ALIGNING CENTRAL BANK REFINANCING OPERATIONS WITH THE G20 AGENDA

Chiara Colesanti Senni and Pierre Monnin

CEP POLICY BRIEF
October 2021

AUTHORS

Chiara Colesanti Senni is a fellow with CEP where she focuses on the integration of environmental risk analytics in monetary policy. She is also co-founder of the Sustainable Macro research network. Prior to that she completed her PhD in Resource Economics at ETH Zurich. During this time, she focused on the transition to a low-carbon economy, including the possibility for central banks to adopt emission-based interest rates in their lending facilities. Chiara holds a MSc in Economics from the University of Bologna, as well as a BA in Economic Development from the University of Florence.

Pierre Monnin is a Senior Fellow at CEP, where he works on central banking, monetary policy, and financial regulation, with a focus on their interdependence with environmental and social sustainability. Prior to joining CEP, he worked for the Swiss National Bank (SNB) in various roles for a total of ten years, as well as in the financial industry.

INTRODUCTION

Since the Pittsburgh Summit in 2009, G20 leaders have repeatedly highlighted inclusive growth and environmental protection as core objectives in their joint declarations. With the widening of economic inequalities and the acceleration of climate change and biodiversity loss, their calls for action have gained further urgency. In this context, G20 leaders have repeatedly pledged to use all available policy levers to target their objectives. Central banks should not be carved out from this imperative: the policies they implement can and should support the broader G20 goal of a "strong, sustainable, balanced and inclusive post-COVID-19 era".[1]

Targeted refinancing operations (TROs) are a key instrument that central banks can and should use to support this objective. TROs provide central bank loans to banks at favorable conditions to fund their lending to specific segments of the economy. Since the 2007-2008 financial crisis, central banks have increasingly resorted to TROs to stimulate bank lending to small and medium-sized enterprises (SMEs) or specific economic sectors. Their experience suggests that TROs are effective in reaching these goals and has positioned these instruments as an integral part of central bank toolkits. Yet, despite the recognition by central banks that monetary policy instruments can support broader goals,[2] TROs targeted at inclusive growth and environmental protection have not received the attention they deserve, let alone been implemented in G20 countries.

Against this background, this policy note calls for a wider use of TROs by G20 central banks and their alignment with the broader G20 agenda. We argue that central banks must adjust existing TROs accordingly and deploy new TROs when appropriate. To be effective in this endeavor, central banks must implement TROs that provide tangible financial incentives, account for interdependencies with other monetary instruments and rely on transparent rules.

To that end, we first document existing TROs by G20 central banks and present empirical evidence for their impacts on targeted economic activities. We then highlight that it is crucial to align TROs with the broader G20 agenda to support strong, sustainable, balanced and inclusive growth, before turning to recommendations regarding the elements that central banks must account for to implement effective TROs.

---

[1] G20 Riyadh Summit, Leaders' Declaration, 21-22 November 2020.

[2] See, for example, the work of the Central Banks and Supervisors Network for Greening the Financial System on integrating climate change considerations in monetary policy operations (see NGFS 2021).

TARGETED REFINANCING OPERATIONS: AN ESTABLISHED MONETARY POLICY INSTRUMENT

With targeted refinancing operations, central banks provide funding to banks at favorable conditions when they lend to specific segments of the economy. The advantageous conditions reduce funding costs for banks, and thus incentivize them to lend in larger volume and/or at lower interest rates to the targeted economic activities. The decision to lend to and the ownership of the loans, however, remains the remit of banks. Central banks set favorable conditions through two dimensions: (1) maturity, by providing funding to banks for a longer term than in other refinancing operations, and (2) rate, by providing funding to banks at a lower interest rate.[3] These dimensions are not mutually exclusive and are often used in combination. In addition, central banks can influence bank lending to targeted economic activities by easing or constraining access to TROs funding.[4]

Targeted refinancing operations have increasingly been used by G20 central banks since the 2007-2008 financial crisis. The Bank of Korea was a pioneer in this practice in 2008 with the implementation of its Bank Intermediated Lending Support Facility (BILSF), which provides funding at low-interest rates to financial institutions that extend loans to SMEs.[5] The Bank of Japan followed in 2010 with a program targeting economic activities that strengthen the foundations for Japan's economic growth. In 2012 and 2014, respectively, the Bank of England and the European Central Bank (ECB) introduced refinancing programs targeting credit to households (excluding mortgages in the case of the ECB) and non-financial corporations. In parallel, the People's Bank of China developed programs aimed at supporting key economic sectors. The COVID-19 crisis has further expanded the use of TROs in G20 countries, with four additional central banks starting such schemes[6] and two expanding their usage of them. In total, nine G20 central banks, covering eleven G20 countries, have implemented TROs since the 2007-2008 financial crisis (see Table 1).

