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UNVEILING THE NEW FORM OF THE TRIFFIN DILEMMA AND ITS INHERENT DESTABILISER:

THE RELATIVE SHORTAGE OF DOLLAR-SAFE ASSETS, A CRITICAL ISSUE WITH PROFOUND IMPLICATIONS FOR GLOBAL LIQUIDITY

April 2024

RTI Paper no. 18

CENTRO STUDI SUL FEDERALISMO

Robert Triffin International

A watch on the international financial and monetary system

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by Christian Ghymers

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Executive Synthesis

This paper delves into the complex issue of the instability and pro-cyclicality of Global Liquidity (GL), which is primarily driven by the structural scarcity of dollar-safe assets. This scarcity, the present expression of the Triffin Dilemma (TD) and its inherent destabilizer, underscores the intricate nature of the problem: the US economy's inability to supply sufficient dollar liquid assets to the global economy. The circular cumulative causality introduced by the use of a national currency as an international reserve currency perpetuates this issue, as it bestows the currency with higher liquidity than other safe assets. This liquidity disparity fosters a cyclical instability between the dollar and non-dollar components within the global "high-powered money" (monetary basis), perpetuating the reversed pyramid of Global liquidity.

The core of the problem lies in the endogenous fluctuation in the perceived advantage in the degree of moneyness of the dollar. In a liquidity crisis, this can reverse the mechanism of creating a monetary base by the non-bank sector using other reserve currencies as a substitute for the too-scarce dollar-safe assets. The advantage of liquidity enjoyed by dollar assets jumps in a crisis moment, activating suddenly a kind of "Gresham Law" between international currencies used as a monetary basis. In this crisis case, the contraction in the monetary basis produced by non-bank markets implies a multiplied contraction on the private GL volume. The dollar's dominant role is directly responsible for the pro-cyclicality of the GL reversed pyramid, which generates potentially significant socio-economic costs that cannot be ignored. These costs include increased financial instability, reduced economic growth, and heightened income inequality.

The proposed solution to the systemic flaw of the dollar system and the eradication of the TD offers a ray of hope. The creation of the missing multilateral LOLR with a multilateral reserve currency, which is issued (or withdrawn) against buying (or selling) national reserves to the central banks, has the potential to adjust the global monetary basis and stabilize the GL reversed pyramid. While political obstacles, such as the US authorities' veto at the IMF level, exist, the emergence of CBDCs and the development of the use of the private SDR, in conjunction with an international coalition, could create market pressures and the conditions for multilateral cooperation paving the way for systemic reform.

About the Author

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*This paper is a reedited version of the working paper "**The new form of the Triffin Dilemma and its built-in destabilizer: the process of relative shortage of dollar safe assets**", dated 2022.*

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Unveiling the new form of the Triffin Dilemma and its inherent destabiliser: the relative shortage of dollar-safe assets, a critical issue with profound implications for global liquidity.

by Christian Ghymers

1. Four forms of the same "Triffin Dilemma" (TD)

Triffin Dilemma[1], coined from the argument of the Belgian economist Robert Triffin (1911-1993), who had been warning since the 1950s that the dollar system was incoherent for obliging the US policy-mix to choose between domestic or international stability and for incurring growing net US external liabilities with over-valuation of the dollar, takes several forms depending on the structural evolution of the financial markets and the phenomenon to be highlighted:

(i) The general principle and most common, traditional facet focus on net external flows, i.e. the US net dis-saving and its consequent growth of net external liquid debt, which results from the automatic net inflows of liquid capital held by foreigners in need to accumulate dollar reserves; the dilemma being the impossibility to satisfy world demand for dollar reserves while preserving the long-term credibility of the dollar necessary for fulfilling the function of the leading international currency.

(ii) A second aspect was developed by Gourinchas and Rey (2007) - in line with Kindleberger's justification (1966) of the TD - by using its corollary, which is the so-called "exorbitant privilege[2]" enjoyed by the US economy as the "world banker" for issuing the reserve currency to the rest of the world against longer-term investment. The privilege comes from warranting to the US cheap financing of investing abroad in risky assets, and they attribute it to a less risk-averse behaviour than the rest of the world; this intermediation provides not only a transformation margin like a banker, i.e. an excess return on its assets (risky) compared to its liabilities (safe), but also a differential valuation advantage when the dollar depreciates since the assets are mainly in Foreign currencies while the liabilities are only in the dollar. Gourinchas & Rey (2010, 2017) explain that this privilege corresponds to the sum of a financial service (world banker) and an insurance service, with a fee being paid to the US in normal times in exchange for an insurance transfer being paid by the US in global crisis times via the impact of the appreciation of the dollar on the value of their net external portfolio. In global crisis times, the value of the risky external assets of the U.S.

[1] The ***Triffin dilemma (TD)*** expresses the logical impossibility to reach an optimal management of liquidity simultaneously for the US domestic economy and for the global needs, when the dollar is used as the main international reserve; to satisfy the global needs of international liquidity means increasing the gross external liquid liabilities of the US economy, because the demand for the dollar as international reserve is an automatic cheap foreign loan to the US economy. This asymmetry creates macroeconomic imbalances which will logically increase in as much as the growth rate of the US economy is lower than in the rest of the world.

[2] Expression coined by Giscard d'Estaing and General De Gaulle in 1965

collapses while the value of its liabilities (mostly nominal reserve assets in dollars) increases. The result is an insurance transfer from the US to the rest of the world. The cyclical role of the dollar would act as insurance for the rest of the world, which pays a fee for receiving a substantial wealth transfer in crisis time. Although their explanation tends to justify the existence and even the persistence of the "exorbitant privilege" by this "exorbitant duty", they acknowledge a "new TD" as far as potential financial fragilities could appear: "*Triffin Dilemma is still with us, albeit in a subtly different form.*"[3]

(iii) A third one draws attention to the destabilising global liquidity waves created by the FED monetary policies due to the dollar's dominant role in global banks' gross operations and international capital flows. This negative externality of the dollar system was named by Triffin the "built-in destabiliser" (Triffin 1959) effect of the dollar system as part of the TD for putting stress on the spillovers created worldwide by the US monetary stance. This aspect was rediscovered after the Global Financial Crisis of 2008 and empirically demonstrated by Shin (2012), Miranda-Agrippino (2012), and Rey (2012, 2013)[4].

(iv) The fourth facet of the dilemma – Ghymers (2021) – is the subject of this paper. It connects the Dilemma (TD) and its built-in destabiliser to the structural scarcity of dollar-safe assets, which explains most of the instability of global liquidity (GL), showing the impossibility of the present dollar system in managing global liquidity and ensuring less macroeconomic instability. This aspect becomes more visible with the growing role of non-bank financial intermediation (NBFI or "shadow banks") in global liquidity development through the intensive use of "safe assets" as collaterals, leading to a relative scarcity of those assets in dollars. Contrary to the many other works on NBFI and on safe-assets shortage, our view allows for understanding better the critical aspect of the TD than the three different forms because it shows its fundamental message, the incoherence of using a national currency, the dollar, to provide smoothly the safe assets necessary for stabilising global liquidity. Furthermore, this facet explains why TD has not led to a faster loss of credibility of the dollar status with a decrease in its international role. On the contrary, not only does the dollar remain dominant, but it is even condemned to increase its importance due to the vicious circle created by its spillovers, as far as the worsening of growing systemic financial risks and the global financial crisis do not impose institutional changes.

While the importance of the global spillovers generated by the dollar as the dominant reserve currency (the third form of the TD) is recognised and brilliantly demonstrated by several econometricians, they, however, don't consider as a systemic issue the growing scarcity of dollar safe assets, that they correctly describe. Even they generally don't question the status quo and the efficiency of this dollar system with its described negative spillovers considered implicitly as inevitable effects. Not even one of these authors neither considers the described asymmetries as a systemic flaw nor envisages alternatives to the dollar system; at the most, some policy recommendations were formulated to maintain the dollar system[5].

[3] Gourinchas & Rey, 2017

[4] Several other economists also worked on the global liquidity effect. See the bibliography at the end.

[5] This is the case of Caballero [2017], who envisages either increasing the supply of safe assets through pooling or insurance or taking measures for reducing the demand for safe assets by emerging economies (global risk sharing arrangements including swap lines, credit facilities backed by international financial institutions like the IMF or the World Bank, and reserve sharing agreements), and for advanced ones by central banks buying riskier assets than T-bills in their QE, and by relaxing Basel III regulation.

2. Our thesis: the growing scarcity of safe assets in dollars is a systemic flaw from using a national currency as the global monetary reserve

Contrary to the other authors contributing to the analysis of the TD and providing "new forms" of it, this fourth aspect of the TD - that we analysed in this paper - shows the growing inability of the US economy to supply the necessary volume of liquid debt in the dollar that is required for ensuring global financial stability. Our purpose is, in the Triffin's line, to demonstrate:

(i) First, the incoherence of using a national currency as an international reserve from a global point of view, i.e. to establish that the present International Monetary System (IMS) is seriously inefficient and very costly not only for the rest of the world but also for the US economy, and overall is condemned to be unsustainable;

(ii) Second, the IMF must be moved into a LOLR that can issue a multilateral reserve currency. Our RTI publication (Ghymers [2021]) provides a more detailed analysis.

