Decentralized Money Supply: A New Paradigm for Reserve Currency

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Abstract

This paper proposes a decentralized reserve currency called the Global Dollar that is meant to be an alternative reserve currency for global trade. From the perspective of banks and customers of banks, the Global Dollar is just another currency like the US Dollar. Customers of banks can transact in Global Dollars using the same technologies that they now use to transact in the US Dollar. At the same time, no particular entity or group has unilateral control of the money supply of Global Dollars. Instead, the supply of Global Dollars is controlled by users of the currency by taking part in auctions for bonds denominated in the Global Dollar. The goal is to provide a viable alternative to existing global reserve currencies by incorporating the best features of existing reserve currencies while introducing decentralized control of the money supply.

1. Introduction

The goal of this paper is to propose a new reserve currency for global trade called the Global Dollar (GD). From the perspective of banks and ordinary users, the GD is just another currency like the US Dollar (USD) or the Euro. Banks can issue deposits and loans in the GD and customers can use existing payment systems to carry out transactions. From the perspective of central banks, the GD is quite different from fiat currencies because no central bank is special. The authority to issue new GDs is not held by a single central bank or any group of central banks. Instead, the power to regulate the money supply of the GD is distributed among all users of the GD using auctions for bonds denominated in the GD. Central banks conduct monetary policy by holding, trading, and lending bonds and GDs.

Before giving the details of the Global Dollar, we recall some key attributes of the US Dollar (USD) that have helped to protect its entrenched position as the dominant global reserve currency.

Advantages of the USD

1. **First-mover advantage**: The USD is the common language of international finance. Systems, protocols and regulations have been built around the USD over a period of many decades. The USD's dominance in global trade, especially in commodities like oil, creates a self-reinforcing cycle.

2. **Liquidity**: The USD is supported by robust mechanisms developed by the Fed to address liquidity crises and ensure stability. The infrastructure to deliver the USD wherever it is demanded is provided by an established network of international banks that are able to issue USD deposits (called Eurodollars) and trust each other's deposits.

3. **Safety**: Foreign holders of USD can invest in a deep and liquid market for US Treasuries, the defacto safe-haven asset. These assets preserve the value of reserves, yet can be efficiently and reliably sold to defend local currencies when needed. Countries around the world have used these safe assets to hold their rapidly expanding reserves. Although the US has recently shown it is willing to seize the reserves of countries it has conflicts with, the USD remains the safest available option for holding reserves.

4. **Transparency**: The USD is overseen by relatively independent and transparent institutions, such as the Federal Reserve. While these institutions prioritize US interests, they are perceived as insulated from short-term political pressures.

Lack of Alternatives

The **Euro** is the most likely challenger to the USD. However, the Maastricht Treaty and the Stability and Growth Pact limit Eurozone countries' annual budget deficits to 3% of GDP and public debt to 60% of GDP. These constraints prevent Eurozone countries from issuing sufficient government debt to provide safe assets like US Treasuries. There is not enough safe Eurozone debt available to absorb a significant fraction of the global reserves of the world: for example, $2.9T of German debt is available as compared to $36T of US debt.

Currencies backed by a fixed supply, like **gold or Bitcoin**, are incompatible with the banking system that runs global finance. Banks fund loans, which involve risk, using savers' deposits, which are guaranteed to be safe. The gap between risk and safety is managed by generating new money. A currency that does not allow for new money to emerge cannot use this advanced credit system to efficiently route money where it is needed. A system based on gold or Bitcoin for global trade will need to build an alternative banking system to provide credit.

The BRICS nations—Brazil, Russia, India, China, South Africa, and recent additions Egypt, Ethiopia, Indonesia, Iran, and the United Arab Emirates—have long discussed creating a common currency to reduce reliance on the USD. At the 2023 and 2024 BRICS summits, proposals included a currency called the "**Unit**," pegged 40% to gold and 60% to a basket of BRICS currencies. The Unit is close, at least in spirit, to the Global Dollar, but the implementation is significantly different. In particular, the Unit requires BRICS countries to agree about the composition of the basket of currencies used to set the peg, and an agreement has proved to be elusive.

The design of Global Dollar is discussed in Section 2. Section 3 addresses how Global Dollars can be integrated into the banking system and how countries might adapt their monetary policy. Section 4 compares the features of the Global Dollar with the advantages of the US Dollar discussed above. Possible paths for the adoption of the Global Dollar system are discussed in Section 5.

