

Do Central Banks' repo Transactions and Liquidity Infusions Increase Financial Stability Risks? A Case for Circular Monetary Economics

Henri Kouam

Fellow in Economics, Nkafu Policy Institute

Abstract: Central banks repo market operations and liquidity infusions occasion a structural liquidity mismatch in bank balance sheets and increase the dependence on central bank liquidity. This paper argues for what I term “Circular Monetary Economics”, an approach to monetary policy that seeks to green and prudentially insulate the design and implementation of liquidity and credit facilities. Circular monetary economics will lessen the probability of cross-asset contamination within financial institutions and contagion within the broader financial system, whilst simultaneously improving the transmissions from changes in the policy rate as well as macro-prudential regimes in the event of a climate or credit-driven financial shock.

I. INTRODUCTION

The last decade has seen an approach to monetary policy that has facilitated a financial market dependence on central bank repo facilities and operations in money markets. Admittedly, low and sometimes negative interest rates are justified given weaker transmissions from the labour market to inflation outcomes. Whilst this has occurred at varying intensities amongst advanced economies, the shifting of risk away from the shorter end of the curve via quantitative easing has culminated money market operations and ad-hoc liquidity infusions designed to lessen financial stability risks (Eisenschmidt and Smets, 2018). During and after the financial crisis, permanent open market operations (OMOs) were used to adjust the Federal Reserve's holdings of securities to put downward pressure on longer-term interest rates and to make financial conditions more accommodative and ensure credit-driven investment and economic growth. Currently, permanent OMOs are used to implement the FOMC's policies of reinvesting principal payments from its holdings of agency debt and mortgage-backed securities (MBS) and of rolling over maturing Treasury securities at auction (Federal Reserve, 2020). Meanwhile, large scale asset purchases at the European Central Bank (ECB) were also accompanied by targeted longer-term refinancing operations designed to improve the transmissions of monetary policy (ECB, 2020). All these were designed to improve market functioning and reduce the negative effects of liquidity constraints.

In the case of the ECB, said liquidity infusions are also designed to smooth the functioning of monetary policy, improve the transmission of negative interest rates, and lessen

credit mismatches in the financial sector. Eisenschmidt and Smets (2018) show that banks started to charge negative interest rates in some core European countries by end-2016, which was indispensable in supporting profitability over the medium term. This change was, however, only limited only to corporations, which nonetheless served to mitigate the adverse effects of negative interest rates. This suggests that eventually, the pass-through of negative rates may take place, but it is more sluggish than with positive rates and it may affect only certain types of customers (see also Heider et al., 2019). Meanwhile, Eggertsson et al., 2019 investigate the effect of negative interest rates via the Swedish banking channel and note that bank lending fell by 7.0% following the introduction of negative interest rates, even as quantitative easing played a significant role in alleviating market stress and supporting financial conditions. This created an increased dependence on central bank repo market operations, designed to smooth the credit mismatch latent in commercial banks' balance sheets.

While the signalling mechanisms from interest rates cannot be understated, continued liquidity infusions suggest a structural mismatched has emerged more strongly amongst financial intermediaries. While the need for liquidity culminates the smooth functioning of capital and financial markets, “Circular Monetary Economics” will address long-term structural vulnerabilities that have dented the potential growth rate, whilst improving the transmissions from monetary policy to macroeconomic outcomes.

The proposed approach will ensure that commercial banks green their loan operations by prioritizing higher value-added investments, whilst remaining cognizant of the mismatch inherent in current funding mechanisms.

This will inadvertently lessen the transfer of risks away from the corporate sector into central banks' balance sheet, by pushing risk at the longer end of the curve via targeted QE and differing improvement to the “growth-centric” approach that has come to characterise most advanced economies. The liquidity trap created by money market operations, are designed to smooth the functioning of financial markets but have nonetheless” allowed a structural credit mismatch to persist. The divergence between short and long term lending is assuaged by central bank adhoc interventions, but can only serve to extend the financial cycle.

The broad credit channel – the balance sheet channel of monetary transmission – has displayed the salience of credit and the relevance of policy rates to the real economy (Boivin et al (2011)). By utilizing asset purchases and repo transactions in a manner consistent with decarbonizing portfolios and boosting the potential growth rate, central banks can achieve their inflation target and reduce structurally-driven balance sheet vulnerabilities in commercial banks' whilst greening their balance sheets and approach to monetary policy. Such an outcome is only probable targeted investments and productivity-driven wage growth that place a floor of demand-driven inflation.

Meanwhile, a great deal of research delves into the quantitative imperfections associated with credit constraints. It is, however, important to note that a change in the policy rate can impact other channels such as the financial accelerator mechanisms suggest that other mechanisms are equally as important. The findings from Kiyotaki and Moore (1997) suggest that such constraints can be small, while Kocherlakota (2000) finds that the impact of credit constraints are contingent on varying parameters of the economy such as its labor market structure, the diversity of funding and the salience, if not, indispensability of liquidity infusions.

While the relationship between bank capital and firm liquidity has implications for economic growth, productivity, and investments, the approach to the latter will determine the cost of monetary policy over the long run.

In other words, the cost of holding reserves, repo market transactions, macroprudential loosening, and tightening, QE, and liquidity needs to determine the cost of monetary policy. As such a contraction in the capital is not always symptomatic of changes in the level of interest rates, but rather variations in interbank lending activity.

Central banks such as the Bank of England, the Federal Reserve Bank, and ECB target 2.0% inflation and output at varying intensities in addition to pursuing financial stability (Meyer, 2001). Following the 2008 financial crisis, years of ultra-accommodative monetary policy and low-interest rates in most advanced economies and negative interest rates in Europe and Switzerland have caused a significant increase in Central bank's balance sheets. (Brunnermeier and Koby, 2018; Eisenschmidt and Smets, 2018). In addition to quantitative easing, central banks provide liquidity by way of money market operations and reverse repo transactions, which have further increased their non-reserve liabilities in the recent past. The ECB's balance sheet is currently worth more than 4.2 trillion, while that of the FED and Bank of England is worth 3.8 trillion and 20% of GDP respectively (Ferguson, Schabb and Schurlarick, 2014). Meanwhile, central bank liquidity and repo-facilities lessen funding constraints among financial institutions; they must, however, green the design and implementation of their monetary and macroprudential (macroprudential) regimes.

