Export-Import Bank of India's

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Commencement Day
Annual Lecture

Financial Globalisation and International Financial Markets

by

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Abstract

This lecture will describe the characteristics of the Global Financial Cycle, defined as common co-movements in capital flows, risky asset prices and credit growth across countries. One important driver of the global financial cycle is the monetary policy of the US Federal Reserve which influences financial conditions around the globe. This reflects the central role of the US in the international monetary and financial system and the dominant role of the dollar in international banking, in trade invoicing and in asset markets. Looking into the future, as the relative mass of the US is decreasing in the world economy and in world trade, we may see the emergence of a more multipolar international monetary and financial system where the Euro Area, China and others play a bigger role. The emergence of digital currencies may also disrupt the International Monetary System and profoundly transform geopolitics.

This lecture draws on joint work with Pierre-Olivier Gourinchas, Silvia Miranda-Agrippino, Evgenia Passari, Richard Portes, Maxime Sauzet. The lecture does not represent in any way the views of the French Macro Prudential Authority.

Introduction

It is a great honour to be invited to deliver the Export-Import Bank of India's 35th Commencement Day Annual Lecture. I am walking in the footsteps of great lecturers who have talked about important economics topics. I will focus on international finance and the importance of globalisation for economies, a topic I have much researched over the years and which , I believe, is very relevant for India.

Keynes in the 'Economic consequences of peace' published in 1920 lauded the benefits of international integration in trade and financial flows. He explained how before the first world war, "...the inhabitant of London could order by telephone, sipping his morning tea in bed, the various products of the whole earth, in such quantity as he might see fit, and reasonably expect their early delivery upon his doorstep; he could at the same moment and by the same means adventure his wealth in the natural resources and new enterprises of any quarter of the world, and share, without exertion or even trouble, in their prospective fruits and advantages; or he could decide to couple the security of his fortunes with the good faith of the townspeople of any substantial municipality in any continent that fancy or information might recommend." (Keynes, 1920, p.11)

After some important setbacks during the wars and the Great Depression, financial openness seems to have resumed its long run upward trajectory. Both emerging markets and advanced economies are increasingly holding large amounts of assets cross-border, even though the 2008 crisis has moderated the trend and the prospect of Brexit may jeopardise some international financial links in Europe. A simple and widely used measure of de facto financial integration, the sum of cross-border financial claims and liabilities, scaled by annual GDP has risen from about 70% in 1980 to 440% at the eve of the crisis in 2007 for advanced economies, and from about 35% to 70% for emerging markets during the same period. For India in 2018, the corresponding number is 61.3% (gross external assets 20.5% and gross external liabilities 40.8% of annual output respectively). The menu of assets exchanged across borders has also become broader with derivatives and asset backed mortgage securities becoming internationally traded. It becomes therefore increasingly important to analyse how financial globalisation affects international and domestic financial markets in order to understand how shocks transmit into

countries and in particular into emerging markets. Central to this analysis is the role of the United States and of its currency, the Dollar, in the international monetary and financial system.

According to the theory of hegemonic stability, the country at the centre of the international monetary and financial system plays a critical role in stabilizing the world economy. As Kindleberger wrote in 1981 "for the world economy to be stable, it needs a stabilizer, some country that would undertake to provide a market for distress goods, a steady if not countercyclical flow of capital, and a rediscount mechanism for providing liquidity when the monetary system is frozen in panic." The centre country can be an importer of last resort when the world economy is in trouble as it can borrow from the rest of the world since it issues a type of liability that is always in high demand. It is the essence of a reserve currency to be demanded by economic agents around the world especially in bad time. The reserve currency issuer provides the liquidity necessary to "oil" the wheels of the international financial system and this is critical in crisis times. It is therefore not surprising that periods of transitions between great powers such as the 1930s, when the economic influence of the UK was waning while that of the US was still not fully established, were especially dangerous for economic stability. In such periods, there may be brutal portfolio shifts as the dominance of a given reserve currency is contested. Besides, the economic leadership of the hegemon is sometime a cause of frustration. The asymmetries inherent in the new international monetary arrangement born in Bretton Woods in 1944 and anchoring the United States firmly at the centre of the system triggered some strong responses in France. In a press conference on February 4,1965[1], Général De Gaulle stated: "The fact that many states accept, on principle, dollars just as much as gold to compensate if need be the deficits of the US balance of payments, means that the United States can issue external debt freely. Indeed, when the US owe something, they can pay for it, at least in part, with dollars which they can issue, instead of using gold, whose value is real, has to be earned and that one cannot transfer to others without risk and sacrifice. This unilateral facility that the United States has implies that the dollar is not an impartial means of international exchange, since it is a means of issuing credit for one state." Valéry Giscard d'Estaing, De Gaulle's finance minister, echoed the words of the Général on February 16, 1965 and famously summarised them by stating that