Our analysis is based on the workings of the global financial markets, which determine global liquidity (GL), which presents a recurrent and worsening instability. This trend became more visible in the 1990s and became spectacular with the Global Financial Crisis (GFC) 2008. Indeed, since 1990, the global financial cycle has been increasing in its impact on the global economic outlook. We sustain the thesis that the deep root of this systemic instability must be considered in the unresolved TD. Though a conjunction of several factors caused the GFC of 2008, the fragilities introduced in the GL by the structural scarcity of "safe assets" in dollars are a fundamental explicative factor, as demonstrated by various works. However, what is amazingly not yet considered by all these studies – except Mark Carney [2019] - is the responsibility of the dollar system plagued by the TD.

Caballero [2017] explains in detail the process of a structural downward trend of real yields on safe assets, which he named a "safety trap"[6], in which the safe real rates find increasing resistance to further downward adjustment. The consequence is to push the global economy below its potential; the corresponding decline in global output and wealth decreases the relative demand for safe assets. This shift reabsorbs the safe-asset shortage and restores equilibrium in the safe-asset market with a huge macroeconomic cost. Strangely, Caballero does not question at all the dominant dollar role in the IMS in such a disequilibrium. Nor does he question how to solve systemically the shortage of safe assets. At the most, he considers that developing a multi-currency system would be too slow and, anyway, too unstable. He instead suggests concrete measures to reduce the demand for safe assets by central banks and regulatory obligations. The possible escapes he considers remain all in accepting the systemic status quo for the dollar, considering inescapable "*the multiple symptoms of this economic illness: very low interest rates on safe assets, bubbly expansions of seemingly safe assets, recessions, episodic sharp appreciations of core currencies, and so on*". Although he mentioned the TD as a generic limitation for all the issuers of safe assets, he does not relate it to the dollar role in the IMS.

On the contrary, we take the position that a systemic change is the only efficient escape once and for all to the growing scarcity of safe assets by moving smoothly to a multilateral safe asset, which is not the debt of an economy. The scarcity of safe assets issued by the economy in charge of the global reserve currency is inevitable, as it is the debt of a single economy that cannot satisfy "safely"

[6] The difference with a liquidity trap is that a safety-trap is specific to the gap between supply and demand for safe-asset while a liquidity trap refers to the difference between savings and all class of assets.

the fast-growing demand for reserves by the rest of the world. This phenomenon is nothing else than the TD: a national currency used as the dominant reserve currency, which is logically unable to provide sufficient safe assets to ensure the financial and macroeconomic stability of the world economy. This scarcity explains not only recurrent strong recessions but also two intermediary worsening factors that caused the GFC and are mutually supporting: (i) a too laxist US monetary stance and (ii) the manufacturing by securitization on the "repos" (wholesale financial market) of pseudo-safe-assets in non-dollar currencies as a profitable reaction of intermediation by the financial markets in need for safe-assets for their business and the economy.

Gourinchas & Rey (2017, 2019) also observe this growing scarcity of dollar-safe assets resulting from the demand for dollar liquidity, which keeps growing when the relative size of the US shrinks in the world economy. As Caballero and others, Gourinchas and Rey conclude that the decrease in the real rate of interest is mainly a function of the shrinking size of the US economy; they also mention the unanalysed possibility of a future run on the dollar in conformity with the TD. Paradoxically, these authors [2013, 2015] had already, with Miranda-Agrippino [2012], brilliantly demonstrated the existence of a global financial cycle attributed to the dollar role. However, they don't deal with this systemic aspect and the increasing pro-cyclicality of global liquidity and spillovers inherent to the dollar system. The deeper causes are not covered by their skilful empirical method, which only delivers descriptive analysis. Therefore, they don't consider possible alternatives or remedies to the observed spillovers. This is why the purpose of our paper is to dig further into the structure and evolution of Global Liquidity (GL) to understand the roots of its increasing pro-cyclicality and to draw attention to what was not considered by others: the direct links with the IMS and the dollar predominant role.

3. The mechanisms of the pro-cyclical evolution of global liquidity (GL)

3.1. Financial markets are pro-cyclical: the Minsky "financial instability hypothesis" (FIH)

Minsky's "financial-instability hypothesis" [1982, 1992] and its more recent Aglietta formulation [2018] remain strangely almost ignored by mainstream economics and most central banks. The slowness to adjust the theoretical model to the observed reality is difficult to understand. It is incredible that dominant macroeconomic theories and even monetary authorities still seem to be lagging behind facts despite the lessons drawn from the GFC of 2008. As shown by Aglietta in Minsky's line of Keynes' interpretation, financial market behaviours are not ruled as other markets but by liquidity, which is mainly self-fulfilling and makes financial operators mutually dependent. Contrary to non-financial markets, where the two sides of the market have opposing interests about prices since demand is subject to saturation conditions (i.e. demand slope is negative), financial markets are inherently unstable and inevitably generate a succession of euphoria and panics in the function of their subjective common perceptions of liquidity, which link demand and supply of credit: credit demand slope could be positive when the expected change in asset value is greater than the costs of borrowing. Since both borrowers and credit suppliers share this expectation, this explains that the expected yields cannot have the stabilisation role of standard competitive market prices. Free financial markets inevitably trigger pro-cyclical mechanisms through the joint assessment of asset price changes by both sides of the market, which makes liquidity self-fulfilling. In the cyclical upward phase, optimistic expectations increase the demand for credit even with interest rate increases. At the same time, lenders also increase their supply of credit as they perceive fewer business risks and as their collaterals take more value. Paradoxically, indebtedness tends to contract risk premium. When the cyclical bubble bursts, coined[7] the *Minsky Moment*, the same cumulative process is in motion on the negative side: asset values decrease while debt values remain (or even increase in real terms), moving back supply and demand for credits. The deterioration of debtors directly affects creditors and lenders, triggering a de-leverage adjustment process that has macroeconomic depressing effects (balance-sheet recession). Thus, self-regulation of liquidity by credit price adjustments cannot generate stability in free financial markets.

3.2. The structural changes in the funding sources have reinforced the degree of financial pro-cyclicality and systemic risks.

Minsky's principle of the inner pro-cyclicality of financial markets has been reinforced during the last three decades by the progressive changes in the financial structure and the adjustments in behaviour. The most significant change is the dramatic expansion of GL driven by private liquidity based upon a shift in the sources of funding credits: wholesale financial markets have increasingly evinced traditional bank activities with the fast development of the "shadow banking" activities (the Non-Bank-Financial Intermediaries – NBFI) which substitutes short-term secured loans with collateral for conventional bank loans based upon demand-deposits. This kind of borrowing explains two-thirds of the growth of available global funding. It has grown to eclipse in size the pre-2008 un-collateralised interbank loan market and, in fact, embeds the latter because participants now prefer secured lending, even between banks[8]. So, it repackages and recycles existing savings by offering asset-backed securities to institutional investors who want to hold their liquid assets in insured assets and not in (uninsured) bank deposits. Although protecting the individual creditors (micro-aspect) gives them an illusionary expectation of liquidity, the NBFI intermediation supplies pseudo-safe -assets that introduce a systemic risk (macro-aspect). As Caballero [2017] expressed, "*complex private safe assets are not truly robust against the potentially chaotic unravelling that follows a systemic panic, in the absence of an explicit public backstop. That is, private safe assets are not macro-AAA assets*". All the more, this risk results from intermediation, which includes a multiplicative impact on the monetary basis itself, thus strongly affecting the resulting GL with a damaging effect on the value of securitised collaterals (or pseudo-safe assets).