Targeted refinancing operations are here to stay. Although most TROs are introduced as temporary support to the economy, experience shows that they tend to remain in place for long periods. In fact, except for the programs of the Bank of England, all TROs implemented before the COVID-19 crisis are still in place. These programs have proved to be useful monetary policy tools, especially in a low-interest rate environment. It is therefore likely that central banks will continue to resort to them in the near and possibly also the longer future. The ECB, for example, concluded in its 2021 strategy review that its

[3] Note that it is also possible to set higher interest rates for banks that decrease their lending to the targeted segments. In its Funding for Lending Scheme (FLS) the Bank of England, for example, charged banks a higher fee on funding if they decrease their net lending to the real economy.

[4] The Reserve Bank of Australia's Term Funding Facility (TFF), for example, provides one dollar of funding to banks for every dollar increase in credit outstanding to large businesses, while it provides five dollars of funding for every dollar increase in credit outstanding to SMEs. The Bank of England's TFSME provides ten times more refinancing for bank lending to SMEs than when they lend to households or large businesses.

[5] Note that the Bank of Korea's BILSF also provides higher incentives in terms of volume of funding received for banks that lend to specific types of SMEs, like, e.g., start-up SMEs with creative technologies.

[6] The Reserve Bank of Australia, the Reserve Bank of India, the Banco de Mexico and the Central Bank of Russia.

TLTROs program significantly contributed to the transmission of monetary policy to the economy and that the ECB will carry on using this instrument, if necessary. Given the relative success of such schemes in other countries (see the section on "Empirical Evidence" below), this conclusion is likely to be shared by other central banks.

Table 1: TROs in G20 countries

Pre-Covid

Central Bank	Program	Maturity	Target[7]	Incentive	Period
People's Bank of China	Pledged Supplementary Lending (PSL)	3 years	Specific sectors (e.g., agriculture, small businesses, shantytown redevelopment)	Maturity Rate	April 2014 – ongoing
	Targeted Medium-Term Lending Facility (TMLF)	3 years	Small and micro-enterprises, private enterprises	Maturity Rate	December 2018 – ongoing
Bank of England	Funding for Lending Scheme (FLS)	4 years	Households, businesses (with additional incentives for small businesses as of 2013)	Maturity Rate	July 2012 – January 2018
	Term Funding Scheme (TSF)	4 years	Households, businesses	Maturity Rate	August 2016 – January 2019
European Central Bank	Targeted Longer Term Refinancing Operations (TLTROs)	3 years	Households (excluding mortgages), corporates	Maturity Rate	June 2014 – ongoing
Bank of Japan	Fund-Provisioning Measure to Support Strengthening the Foundations for Economic Growth	1 year	Economic activities that strengthen the foundations for economic growth	Maturity	June 2010 – ongoing
	Stimulating Bank Lending Facility	1 year	Households, firms	Maturity	December 2012 – ongoing
Bank of Korea	Bank Intermediated Lending Support Facility (BILSF)	1 month	SMEs (with greater incentives for start-up SMEs with creative technologies)	Maturity Rate	March 2008 – ongoing

[7] Note that in this table the terms businesses, enterprises and corporates are equivalent: they all refer to non-financial firms. For each program, we follow the term used by the central bank implementing it.