Such an approach should be pursued in a manner consistent with decarbonizing asset and financial flows, whilst supporting productivity-driven wage growth. The latter is indispensable to ensure inflation converges towards mandated targets as well as support firm-level competitiveness. Furthermore, it is also not inconsistent with the macroeconomic stability, needed to ensure financial and price stability.

Such an approach, this paper contends, will bolster the effectiveness of macroprudential regimes and transmissions from accommodative monetary policy following periods of economic or financial shock.

“Circular monetary Economics” will disincentivize over-reliance on Central bank liquidity facilities and minimize financial stability risks

According to the BIS (2017), repo market transactions or operations offer a low-risk and liquid investment for cash, as well as the efficient management of liquidity and collateral by financial and non-financial firms. But the excessive growth of repo markets can also pose risks to financial stability over the long term as financial intermediaries become highly levered from excessive risk-taking. Such an outcome increases the risk of liquidity mismatch becoming a permanent characteristic of financial intermediaries, who are nonetheless indispensable in facilitating the credit flows to varying parts of the economy. This is especially salient, given the credit-reliant financial and economic cycle that has been exacerbated by years of ultra-low and negative interest rates that have prioritized the extension of global value chains whilst increasing the incidence of capital misallocation. As such, liquidity mismatches are symptomatic of overextended value chains (Shin, 2018), rather than efficiency-driven investments supported by monetary policy accommodation and quantitative easing.

This, in part, explains why record low-interest rates have not resulted in significant increases in non-residential investments, and are increasingly driven by non-interest rate factors such as domestic political uncertainty, external demand, or outcomes in global trade. Rather than cause financial stability risks per se, the increased reliance on short-term funding and repo facilities intensify the upswing in credit and financial cycles, whilst over-extending structurally-driven mismatches in commercial banks' balance sheet. This mismatch is evident in risk-taking behaviour following the introduction of negative interest rates.

Negative interest rates induce a search for yield, as banks reshuffled their portfolios towards riskier securities denominated in dollars in addition to the Euro. Bubeck, Maddaloni, and Peydro (2020) find that a 10 pp greater deposit increased holding securities by 2.0%, in response to a 1.0% yield for the 26 largest Euro Area banks.

Given changes in risk-taking behaviour are symptomatic of a low-interest-rate environment, repo market transaction and

liquidity infusions, rather than simply attempt to smooth the functioning of the financial sector, should more readily seek to incentivize lending behaviour that lessens the negative spillovers from liquidity mismatches. The Targeted Longer-Term refinancing operations are evidence of how monetary policy can serve as the basis for increased bank lending or credit-driven growth.

Rather than attempt to stimulate economies amidst structural impediments and a lower potential growth rate, central banks can use credit mechanisms to incentivize lending behaviour consistent with the attainment of financial stability over the longer run. Historical evidence suggests that the contraction of central banks' balance sheet will be gradual in relation to GDP; 2008 alone culminated the largest of all expansions recorded since 1900 (Ferguson, Schabb and Schurlarick, 2014). Given noticeable changes in investment behaviour as banks seek to balance negative-yielding deposits with yields from securities, repo market transactions can be designed to smooth the functioning of financial systems whilst supporting a transition away from structurally-driven liquidity mismatches.

As such, the proliferation of financial stability risks can indeed be averted via "Circular Monetary Economics"; an approach to monetary policy that seeks to green both central and commercial banks' balance sheets, by aligning the provision of liquidity with debt ratios that incentivize investment in the value-added sectors. This is further outlined below, noting the components of interest rates in the ratio of short and long-term debt, and the structurally-driven mismatch that is not unlikely under such a scenario.

The mismatch suggests a structural mismatch between loans of varying liability and asset structures under specific assumptions such as the variability of interest rates at the time of operation, interest income from short term assets, and susceptibility to the variable interest rate.

A great deal of econometric modeling attempts to prove the effect of pass-through and the probability of mismatch given a particular level of the interest rate. While Bubeck, Maddaloni, and Peydro (2020) investigate the extent of pass-through via investment behaviour, Iren Levina, Robert Sturrock, Alexandra Varadi, and Gavin Wallis, (2019) to an approach related to the flow and the stock of mortgage debt, using loan-level data. This paper aggregate emphasizes the role of variable interest rates in driving the perceived mismatch latent in current funding structures. The empirical framework outlines the transmission of policy rates vis-à-vis the proposed liability ratio, at once, driven exposure of liabilities to variable interest rates.

$$f(\delta) = \begin{cases} -\delta, & T_m < 7 \\ \delta, & T_m \geq 7 \end{cases}$$

$$\left(\frac{stl}{ltl}\right)^{\pi_\theta} = \left(\frac{\theta_{t<7}^l + ip_{bp}^\theta}{\theta_{t>7}^l + iy_{bp}^\theta}\right)^{\pi_\theta} \tag{1}$$

$$\left(\frac{stl}{ltl}\right)^{\pi_\theta} = \left(\frac{\theta_{t<7}^l + ip_{bp}^{(y-ex)}}{\theta_{t>7}^l + iy_{\pi+1}^{(y-ex)}}\right) \tag{2}$$

If the ratio of short and long-term debt is, at least in part, driven by variable interest rates, the net stable funding ratio is designed to ensure that financial intermediaries and banks diversify funding sources. As such, the credit risk is a function of the level of current policy rates, which determine market rates, but also the diversity of said sources to serve as an anchor. But the provision of liquidity i.e. credit at variable interest rates lessens the probability of funding stress over the medium-to-long term, which in turn facilitates the build-up of liquidity mismatches.

$$\left(\frac{\theta_{t<7}^l + ir^{(y-ex)}}{\theta_{t\geq 12}^l + ir_{\pi+1}^{(y-ex)}}\right)^{\pi_\theta} \tag{3}$$

Where;

$$(\partial) : stl \neq ltl$$

$$\begin{pmatrix} (y - ex)_{t<7} \geq 1 \\ (y - ex)_{\pi+1} \leq 1 \end{pmatrix} \tag{4}$$