This trend of expansion of NBFI results from many structural changes[9], including the incentive to escape the bank's capital requirement and other regulations, impacting the systemic risks. Indeed,

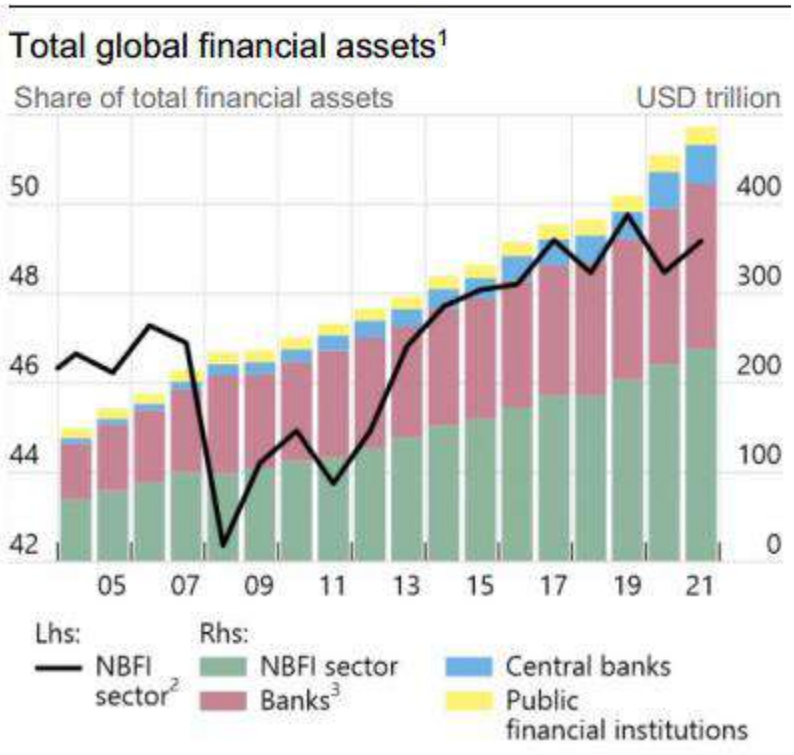
[7] See Cassidy [2008, 4 February] «The Minsky Moment», comment in The New Yorker

[8] According to 2022 FSB estimations, the NBFI would reach about US $ 250 trillion or one-half of world financial markets (to give an idea, this is 250% of world GDP)

[9] These intertwined changes are not analysed in this short paper and cover overly expansionary monetary policies (QE), over-indebtedness leading to growing recurrent needs of liquidity for refinancing existing debts, combined with a lack of adequate financial regulations (excess of leveraging and credit boom), generalized financial and international capital liberalisation, financial innovation, financial surplus of emerging economies with less developed domestic financial markets, increases of cash holdings of Forex dealers and Sovereign Wealth Funds, decreasing marginal profitability of capital in advanced economies and decreasing growth of total factor productivity everywhere, ageing…etc.

the NBFI sector does increase the elasticity of the GL as the absence of capital ratios to respect boosts the credit multiplier. It means a "*credit extension outside of the banking system*" (FSB 2012) but also out of reach of any regulation. Therefore, it increases the systemic risks and the instability by making more endogenous (in two ways) the supply of liquidity: first, since this elasticity works both sides along the cycle, so GL is more reversible, being highly pro-cyclical; second, NBFI manufactures pseudo-forms of "high-powered money" to boost the effective size of the global monetary base which means that these credit providers are able to expand liquidity independently of the Central Banks but at the cost of higher instability and risks i.e. with reversibility when cyclically inappropriate.

Chart 1. The Non-Bank Financial Intermediaries – NBFI – drives Global Liquidity



Source: Financial Stability Board

This feature is a result of the fast expansion of NBFI activities, which implies an over-demand for "safe assets mechanistically" as proportionally more collaterals are required (especially by fast-growing emerging economies without efficient financial markets) in a growing share of the intermediation for providing the GL. Facing this lucrative opportunity, financial market operators, especially on the **repurchase agreement ("repo") markets**[10], respond to such a higher demand by organising highly profitable intermediation in order to supply additional safe assets through a transformation of liquid liabilities in riskier assets through an asset-backed securitisation which allows them to borrow more for increasing their loans to riskier borrowers[11]. In particular, the repo

[10] This form of loan consists of two simultaneous short-term operations: a repurchase agreement (named "a repo") for providing immediate cash to a borrower who sells security as a guarantee to an investor with the commitment to repurchase this security at a higher price (the "reverse repo") which depends upon the quality of "safe-asset" used as collateral. The collateral must be a "safe asset", i.e. a perfectly liquid one: mainly US T-bills, plus some other AAA bonds and CDs.

[11] This is a "déjà-vu"which remains the development leading to the GFC, but this time, this securitisation affects

operators activate the circulation of their first-best collaterals (US T-Bills) for supporting a cascade of successive loans, corresponding to an increase in the leverage but inside the monetary basis itself, thus with multiplied effects on GL. This process of endogenous creation of the monetary basis for fast-profit through an over-expansion of repo intermediation tends to become a process of cumulative circular causality of instability and systemic risks in as much as the scarcity of "safe-assets" continues to increase (because the yield of the safe-assets diminishes as far as they are highly demanded, giving so higher incentives to the dealers to increase their business). As explained, this process of the relative scarcity of safe assets is itself the result of the fast development of the repo markets.

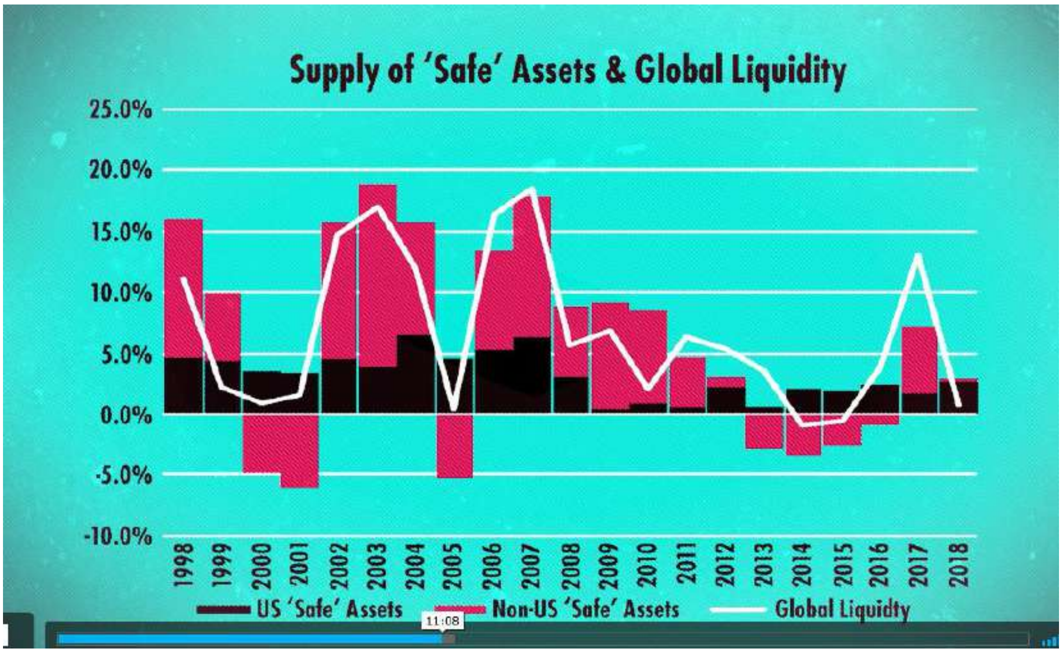
We face thus a systemic cumulative causality which produces a differentiation among the collaterals composing the liquidity basis according to their specific degree of "moneyness"[12]: the "external" collaterals, which are exogenous policy tools issued by authorities (central bank and Treasury, mainly from the US), and the "internal" collaterals, which are pseudo-safe-assets endogenously created by the intermediation on the repo with leverage by operators which, by definition of being non-bankers, have no direct access to a LOLR. Therefore, this differentiation in moneyness across safe assets is meaningful, reflecting the difference in information-sensitiveness between external and internal collaterals: the value of the latter co-varies more along the cycle, and market expectations produce so an instability inside the GL basis which becomes itself moving reversed credit pyramid (see charts in Annex) supporting the big GL reversed pyramid of credits; in the upward phase of the cycle, the internal collaterals are accepted as safe-assets, the GL expands by a multiplied volume (see the Minsky/Aglietta instability process), but once the "Minsky Moment" occurs, the differentiation is revealed. This cyclical differentiation produces, therefore, an amplified fluctuation in private liquidity. Inside the basis itself, in case of a liquidity squeeze, a sort of "*Gresham law*" could suddenly occur for chasing the best external collaterals by selling some internal ones, which means the destruction of part of the basis, provoking a multiplied reduction of the private liquidity volume with significant contraction effects on the global economy.

The result of this process of endogenous creation of "high-powered money" by the repo is worsening systemic risks and amplifying the general principle of the inner pro-cyclicality of liquidity. The global monetary basis of the GL has become itself pro-cyclical; the endogenous collaterals expand their volume in the upward part of the cycle, amplifying the volume of GL and contracting it abruptly in the recession. This feature worsens the pro-cyclicality of the GL by a multiple factor because the global monetary basis has also become a reversed pyramid of credits that expands and contracts along the financial cycle, generating amplified variation in the final volume of available GL.

the "high-powered-money" itself, i.e. with a multiplied and reversible impact on GL

[12] Moneyness or resilient liquidity is used here in its broad sense: the degree to which an asset approximates cash in its ready liquidity and the low transaction costs in realising that liquidity, not as the technical application of the same concept to derivatives instrument (options).