Post-Covid[8]

Central Bank	Program	Maturity	Target	Incentive	Period
Reserve Bank of Australia	Term Funding Facility (TFF)	3 years	SMEs	Maturity	April 2020 – June 2021
Bank of England	Term Funding Scheme with Additional Incentives for SMEs (TFSME)	4 years	SMEs	Maturity	March 2020 – April 2021
Reserve Bank of India	On Tap TLTRO	3 years	5 specific sectors (including, e.g., MSMEs). Later extended to 26 sectors	Maturity	October 2020 – ongoing
Bank of Japan	Special Funds-Supplying Operations to Facilitate Financing in Response to the Novel Coronavirus	1 year	SMEs	Maturity Rate	March 2020 – ongoing
	Fund-Provisioning Measure to Support Efforts on Climate Change	1 year	Firms that contribute to Japan's actions to address climate change	Maturity Rate	September 2021 – ongoing
Banco de México	Financing Facilities for Loans to MSMEs and Households	18 to 24 months	MSMEs and Households affected by the COVID-19 pandemic	Maturity	April 2020 – ongoing
Bank of Russia	Refinancing Program for SMEs	1 year	SMEs	Maturity, Rate	March 2020 – ongoing

[8] Note that we did not include the following programs in this table. For India, the Targeted Long Term Repo Operations (TLTROs and TLTROs 2.0) because the Reserve Bank of India targets these programs on asset classes (corporate bonds, commercial paper, and non-convertible debentures) rather than bank loans for specific economic segments. For Saudi Arabia, the Guaranteed Facility Program (previously known as Funding for Lending) because the Saudi Central Bank guarantees loans but does not provide funding for them. For the United States, the Main Street Lending Program because the Federal Reserve funds a special purpose vehicle that acquires the loans provided by banks, and the Paycheck Protection Program Liquidity Facility because banks are only an intermediary for the Paycheck Protection Program – i.e. loan eligibility is defined in the Coronavirus Aid, Relief, and Economic Security (CARES) Act and not by banks own lending policy.

HOW DO CENTRAL BANKS USE TARGETED REFINANCING OPERATIONS?

Central banks use a variety of incentives for their targeted refinancing operations. All G20 central banks that have implemented TROs provide longer loan maturities than for conventional refinancing operations.[9] Some of them also resort to incentives in terms of interest rates. The TLTRO program of the ECB, for example, links the interest rate to banks' lending portfolios: the more loans to non-financial corporations and households (excluding mortgages), the more attractive the interest rate. Furthermore, the interest rate for TLTROs is not fixed but defined in relation to a policy rate.

Targeted refinancing operations are usually aimed at broad economic segments, but narrower targets are also possible. All TROs aim at stimulating loans to the real economy and thus exclude loans to financial institutions. Often, SMEs or MSMEs[10] are a particular target. Some central banks focus on more specific economic activities. In response to the COVID-19 pandemic, for example, the Reserve Bank of India implemented an On Tap TLTRO program to incentivize banks to lend to the drugs, pharmaceuticals, and health care sector, along with the agricultural and retail sector as well as MSMEs.[11] With its BILSF program, the Bank of Korea provides specific incentives for loans to start-up SMEs with creative technologies. The Fund-Provisioning Measure to Support Efforts on Climate Change, recently announced by the Bank of Japan, shall support lending to firms that contribute to Japan's actions to address climate change.

Refinancing operations are implemented to ease funding conditions for the targeted segments in downturns and to pursue long-term objectives. Most TROs aim at stimulating the economy at large by easing funding conditions for firms that mainly rely on bank loans to fund their activities. SMEs are a case in point, which underpins the fact that most TROs put a particular focus on them. Some central banks also use TROs to pursue longer-term objectives. The Bank of Japan, for example, introduced its Fund-Provisioning Measure to Support Strengthening the Foundations for Economic Growth in 2010 to reverse the declining trend in Japan's growth rate and to put the economy on a higher medium- to long-term growth path.[12] The Bank of Korea uses its BILSF program to support bank lending in specific regions, depending on the regional economic situation.

---

[9] Note that the Bank of Korea set a maturity of one month for its BILSF program. Although this maturity is longer than usual short-term refinancing operations, it is not in the range of the other G20 TROs programs (at least one year).

[10] Micro, small and medium-sized enterprises.

[11] This program was later extended to 26 economic sectors.

[12] This program will expire in June 2022 and the Bank of Japan announced that the Fund-Provisioning Measure to Support Efforts on Climate Change will replace it.