[1] Translation of Gourinchas, Rey and Sauzet (2019).

the country issuing the reserve currency enjoyed an "exorbitant privilege". The competition between world powers and its parallels in the international monetary system is in part what makes studying the latter fascinating. As the economic centre of the world is moving towards Asia, and China is emerging as a geopolitical force, the days of the Dollar hegemony may be counted. It is a first order issue to think through the dynamics of a regime change. The emergence of private or public digital currencies could also have a catalytic role and upset the payment systems in ways which are unusual historically.

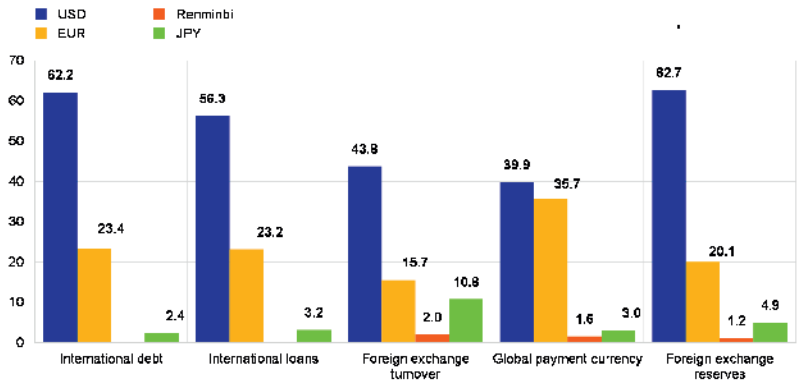
In this lecture I will first discuss the different dimensions of the Dollar hegemony. I will then document the existence of a global financial cycle (Rey, 2013), its implications for domestic financial systems and their stability. Finally I will discuss the stability of the current monetary order as the asymmetry inherent in a hegemonic system may also create financial fragilities that can ultimately lead to its demise, a scenario that I will describe as a "New Triffin Dilemma". If the system is moving towards a multipolar one, it becomes paramount to discuss the coming challenges from emerging superpowers such as China or from new - possibly private - actors issuing digital or crypto currencies. I speculate that countries could compete using increasingly sophisticated cross-border payment technologies to expand the network of countries under their monetary and financial influence. This could be a new type of geopolitical game.

I. International Monetary System and Dollar Hegemony

The roles of a dominant international currency, i.e. a currency used outside the borders of its country of issuance, are multifaceted and involve the three functions of money: medium of exchange, store of value, and unit of account. There are many synergies between the international use of a currency in its different roles, which makes incumbent international currencies hard to displace. Trust in the medium of exchange is necessary, so it has to be recognisable and stable in value. In modern days, this implies that a given fiat currency has to be backed by a credible fiscal authority. In turn, stability makes it a good unit of account, which people are happy to use to estimate their purchasing power and engage in trade. The more people use a currency the more other agents want to use it as there is a network externality in the medium of exchange function: the Dollar is to currencies what English is to

languages. Furthermore, investors like to hoard liquidity in the currency they need to perform their transactions so there is a natural complementarity between the development of bond markets and asset markets in a currency and the use of that currency in international exchange. From the official sector point of view the strength of complementarities is also very high. Central Banks will tend to stabilize their exchange rate vis-à-vis the international currency to decrease exchange rate risk for international trade and investment (see Ilzetski, Reinhart and Rogoff, 2018). In order to do so they will hold reserves in dollars and use them to intervene. By all these measures of internationalisation, the dollar is largely ahead of other currencies as is neatly summarised in Figure 1. The Renminbi is barely taken up in international markets, while the euro is a distant second. Hence the Dollar hegemony has perfectly withstood the passage of the gold backed Bretton Woods system to the fiat money and flexible exchange rates era post 1973.

Figure 1: The Dominance of the dollar. Source: ECB Report on the international role of the euro, ECB (2018).