Chart 2. Amplification of Pro-cyclical Changes in Global Liquidity by changes in Pseudo Safe Assets versus changes in dollar safe assets (in annual %)



Source: Howell, M. Video Conference in 2020, CrossBorder Capital Ltd, London

Thus, the faster expansion of NBFI activities has made GL liquidity more endogenous and unstable, being more pro-cyclical than traditional bank loans since they rely increasingly upon non-regulated, less reliable, more reversible, and more variable wholesale sources (compared to conventional retail sources); in particular, the growing dysfunctionalities of the financial system appear in this trend of an increase the scarcity of safe-assets in the dollar. It results in more financial fragilities, less power for the central bank, and negative spillovers with an amplification of the financial cycle with a higher probability of reversal liquidity contraction, provoking a rush towards dollar-safe assets and deeper recession for the real economy with a lot of social costs and political risks.

It is damaging that the public good aspect of the global financial system is not ensured. Therefore, there is a case for a multilateral intervention since the issue is international and cannot be solved at the national level. In the panoply of possible tools, the most efficient way to act should be the most global and easiest to bargain among national authorities. This means looking for a tool requiring the minimum reduction of national sovereignty. Historical experiences show repetitively that attempts to coordinate national policies or agree upon common regulations are either (politically) too costly for poor results or, most often, fail. Therefore, as we propose in section 6, it is logical to turn efforts towards the factor which covers the broadest range of impacts with the more centralised level at the national level and for which already exists a multilateral forum with agreed-upon tools and institution: the International Monetary System (IMS), the SDR and the IMF.

4. The link with the International Monetary System (IMS) and the Triffin Dilemma (TD)

In the previous section, we limited our analysis to describing schematically the increasing instability of global liquidity (GL) and its growing pro-cyclical impacts on the real economy. We synthesise this systemic instability as a combination of the Minsky general principle of financial instability (valid for any financial market) with the specific emergence of the NBFI as the primary funding source. In this section, our analysis goes further by showing that this combination worsens and makes more visible the genuine systemic incoherence for relying upon a national currency for international purposes. Nothing more than the core principle of the TD, which demonstrates here that TD is the ultimate cause for the amplification of the pro-cyclical nature of global liquidity, which is a worsening systemic flaw. The argumentation is that TD explains two intertwined observed phenomena: 1) the process of shortage of dollar safe assets and 2) the consequent additional pro-cyclicality of the GL resulting from the endogenous response to the scarcity of safe assets by the repo markets. Both phenomena are entirely due to the use of national currency as the dominant reserve currency:

1) The shortage of safe assets is essentially a shortage of the top-liquid assets in dollars. To give roughly an order of magnitude of this scarcity, the huge stock of loans financed by the NBFI sector in 2022 wavers around US $ 250 Trillion. With the hypothesis that these loans are supported by assets with an average duration estimated to be about five years, pure refinancing needs to reach a gross flow of the order of 50 trillion per year[13]. Since around 60% of the global assets are issued in dollars, with NBFI ensuring 50% of the global refinancing needs, the potential demand for dollar-safe assets could be mainly superior to the supply by blocking permanently around US $ 15 trillion. In contrast, the new global investments, of which a part also need collaterals in dollars, could face an annual supply of US T-bills of less than 1 Trillion (the historical record of annual issuance of US T-bills during the peculiar years 2020 to 2022 had reached a yearly flow of 2,43 Trillion against an average or the pre-pandemic period 2015-2019 of 0,7 Trillion). Even with more precise figures than those from this rough estimation, it is clear that the explosive global need for a flow of new safe assets is on a rising trend that seems impossible to match with accelerating US Treasury debt issuance, all the more that the US economy is losing relative weight in the world economy. This means that the global economy actually faces a worsening of the typical TD: the size of the global needs for international liquidity makes it impossible for US policy tools to satisfy them by issuing T-Bills and Fed reserves. The dollar cannot be used safely as the best safe asset for the world economy. However, contrary to the initial fear with the TD in the 1960s and 1970s, the adopted alternative is not an excess of issuance of dollar debt putting the quality of the dollar-safe assets in danger, but the other alternative of an imposed dollar shortage. This scarcity of dollar-safe assets confirms the TD and its corollary, the "built-in-destabilizer" coined by Triffin [1959][14]. The shortage of dollars means that the GL relies on a shrinking basis of dollar-safe assets, i.e. imposing higher leverage, which increases the systemic risks of the global financial system and implies lower yields on dollar assets (visually represented in the chart in

[13] Howell, M., *Capital Wars: The Rise of Global Liquidity*, Palgrave, MacMillan, 2020

[14] Triffin's hearing before the Joint Economic Committee of the US Congress, 28 October 1959

Annex by the widening of the angle of the pyramid which illustrates a higher global multiplier of the monetary basis in the dollar).

The amplified destabilising mechanism through which the dollar's reserve currency status significantly impacts non-US safe-assets yields is exemplified by the episode of the start of the COVID crisis (March 2020) on the UK bond market[15]. The price patterns of dollar-safe assets in crisis periods registered an opposed movement to those of non-dollar-safe assets. The dollar appreciated sharply against the £ (10% in a few days) as against other major currencies. As the non-dollar areas hedge their dollar exposures using foreign exchange derivatives – by selling USD forward - many operators received margin calls on their foreign exchange derivatives holdings. To meet margin calls, these firms liquidated their domestic safe assets, thereby contributing to the yield spikes in non-dollar domestic markets, with heavy losses for the financial sector (for example, £6.4 bn £ for the UK insurance and pension funds) and damaging impacts on the rest of the economy. This episode shows the importance of the advantages of "moneyness" the dollar is endowed by its prominence in the IMS.

2) Furthermore, as also described in section 3, the lower dollar yields push to highly profitable intermediation on the repo market for creating by securitisation the demanded "pseudo-safe-assets" as substitutes for the missing "safe" dollar T-bills and CD. This securitisation creates a two-tier hierarchical monetary basis: external collaterals and internal ones. Since the US dollar enjoys the best degree of moneyness for being the primary vehicle in international transactions, the best safe assets remain dollar assets, which compose most of the external assets. This operator's reaction amplifies the systemic risks even further. The explanation of the destabilising effects of this endogenous creation of a part of the global monetary basis also comes directly and entirely from the incoherent fact that a national currency gets a dominant international status, which warrants a superior level of "moneyness" (safe-haven effect) compared to other reserve currencies. This difference introduces binary segregation inside national currencies, opposing the dollar to the other currencies when a cyclical downturn increases the expectations of a liquidity squeeze. The increase in the perception of global financial risks accelerates the demand for collaterals in dollars for prudential reasons while the supply of pseudo-safe assets vanishes, up to the point of becoming a sharp discrimination between the safe assets in dollars and any other. The de-leveraging and dash-for-cash results become a safe-haven search: the dollar is the standard of the global banks and the Central banks, it has an effective LOLR and is also the most accepted liquid asset for being the only one which concentrates most of the attributes of an international currency (see Chart in Annex).

We don't dispute the objective elements which explain the higher moneyness of the dollar – these are very known facts[16] - but the absence of awareness or the denial by most monetary authorities[17]

[15] See Bank of England Working Paper by Robert Czech and others [2021]. Despite being the mechanical consequence of the binary discrimination across currencies created by the dollar role, the Bank of England qualifies it as an "intriguing pattern" for the "Unintended consequence of holding dollar assets".

[16]No other national currency is able to play the same role as the dollar in trade, in capital markets, in global bank operations with access to the Fed, in international reserves, and on the Forex. Theses dominant functions are mutually supporting through the network and scale economies and give to the dollar a de-facto monopoly in crisis-times.

[17] The only exception of a central banker in function to formally contest the dollar system was Mark Carney, Governor of the Bank of England, in his brilliant speech at Jackson Hall in 2019, see Carney [2019]

of the fact that the best safe asset, for being issued only in function of domestic objectives, cannot correctly fulfil the international role of global monetary reserve that any stable monetary system requires. The consequence is the impossibility of managing the global liquidity efficiently. Indeed, the dollar cannot cope with the worldwide need for safe assets, the Fed cannot act as the Lender of Last Resort for the world, and the private markets cannot compensate for this gap without destabilising the GL. As described, in a cyclical "dash-for-cash", the binary difference in moneyness favouring the dollar collaterals triggers a Gresham's law inside the global monetary basis, applied to the two categories of safe-assets: the external collaterals in the dollar are suddenly too highly demanded and tend to be hoarded against the internal collaterals, especially those non-dollar ones, which are sold. The repo intermediation inside the global high-powered-money (through successive pledges in repo chains) tends to be reversed by the jump in the haircut[18] of non-dollar internal collaterals, destroying part of the global monetary basis with an amplified impact on GL and on the shortage of first-quality safe-assets which are subject of an overbidding of demand. The reason for higher reversibility is the worsening of the "Minsky moment" due to the differentiation favourable to the dollar.