2. Global Dollars with a Decentralized Money Supply

Global Dollars aim to mimic US Dollars as much as possible. Just like in the USD system, the Global Dollar consists of GD reserves and GD deposits. GD reserves are held at a *global reserve*,

while GD deposits are issued by banks and held in bank accounts. GD reserves are governed by transparent rules, given below, specifying exactly how new GDs are generated in the reserve. Users of the reserve have accounts that hold their GDs. The rules governing the reserve could be enforced by a new Global Central Bank (GCB) that administers the global reserve. Alternatively, the global reserve could be implemented on a blockchain with a cryptocurrency that enforces the rules of the reserve, effectively creating a distributed algorithmic GCB.

GD deposits can be issued by banks just as they now issue USD deposits. The GD deposits at banks may be regulated locally by central banks or governments, but they are not regulated by the GCB, and the GD system places no restrictions on these deposits. The GCB does not keep track of transactions involving GD deposits. However, net flows between institutions holding deposits are ultimately settled by transferring GDs in the global reserve from one account to another. This limits the ability of countries or banks to issue excessive GD deposits, because doing so risks a liquidity crisis.

The supply of GDs within the global reserve is controlled by users of the reserve. They exert their control by bidding in auctions for a new kind of bond that is also held in accounts at the reserve. If d is a date, $\mathsf{Bond}(d)$ is a financial instrument that automatically becomes 1 GD in the reserve on date d. Each user of the reserve may hold a mix of GDs and bonds, and these instruments may be freely exchanged between users within the reserve. They can be bought and sold by users in secondary markets, and used to settle transactions, but they always stay within the global reserve. New bonds in the reserve are issued using the following rule:

- **Bond Rule:** If the number of bonds in the global reserve is less than the number of GDs in the global reserve, a new bond is issued by the GCB and sold in an auction open to all users. The date of the new bond is determined by the bids in the auction. For $p \geq 1/2$ and d a date in the future, each bid has the structure

  $$\text{user A bids } p \text{ for } \mathsf{Bond}(d),$$

  indicating that user A is willing to pay p GDs to obtain a new bond that matures on date d. Here d is chosen by user A, and different bids may be for bonds that mature on different dates. If the current date is D, this bid corresponds to a yield of r, where $r \geq 0$ satisfies

  $$p \cdot (1 + r)^{d-D} = 1.$$

  The yield for each bid is computed, and the winning bid is the one with the smallest yield. The bond corresponding to the winning bid is issued to the winner, and the price of the bond is deducted from the account of the winner in the reserve. The GDs that are used to buy the bond disappear from the global reserve.

This concludes the description of all the rules enforced by the GCB on the global reserve.

Discussion

Here are some consequences of the rules given above:

1. **Bonds vs GDs**: The number of bonds and GDs in the system will typically be very close to each other. That is because every bond eventually turns into a GD, so if the bonds exceed the GDs, bonds will be replaced by GDs until the GDs are in excess. The bond rule means

that as soon as the bonds drop below the GDs, new bonds are issued. The new bonds will surely be purchased at some price. This will consume GDs until the two quantities are back in equilibrium.

2. **Growth of money supply**: The yield r of the winning bid controls the rate at which the money supply is currently growing. Because the bond rule picks the bid that minimizes r, the system aims to minimize the rate at which new money is generated. At the same time, the system does not place any restrictions on the value of the winning yield, this is entirely determined by the bids of users. In particular, r can become very large in times of crisis, resulting in a flood of new liquidity exactly when the users need it.

3. **Churn**: The average daily volume of bonds sold via the bond rule is determined by the duration of bonds held by users in the system. If most bonds are of long duration, the volume will be small. If the bonds are of short duration, the volume will be large. If the daily volume is large, the system will maintain a high level of liquidity allowing many users to quickly increase the money supply by underbidding for the new bonds. If the volume is small, only a small part of the money supply can expand, though the rate at which that part expands can still be arbitrarily large as determined by the bids of users. The churn and consequently the liquidity of the system is determined entirely by users of the system.

4. **Fairness/security**: The system is fair in two ways: all users can participate to determine the rate of growth of the money supply, and all users have fair access to the newly generated money. A coalition of users that controls a large fraction of the bonds and GDs can cause the money supply to grow at a high rate, but the generated money will accrue to all users: every user that takes part in the auctions should expect to maintain their share of the GDs and bonds in the system over time. Because of the condition $p \geq 1/2$, every user must spend at least 1/2 GD to acquire a bond. This ensures that no group can capture all the bonds unless that group already controls a significant fraction of all the bonds and GDs in the reserve.

