + t(M, \lambda)$ (in black) is convex, which is the natural outcome of an increasing return model. The supply of banking, $f^*_{\text{Banks}}(M)$, is elastic at $f = 0$ until a point determined by the exogenous L. There are three regions of interest indicated in the figure, delineated by the three supply curves in green, pink, and light blue.

The first region is "sanctions-driven": there are a small number of bonds L_0, which pins down equilibrium entry at $M_0^* = \theta L_0 P_{L_0}$. Given small M^*, the liquidity benefits of the market are small. In this case, the small number of bonds cater to highly sanctioned agents. We have that $f = \Delta(M_0^*) + t(M_0^*, \lambda) > 0$. From the bank zero profit condition (4), we see that if $f > 0$ then $P_{L_0} > 1$, and the convenience yield is positive.

The second region has "intermediate" L_1 and equilibrium at M_1^*. Here we have that the collateral constraint (1) is slack. In this case, (4) implies that $f = 0, P_{L_1} = 1$. The supply of bonds is sufficient to cater to all of the sanctions-driven demand, but this supply

Figure 2: Model Equilibrium Regions



is insufficient to draw in enough traders to achieve self-sustaining liquidity.

The third region is "liquidity-driven" with a high L_2 and high entry M_2^*. The market is now large and generates liquidity services. Importantly, the liquidity benefits draw in agents for whom $\Delta^m < 0$. In this third region, the offshore market exhibits strong liquidity complementarities and $f > 0, P_{L_2} > 1$. Finally, note that given these complementarities, both M_2^* and M_1^* are stable equilibria given sufficiently high L_2. There is also an additional unstable equilibrium, indicated by the white dot.

3 Implications

3.1 Financial Development

Our model identifies the current world as being in the sanctions-driven region. The supply of dollar bonds is low, yet sanctions-driven demand for these bonds is sufficiently high that there is a convenience premium on these bonds despite the superior liquidity of Treasurys, which drives their yields to the levels of U.S. Treasurys.

Can the equilibrium evolve beyond this sanctions-driven region? The model provides insight into these dynamics. Note that $P_L > 1$ provides an incentive for private and public safe asset issuers to supply more dollar bonds into this market. These incentives can dynamically shift the equilibrium from M_0^* to M_1^*. However, the second region is an absorbing state since $P_L = 1$. In other words, getting to the third region requires a coordinated policy action (a "big push").

To move to M_2^*, China will have to incentivize Chinese banks and quasi-government agencies to issue dollar bonds, even if doing so is currently unprofitable. It may also facilitate the equilibrium transition by incentivizing use of the offshore banking system by banning the onshore system, for instance through capital controls.

An increase in sanction concerns shrinks this intermediate region. Consider a comparative static consisting of an upward shift in the inverse distribution $\Delta(M)$, capturing heightened sanction fears. In equilibrium, the combined value function $\Delta(M) + t(M, \lambda)$ is shifted-upward at each M. As a result, more agents find the offshore system attractive even at low levels of liquidity provision. This shift expands the sanctions-driven region and reduces the intermediate region where the system struggles to achieve self-sustaining liquidity. In some cases, the intermediate region may vanish entirely, causing the offshore market to transition more directly from a sanctions-driven to a liquidity-driven equilibrium. Thus, heightened fear of sanctions, especially on the extensive margin of previously unconcerned agents, can serve as a catalyst.

This transition dynamic requires sufficient safe asset capacity outside of the Western financial systems. Any non-U.S. institution that issues such bonds will likely be incurring currency mismatch costs, which acts as a brake on supply. At present, it appears that such capacity ($\theta > 0$) exists in China, where the big four commercial banks and the policy banks issue deposits that are considered highly safe. Russia, Brazil, and other interested countries do not currently possess this ability.

3.2 Dynamic Complementarities

Consider now an extension to two periods, $t = 1, 2$, which we denote in subscripts for all relevant variables. At $t = 1$, the economy may be in the sanctions-driven or intermediate region. At $t = 2$ we assume that the economy may be in the liquidity-driven region. We model all circulating bonds as maturing at $t = 2$, so that in the first period there is a circulating supply L_1 of two-period bonds, while in the second period the total supply of bonds is $L_2 = \tilde{L}_2 + L_1$, where $\tilde{L}_2$ is any additional issuance that takes place at $t = 2$.