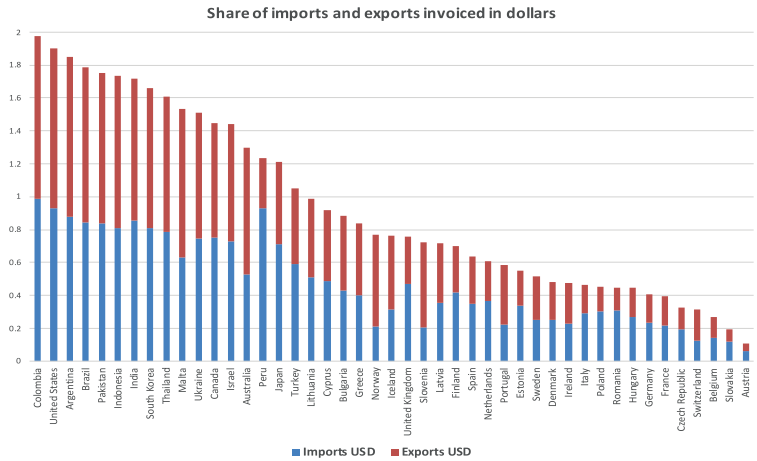
(Figures in percentage)

One of the key facts underpinning the architecture of the international system is that the hegemon provides safe assets to the rest of the world. Hence, as shown in Gourinchas and Rey (2007b) (see also Despres et al, 1966), the US has a very specific external balance sheet: it is a world banker, long in risky foreign assets and short in risk-free liquid dollar liabilities, which are in high demand by the rest of the world. One can also see the US as an insurer since the value of its external dollar liabilities such as Treasury bills and US government bonds held by the rest of the world tend

to appreciate in bad times, thereby insuring the people holding them. This insurance transfer is large in global crisis times, about 13% of US GDP after the collapse of Lehman Brothers (see Gourinchas et al, 2018).

The advantage of issuing the reserve currency spills over into other realms, such as the large amounts of private debt issued in US dollars in international markets (Maggiori et al, 2018) and the large share of trade invoiced in US dollar, which stabilizes the terms of trade of the centre country (see Gopinath et al, 2018). Figure 2 shows the share of exports and imports invoiced in US dollars. It is particularly important in Latin America and in Asia. India is among the most dollarized countries as far as invoicing is concerned.

Figure 2: Share of exports and imports invoiced in dollars. A value of 2 means that 100% of exports and 100% of imports are invoiced in dollars. Source Gourinchas et al (2019). Data from Gopinath (2015).



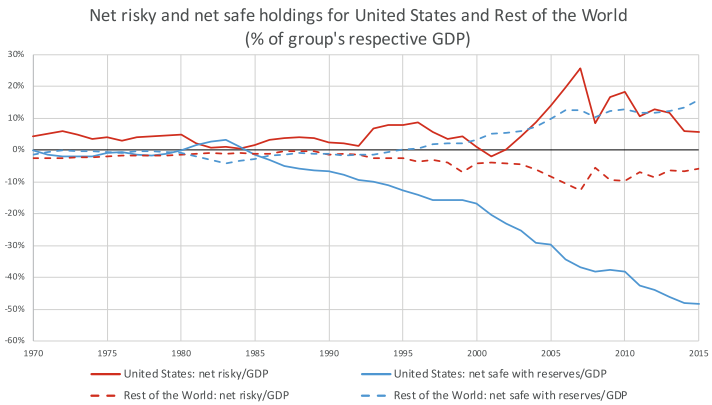
Issuing the reserve currency also goes together with the monetary policy of the Federal Reserve setting the tune for the global financial cycle, in particular by affecting the balance sheet of global financial institutions and their risk appetite. Miranda-Agrippino and Rey (2015) show in particular that a tightening of the US Federal Reserve translates into a contraction in credit flows cross border and into a decrease in leverage of US broker dealers and also of European global banks.

The dollar exchange rate is a key relative price in the world economy whether on goods markets or in international financial markets. Moreover, a world banker balance sheet means earning a banker intermediation margin, which confers to the US excess returns on its net foreign asset position (about 2% in real terms per year since 1952), thus easing the process of international adjustment, something Gourinchas and Rey (2007b) called the "exorbitant privilege" in reference to the Gaullist rhetoric of the 1960s.