ECONOMIC IMPACT OF TARGETED REFINANCING OPERATIONS: A LOOK AT EMPIRICAL EVIDENCE

Banks appear to pass through the favorable conditions of targeted refinancing operations to the real economy. Empirical evidence on the impact of TROs on the economy is scarce and often program specific. Yet, with this caveat in mind, studies indicate that, following the implementation of TROs, banks decrease lending rates and ease credit conditions for borrowers. Benetton and Fantino (2018) find that banks using ECB's TLTROs decreased lending rates by 20 bps compared to banks that did not participate in the program. Andreeva and García-Posada (2020) additionally find that higher TLTROs uptake by banks is associated with an easing of their credit standards. Similarly, Alston *et al*. (2020) find that the Reserve Bank of Australia's TFF program decreased interest rates for borrowers.

Targeted refinancing operations reach their targets. Evidence from TROs aimed at SMEs tend to show that they were effective in increasing loans for the targeted firms. The Bank of England (2015) reports a positive impact of its Funding for Lending Scheme (FLS) program on net lending to SMEs with an increase in the annual lending growth rate. Ginelli Nardi *et al*. (2018) show that the Bank of England's Term Funding Scheme (TFS) contributed to decreasing interest rates for households and businesses. Laine (2020) shows that banks participating in the ECB's TLTROs increased their lending to non-financial corporations by more than 20%.[13] Note that none of these studies investigates whether TROs generate larger impacts on their targets than on other firms. Jung and Lim (2014) analyse the impact of the Bank of Korea's BILSF program and find it helped increase bank loans to SMEs, as well as decrease lending rates. They also find that the effects are particularly prominent for start-ups, which are a specific target of this program.[14] Alston *et al.* (2020) find that the Reserve Bank of Australia's TFF generated neither a differential in interest rate between large and small businesses, nor an increase in lending to them.[15]

The effectiveness of targeted refinancing operations varies with economic and monetary conditions. Empirical evidence indicates that TROs are particularly effective in easing credit conditions for SMEs with tight funding conditions. Afonso and Sousa-Leite (2019) show that the ECB TLTROs particularly increased lending in vulnerable euro area countries, easing funding conditions especially for financially stressed economic segments. Benetton and Fantino (2018) find that the impact of TLTROs on the cost of credit is significant for smaller firms, but insignificant for larger firms. This suggests that the monetary policy mix of a central bank may impact the effectiveness of TROs. In the case of the ECB, for example, in addition to TLTROs, funding to larger firms is also supported by other monetary programs, such as the Corporate Sector Purchase Program (CSPP). This may explain the muted impact of TLTROs on larger firms' bank rates. Finally, TROs must be

[13] Note that Laine did not find a similar impact on loans to households, another target of the TLTROs program.

[14] Note that Jung and Lim's paper is only available in Korean. We base our conclusion based on their abstract in English.

[15] This finding does not exclude the possibility that SMEs would have faced higher rates and lower volumes without the TFF program, which would support the effectiveness of the program.

substantial to be decisive. Havrylchyk (2016) does not find any increase in loan growth to SMEs compared to large corporates after a marginal change in the Bank of England's program.

TARGETING THE G20 AGENDA WITH REFINANCING OPERATIONS

Inclusiveness and environmental sustainability are on top of the G20 agenda. Calls for inclusive growth has been at the core of the G20 agenda since the 2009 Leaders' Summit in Pittsburgh. This call has repeatedly been part of the joint declaration by G20 leaders ever since. Environmental protection is an objective for G20 leaders ever since their first summit in 2008. They have recognized the accelerating deterioration of the environment and its threats in multiple occasions since then. In 2016, the G20 leaders highlighted the critical role that the financial sector must play in addressing them[16] and called for clearer policy signals and frameworks for sustainable investments.

Central banks can and should support these G20 objectives with targeted refinancing operations. G20 leaders have repeatedly pledged to use all policy levers in targeting their objectives. Central banks should not be carved out from this imperative (Barkawi and Siaba Serrate 2019). TROs are a key instrument that central banks can deploy to support inclusiveness and environmental sustainability. The experience in G20 countries shows that TROs indeed support the targeted economic segments. Focusing TROs on activities that foster inclusive growth and environmental sustainability – and reducing those in conflict with these goals – would offer critical support to the G20 agenda.