Contrary to the simple case of a national credit pyramid where the Minsky Moment occurs with a monetary base exogenous and manageable by the national central bank, at global level, the Minsky Moment occurs with a worldwide "extended" monetary basis which does contract by an internal de-leveraging, since part of global monetary basis has become also pro-cyclical, the repo having created second-best internal collaterals in the upward part of the financial cycle (Chart in Annex). Furthermore, while the national monetary base is manageable by the national central bank, it is not the case globally, where there is no LOLR. Neither the Treasury nor the Fed could suddenly supply safe assets in adequate volumes. Since the GFC, the only concrete response has been the agreement of a set of bilateral swaps between the Fed and some central banks, but too late, under the risk pressures for the US system, and on a discretionary (politically) base. Although very useful, these swaps are rather ad-hoc «bricolage» in urgency than a systemic solution to the TD through creating the missing tool for regulating the global basis of the GL in an objective and multilateral way.

In addition, in case of a liquidity crisis, the fall in asset values impedes the repo markets from channelling conventional liquidity injection by central banks through banks to indirectly feed the (huge) non-bank needs on the wholesale markets. Central banks responded to this limit in their conventional monetary policies and the too-low interest rates by moving to quantitative easing (QE). Still, the net impact on the supply of safe assets remains to be seen in as much as QE freezes safe assets in central bank balance sheets[19]. This means that the "inverted pyramid" of global liquidity relies essentially upon a pro-cyclical monetary basis of safe assets, among which the proportion of dollar-safe assets is shrinking. This combination increases the systemic risks and instability of global liquidity created from this shrinking basis.

According to our analysis, the Minsky Moment is compounded by Triffin's built-in destabiliser (a corollary of his Dilemma), making the international financial system increasingly fragile. So, we demonstrate that using a national currency as the main international reserve currency, providing

[18] Repo terminology for naming the percentage loss in the value of an asset when its yield rises by a spread for being less liquid than the benchmark.

[19] In the Euro area, the effect is demonstrated to be significant: QE makes scarcer the safe bonds and 1% of a bond outstanding purchased by the ECB is associated with a decline of about 0.78 bps in its repo rate. See William Arrata and others [2018]

the best safe assets is the ultimate systemic cause of macroeconomic instability through the global monetary basis's procyclicality that supports global liquidity issuance.

5. The Triffin Dilemma (TD) and the resilience of the dollar system are not contradictory.

The persistence of the dollar dominance - especially its increased international role since the GFC- has been interpreted as a counterargument against the TD Triffin announced in the 1960s that the Bretton Woods system was condemned by the excess of dollar liquid liabilities compared to the availability of US gold assets. This gap will force the US to abandon the fixed link between the dollar and gold. This correct argument led to the simplification that the TD would announce a loss of confidence in the dollar with an inevitable run out of the dollar due to an excess of liquid debts providing GL. This is one branch of the alternative dilemma: the hypothetical case where the US would try to act as the global LOLR to satisfy the world's reserve appetite. Our interpretation of the TD, in line with Triffin's built-in destabiliser, is the other branch: the scarcity of dollar-safe assets is the contrary of a dollar run; it is "dash-for-dollar cash", which creates global instability. Of course, this instability should lead, in an undefined future, to geopolitical debates and a significant financial crash with a loss of confidence in the dollar and then to the need for an institutional reform of the IMS.

However, this still needs to be on the agenda, and almost all monetary authorities still prefer the status quo, while most economists accept it. The reasons remain unclear. A pragmatic one is merely that the dollar is the only efficient vehicle for daily transactions. This operational argument is extended by another one. Despite admitting the rationale for change, the authorities opt for the status quo because they believe it carries the lowest risk for most players in the short term. The risk-averse behaviour imposed by their function pushes them to prevent any abrupt move away from the dollar, which could trigger trade and currency flow disruptions and losses. These two arguments are reinforced by a combination with a third one, which naively follows geopolitical views: the implicit consensus to see favourably the financial markets being able to make the IMS evolve smoothly into a multi-currency system in which several international currencies, ideally representing the primary trading areas, would progressively share the functions of the global reserve with the dollar.

However, this spontaneous evolution towards a monetary multi-polarity simplistically mimics the economic or political multi-polarity, which are already realities but which underestimate the currency substitution and do not rely on the inner need of universality for being an ideal monetary standard[20]. A multi-polar monetary world is an aesthetic view that ignores the technical aspects that make the monetary system work. Money must be based upon a universal standard either imposed by hegemonic power or agreed upon by consensual international conventions and institutions. Past experiences, as well as the inner logic of money, make clear that currency competition could only be destabilising[21]. For precisely the same reason as the instability generated inside the global monetary

[20] The political weaponization of the dollar is a dangerous infringement of the necessary universality of an international currency, and the same would probably apply to the projects to build an anti-dollar international standard

[21] Kareken J. & Wallace N. [1981], "On the indeterminacy of equilibrium exchange rates", The Quarterly Journal

basis, by the difference of moneyness among reserve currencies, a monetary system cannot work efficiently with competing alternative tools, all the more that the reserve currencies are closer substitutes. Without formal agreement on a single standard, any news affecting the moneyness among currencies will imply massive substitutions against the less liquid ones. These substitutions would seriously affect the ability of the central banks to regulate their own liquidity, with damaging consequences for GL along the same phenomenon as analysed in sections 3 & 4 inside the global monetary basis. Furthermore, for operational reasons, dealers could not work efficiently by managing simultaneously competing standards in their intra-day fast operations.

Anyway, the unrealistic aspect of the current hypothesis of multi-competing currencies dethroning the dominant dollar also allows for making clear that nowadays, the primary determinant for being the main reserve currency is the existence of a fast-growing stock of high-quality (liquid) debt, i.e. to be also the dominant debtor. This implies:

- either to sustain significant current account deficits, which means, by accounting definition, that other big economies cannot simultaneously do the same,
- or that another big economy would want and be able to attract substantial liquid liabilities for transforming them into long-term external assets. In fact, this is contrary to what emerging economies (like China) have been doing.

Therefore, the dollar could only be dethroned when another economy could compete with the US by issuing as much or more high-quality debt as those in dollars. Neither the EU, China, nor any other BRICS member seems willing or able to fulfil this condition. So, even the weaponisation of the dollar could not reverse its dominant role in a reasonable, predictable horizon, even if geopolitical reasons justify it.

6. The smoothest solution to the Triffin Dilemma by upgrading the SDR

The present IMS is affected by a systemic flaw that causes instability in the monetary system and the pro-cyclicality of GL volume. Still, economists and policy-makers don't seem to look for a systemic solution. As Triffin [1991] expressed, this observation is mind-boggling and "*highlights a major blindness of virtually all analysts*". Despite the staggering status quo defended by monetary authorities, the logic of this paper is to try to unlock the debates by diffusing a common sense awareness that anyway the long-term costs of the status quo vastly outweigh those of a reform which would focus upon the root of the problem: "*the logical absurdity and disastrous results of the use of a few national currencies as the major, or sole, instrument of international monetary reserves*" (Triffin [1991]).

The most obvious and the easiest technical solution is the simplest: the creation of a multilateral LOLR able to issue or withdraw the multilateral safe assets to optimise the GL's volume without increasing the external debt of the dominant economy (see Chart in Annex). This is, in fact, the Keynes/Triffin plans. Of course, this ideal systemic change is considered politically unrealistic, as we express in the RTI working group on SDR [2015]: "*One must admit that the first-best solution of*

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of Economics 96(2), pp. 207-222. See also the early work of Ragnar Nurkse [1941], and its modelisation by Fahri, E., Maggiori, M. [2018]

global liquidity conditions being determined by a world central bank is out of reach in today's world because political forces, voting, decision-making processes and regulations remain mostly national while economic and financial developments are global. However, the geopolitical nature of the obstacle to a systemic reform could change in the future, especially in a big crisis. Also, the revolution of payment digitalisation and its geopolitical and monetary policy consequences upon central banks and the Forex could generate a dynamics of changes that would oblige authorities to move out of the status quo (Ghymers [2020]). The most promising consequence of Central Bank Digital Currencies (CBDCs) is their capacity to eradicate the costs for bundling (or de-bundling) the five reserve currencies composing the SDR, which the markets would demand as the most competitive reserve asset and the best vehicle for Forex transactions. Indeed, SDR, as a basket of the five main currencies, is arithmetically immune by construction to exchange-rate fluctuations between them. The higher substitution across reserve currencies resulting from CBDCs will mean higher instability of exchange rates, thus reducing the competitiveness of the dollar as a vehicle for Forex transactions and in its use by third countries. This should spur the authorities to solve this flaw by implying multilateral institutions for bargaining a systemic change. The urgency and the market option for developing a private e-SDR will force authorities to intervene in e-SDR and merge it into the official SDR, opening the door to the move towards our MDR. In particular, the rest of the world could cooperate in developing the use of the private e-SDR as well as the official one at the regional level, strengthening the pressures for reform.