II. Exorbitant Privilege

Figure 3 shows the net risky (equity and FDI) and net safe (bonds and bank loans) positions of the world banker (the US) versus the rest of the world. As issuer of the main reserve currency, the US is clearly 'long risky and short safe'. It provides very large and seemingly ever-growing amounts of safe assets to the rest of the world. Furthermore, all external liabilities are in dollars but a substantial chunk of US external assets are in foreign currency. This asymmetric balance sheet both in terms of type of assets and in terms of currency mismatch provides an intermediation margin to the US who earns an excess return of about 2% on its net foreign asset position.

Figure 3: World banker external balance sheet. Underlying data are from Lane & Milesi-Ferretti (2018) and cover 1970-2015 at an annual frequency. Net risky position = portfolio equity assets + FDI assets - (portfolio equity liabilities + FDI liabilities). Net safe position = reserve assets + debt assets - debt liabilities. Debt includes portfolio debt and other investment. Both positions are summed for all countries of each group, US and Rest of the World, and normalised by the GDP of the group in the given year. Source: Gourinchas et al. (2019).



III. Global Financial Cycles

i) Characteristics

The dominance of the dollar in international trade and in international banking and asset markets matters for the international transmission of shocks and for macroeconomic policies. In a paper written for the 2013 Jackson Hole symposium, I defined the Global Financial Cycle as the co-movement of gross capital flows, credit growth, risky asset prices and leverage across countries.

Figure 4 shows the matrix of correlations of capital inflows (liabilities of countries) by asset classes disaggregated in the traditional categories of the balance of payment (FDI, portfolio (debt and equity) and credit[2]) into different geographical regions (North America, Europe, Latin America, Asia, Emerging Asia, Africa) during the period 1990Q1-2017Q4. The heatmap colours correspond to the signs of the correlations of capital flows across regions and types of flows (green when the correlation is positive and red otherwise).

Figure 4: Correlations of gross capital inflows by asset classes and geographical regions. The data are quarterly 1990Q1-2017Q4 and come from the IMF BOPS.

Liabilities	Pfolio N. Am	Pfolio Asia	Pfolio EU	Pfolio Africa	Pfolio LatAm	Pfolio Em. As	FDI N. Am	FDI Asia	FDI EU	FDI Africa	FDI LatAm	FDI Em. As	Cred N. Am	Cred Asia	Cred EU	Cred Africa	Cred LatAm	Cred Em. As
Pfolio N. Am	1.0																	
Pfolio Asia	0.6	1.0																
Pfolio EU	0.7	0.5	1.0															
Pfolio Africa	0.6	0.6	0.4	1.0														
Pfolio LatAm	0.5	0.5	0.3	0.6	1.0													
Pfolio Em. As	0.7	0.7	0.5	0.7	0.7	1.0												
FDI N. Am	0.5	0.4	0.5	0.5	0.4	0.5	1.0											
FDI Asia	0.6	0.5	0.4	0.6	0.6	0.7	0.7	1.0										
FDI EU	0.6	0.4	0.5	0.3	0.4	0.3	0.6	0.7	1.0									
FDI Africa	0.4	0.5	0.2	0.5	0.6	0.6	0.6	0.9	0.6	1.0								
FDI LatAm	0.5	0.5	0.4	0.5	0.6	0.6	0.7	0.9	0.7	0.8	1.0							
FDI Em. As	0.5	0.5	0.4	0.5	0.6	0.6	0.6	1.0	0.7	0.9	0.9	1.0						
Credit N. Am	0.3	0.2	0.4	0.1	0.1	0.2	0.2	0.0	0.2	0.0	0.1	0.0	1.0					
Credit Asia	0.5	0.4	0.3	0.4	0.5	0.5	0.3	0.5	0.4	0.4	0.4	0.5	0.4	1.0				
Credit EU	0.4	0.2	0.4	0.1	0.1	0.2	0.2	0.0	0.3	0.0	0.1	0.0	0.6	0.4	1.0			
Credit Africa	0.3	0.3	0.3	0.4	0.5	0.5	0.6	0.7	0.4	0.6	0.7	0.7	0.0	0.4	0.0	1.0		
Credit LatAm	0.2	0.3	0.2	0.2	0.3	0.3	0.4	0.4	0.3	0.4	0.3	0.4	0.1	0.4	0.1	0.2	1.0	
Credit Em. As	0.4	0.5	0.3	0.4	0.5	0.5	0.1	0.4	0.2	0.4	0.3	0.4	0.2	0.7	0.2	0.2	0.3	1.0