Substituting (3) in (1) and following a static balance sheet assumption consistent with the International Financial Reporting Standard (IFRS 9)

$$\left(\frac{stl}{ltl}\right)^{\pi_\theta} = \left(\frac{\theta_{t<7}^l + ip^{(y-ex)}}{\theta_{t>7}^l + ip_{\pi+1}^{(y-ex)}}\right) \tag{5}$$

Accounting for a scenario of interest rate at given time ('t)

If $\theta_{t<7}^l \neq \theta_{t\geq 12}^l$: Where $\theta_{t=m+1}^l$

$$\theta_{t=m+1}^l = \theta^{\pi+1} + ir^{(y-ex)} \tag{6}$$

The expected change in interest rates can be expressed as a function of the change in basis points. It logically follows that;

$$\theta_{\Delta, bp}^{(\theta \mp \pi)} + ir^{(y-ex)}$$

$$\begin{pmatrix} exp_{bp, \pi} \leq \pi + 1 \\ exp_{bp, \pi} \geq \pi + 1 \end{pmatrix} \quad \begin{pmatrix} (y - ex)^\pi < \left(\frac{stl}{ltl}\right)_{t+1} \\ (y - ex)^\pi > \left(\frac{stl}{ltl}\right)_{t+1} \end{pmatrix}$$

$$exp_{bp, \pi} \geq \pi + 1$$

$$\left(\frac{stl}{ltl}\right)^{\pi_\theta} = \left(\frac{\theta_{t<7}^l + ip^{(y^\pi - ex^\pi)}}{\theta_{t>7}^l + ip_{\pi+1}^{(y^\pi - ex^\pi)}}\right) \tag{7}$$

$$\left(\frac{stl}{ltl}\right)^{\pi_\theta} = \left(\frac{\theta_{t<7}^l + ip^{(y-ex)^\pi}}{\theta_{t>7}^l + ip^{(y-ex)^{2\pi+1}}}\right) \tag{8}$$

As outlined above, the difference in interest income and expenses determines the need for central bank repo transactions and liquidity infusions; where this difference is

positive, the mismatch is much less severe in the medium-to-near term.

Given varying loan types and capital structures, a mismatch is seldom inevitable and could be symptomatic of the magnitude of an interventionist approach. Rather than argue against central bank liquidity provisions, circular monetary economic will ensure that central banks align the provision of liquidity more closely with specific loan types, to incentivize a gradual transition away from fossil fuels towards cleaner industries. This will lessen the perceived mismatch; improve the effectiveness of liquidity mechanisms, with a more lasting economic dividend that serves as the basis for productivity-driven wage growth on a much more sustained basis. While central bank liquidity infusions will ensure a sustained convergence of inflation towards the target and reduce funding stress in financial markets, it also facilitates wage-driven, on-target, inflation outcomes.

Additionally, such an approach will lessen the adverse balance sheet effects of climate-centric shocks on corporate sector liquidity as well as risk-shifting to households via increased insurance premiums. The latter is driven by the marked fall in earnings following such events, as insurance pay-outs not only affect interest margins in the short-run but also lessen the incentive for risk-taking by commercial banks.

It is important to note that climate-centric shocks not only extend the time taken for economies to recover, it also lowers the potential growth rate, causes households to postpone purchasing decisions and increases the incidence of capital misallocation as low-interest rates suggest an increased reliance on interest income even as wider credit spreads lessen the incentive for risk-taking. "Circular monetary economics" will address sector-wide vulnerabilities, limit the risks of cross-asset contagion, and lessen financial stability risks.

Admittedly, repo rate transactions are indispensable to the efficient and smooth functioning of financial markets.

Although repo market operations are indispensable to the efficient functioning of financial markets; its functions, however rational, can amplify the likelihood of asset-specific or sector-wide shocks being amplified as it allows for structural vulnerabilities over the credit life cycle. As such, the necessary but fiscally deleterious act not only increases the cost of credit, an event-driven shock to the financial system, or crisis-centric response from central banks; it inflates the central bank's balance sheet and exacerbates the dependence on market finance from already strained financial institutions.

More importantly, the extension of specific components of the credit cycle such as a lower Loan-to-Value ratio coupled with readily available liquidity, repo transactions, facilitates structurally-driven mismatches in portfolios and asset/credit flows. Circular monetary policy lessens the intensity stemming from structural-vulnerabilities latent in the asset and financial flows as well as capital structures that prioritize liquidity and risk shifting over the short to medium term. The

latter appears increasingly driven by the balance of risks between the costs of holding debt versus equity, and capital structures are increasingly reminiscent of interest rates changes and forward guidance that appears more conducive to debt. As such, the incentive for said institutions suggests a balance between protecting returns in the short-term as favourable capital structures at a given level of interest rates bode well for asset prices.

Insulating the credit cycle via targeted amortization requirements reduce cross-asset contagion

As such, while the expansionary impacts of a lower loan-to-value ratio and a debt to income ratios cause the economy to grow at a faster pace, it is not clear that additional liquidity reduces structural vulnerabilities over the long term. Arguably, this approach to stimulus amidst quantitative easing and asset purchases adds to structurally-driven vulnerabilities as they only serve to extend the credit life cycle than is currently warranted. Meanwhile, the FED continued to purchase T-bills worth \$60 billion per month, at least into the second quarter of 2020. In the UK, the loan-to-value ratio of the owner-occupied mortgage was loosened from 87.8% to 88.5% on December 4th, 2019 (BoE, 2020). Meanwhile, the buyer-to-let loan-to-value was also loosened to 57.4% and 58.4%.

The cumulative reduction of 25bps was accompanied by the continuous provision of liquidity to domestic banks. At first, this might suggest looser macroprudential standards, justified by an event-specific shock i.e. Brexit. Such an approach to lessening the adverse effects of a specific shock is appropriate over the short term but should be utilized sparingly as increases in home values can exacerbate risk-taking and increase financial stability risk. The transient loosening in housing-related macroprudential tools has coincided with a dent in household credit growth and household debt to income ratio to 2.8% and 127.8% from 3.6 and 128.5% in Q3 2019 (BoE, 2020). The lowering of macroprudential standards and continuous provision of liquidity undoubtedly stimulated the economy and lessened the impact of event-specific uncertainty. It has, nonetheless, extended the current credit cycle and allowed structural vulnerabilities to increase the need for central bank repo market transactions.