5. **Secondary Markets**: Because users are allowed to exchange both bonds and GDs within the reserve, secondary markets for these instruments will inevitably emerge, and consequently bonds of all durations will have yields assigned to them by the secondary markets. Arbitrage between secondary markets and the auctions on the reserve should ensure that changes in the prices of bonds in the secondary market will lead to corresponding changes to the winning yield in the auction.

6. **Hoarding vs Spending**: Currencies backed by a fixed supply, like gold or Bitcoin, favor hoarding rather than spending. As the number of transactions increase, the supply of the currency per transaction decreases. This steady increase in demand for the currency incentivizes users to hoard it and spend something else. In contrast, the incentives for the Global Dollar are similar to those for the USD. The favored strategy is to hoard GD bonds and spend GDs. It is the bonds that help to preserve value, while the GDs lose value as the money supply increases. Each bond eventually becomes a GD, so users cannot simply buy and hold bonds forever; users are incentivized to buy new bonds and contribute to the churn of the system.

7. **Omitted Details**: Any implementation of the Global Dollar system will need to make decisions about details that have been omitted here. The auctions in the bond rule will have to be implemented efficiently, allowing for many bonds to be sold at once. Transaction costs

will have to be taken into account. Care must be taken to ensure that the bids of the users are sealed so one user cannot win the auction by looking at the bids of others.

3. Banking with Global Dollars

Just as banks issue deposits in the USD that exceed the supply of USD reserves, they can issue deposits in the GD that exceed the supply of GD reserves. Recall that the GCB does not monitor the GD deposits at banks. Banks can issue loans in the GD, and bank account holders can carry out transactions using GD deposits, all without the involvement of the GCB. Banks do need to ensure that they retain enough GDs on the global reserve to settle transactions with other banks, and central banks need to retain enough reserves to settle transactions between countries.

3.1. Consequences

A bank that runs out of GD reserves faces failure. Governments and centrals banks will adapt to this hard constraint by planning to prevent such failures and so preserve the reputation of their banking systems. The rules for the Global Dollar are intentionally minimal. This gives central banks great flexibility to implement monetary policy tailored to their local financial system.

Just as non-US central banks today amass USD reserves in order to handle liquidity crises or attacks on their local currencies, central banks and banks would need to amass GD reserves and GD bonds, and develop strategies to prevent such a crisis from emerging. If a bank extends beyond its means and is in danger of running out of reserves, the central bank could step in to provide a loan of reserves, or orchestrate such loans from other banks in the country. If all the banks in a country do not collectively have enough reserves, the banks and central banks can sell their amassed bonds on the secondary market, where they will be purchased by central banks and banks in other countries. If the crisis escalates to affect many countries, the yield r in the bond rule will rise, and the GCB will generate a flood of liquidity that can be routed to the affected countries. All of this can happen without any deviation from the rules by the GCB.

Customers of banks need not interact with the GD system at all. The vast majority of GD transactions can take place using existing infrastructure for payments, without involving the GCB. In particular, if a cryptocurrency is used to implement the GCB, customers of banks need not interact with the blockchain. This means that a blockchain based implementation of the GCB need not be particularly efficient or fast.

Mismanagement by the financial system of one country will not necessarily lead to a crisis in another country. In fact, mismanagement in a country will lead to a relative loss of holdings of GD reserves for that country, and a relative gain for other users of the reserves.

The optimal system of regulations needs careful thought to accommodate the circumstances of each country. There is a lot of room for creative new ideas consistent with the Global Dollar system.

4. Comparison with the USD

The primary advantage of the GD over the USD is that the money supply is decentralized. The primary advantage of the USD over the GD is the first-mover advantage. Assuming that the GD is adopted at scale, here is a comparison between the two on some other dimensions:

1. **Liquidity**: If adopted, the GD can simply use the same mechanisms for delivering liquidity currently used by the USD. Existing relationships between banks and existing infrastructure for issuing credit can easily be ported to the GD. Central banks and governments will have to come up with new protocols and regulations to prevent liquidity crises, but there is no reason why the GD would not attain the same level of liquidity that is currently enjoyed by the USD.