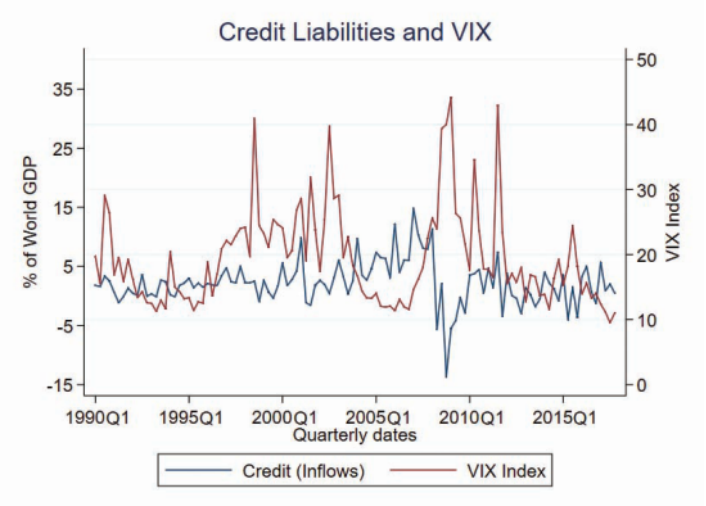
Almost all capital inflows are positively correlated with one another and across regions[3] : there is a strong commonality in gross flows across the world. Calvo et al. (1996) already noted that global factors are a major determinant of international capital flows. They write "global factors affecting foreign investment tend to have an

[2] Technically I use "other investment" which contains bank loans and trade credit.
[3] The same results hold for cross border capital outflows.

important cyclical component, which has given rise to repeated booms and busts in capital inflows". Cycles in the real rate of interest and in the growth rate of advanced economies are important "push" factors for capital flows. Movements in the VIX[4] are also strongly associated with capital flows. The VIX is widely seen as a "fear gauge", a market proxy reflecting risk aversion and expected future volatility.

Figure 5 plots aggregate gross credit inflows as a proportion of the world GDP for the period 1990Q1-2017Q4 together with the VIX. There is a striking negative correlation between the two time-series. Credit flows have been the more volatile and procyclical component of all flows with a particularly dramatic surge in the run up to the crisis between 2003 and 2007 and an equally dramatic collapse during the crisis. Credit growth and leverage are also negatively linked to the VIX. Passari and Rey (2015) show that banks leverage growth (leverage is measured by loan to deposit ratio) and VIX are also negatively correlated.

Figure 5: Gross credit inflows (% of world GDP) and VIX. (1990Q1;-2017Q4). Source : IMF BOPS and Chicago CME.



Miranda-Agrippino and Rey (2015) have shown using a large cross section of 858 risky asset prices (prices of stocks and corporate bond prices) distributed on the five continents that about 25% to 30% of the variance of risky returns is explained by

[4] The VIX is the Chicago Board Options Exchange Market Volatility Index. It is a measure of the implied volatility of S&P 500 index options. Forbes and Warnock (2012) and Bruno and Shin (2015) emphasise the surge in capital flows associated with the lowering of the VIX.

one single global factor. This factor goes up from the early 1990s until mid 1998 when the Asian and the Russian crisis erupt followed by the LTCM bankruptcy. From 2003 onwards, the global factor increases until the third quarter of 2007 when it drops. This happens after the collapse of the subprime market and this is contemporaneous with the first clear signals of vulnerability in the banking sector and financial markets. Furthermore, the global factor in risky asset prices is negatively correlated with the VIX. Interestingly, the global factor in risky asset prices is also strongly positively correlated with a global factor in capital flows estimated by Miranda-Agrippino et al. (2019)[5], which itself represents about 20% to 25% of the variance of capital flows around the world. These remarkably strong co-movements of quantity and price of financial variables characterise the global financial cycle.

ii) Origins of the Global Financial Cycle

One mechanism consistent with those facts has been described by Andrew Crockett in 2001: "The financial industry is unlike other sectors in that the feedback mechanism from supply to price is less effective, or even perverse. In a traditional industry, an expansion in supply puts immediate downward pressure on price, squeezing profit margins, reducing the incentives to invest and encouraging exit from the industry. In the financial sector, the price that falls when the supply of credit increases is the interest rate. This has the effect of pushing up asset values and appearing to strengthen the balance sheets of borrowers and intermediaries alike. Rising asset values encourage leverage and credit expansion contributing to further increases in credit growth." Which factors trigger the initial expansion of credit? Miranda-Agrippino and Rey (2015) find that the monetary policy of the US Federal Reserve is one of the drivers of the Global Financial Cycle. As the Dollar is an important funding currency globally and intermediaries draw on short-term dollar credit and issue floating-rate dollar debt, the monetary policy of the US has an immediate cash flow effect. Because of the presence of dollar-denominated assets or dollar linked-assets around the world, US monetary policy affects the net worth of banks, asset managers, households, corporates and their ability to borrow via collateral effects. International investors appear subject to sharp swings in sentiment linked to the abundance of dollar liquidity: during "risk-on" periods financial capital flows across boundaries, leading to increases in risky asset prices