The political obstacle[22] cannot impede the purely economic and welfare debates. Unfortunately, geopolitics pollutes the economic rationality. The benefits for the US far outweigh the short-term disadvantages of adjusting to the realities. For the rest of the world, the advantages would be even more significant, and the short-term costs generated by the US external adjustment would be much lower if the risks of financial and exchange-rate turbulences were taken under control by specific dispositions. Therefore, the proposed solution should be able to meet simultaneously the following set of conditions (see Central Bank bookkeeping in Annex):

1. Transforming the present Special Drawing Right (SDR) into a genuine multilateral currency by allowing the IMF to issue (or withdraw) them directly for being the multilateral safe assets supporting the creation of the GL. This upgraded SDR issued as a liability of the IMF against deposits in national reserve currencies or national bonds on its asset side also transforms the IMF into the missing **multilateral LOLR** able to manage the global monetary basis in SDR for stabilising the volume of GL without affecting the debt of the dominant economy.
2. To be immediately as efficient as the dollar as a vehicle for international transactions, especially for the dealers and intra-say daily market operations.
3. To spare bargaining and policy conflicts on the international commitment to coordinate and to be financially neutral.
4. To prevent any sudden shock on the financial and exchange-rate markets
5. To make up for the deflationary risks that could result from the end of the absence of external constraint on the US economy, which has used, up to now, to play the role of "consumer of last resort."

[22] A decision to change the IMF statuses and the SDR requires a qualified vote of 85%. This requires the approval of the US, which has a veto with 16.5% of the total voting power. Furthermore, the US Congress has to approve any issue of SDR superior to the US quota of SDR 82 bn.

At first glance, meeting these five conditions seems a utopian challenge. Nevertheless, drawing upon the highly probable move to Central Bank Digital currencies (CBDCs), the growing costs of the recurrent financial crisis, and in comparison with possible alternatives, the cost/benefit assessment would inevitably give clear advantages to the systemic solution of upgrading the SDR issued by an IMF acting as the global LOLR. Let's review the main aspects of the respective five conditions:

1. On the first condition, the Special Drawing Right (SDR) is à-priori the unique legitimate candidate from which such a multilateral reserve currency could be shaped from the only existing multilateral instrument which has the merit to exist, for having been already created more than fifty years ago with the legal purpose to become "*the principal reserve asset in the international monetary system*", according to the formal agreement enacted in the Article VIII section 7 of the IMF statuses (1969).

The systemic argument for upgrading the SDR into a "**Multilateral Drawing Right**" **(MDR)** - i.e. the missing multilateral reserve currency - is that the present SDR is not yet a reserve currency but only a reserve asset made up of a mere basket of five (national) reserve currencies. Solving the TD requires a genuine (n+1)th currency, which is not more the net debt of one of the "n" national economies. This additional reserve currency to the "n" existing ones allows the restoration of the missing degree of freedom to national policies because with "n" different currencies, there remains only (n-1)th exchange rates and current account balances, making it impossible to get "n" autonomous policies: one economy has to abandon its sovereignty for supplying the necessary safe-assets to the n-1 other economies. This is precisely what the dollar cannot do but what a multilateral currency can solve automatically: its issuance of safe assets would immediately suppress the asymmetry due to the binary discrimination introduced by the "nth" currency (the dollar) against all the others, once this currency fulfils the role of dominant standard, especially among the safe-assets composing the global monetary basis of GL (see Chart 2). Automatically, the occurrence and amplitude of financial crisis would be reduced, but, more importantly, the variation of the issued volume of multilateral safe assets makes possible and easier rational management of global liquidity as a public good because the global monetary basis is not anymore the debt of national economies, but a liquid liability of the system.

The systemic logic of moving from national reserve currencies to multilateral ones is precisely the same as what was necessary to do at the national level when national central banks substituted private bank currencies for their own liability issued to ensure the stability of the interbank liquidity. The reason is the same: the need for a neutral LOLR, which issues its own liquid debt as the safest assets, above all the "n" others, according to the needs and without creating asymmetries among other assets.

The MDR (the upgraded SDR) would become the principal reserve currency across central banks without creating any asymmetry and spillover effect, but able to create the function of global LOLR by issuing or withdrawing safe assets in order to stabilise the GL like the open-market policies managed at the national level. It would significantly reduce the TD since the exchange-rate risk and the external constraint would appear automatically for the dollar, as is the case for any other national currency[23]. IMF would issue (withdraw) it as its own liability against buying (selling) to national central banks the exact asset counterpart in eligible reserves and liquid bonds. These issued MDRs

[23] Although not perfectly as far as the four other reserve currencies do not represent completely the rest of the world economy. This is why, later on and ideally, it would also be necessary to adjust its composition in order to reflect better the world economy (increasing the size of emerging economies and some representative LDCs)

would play the role of multilateral first-best safe assets because they will be necessarily less discretionary, safer, arithmetically more stable, and collegiately manageable, and their issuance no longer implies a growing indebtedness of a national economy. Once the IMF issues them, their liabilities are always identical to their assets. This is the property of the (n+1)th currency to be an "external" currency in a world with "n" national currencies. This management should be strictly based upon technical criteria set by IMF experts, under the authority of the independent Central Banks[24] with a clear mandate from the IMF Board to regulate the global liquidity in the world's interest. This mandate would be under the scrutiny of a public debate inside a professional forum of representative macro-economists.

2. Blockchain technology and **the generalisation of Central Bank Digital Currencies (CBDCs)** will make bundling/unbundling the SDR costless. Therefore, this e-SDR would become competitive for the private sector, contrary to the present situation. At the same time, for the same absence of conversion costs, the dollar could and should remain the primary operational vehicle on the day-to-day markets for logistical (and logical) reasons: only one working standard is feasible for intra-day or short-term operations of dealers. For the same reason, a multi-currency option would be even more unstable[25] without a superior (n+1th) reserve currency above them as regulated by a (n+1)th LOLR. Our proposal does not pretend (or would not imply) to substitute for the US dollar operational role on the interbank markets, but mainly across the primary Central Bank operations, as a vehicle for exchange-rate transactions and for GL management in a collegial way for ensuring global stability. This CBCD feature allows for **maintaining the operational vehicle role of the dollar**, keeping the acquired technical advantages and practices of its use as the standard tool for the dealers, especially in intra-day or day-to-day transactions. However, this new ability to permanently convert in e-SDR creates symmetrical exchange-rate risks for all currencies.

3. In a world segmented in "n" national currencies and without (n+1)th currency, it is unsurprising that decentralised policy choices are potentially conflictive and lead to destabilising spillovers. GL management requires the capacity to manage the volume of safe assets which constitute the global monetary basis, something which could only be effective through two alternatives: either by reaching perfect coordination among "n" sovereign Central banks and Treasuries for resolving the missing degree of national policy freedom among "n" currencies, or by centralising the management of the volume of the safe-assets by upgrading the IMF as a global LOLR in charge of «multilateralizing» the emission of safe-assets against national safe-assets. The first option imposes reciprocal external adjustments (i.e. restricting national policy sovereignty through a supranational power). In contrast, the second one, by adding a neutral "n+1" currency, does restore symmetric forces able to constraint automatically the set of "n" monetary policy stances (i.e. creating an automatic self-constraint which does **not imply any supranational power and no transfer of monetary policy sovereignty**). This latter alternative is à-priori, the more realistic one (or the less difficult to agree upon) because it is the most "subsidiary" and the least costly, both financially and politically, fitting better with the current populist mood against international cooperation.

[24] Of course, this technical responsibility must remain exclusively in hands of central bankers. This supposes that the IMF Board gives mandate to central banks of the IMF members to set up a specific monetary committee in charge of managing the MDR with the same autonomy as the central banks with respect to their respectiveTreasury.

[25] See footnote n°21

It consists in charging this "n+1th" agent to validate the net result of "n" policies upon world liquidity demand from the "n" autonomous choices under only the technical global constraint of a nominal anchor able to ensure world price stability. This means purely technical management focusing only on the world's general interests. This nominal anchor - or global constraint - represents the need to organise this public good of a global monetary policy stance that is transparent and compatible with international price stability and stable macroeconomic growth.

Such a public good is “a-political” for being purely technical, but at the highest global level: managing the degree of GL collegiately according to previously agreed objective parameters is the most efficient lever that monetary authorities could ever dream. Overall, this is the smoothest way to cooperate while respecting each other's sovereignty. There is no more need for stronger coordination of policies interfering with national sovereignties or against central bank autonomies once the “n” countries accept the SDR's costless upgrading in the IMF statutes. Each economy recovers more independence with the eradication of monetary spillovers. They remain free to adopt their own policy stances as they want; there is no more need for dedicating resources to costly safety nets or piling up an excessive stock of reserves, no more waste of time for bargaining polemical burden-sharing, and - most crucially - no more Triffin Dilemma since the IMS would become automatically more symmetrical, and therefore no more “built-in destabiliser” from the dollar-system since the proposed multilateral currency would be managed only to ensure global stability and the general interest as defined technically by the Central Banks members of the Board of IMF.