Targeted refinancing operations should be refocused and deployed at larger scale in G20 countries. So far, apart from the Bank of Japan's Fund-Provisioning Measure to Support Efforts on Climate Change implemented in September 2021, none of the TROs implemented in G20 economies is targeted on these wider G20 goals. They are thus equally supporting economic activities that are aligned with these objectives and those in conflict with them. This must change. Current programs must be redesigned to ensure policy coherence with the broader G20 agenda.

Targeted refinancing operations based on interest rate incentives are likely to be more effective in the current environment. Empirical evidence suggests that the impact of TROs depends, at least to some extent, on other monetary policy programs in place.[17] In the current environment, with central banks implementing strong expansionary monetary policies, TROs impact might be dampened by the large amount of funding provided to firms through other monetary policy operations. Against this background, setting lower

[16] In 2016, the G20 leaders formally launched the "G20 Green Finance Study Group" – later renamed to the "G20 Sustainable Finance Study Group", which was elevated to a working group in 2021 under the Italian presidency.

[17] Benetton and Fantino (2018), for example, finds that TROs have a larger impact on SMEs – which are heavily depending on bank funding and thus on TROs – than on larger firms – which are being supported by other monetary programs, like corporate bond purchases.

interest rates for TROs that are targeted at the broader G20 agenda would secure a clearer financial incentive for banks and firms.[18] In addition, if central banks fix the rate difference between such TROs and other refinancing operations – e.g., by setting it 50 bps lower – they would guarantee a constant and clear financial incentive for such TROs over time. This strategy would also allow central banks to adapt the financial incentive associated with TROs when needed by recalibrating this premium.

Targeted refinancing operations should support economic activities that contribute to the broader G20 agenda as well as deter those in conflict with them. Current propositions to align TROs with the objective of environmental sustainability focus on supporting targeted economic activities.[19] This option requires central banks to define which firms are considered within scope. Another option for central banks is to target refinancing operations away from economic activities that conflict with the G20 objectives. Both options are economically equivalent since they both generate financial incentives to cut funding for activities at odds with the established goals and to redirect it to economic segments that support them. Excluding the economic activities that are the most misaligned with G20 objectives is one possible way for central banks to decrease funding for them and keep the refinancing channel broadly open – since only a few economic segments would be affected – to continue to stimulate the economy at large.

Ensuring that the design of targeted refinancing operations accounts for climate financial risks is an urgent first step. As highlighted by central banks and financial regulators, climate risks are financial risks (NGFS 2019). Supporting loans to firms that are highly exposed to such climate financial risks through TROs goes against the financial stability mandate of G20 central banks. Indeed, it encourages banks to lend to financially risky activities and thus weaken financial stability. Against this background, reflecting climate financial risks in TROs is crucial for them to achieve their mandate. An option for central banks would be to link the interest rate on TROs to a bank's exposure to climate financial risks: the higher the risks, the higher the rate.[20] To that end, identifying high climate risks is a critical first step for which the convergence among climate risk analysts already provides a solid foundation.[21]

Targeted refinancing operations should rely on transparent rules and metrics. Forward guidance is a central instrument in modern central banking. Central bankers should also rely on it for TROs and communicate clearly how TROs will evolve in the future and on which elements they will base their decisions. Knowing which criteria and

[18] This option is explored by Böser and Colesanti Senni (2020). They show that, when TROs rates reflect the emissions of a bank's asset portfolio, liquidity costs for banks increase with the emission intensity of their portfolio, leading banks to favour low-carbon assets and to improve the financing conditions for low-carbon sectors.

[19] In the context of environmental sustainability, see, e.g., Batsaikhan and Jourdan (2021) for a proposition for the ECB to target sustainable building renovation in Europe or van 't Klooster and van Tilburg (2020) for a proposition to align ECB's TLTROs with the EU Green Taxonomy.

[20] Böser and Colesanti Senni (2021) explore this option. They find that such a policy shifts bank lending away from economic activities exposed to climate financial risks. This improves financial stability, reduces the need for central bank interventions to restore financial stability and steers investments in support of the achievement of climate objectives.

[21] Bingler, Colesanti Senni and Monnin (2020, 2021) show that transition risk metrics that are currently available on the market tend to agree on which firms are highly exposed to transition risk.

thresholds central banks use to determine loan eligibility for future TROs and their refinancing rates is key for firms: it allows them to choose an investment strategy that meets these criteria and thus potentially opens the door to financial support through TROs. As such, to the extent that TROs are aligned with G20 objectives, they also give firms a financial incentive to work to support them.