2. **Safety**: Instead of holding US Treasuries as a safe-haven asset, central banks would hold bonds on the global reserve. Because the number of bonds is about the same as the number of GDs on the reserve, there will always be a significant number of bonds available. These bonds are safer than US Treasuries, because they are not tied to the spending of any government, and the rules guarantee that the bonds are always paid out. In addition, the issuance of bonds follows predictable rules that ensure that new bonds will be available and every user has fair access to new bonds. For these reasons, the GD is safer.

3. **Transparency**: The rules for the GD are so transparent that they can be implemented by an algorithm. This extreme transparency is a key advantage of the Global Dollar.

4. **Financial Contagion**: The world economy is entangled with the USD, and so mismanagement by financial institutions in the US has serious consequences for all countries. This was on display during the Great Financial Crisis. In a world where the GD is the dominant reserve currency, what happens in one country will surely affect another, but no country has a special role. If a single country has a liquidity crisis, that crisis has limited ability to spread to other countries. In fact, countries that have secure finances will be able to help the country that is in distress, for an appropriate price.

5. **Volatility**: The USD maintains a stable exchange rate with all the major currencies of the world. It is hard to predict how volatile the GD would be as a financial instrument if it was only partially adopted. A collection of central banks that commit to adopting the GD could put into place protocols that help to manage its initial volatility, as discussed below.

5. Paths to Adoption

Any change to the status of the USD would be a seismic shift to the world order. A few radical paths for adoption of the GD are sketched below.

1. **Led by the US**: The US benefits enormously from the use of the USD as the global reserve currency, but there are also some negative consequences for the US. Because of the special status of the USD, foreign countries have great demand for USD reserves. Tariffs on US exports are attractive because a trade surplus with the US gives countries access to more USDs. In effect, the USD is a significant export of the US, and it competes directly with other US exports. The Trump administration has imposed tariffs on imports, restricting the flow of the USD to foreign countries.

   The US government could choose to support a transition to the GD, for the right price. Here is an example of an arrangement that might be attractive for all parties:

   (a) The US agrees to support the transition to the GD, and creates the GCB.

(b) The Fed agrees to redeem each GD for a USD during the transition period. This ensures that the GD immediately has value. All financial systems that use the USD and Eurodollars are adapted to use the GD during the transition period.

(c) US government debt to foreign nations is effectively erased: all US Treasuries and USD currently held in foreign government reserves are replaced by GD bonds and GDs on the new global reserve. This can be thought of as a soft default on US debt to foreigners. This compensates the US and strengthens the Global Dollar.

(d) The Fed's account at the new global reserve is initialized with some large number of bonds and GDs. This sweetens the deal for the US and ensures that it remains committed to the GD system.

The USD loses its status as the global reserve, but the US gets a large payment in return. Foreign nations secure a decentralized money supply. They need not amass USD reserves anymore, so the pressure on US exports is reduced.

2. **Led by BRICS or similar coalition of countries**: BRICS has been trying to come up with an alternative to the USD for a number of years. They could take the following actions:

   (a) The countries of BRICS create the GCB and commit to the success of the GD.

   (b) During a transition period, the central banks participating in BRICS agree to redeem each GD for a basket of their currencies. This ensures that the GD immediately acquires the value of the basket of currencies.

   (c) All trade between the participating countries is switched to the GD.

   (d) After the transition period, the GD is allowed to float freely.

3. **Organically using a Cryptocurrency**: Bitcoin has shown that it is possible for an organically emergent cryptocurrency to acquire value. A similar chain of events could allow the GD to emerge.

   (a) A carefully designed cryptocurrency that implements the GCB is released.

   (b) Users organically adopt the GD and begin trading bonds on the global reserve. Users are attracted to investing in GD bonds based on the belief that the global financial system will eventually transition to using GDs.

   (c) Without a traditional central bank to backstop the GD, the resulting GD might be volatile. Unlike Bitcoin, users of GDs are incentivized to spend rather than hoard GDs.

   (d) GDs organically begin to play a large role in global transactions.

   (e) Banks begin to hold bonds and GDs on the global reserve and issue deposits and loans in the GD.

   (f) Central banks begin to participate in order to protect banks from liquidity crises.

6. Conclusions

The main goal of this paper is to propose a global reserve currency with a decentralized money supply. The chief advantage of such a system is that all users of the reserve play the same role.

Users participate in a market for bonds that controls when new money is created, and who receives the new money. The Global Dollar can be used by the existing banking system with minimal changes. It may well be in the best interests of the US and other countries to adopt it, if all parties are appropriately compensated during the transition.

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