This is in clear contrast with the establishment views and some proposals which recommend strengthening surveillance and policy coordination, advocating that this option would be more realistic than reforming the statutes of the IMF. However, reality shows that international coordination has not only generally failed but is complex and unpopular to defend. Indeed, uncertainties about the “real model” combined with a lack of communication and reliability between heterogeneous players (lack of trust for sharing the costs and benefits among autonomous actors who pursue geopolitical goals) block them into a typical “Prisoner's dilemma” situation, i.e. non-cooperative attitude leading them to a negative outcome for all. It is, therefore, shocking that authorities consider it seriously feasible that dominant economies would accept to abandon part of their sovereignty on their monetary and fiscal policies for the undefined sake of others. In comparison, introducing a once-for-all agreed automatic constraint with no financial cost (on the contrary) and does not need political bargaining or burden sharing among nations looks much less utopian.

4. The proposed upgraded SDR would eradicate automatically and immediately the destabilising multiplier inside the liquidity basis, one of the major causes of the boom-bust cycles of private liquidity and dollar exchange-rate fluctuations. Of course, the counterpart would be the end of the scarcity of the dollar-safe assets and, thus, some depreciations of the dollar exchange rate. Furthermore, this depreciation could be amplified by the attractiveness of the higher (arithmetic) stable store of value of the MDR that should add a net demand for reserves in MDR by selling those in dollars. Although the dollar would remain the primary operational vehicle on the markets, a significant substitution of dollar assets for SDR reserves would probably result. To prevent wild exchange-rate movements, it is essential to organise an orderly process in this transition from the dollar system to the MDR system by setting an off-market mechanism easing the automatic conversion of excess dollar reserves into MDR reserves. A substitution account (see Annex) should be opened at the IMF, where holders of

excess dollar reserves could deposit them in exchange for their equivalent value in MDR. At the end of the 1970s, a reform of the IMF for moving to SDR reserves failed on the burden sharing of the exchange-rate losses that the dollar's depreciation against the SDR could imply[26]. However, this difficulty is merely artificial and shows a poor systemic vision. When this substitution is considered as a system change, which means, as in our proposal, a definitive and institutional move to the MDR issued by the IMF as the global LOLR, no possible exchange-rate losses could appear at the multilateral level in the IMF balance by using a fixed-exchange-rate: on the IMF bookkeeping, assets in dollar deposits and liabilities in SDR are registered at the same value, and the system cannot suffer losses. Only the case of a dissolution of the IMF with its substitution account could make some exchange-rate losses or gains appear for the initial depositors when the dollar assets are returned to their owners against their SDR[27]. Therefore, this was a sterile conflict of the past led by politicians without a systemic view. Furthermore, the character of the public good of this IMS reform would justify, anyway, the multilateralisation of the benefits and possible losses.

5. In the present system, the dollar's role is also to give the function of "*consumer of last resort*" to the US economy through its trade deficit resulting from the cheap capital inflows due to the demand for dollar reserves. The move to the MDR would end this role, implying an external and financial adjustment of the US economy with a potential deflationary risk. But, precisely, this downward bias on global demand could be compensated easily by this new tool, allowing the management of the global monetary basis (the volume of MDR) to ensure an adequate volume of global demand. This was part of the Keynes plan in Bretton Woods, as well as in the successive Triffin plans and RTI's proposals.

7. Conclusion

This paper demonstrates that the instability and pro-cyclicality of GL come mainly from the structural scarcity of dollar-safe assets, which expresses the present form of the Triffin Dilemma (TD) and its built-in destabiliser. It is a process of circular cumulative causality provoked by the binary discrimination introduced by using a national currency as an international reserve currency, which endows this currency with higher liquidity than the other safe assets. This differentiation in the liquidity degree develops binary discrimination between the dollar and non-dollar components of the global "high-powered money" (monetary basis), sustaining the GL's reversed pyramid. When a liquidity squeeze is in view, the demand for dollar-safe assets jumps. At the same time, the non-bank sector (namely the repo markets) cuts its supply of pseudo-safe assets in non-dollar, creating a systemic instability of global liquidity. Contrary to any national liquidity "reversed pyramid" where the basis is homogeneous and could always be controlled by its national central bank, the GL has a binary basis that cannot be stabilised to the same degree without a genuine international LOLR.

[26] According to witnesses of the negotiations, the final US offer was to support half the losses, but France refused, imposing on the US to support all the losses.
[27] Sobol D. [1979], Icard A. [2011]

The TD is often interpreted as announcing that the growing indebtedness of the US economy would lead to the end of the dollar's dominant role. In fact, this interpretation based upon net flows is counteracted by the structure of the gross flow – mainly in the dollars and dedicated to refinancing past debts with dollar collaterals (safe assets) - combined with the liquidity advantage given to the dollar-safe assets by its role as a leading international reserve. A cumulative causality explains a growing scarcity of dollar-safe assets as the flow of their demand increases much faster than what can provide the US debt capacity. This growing gap is the result of two evolutions:

(i) a structural shift in the founding sources by which non-bank financial intermediation (NBFI or "shadow banks") substitutes short-term secured loans with dollar collaterals for traditional bank loans based upon demand-deposits, provoking a considerable need for dollar-safe assets,

(ii) while their supply by an economy whose economic size is relatively shrinking due to the fast expansion of emerging economies, all the more than most of the liquidity needs of this growing group are in dollars.

The excess demand for dollar assets implies lower yields. Encouraged by these too-low yields, a combination of risk appetite and financial innovations among the private operators on the wholesale financial markets generates intermediation for supplying by securitisation pseudo-safe assets with non-dollar assets and corporate debts usable as collaterals (Repo and asset-backed commercial papers). However, these developments in the global monetary basis of GL correspond to an endogenous increase composed of dollar-safe assets and pseudo-safe assets in non-dollar. This basis becomes pro-cyclical along the cyclical changes in the expected value of both kinds of assets: in the expansive part of the cycle, pseudo-safe assets expand, and in the recession part, they diminish. Therefore, the global monetary basis becomes reversible for missing a LOLR that can compensate for the pro-cyclical behaviour of the basis. Hence, the TD - which expresses the impossibility of a single economy to ensure an adequate supply of safe assets able to stabilise the GL by issuing its own liquid debts - induces the wholesale markets to create an accumulation of systemic destabilising factors:

(i) they encourage the issuance of lower-grade debt through new collaterals

(ii) they develop mismatches in time terms, currencies and credit quality

(iii) these pseudo-safe-assets as collaterals use to co-vary more with the global financial cycle, provoking an endogenous reversibility in the volume of the monetary basis, which amplifies the contraction in the GL and

(iv) National central banks are poorly equipped to intervene safely in repo markets, which, by definition, are shadow banks and have no direct access to their central banks.

This vicious circle of liquidity destabilisation is not (yet) a run-out of dollars but instead leads to its contrary "dash-for-dollar" liquid assets and creates a cyclical appreciation of the dollar. An inevitable global recession and a growing pro-cyclicality of GL generate increasing socio-economic costs. One day, this built-in destabiliser will lead to a big crash, forcing a systemic change.

The principle of the solution to the systemic flaw of the dollar system and the eradication of the TD is technically straightforward: to create the missing multilateral LOLR with a multilateral reserve currency, which by definition can no longer be a liquid debt of an economy but is issued (or withdrawn) against buying (or selling) national reserves to the central banks in order to adjust the global monetary basis for stabilising the GL reversed pyramid. However, the only serious obstacle to moving from the dollar system to a multilateral system is not economic but geopolitical. The challenge is to make the US authorities and citizens aware of the net benefits of trading off losing the risky "exorbitant privilege" of the dollar for winning a permanent, stable environment. This process could be spurred by the emergence of CBDCs, which can create attractive private e-SDRs without cost. This multilateral private reserve could compete with the dollar as a vehicle on the Forex and in global banks, paving the way for an IMS reform, all the more that the rest of the world could implement it at their respective regional agreements, strengthening the needs for a LOLR and a multilateral tool for managing liquidity as a public good and spurring the winds for change at the geopolitical level.