Stricter Amortization requirements are an important tool in the "Circular Monetary Economics"

Such outcomes suggest the need for amortization requirements throughout the credit life cycle; during a credit cycle upturn or at specific points of the credit cycle – contingent on household incomes and interest expense. It can, therefore, be argued that the vulnerabilities latent in over-extended credit cycles are negated by rising property values and positive spillovers from balance sheet effects in the near term. Amortization requirements will lessen the adverse impacts of indiscriminate liquidity being provided to financial institutions and lessens the cross-asset contagion stemming from housing-related loans to other asset classes in banks'

balance sheets. While the correlation between the financial and economic cycle cannot be understated, credit-driven economic growth has become characteristic of current approaches to the central bank and monetary policy.

The mandates conferred on central banks, however, seek to lessen or at the very best stem structural vulnerabilities characteristic of credit-driven economic growth and increased risk-taking facilitated by lower policy rates and accommodative monetary policy.

Additionally, targeted amortization requirements comprise an effective tool in circular monetary economics, as it improves the transmissions from monetary policy in the event of a shock and bolsters the resilience provided by the countercyclical buffer currently at 2.0%, capital conservation buffer, prudential regulatory capital, and Common Equity Tier 1 ratio. While these allow banks to provide vital credit functions such as lending, insurance, savings, and money management in the event of a downturn, they do not address the vulnerabilities latent in the design and implementation of current monetary policy frameworks.

Climate risks also constitute a financial stability risk and should now be embedded in Central Banks' policy calculus.

Although Central Banks' mandates are constrained to achieving price and financial stability, climate risks (wildfires, floods, cyclones, soil erosion, torrential rain, and extreme temperatures) now constitute a financial stability risk. Households and corporate balance sheets, financial assets, and incomes (interest incomes or dividends) are exposed to extreme weather events via higher funding risks, loss of property, and interest payments. The inevitable capital reallocation that inadvertently results following a climate-centric shock provides a rationale for a more expansive monetary and macroprudential policy, but the implications of such an approach fall outside the remit of this paper.

Amortization requirements should be used ad-hoc but should be implemented throughout the credit life cycle in order to lessen household indebtedness. This is particularly salient for emerging market central banks whose housing sectors are not particularly developed. By ensuring amortization requirements are employed throughout the credit life cycle, it lessens the build-up of financial stability risks and supports macroeconomic performance over the long-term

“Climate change constitutes a financial stability risk; as such, liquidity operations, the monetary and macroprudential policy should address perceived vulnerabilities in the structural composition of asset holdings and loan books, whilst lessening the intensity of event-specific shock on asset classes. Such an approach i.e. “Circular monetary Economics” also reduces the risk of asset-driven liquidity mismatches stemming from redemptions or bank runs, as well as cross-contagion from varying types of shocks such as a sudden increase in funding or an event-driven shock”

A crisis-averse approach to policy design suggests lower interest for longer with a transient boost to productivity and wages.

Not only is residential and commercial real estate at risk, supply chains, factories, and asset portfolios are affected by extreme weather events. As a result, Central Banks will need to lower policy rates and fiscal policy will become more expansive, albeit responsive, causing tepid accelerations in the growth rate and below-target inflation at best. Such an approach to setting monetary policy suggests a more expansive balance sheet, lower interest rates for longer, and an increased reliance on fiscal policy to boost the potential growth rate (Goodfriend, 2011). The latter holds, as low-interest rates will likely be reflected in mortgage rates despite a 30% pass-through (Saunders, 2019), while the cost of capital, rather than support growth, might simply seek to replace damaged infrastructure.

As such, circular monetary economics will reduce capital misallocation; insulate commercial banks' returns over the long-run whilst boosting the potential growth rate. The impact of a more expansionary monetary policy cannot be understated, but the potential growth rate hinges on targeted investments in tech-centric sectors that facilitate diffusions across sections of the economy spanning digital services, ICT-related sectors, logistics, financial services, energy, transport, logistics, residential and commercial real estate, banking, fin-tech, education, and manufacturing.

Meanwhile, extreme climate events such as floods, wildfires, heat waves, and cyclones could increase financial stability risks despite carefully designed and targeted macro-prudential measures such as adjusted loan-to-value ratios, capital conservation buffer, countercyclical buffer, and Common equity Tier 1 ratio. As such, monetary and macroprud measures under such a context will only serve to replace climate-induced, and any gains in productivity and wages will be short-lived at best. The gradual attainment of the inflation target will be compounded by an increasingly leveraged corporate sector, whose reliance on low or negative interest rates equate the need, if not dependence, on central bank financing.

Fiscal policy will play an increasingly important role in supporting macroeconomic outcomes

Admittedly, fiscal policy must be designed in a manner that facilitates the transition away from a low-productivity growth economy to one where the majority of the working population is employed in, skilled, hi-tech, and knowledge-intensive sectors. The contribution of said sectors to overall employment stood at 2.5%, 3.1%, and 3.9% for Italy, France, and the United Kingdom (European Commission, 2020). Advanced economies are able to borrow at lower interest rates, which should facilitate such an approach amidst differing labor market structures and structural characteristics.

This is a small fraction of the workforce that negates the effects of consumption-driven inflation outcomes already mitigated by greater competition and technological advancements, which have placed downward pressures on prices. It is therefore imperative that crisis-centric monetary policy reform is conducted alongside targeted fiscal spending and labor market programs designed to address long term structural vulnerabilities such as an ill-equipped workforce for an increasingly digitized market place.

As such, by aligning credit facilities to specific loan types, central banks rather than dictate commercial bank investments can begin to incentivize capital flow into productivity-boosting sectors that will, at once, boost the potential growth rate and ensure inflation converges towards the 2.0% target.