[5] See also Davis et al. (2019).

and more leverage. This process can reverse sharply during "risk-off" periods. Rey (2013), Passari and Rey (2015) and Gerko and Rey (2017) show that US monetary policy has a significant impact on the VIX. More generally, US monetary policy is one of the determinants of fluctuations in effective aggregate risk aversion in international markets (see Rey (2016) and Bernanke (2017) for discussions). Effective risk aversion should not be understood as deep preference parameter but as determined by the marginal investor in different markets. For example, between 2003 and 2007, global banks were very important in international financial markets; this was at a time where regulation was lax and they could be considered as high-risk taking entities with a lot of leverage. These institutions had low risk aversion and as a consequence, since they were major players effective aggregate risk aversion was low internationally.

iii) Global Financial Cycle and domestic financial systems

The Global Financial Cycle relaxes or tightens financing conditions of domestic intermediaries, banks or non-banks, irrespective of domestic cyclical conditions. This happens for countries with fixed or flexible exchange rate regimes vis-à-vis the Dollar. The extra degree of freedom gained through exchange-rate flexibility is not enough to neutralise the effects of foreign financial conditions on the domestic macroeconomy. Hence, in a world of massive capital flows, the Mundellian Trilemma is transformed into a Dilemma (Rey (2103)). Letting the exchange rate float and adopting an inflation target, say, is not enough to insulate the domestic economy and permit monetary policy independence. This does not mean that flexible exchange rates have no purpose, they do and they help external adjustments of countries following large macroeconomic shocks as emphasised in Obstfeld and Taylor (2017). But it does mean that flexible exchanges rate cannot decouple economies from global financial conditions.

The Global Financial Cycle affects the tightness of value-at-risk constraints, which are widely used in the banking sector and also in the non-bank financial sector. This contributes to the procyclicality of credit and portfolio flows and their importance in the build-up of financial fragility. Of course, the Global Financial Cycle interacts with local conditions to determine domestic financial conditions. And some crises are home grown. But there is an important correlation of crises across countries: they

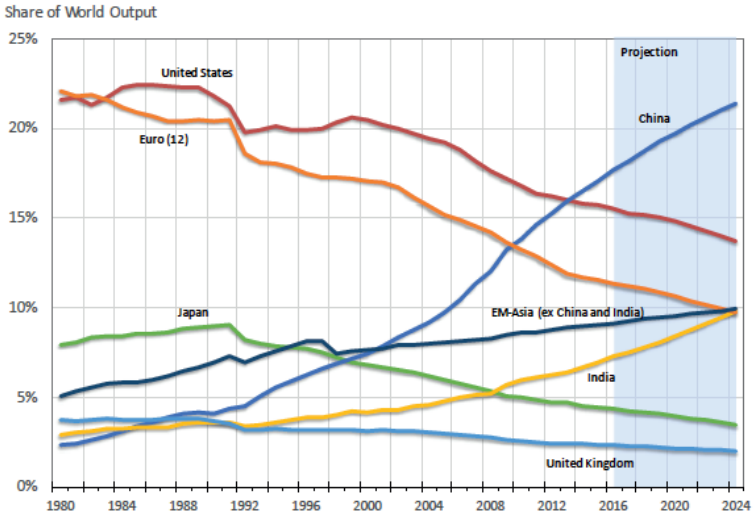
tend to be "bunched" together as shown by the classic work of Reinhart and Rogoff (2009). As excessive credit growth is one of the best predictors of crisis[6], global financial cycles can be associated with surges and retrenchments in capital flows as well as booms and busts in asset prices.