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Chart Annex

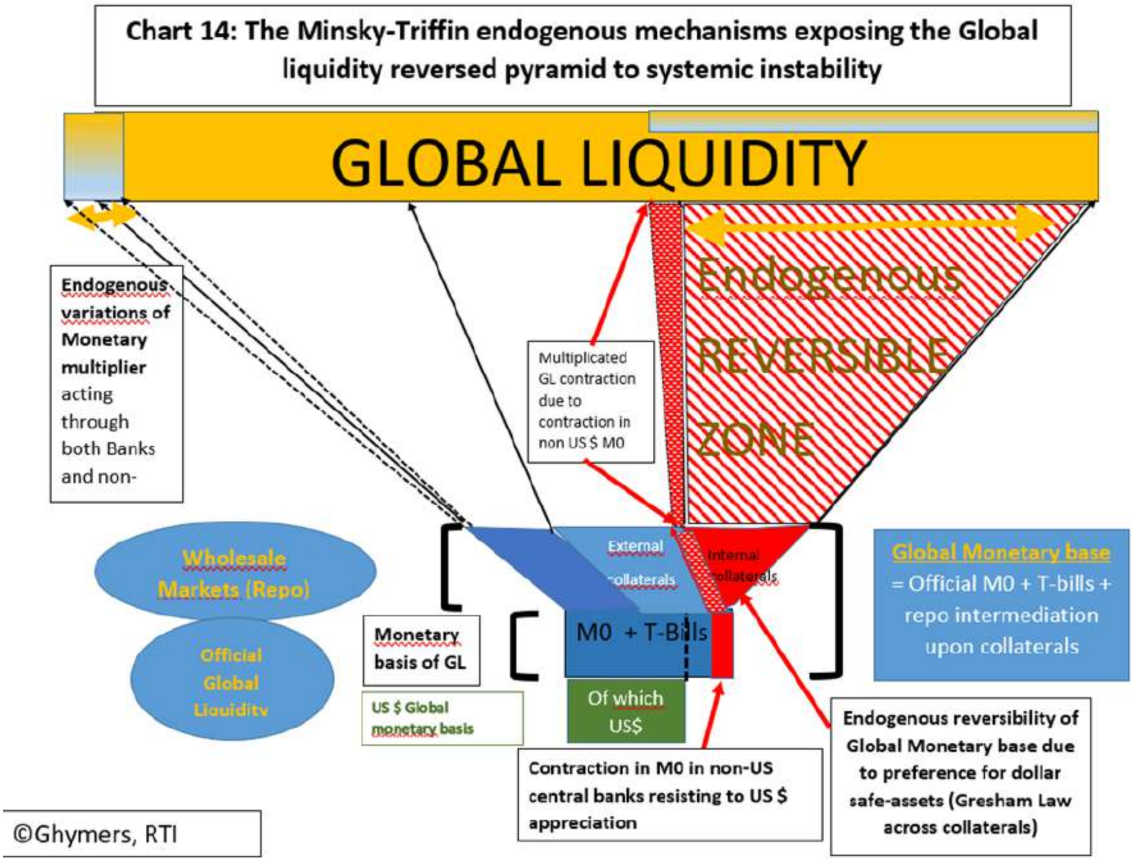
Chart 14: The Minsky-Triffin endogenous mechanisms exposing the Global liquidity reversed pyramid to systemic instability
GLOBAL LIQUIDITY
Endogenous variations of Monetary multiplier acting through both Banks and non-
Multiplicated GL contraction due to contraction in non US $ M0
Endogenous REVERSIBLE ZONE
Wholesale Markets (Repo)
Official Global Liquidity
External collaterals
Internal collaterals
Monetary basis of GL
M0 + T-Bills
US $ Global monetary basis
Of which US$
Global Monetary base = Official M0 + T-bills + repo intermediation upon collaterals
Contraction in M0 in non-US central banks resisting to US $ appreciation
Endogenous reversibility of Global Monetary base due to preference for dollar safe-assets (Gresham Law across collaterals)
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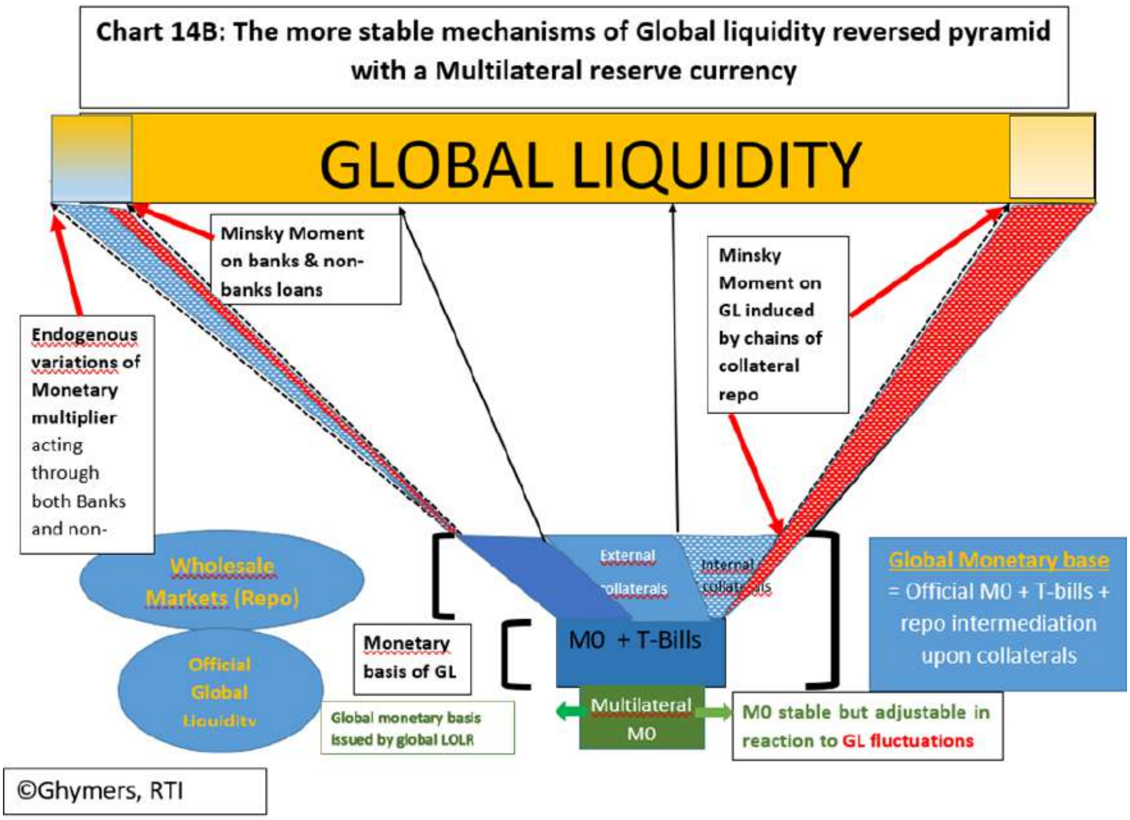
Chart 14B: The more stable mechanisms of Global liquidity reversed pyramid with a Multilateral reserve currency
GLOBAL LIQUIDITY
Minsky Moment on banks & non-banks loans
Minsky Moment on GL induced by chains of collateral repo
Endogenous variations of Monetary multiplier acting through both Banks and non-
Wholesale Markets (Repo)
Official Global Liquidity
External collaterals
Internal collaterals
Monetary basis of GL
M0 + T-Bills
Global monetary basis issued by global LOLR
Multilateral M0
M0 stable but adjustable in reaction to GL fluctuations
Global Monetary base = Official M0 + T-bills + repo intermediation upon collaterals
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Analytic Scheme 1: Balance-sheet of the Multilateral Central Bank (MCB = IMF*) in MRC (=SDR*)

ASSETS	LIABILITIES
A1 + A2 + A3=total claims on n central banks nverted into SDR*/MRC	**L1+L2 +L3= Global Monetary Base total MRC liquid liabilities**
A1. Counterpart of % of central banks reserves (assets in 5 components of SDR) converted in MRC (= SDR*) (=valorised at daily market-rates against the MRC "Multilateral Reserve Currency")	**L1. Deposits in 5 reserve currencies converted into MRC from « n »** (countervalue changing all days but assets = liabilities, no exchange-rate risks for IMF)
A1.1 Swapped Bonds (no change in global monetary base)	**L1.1 = counterpart of swapped Bonds with CBs**
A1.2 Bought Bonds (= pure monetary creation) decided as multilateral open-market policy (with veto)	**L1.2 = net issuance of MRC** (= exogenous variation in Global Monetary Base according to global needs, collegial decision under IMF proposal and minority veto)
A2. stocks of SDR reserves converted in SDR*= MRC	**L2. Reserve Deposits in MRC (SDR*) from National CB (**countervalue of received SDR
A3. Overdraft Facility in MRC (SDR*) to National CB from deficit economies = Global Safety net (according to objective criteria and asymmetric minority veto)	**L3 Overdraft loan = GLobal Safety Net** = endogenous net variation in Global Monetary Base according to national deficit adjustment needs decided collegiately with asymmetric minority veto

Analytic Scheme 2: Substitution Account Balance-sheet of the Multilateral Central Bank (MCB = IMF*) in MRC (=SDR*)

ASSETS	LIABILITIES
1) claims upon "n" central banks expressed in MDR for their deposits in dollar exchanged at a book-keeping fixed rate of MDR for $	**1) Deposits by «n» central Banks expressed in MDR** exchanged for MDR at the same book-keeping fixed rate of MDR for $
2) Investment of these deposits in longer-term assets (yield) expressed in current exchange rates	**2) Interest rate paid to central banks for their holding of MRC** expressed in current exchange rates
With a permanent and indefinite Substitution account, no exchange-rate loss or gain could appear, but a positive net return should accumulate in long-term for the positive yield curve LT-SY)	Only in case of dissolution of the account, could appear exchange-rate net losses or gains which should be paid to the initial deposits in key-currencies
Note: SDR* = updated SDR issued as multilateral reserve currency (MRC) IMF* = updated IMF as a multilateral LOLR issuing MRC	

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