The price of the bonds at issuance in the first period, P_L^1, now reflects the anticipated convenience yields over both periods. We elucidate our main points in a simple case: we assume perfect foresight about future issuance $\tilde{L}_2$, assume that the economy will be in the liquidity-driven region, and set the time discount factor to one. The zero-profit condition then yields

$$P_L^1 = 1 + \frac{f_1 M_1 + f_2 M_2}{L_1 + \tilde{L}_2}. \tag{7}$$

Note that even if bond supply at $t = 1$ satiates the current sanctions-driven demand ($f_1 = 0$), the anticipation of future convenience yields at $t = 2$ raises the bond's initial price.

The model embeds a dynamic complementarity. Because f_2 is high in the liquidity-driven equilibrium of $t = 2$, issuers at $t = 1$ have an incentive to supply more bonds L_1, even if $f_1 = 0$. This, in turn, sets the stage for entering the liquidity-driven equilibrium at $t = 2$, where banks use the bonds to capture $f_2 > 0$. On the other hand, if the $t = 2$ equilibrium is in the intermediate region, then $f_2 = 0$, and the issuance incentive at $t = 1$ is dampened.

Note that the same logic applies if the $t = 2$ equilibrium is determined not by high bond supply $\tilde{L}_2$ but by improvements in the collateralization technology θ, or by improvements in the financial settlement technology λ. In the latter case, the development of financial market infrastructure like China's Cross-Border Interbank Payment System (CIPS) could serve as a catalyst. CIPS provides both messaging and settlement capabilities that could improve the speed and efficiency of offshore dollar transactions, which raises the liquidity benefits for any given M. If market participants anticipate that such technological improvements will enhance liquidity services at $t = 2$, they would be more willing to enter the market at $t = 1$, even with relatively basic settlement technology.

Further, suppose that at $t = 2$, segmentation between the onshore and offshore markets diminishes, flattening the Δ curve. Agents would then value holding offshore dollars not primarily out of fear related to sanction avoidance but due to the broader liquidity and acceptance of the offshore system. As a result, the effective demand for these offshore bonds—and thus f_2—rises. Anticipating this reduced segmentation, issuers at $t = 1$ again find it profitable to increase supply, since they can sell bonds at a price P_L^1 that incorporates the higher expected f_2.

4 A Historical Precedent: The Eurodollar Market

The historical evolution of the Eurodollar market provides a parallel to the dynamics of offshore dollar systems considered here. In the Cold War era under the Bretton Woods System, Soviet-bloc and non-U.S. actors sought to hedge against potential asset freezes, while European (especially London-based) banks saw an opportunity to circumvent U.S. capital controls and regulatory constraints (such as, in later years, U.S. interest rate ceilings under Regulation Q). This combination of sanctions concerns and regulatory arbitrage led to the creation of segmented onshore and offshore dollar markets, with European banks developing a parallel financial system beyond U.S. regulatory reach. Over time, the scale of the Eurodollar market in London increased substantially: European intermediaries had sufficient capacity to issue large quantities of dollar deposits, expanding liquidity. By the late 1980s, the Eurodollar market had grown to approximately 1.6 times U.S. domestic M2 money supply. This greater depth allowed the Eurodollar market to evolve from its initial sanctions-driven phase into a liquidity-driven regime.

A key feature of the Eurodollar market's evolution was the gradual reduction in segmentation between onshore and offshore markets. As U.S. financial regulations relaxed and global financial integration deepened, agents increasingly valued Eurodollars not out of sanctions concerns but due to their broad liquidity and acceptance. This matches the final example of dynamic complementarities that we discuss in Section II B. By the end of the Cold War in the late 1980s and early 1990s, the distinction between onshore and offshore dollars had effectively disappeared, resulting in a unified and even more dominant dollar system.

5 Conclusion

While historical parallels with the Eurodollar market are instructive, today's geopolitical environment suggests a potentially different trajectory. The persistence or intensification of current tensions could maintain a durable segmentation between onshore and offshore markets. This possibility of parallel systems presents a sharp contrast to the Eurodollar experience and would be a genuinely new configuration in the international monetary system.

However, the scale needed to reach self-sustaining liquidity in today's offshore dollar market is quantitatively vast, and even if the market continues to develop, it may remain in an intermediate state for an extended period. Our analysis points to the need for a large supply of safe offshore bonds (L) coupled with efficient liquidity technologies (λ), to move equilibrium from a sanctions-driven demand for offshore dollars to a self-sustaining liquidity regime. Qualitatively, to arrive at the liquidity regime, the equilibrium must shift to the right of the minimum of the convex curve in Figure 2. While our analysis does not put a number on this minimum, it points to the indicators of a self-sustaining liquidity regime. These are three-fold: (1) persistent convenience yields on bonds trading outside Western jurisdiction; (2) substantial deepening of liquidity and trading volumes in these venues; (3) broadening of market participation to include agents who are not solely driven by sanctions fears.

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