IV. The New Triffin Dilemma and a Multipolar International Monetary System

The Gold Standard and the Bretton Woods systems face a fundamental tension between the role of the hegemon as an international liquidity provider in an expanding world economy and the necessity to back the value of the reserve currency pegged to a finite stock of gold. Triffin (1961) pointed out that for the US to issue enough reserve assets to enable the international payment system to function, it had to run balance of payments deficits under official settlements as it accumulated liabilities to foreign officials without increasing its gold reserves. As the dollar value was fixed against gold, this had the consequence of decreasing foreign confidence in the dollar, which could lead to a run out of the dollar. If, on the contrary, the US were to limit its provision of liquid reserve assets to a growing world, there would be a shortage of dollars, which would hold back international transactions and distort prices. This is the Triffin Trilemma. Interestingly, the current situation can be seen in a similar light: in a world where the US supplies international liquidity in the form of Treasuries and other safe dollar assets, and invests in illiquid assets, it faces a confidence risk. There could be a run on the dollar not because investors would fear an abandonment of the gold parity, but because they would fear a massive depreciation of the dollar exchange rate, due for example to a loss of fiscal credibility by the US government. In other words, the analysis does not have to rely on the gold-dollar parity to be relevant and we may face a New Triffin Dilemma (see Gourinchas & Rey (2007b), Farhi et al. (2011), Obstfeld (2011), and Farhi & Maggiori (2018)). To put it simply, the sheer size of the gross liquid external debt of the US may be threatening at some point the ability of the US to act as a world banker or insurer. As can be seen from Figure 6, the United States is a shrinking hegemon in the world economy.

[6] Eichengreen and Portes (1987), Gourinchas and Obstfeld (2012), Schularick and Taylor (2012).

Figure 6: Share of countries in world GDP. Source : Gourinchas (2019) and WEO (2019).



In Gourinchas, et al. (2018), an increase in the demand of safe assets by the rest of the world at a time of a decreasing size of the US economy in the world translates into a decrease in the real rate of interest. The shrinking hegemon phenomenon may therefore contribute to the decline in the world real rates. In many crisis models, when fundamentals are bad there is a crisis with probability one; when fundamentals are good there is no crisis with probability one; while when fundamentals are in an intermediate region, self-fulfilling crises are possible. The decline in the relative size of the US over time (or destabilizing US macroeconomic policies) may shift the economy from the no crisis zone to the self-fulfilling crisis zone.

V. The challenger currencies, private or public, digital or crypto?

An important consequence of the above analysis is that the equilibrium in which the Dollar is the dominant international currency is becoming more unstable over time as the relative size of the US shrinks in the world economy while the stock of dollar

liabilities in the rest of the world keeps growing. Nevertheless, for the run to materialise one needs one or several credible alternatives to the Dollar. Currently, the euro may be the closest substitute to the dollar as the euro area is comparable to the US in terms of economic size and in international trade, as well as in the level of institutional development. But the incomplete architecture of the euro area with 19 finance ministries backing the currency and the absence of a euro area wide safe asset inhibits the internationalisation of the euro. Capital markets in the euro are still underdeveloped and segmented compared to the deep and liquid markets of the US (see Portes and Rey, 1998). While the transition to a multipolar system will not happen any time soon, the euro is already used extensively as a payment currency according to Swift data and it is a solid second in international reserves. The distance between the dollar and the yuan is larger as China still imposes capital control and its financial system is markedly underdeveloped. But the use of renminbi for trade invoicing and cross-border financial transactions, has increased in the recent period. This may be due to the proactive approach of the Chinese authorities who have pushed for RMB trade settlement programmes, RMB offshore clearing banks and RMB swap lines. China also introduced an RMB denominated oil future contract (petro-yuan) and Bloomberg global bond index included Chinese local bonds. Furthermore, the renminbi is now part of the International Monetary Fund's Special Drawing Rights, which was a major, even if largely symbolic milestone, on the road to becoming an important monetary power. Synergies, once they get going may quickly reinforce the adoption of the renminbi in international markets if adequate supportive policies were pursued in China. One game changer could be the issuance by China of an e-RMB with efficient transaction technologies used for international transaction within a certain network of countries.