Financial loss bode ill for both corporate and households balance sheets

Furthermore, insurance pay-outs and premiums are set to rise following extreme climate events, whilst financial institutions are prone to more pronounced losses depending on the composition of their assets and loan books. Under such conditions, Central banks are poised to intervene by easing monetary policy or injecting greater liquidity into the financial system. Such an approach, however salient, will increase the size of central banks' balance sheets from currently high levels. It is important to note that inflation has remained below target, absent a slight overshoot following a pro-cyclical fiscal stimulus from the United States.

Not only does this signal an increasingly financialized economy (Greenwood and Scharfstein 2013; Philippon and Reshef 2013); it also suggests Central Bank liquidity and asset purchases might be overextending current maturities by transferring the risk latent in current debt holding (i.e. short and semi-long term debt) into longer debt securities of varying maturities that take the form of debt issuances that are then purchased by the Central Bank.

The extent to which liquidity and other repo transactions facilitate the transmission of policy rates to economic activity during a climate or macroeconomic shock provides an indication of the effectiveness of current macroprudential frameworks. Asset purchases only serve to introduce longer maturing debt into the financial and economic cycle; the structural mismatch made evident by a climate-centric or macroeconomic shock is only partially addressed as longer-term debt issuances are used to fund shorter-term debt liabilities.

In this context, the effectiveness of macroprudential policies appears to be much more contingent on the effectiveness of liquidity requirements and Net stable funding ratios. The extent of Central Bank intervention in money markets, not via asset purchases, determines the effectiveness of macroprudential frameworks.

The mismatch that inevitably emerges from asset purchases, FX interventions, and money market operations allow a

structural mismatch to linger. One that is not accounted for in macroprudential frameworks, which are designed to ensure sufficient credit serves as the basis for a post-shock recovery.

As such, Circular Monetary Economics will serve to decarbonize Central Banks and financial institutions balance sheets, insulate their flows against climate risk over the long-term and reduce the cost of the Banks' response. Findings from Cerutti et al. (2017); Galati and Moessner (2017) support the view that macroprudential policies are effective at taming credit growth, but the business cycle is increasingly driven by credit growth.

Nevertheless, Aghion et al. 2005; Rousseau and Wachtel, find that the growth-enhancing effect of credit tapers at higher levels of financial deepening. It is, therefore, probable that macroprudential policies address structural vulnerabilities latent in current funding structures that increase the dependence of central bank financing. However, whilst macroprudential policies are designed to lean against excessive leverage facilitated by accommodative monetary policy, they equally stymie credit growth, which is indispensable to the economic recovery.

Current liquidity facilities appear insufficient, suggesting the greater probability of mismatches and cross-asset contagion

The above will allow what I term "Circular monetary Economics" to facilitate the decarbonisation of asset flows and reduce financial stability risks whilst achieving Central Banks' mandates of price stability and output growth at varying intensities. Circular monetary economics entails greening the approach to Central bank repo transaction and liquidity provisions, which have become increasingly utilized as structurally-driven mismatches have emerged more strongly across the United States, ECB, and the UK.

The extent and frequency of interventions determine whether structural mismatches are redressed over time and the balance between macroprudential frameworks and economic growth is addressed on a much more sustained basis (Rivas, Laevan, and Perez-Quiros, 2020).

This suggests that current liquidity requirements, as well as the Net Stable Funding Ratio, are unable to provide a sufficient buffer for banks, who should see liquidity as a pre-clearing facility rather than a persistent mode of finance. Meanwhile, the heterogeneity in liquidity distribution suggests such facilities might not be sufficient, which suggests a greater role for the Central bank in smoothing the functioning of markets. This dependence can allow the proliferation of liquidity mismatches which are likely to become increasingly evident in the event of a downturn or event-specific shock.

Moral hazards and climate unawareness increase the cost of future monetary policy

"Circular Monetary Economics" entails greening the provision of liquidity facilities; prioritizing banks with liquidity needs that are mostly linked to climate-centric

projects such as wind farms, solar panels, and climate-centric infrastructure and technology. The outdated approach much-touted by Central bankers suggests structural liquidity mismatches that are symptomatic of broader funding constraints, poorly designed liquidity, and coverage ratios.

The moral hazards that inadvertently result from such an approach cannot be understated as the ability for monetary policy to achieve the inflation over the long-term is significantly hampered. Meanwhile, macroprudential policy is less effective as climate shocks exacerbate the adverse effects of liquidity provisions contingent on short-term financing needs by increasing the dependence of financial institutions on said sources. Admittedly, the risks of overextending credit cycles via debt issuances precipitated by increasing monetary accommodation amplify such an outdated approach to ensuring the smooth functioning of the financial system.

This suggests the Central Bank's unawareness not only facilitates for fossil-fuel intensive companies but the practice of providing liquidity also further exacerbates financial stability risk. This suggests banks are much less capitalized than their current liquidity positions suggest as capital and liquidity requirements are designed in conjunction with the view that said institutions will continue to rely on liquidity.

The moral hazards rooted in liquidity provisions are not only exacerbated by the Central Banks, but they also lessen the incentive of a balance sheet-constrained approach to setting monetary and macroprudential policy. From a Central Bank's perspective, a balance-sheet constrained – as argued by the 'circular monetary economics' approach improves the effectiveness of monetary policy over the long term and lessens the structural mismatches that are amplified by ad-hoc and liquidity infusions via the money market operations. Some might regard a balance sheet constrained approach as an unwillingness to intervene in repo markets or provide liquidity to financial market participants.

Whilst such rationale appears logical at first, it understates a, somewhat, dated approach to the Net Stable Funding ratio or other liquidity coverage ratios designed to curb financial stability risks whilst enabling increased reliance on central bank liquidity infusions and repo market transactions. If such ratios well defined, there will little need for such liquidity in financial systems even as an investment remains worryingly and with it, productivity growth.

The latter seeks to diversify sources of finance for financial and non-financial institutions, which should be facilitated by technology and lessen the need for idle liquid assets spanning cash, gilts, U.S T-bills. The use of the distributed ledger technology can better align credit needs in the financial system with central bank liquidity and repo facilities. It can also allow for a more targeted approach to liquidity provision, one that aligns repo transactions and liquidity infusions with specific asset and loan types at varying maturities.

In doing so, central banks' can green their balance sheets, as well as incentivize productivity-boosting investments that lessen the structural mismatch latent in current funding mechanisms.