While this transition to a multipolar currency world may get under way, much innovation is happening in the realms of private, digital and crypto currencies. We are seeing simultaneously: i) the emergence of crypto-currencies (such as bitcoin) many of them using a decentralized blockchain; ii) the possibility of the launch of private monies or stable coins (such as Libra with Facebook); iii) the possible creation of public digital currencies (Swedish e-krona). Although they have been periodically fashionable, it is really unclear what problem crypto currencies such as bitcoins are actually solving. They do not have any fundamental value: they are not

legal tenders, backed by the fiscal capacity of a government nor are they stable coins backed by a pool of assets. The only "value" that seems associated to them is to enable transactions which are below the radar screen of regulators and law enforcement agencies. Their use has been associated with the "dark web" and money laundering. They are an extremely poor medium of exchange as their valuation is excessively volatile and susceptible to manipulation. In short, they are either an object of pure speculation or they enable dubious transactions. And they do so at a very high environmental cost since "mining" requires huge amounts of energy consumption. Needless to say that such object will never and should never have any important role in the international monetary system. Stable coins (such as Libra of Facebook if it ever exists) are different animals. Their value is supposed to be backed by safe collateral and their transaction technology does not use decentralised blockchain but is constructed on a centralised network. When that existing network is already very large this means that the use of a stable coin can be scaled up very quickly. One can imagine that in countries where the Central banks have been failing (for example countries with hyperinflation), a stable coin could prove valuable. To the extent that the transaction technology used within the network is vastly superior to the existing cross border transaction technologies, the use of such a stable coin could prove attractive and possibly welfare enhancing. As history has shown it is however undesirable to let private currencies develop: this leads to inflation and to financial instability. Furthermore, the objective of a private company being to make profit, the creation of a stable coin is likely to be used to gather more data on users, to lock in customers, may be to go onto some type of banking activity in the future and gain some seigniorage revenues. The problem of who would be the lender of last resort or who customers would need to turn to in the case of a fraud or any other issue such as abuse of monopoly power is also a major issue. All this should be of concern to public authorities and it requires very careful regulation. It is important to realise that the adoption of very efficient cross border transaction technologies do not require in principle the creation of a new currency. The ball is in the court of the central banks and the BIS to improve cross-border transaction efficiency using existing national and international currencies in a cooperative way. Indeed the issuance of a currency by a state goes together with the provision of vital public goods by the state: macroeconomic stabilization policy, financial stability and some public expenditure financed by seigniorage. To reiterate

this is very different from the objective function of the multinational private companies thinking of introducing a stable coin or any other form of private money. For all these reasons, it would seem very unwise for public authorities to adopt a laissez-faire policy that would threaten their monopoly of issuance of their national currency.

The introduction of a central bank issued digital currency is yet another case. There is no issue there about fiscal backing but a number of interesting questions arise. Among them the biggest one is probably cybersecurity. A country relying exclusively on an e-currency could be very vulnerable to hackers. There could also be some questions about the stability of the commercial banking system if people were allowed to deposit directly at the Central Bank their e-currency, short-cutting commercial banks.

As mentioned earlier, the possibility that a major trading power, the EU or China adopt much more efficient technologies for cross border transactions (the current payment system within the euro area (TIPS) is excellent but does not reach cross-border) relying on an e-euro or an e-RMB could be triggering changes in the international monetary system. Marc Carney in his 2019 Jackson Hole speech proposed the creation of a Synthetic Hegemonic Currency (SHC), which would be essentially a digital SDR (currency basket). The SDR however has never developed from a unit of account to a medium of exchange as in crisis times, the lender of last resort would have to be a consortium of the national Central Banks whose currencies are in the SDR basket and there is no fiscal backing for such a consortium. De facto, in global crisis times the lender of last resort providing swap lines has been the US Federal Reserve. In 2008, it provided several hundred billions of dollars to a network of Central Banks.

Conclusion

The current configuration of the international monetary system may not be stable as the hegemon is shrinking in relative size in the world economy, so we need to think through the potential changes in international monetary order. At this stage it seems plausible to me that the world could turn towards a competition of the main Central Banks to develop high tech international payment and settlement systems within a network that they will seek to expand. In such digital networks, the lock-in effect could be very strong. Indeed, data about all transactions will be collected by the owner of the system who could then use them to help enforce its dominance. In the current monetary system, inertia in the use of the international currency comes from a network externality due to liquidity of markets and to the complementary roles played by the international currency (in central bank reserves, as a nominal anchor, etc...). But the current monetary system does not centralise information perfectly and does not enforce penalties perfectly. A digital network could. To make it concrete, we could see the emergence of a gigantic state owned "Alipay" across borders which could be complemented by an inter-country state owned "Ant Financial". This would ensure that the money used in that network would become a dominant means of payment and of credit and would confer to the issuer an important geopolitical role. From there, expanding the number of countries in the network could be the new rule of the game. This is a possibility that surely requires our attention and some forward thinking as it could have profound geopolitical implications.

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