A "balance sheet-constrained" approach to providing liquidity prioritizes technology such as the distributed ledger technology that facilitates interbank lending and allows for a more pre-emptive ad-hoc intervention.

One which reduces structural mismatches in the financial system and improves the effectiveness of the monetary policy. These transient liquidity infusions into a financial system devoid of the distributed ledger technology (DLT) saw the FED inject over \$170 billion into the financial period in a bid to reduce funding stress for financial institutions as liquidity needs rose abruptly due to tax payments and payrolls (FED, 2019).

These increasingly unjustified short-term bailouts – as could be otherwise termed- suggest central banks are far from greening its monetary policy and liquidity operations. In other words, the Bank of England, ECB and FED's approach to the provision of liquidity is devoid of "Circular Monetary Economics".

Not only will climate risks increase under such a scenario as poorly executed liquidity infusions are misaligned with broader structural reforms that are indispensable to ensuring the smooth functioning of financial and capital markets.

While interest rates have fallen across most advanced economies the potential growth rate has waned significantly, driven by increased capital misallocation. In the U.S. the potential growth rate has fallen by 2.6% and 2.4% between 1991 – 2005, 1999 – 2010, and 1.7% even as the FED cut interest rates by 500 bps in following the 2008 financial crisis (Federal Reserve Bank of St. Louis, 2020). Meanwhile, despite interest rates currently being at 0.1% in the United Kingdom, the potential growth rate currently stands at 0.45%. As such, record low-interest rates have done little to spur productivity-boosting investments and have exacerbated the financial market dependence on central bank funding.

This is especially true as economies have become increasingly financialised, with the UK and U.S financial sector contributing 6% and 20% to GDP (Greenwood and Scharfstein, 2013).

Central bank liquidity provision in their current forms increase the risk of structurally-driven mismatches

These liquidity infusions or interventions are justified by what banks perceive as "period of liquidity stress or volatility". The unoriginal practice is ill-suited to address structural mismatches and vulnerabilities in financial markets. Emerging and developing markets must prioritize an understanding of the composition of the bank's loan books, to gain a better understanding of how liquidity and repo transactions affect the financial system over the long run. In a developing

economy such as Cameroon, confidential data from the Ministry of Finance (MINFI, Cameroon 2020) reveals that while client operations between 2018 – 2019 fell by 0.3%, interbank operations rose by 7.7% during the same period.

As such, continued repo market transactions to the smooth inter-bank activity will exacerbate the perceived trends of liquidity mismatches (IMF, 2019). Underscoring the contention of a mismatch facilitated by money market operations and the continued provision of liquidity to the financial sector. As such, a market correction will be more pronounced as structural vulnerabilities will amplify funding needs, which are currently devoid of consideration in liquidity requirements and net stable funding ratios. Rather than simply provide liquidity, Central Banks' should not only transition to a more advanced clearing system that facilitates the use of tokens (an outdated practice) for clearing and thereby reduce the need for daily liquidity provisions. The latter suggests that Banks are not sufficiently capitalized or hold fewer liquid assets than is warranted albeit carefully designed net stable funding ratios.

Furthermore, this also provides an indication that daily trades (short-selling or otherwise) and other balance-sheet related risks are now accounted for via said liquidity infusions from central banks; hence shifting risk away from the financial system to the Bank's balance sheet. In other words, the risks latent in short-term liquidity risks, rather than solely accrue to corporate spreads, also reflect the probability of said liquidity infusions.

Admittedly, banks' balance sheets can be as expansive as needed, but a financially deleterious approach to long-term financial stability is counterproductive, more so as monetary policy space is increasingly constrained due to record-low interest rates in most advanced economies. Given interest rates are poised to stay lower for longer, money market operations should be designed in lessening the build-up of financial stability risks as households credit growth tends to be associated with financial downturns (Main, Sufi, and Verner (2017). The commodification of central bank liquidity provisions has unintended consequences on the types and nature of finance businesses are able to access in the real economy; it has also created a dependence on Central bank from market actors, which facilitates risk shifting (via risk-absorption latent in quantitative easing), suggests inept liquidity requirements and Net Stable funding ratios.

The inability for banks to use their buffers to finance short-term debt liabilities and daily liquidity suggests that a structural mismatch or what can be termed "Structurally-driven illiquidity" now plagues capital markets on a much more transient basis. As such the effectiveness of prudential policy hinges not on their ability to ensure banks can provide lending, savings, and insurance services by the ability of banks to smooth the transmissions from policy rates and provide liquidity. For example, prompted by the potential risks that come with Brexit, the Bank of England has come to

a similar conclusion to the FED and ECB, marking a decline in standards, which were previously stringent.

More worrying is the fact that continued bank intervention suggests that liquidity and net stable funding ratio requirements are less suitable and the Central Banks reinforce the mismatch whilst lessening financial stability risks and ensuring the good functioning of financial markets. One, which exacerbates the structural mismatches between short-term debt, longer-term liabilities, accounts receivables, and projected earnings. It can be argued that the value of share prices currently reflect projected earnings, debt profile, and credit rating and macroeconomic outcomes of profit destinations.

The continued access to liquidity can provide a better indication of how leveraged or sustainable financed companies are. After all the Net stable funding ratio and liquidity requirements were designed to ensure financial intermediaries have sufficient liquidity to provide vital functions such as savings, credit, and payments.

The reliance on Central Bank funding suggests greater vulnerabilities currently persist or technology is ill-leveraged. Furthermore, these declining liquidity standards have become the norm in most economies, who allow a significant divergence to emerge between their objective of financial stability and their inability to design technologically-driven clearing systems and funding model that lessen the risk of cross-asset contagion from collateralized loan obligations, small caps, equities or redemptions from investment funds.

The continuous provision of liquidity to financial and non-financial institutions are misguided and ill-conceived

Not only have Central bankers noted the need for continuous and indiscriminate liquidity provisions, but Benoit Coeur also noted the ECB has a contingent term repo facility that could be activated at a higher frequency if needed, and the BoE can lend to a very broad range of counter-parties against a wide range of collateral. Ultra-low policy rates and additional liquidity infusions will attenuate the short term effect of the virus, but nonetheless, exacerbate the structural mismatch latent in current funding mechanisms. The Sverige Risk Bank reduced the type of collateral demanded during its most recent stimulus package to ensure an ample supply of liquidity mitigates the adverse effects of COVID-19, a virus that suggests significant negative spillovers to Sweden whose goods and services are highly integrated into global value chains (Ingves, 2020). By lowering the quality of collateral for commercial banks, the central bank can stimulate the economy in the short-term by extending maturities; nevertheless, macroprudential policy will inevitably have to be tighter in an attempt to account for waning collateral that formed the basis of higher lending.

This approach is wrong, misguided and economically counterproductive as it further increases the dependence amongst financial institutions and Central Banks, it also fails

to allow monetary policy to achieve second-round effects such as climate change mitigation, the redirection of finance towards companies providing mini-grids, floating solar panels and precision agriculture in the case of emerging and developing economies. Rather than simply serve as the backstop for the economy, central banks should communicate to commercial banks of the need to diversify asset holdings and decarbonize portfolio flows in order to limit financial stability risks and limit cross-asset or sector contagion in the event of a financial or macroeconomic shock.

Companies benefiting from Central Bank liquidity must green their practices to support sustainable growth

Commercial banks benefiting from central bank liquidity must provide verifiable details of their loan tranches allocated to green and carbon-intensive intensive, following strict reporting standards that link the provision of liquidity to specific loan types based on maturities. Unlike the liquidity provision mechanisms and repo transactions that facilitate liquidity mismatches via ill-regulated investment funds and continued provisions of liquidity mechanisms and ad-hoc interventions i.e. \$170 billion for the Federal Reserve Bank which fail to include any governance approaches to their frameworks, with climate change or gender equity absent from their approaches.

By creating an incentive for financial institutions to green their balance sheets, not only will they green their loan operations, insulate their interest-payments against sudden climate shocks; it will also reduce the risk of cross-asset contagion and sector-wide imbalances from aggravating perceived shocks, exogenous or otherwise.

Exogenous shocks include a sudden appreciation in the dollar and increases in interest rates; this is unlikely given the easing bias and ill-designed fiscal frameworks in advanced economies absent Germany, Netherlands, Sweden, Norway, Switzerland).

There is a notable difference between Central banks such as the Riksbank and Norges Bank- who raised their policy rates in the previous years and continue to gradually move away from the lower bound or normalize monetary policy as it is currently referred – is their labor markets that are designed to ensure sustained increases in wage outcomes that align with domestically-generated inflationary pressures whilst remaining competitive by international peers. As such, said countries benefit from greater domestically-generated inflation outcomes due to labor market laws designed to support wages, and thereby, drive consumption growth.

Central banks and regulators must also be clear that liquidity facilities and buffers are to be used only for financial and non-financial institutions who reduce dependence on external sources of finance such as the dollar that is prone to trade-induced fluctuations. This prompts the question: Are central banks promoting financial stability via macro-prudential frameworks such as the Loan-to-Value ratio which has been

loosened in the United Kingdom from 87.3% and 88.1%. The ensuing spill overs to macroeconomic and credit growth served as an anchor amidst the uncertainty pertaining to Brexit.

Furthermore, the Loan-to-income ratio has also been loosened from 3.8% in Q4 2018 to 4.2% in Q1 2019 as the countercyclical buffer was raised to 2% from 1% and the Common Equity Tier 1 was raised to 14% of the risk-weighted assets (Bank of England, 2019).

As central banks' balance monetary and macroprudential policy in their attempt to ensure a sustained convergence of inflation towards the 2.0 target, redesigning credit and liquidity facilities will green their balance sheets and incentivize forward-looking investments in capital markets.

However, the inability to utilize liquidity and reserve requirements to incentivize the greening of loan operations and firm balance sheets suggests that Central Banks seek to balance inflation and economic growth outcomes against financial stability risks. Not only is this the reverse of their mandated targets and responsibilities, by failing to address vulnerabilities which fall within their remit, but they also increase the intensity of corrections. For example, in October, Central Banks clarified our supervisory expectations to re-emphasize their commitment to providing liquidity in the ordinary course of business. We do not expect firms to justify any usage, nor is there any presumption they would use their own buffers before our facilities. Next year's first system-wide liquidity stress test will be another opportunity to demonstrate that liquidity buffers are fully useable.

By incentivizing the greening of loan provisions via liquidity and reserves at the bank, money-market operations will cause banks to green their balance sheets whilst commercial banks reduce balance sheet vulnerabilities by providing credit in a manner that lessens balance sheet vulnerabilities, cross-asset contamination, and limits industry-wide shocks. As such, it is indispensable for "circular monetary policy" to be normalized by central banks, more so in developing economies where the Bank of Central African States cut policy rates to 3.25%. This is closer to the lower bound amidst the rising risk of climate vulnerability.

II. CONCLUSION

Monetary policy in the recent past has sought to achieve mandated goals of price stability and output at varying intensities. Whilst quantitative easing has sought to re-engineer economic growth, repo market transactions have sought to ensure sufficient liquidity to support interbank lending activity, lessen the risk of liquidity mismatch, and the proliferation of financial stability risks. The proposed approach to the provision of liquidity serves as the basis for addressing structurally-driven liquidity mismatches symptomatic of economies that are increasingly reliant on market-based sources of finance. Rather than lessen the extent of repo market transactions, this paper posits an approach to

the provision of liquidity that incentivizes the transition away from liquidity-depleting investments towards investments designed to smooth said mismatches. Additionally, fiscal policy will play an indispensable role in supporting economic growth and supporting wage-driven inflation outcomes, whilst macroprudential frameworks are symptomatic of different levels of financial sector stress and development in housing markets.

Furthermore, such an approach will improve the transmission mechanisms from policy rates in the event of stress, but lessen the negative effects of insurance premiums and damage claims. It will also lessen the incentive to utilize the countercyclical buffers, capital conservation buffer to reduce the impact of shocks on varying asset classes over the medium term even as such tools are designed to support the economy in the event of stress. It is, therefore, imperative if not indispensable that central banks green their balance sheets by enforcing "Circular Monetary Economics". This paper argues for a, somewhat, urgent and timely change to liquidity and repo facilities that incentivize a greening of loan activity and firms' balance sheet. This will facilitate the pass-through from monetary policy via "circular monetary economics" and lessen the reliance on Central bank liquidity operations. By boosting the potential growth via targeted and carbon-neutral investments, wage-driven inflation will boost domestic demand, cause inflation to converge towards the target, and reduce the cost of conducting monetary policy over the long term.

Circular monetary economics seeks to prudentially insulate the provision of central bank liquidity, facilitate the transition towards a greener and more sustainable economy, whilst reducing the structural mismatch latent in commercial banks' balance sheet.

REFERENCE

- [1] Bank of England, 2020. Mortgage Lenders and Administrators Statistics - 2019 Q2. Available [here](#)
- [2] BIS, (April 2017). Repo market functioning. Committee on the Global Financial System, Bank for International Settlements.
- [3] Boivin, J., M. T. Kiley and F.S. Mishkin, 2011. "How has the monetary transmission evolved over time?" in handbook of monetary economics, Vol. 3, B. M.
- [4] Brunnermeier, M. K. and Y. Koby (2018): "The Reversal Interest Rate," NBER Working Paper No. 25406.
- [5] Christopher Witko, (2016), How Wall Street became a big chunk of the U.S. economy — and when the Democrats signed on.
- [6] Comité monétaire et Financier National de la République du Cameroun, 2019. Note sur la Situation des Établissement De Crédit. Banque des Etats de L'Afrique Centrale.
- [7] Credit and Liquidity Programs and the Balance Sheet, April (2020). Open market Operations.
- [8] Eggertsson, G., R. Juelsrud, L. Summers, and E. G. Wold (2019): "Negative Nominal Interest Rates and the Bank Lending Channel," NBER Working Paper No. 25416.
- [9] Eissenschmidt, J. and F. Smets (2018): "Negative interest rates: Lessons from the Euro Area," mimeo, presented at the XXI Annual conference of the Central Bank of Chile.
- [10] Eissenschmidt, J. and F. Smets (2018): "Negative interest rates: Lessons from the Euro Area," mimeo, presented at the XXI Annual conference of the Central Bank of Chile.
- [11] European Commission, 2020. Employment in high-tech and knowledge-intensive sectors. Available [here](#)
- [12] Federal Reserve Bank of St. Louis, 2020. U.S. Real Potential Gross Domestic Product. Available [here](#)
- [13] Goodfriend, Marvin, "Central Banking in the Credit Turmoil: An Assessment of Federal Reserve Practice", *Journal of Monetary Economics*, 58 (2011), 1-12.
- [14] Heider, F., F. Saidi, and G. Schepens (2019): "Life below zero: bank lending under negative policy rates," *Review of Financial Studies* (forthcoming).
- [15] Hyun Song Shin, May 2019. What is behind the recent slowdown? Presentation at the "Public Finance Dialogue" workshop arranged by German Federal Ministry of Finance and Centre for European Economic Research (ZEW), Berlin.
- [16] International Monetary Fund, July 2019. Cameroon: Fourth Review under the Extended Credit Facility Arrangement and Requests for Waivers. IMF staff report. Available [here](#)
- [17] Johannes Bubeck, Angela Maddaloni, José-Luis Peydró, April 2020. Negative monetary policy rates and systemic banks' risk-taking: evidence from the euro area securities register. Working paper series, No 2398.
- [18] Kiyotaki, N., and J. Moore, 1997, "Credit Cycles", *Journal of Political Economy*, Vol. 105, PP. 221 – 48.
- [19] Kocherlakota, N. R., 2000. "Creating Business Cycles through Credit Constraints," *Quarterly Review*, Vol. 24, pp. 2 – 10, Federal Reserve Bank of Minneapolis, Minneapolis.
- [20] Laurence H Meyer, 2001. Inflation targets and inflation targeting. Remarks by Mr Laurence H Meyer, Member of the Board of Governors of the US Federal Reserve system. Speech to the University of California at San Diego Economics Roundtable, San Diego, California
- [21] Micheal Saunders, March 2019. Speech on Pass-through of Bank Rate to household interest rates. Imperial College Business School, London 6 March 2019
- [22] Niall Ferguson, Andreas Schabb and Moritz Schurlarick, 2014. Central Bank Balance Sheet Since the 1900. Paper prepared for the May 2014 ECB conference in Sintra.
- [23] Philippon, Thomas, "Has the US finance industry become less efficient? On the theory and measurement of financial intermediation", NBER Working Paper No. 18077, 2012
- [24] Quarterly report on Federal Reserve Balance Sheet Developments, November (2019), Board of Governors of the Federal Reserve.
- [25] Robin Greenwood and David Scharfstein, 2013. The Growth of Finance, *Journal of Economic Perspectives*, Vol. 27, No. 2. (pp. 3-28)
- [26] Stefan Ingves, 2020. Speech by Governor of the Riksbank: The Riksbank's measures to mitigate the effects of the corona crisis on the economy. Sveriges Riksbank.
- [27] Mian, Atif, Sufi, Amir, Verner, Emil. 2017. Household Debt and Business Cycles Worldwide. *Quarterly Journal of Economics* 132(4): 1755-1817.
- [28] Iren Levina, Robert Sturrock, Alexandra Varadi and Gavin Wallis, 2019. Modelling the distribution of mortgage debt. Bank of England, Staff Working Paper No. 808
- [29] Galati, Gabriele, Moessner, Richhild. 2017. What do we know about the effects of macroprudential policy? *Economica* 85(340): 735-770.
- [30] Cerutti, Eugenio, Claessens, Stijn, Laeven, Luc. 2017. The Use and Effectiveness of Macroprudential Policies: New Evidence. *Journal of Financial Stability* 28, issue C, 203-224.
- [31] Aghion, Philippe, Howitt, Peter, Mayer-Foulkes, David. 2005. The Effect of Financial Development on Convergence: Theory and Evidence. *Quarterly Journal of Economics* 120(1): 173-222.
- [32] Rousseau, Peter, Wachtel, Paul. 2011. What is happening to the Impact of Financial Deepening on Economic Growth? *Economic Inquiry* 49(1): 276-288.