CONCLUSION

The use of TROs by G20 central banks has been steadily increasing since the 2007-2008 financial crisis, with an acceleration in the aftermath of the COVID-19 crisis. Experience in these countries shows that TROs are effective in supporting the targeted economic activities. TROs are thus likely to remain a mainstream instrument in the toolbox of central banks in the future.

Parallel to this, the objectives of inclusive growth and environmental sustainability have significantly gained traction in the G20 agenda. In this note, we argue that TROs can and should be part of the policies implemented by G20 central banks to support the achievement of these goals. This would ensure coherence across policy fields. For that, G20 central banks should align existing TROs accordingly. Where such operations are not yet implemented, central banks should deploy them.

Based on existing evidence, we argue that relying on an interest rate difference between such TROs and other refinancing operations is a promising option for central banks. This would secure a constant and clear financial incentive over time for banks to lend to economic activities that foster inclusive growth and environmental sustainability. It would also allow central banks to adapt the financial incentives when needed by recalibrating this premium. Both focusing TROs on economic activities that support the G20 agenda or shifting them away from those conflicting with these goals are possible. In implementing TROs, central banks must account for other monetary instruments that are deployed in parallel to TROs to ensure an effective impact on the targeted economic activities. Finally, transparent rules for TROs are critical to ensure their effectiveness in contributing to the G20 goal of a strong, sustainable, balanced and inclusive post-COVID-19 era.

REFERENCES

Afonso, A. and Sousa-Leite, J. (2019). “The transmission of unconventional monetary policy to bank credit supply: evidence from the TLTRO”, *Banco de Portugal Working papers*, No w201901. (link)

Alston, M., Black, S., Jackman, B. and Schwartz C. (2020). “The term funding facility”, *Reserve Bank of Australia*, RBA Bulletin. (link)

Andreeva, D. C. and García-Posada, M. (2020). “The impact of the ECB’s targeted long term refinancing operations on banks’ lending policies: the role of competition”, *ECB Working paper series*, No 2364. (link)

Bank of England (2015). “Bank of England and HM Treasury Funding for Lending Scheme – 2015 Q2 usage and lending data”, *Bank of England*, News release. (link)

Barkawi, A. and Siaba Serrate, J. (2019). “Central Banks and the G20 Agenda: Ensuring Policy Coherence”, T20 Policy Briefs, March 14. (link)

Batsaikhan, U. and Jourdan, S. (2020). “Money looking for a home”, *Positive Money Europe*. (link)

Benetton, M. and Fantino, D. (2018). “Competition and the pass-through of unconventional monetary policy: evidence from TLTROs”, *Bank of Italy Working papers*, No 1187. (link)

Bingler A. J., Colesanti Senni C., Monnin, P. (2020). “Climate financial risk: Assessing convergence, exploring diversity”, CEP Discussion Note. (link)

Bingler A. J., Colesanti Senni C., Monnin, P. (2021). “Climate transition risk metrics: understanding convergence and divergence across firms and providers”, CER-ETH Economics Working Paper Series, No. 21/363. (link)

Böser, F. and Colesanti Senni, C. (2020). “Emission-based interest rates and the transition to a low-carbon economy”, CER-ETH Economics Working Paper Series, No. 20/337. (link)

Böser, F. and Colesanti Senni, C. (2021). “CAROs: Climate risk-adjusted refinancing operations”, CER-ETH Economics Working Paper Series, No. 21/354. (link)

Ginelli Nardi, B., Nwankwo, C. and Meaning, J. (2018). “The term funding scheme: design, operation and impact”, *Bank of England Quarterly Bulletin*, 2018Q4. (link)

Havrylchyk, O. (2016). “Incentivising Lending to SMEs with the Funding for Lending Scheme: Some Evidence from Bank-Level Data in the United Kingdom”, *University of Paris Nanterre*, Working Paper 2016-24. (link)

Jung, H. and Lim, H. (2014). “The impact of credit policy on small and medium-sized enterprises”, *Bank of Korea*, Working Paper 2014-2. (link)

Laine, O.-M. (2021). “The effect of targeted monetary policy on bank lending”, *Journal of Banking and Financial Economics*, 1(15), 25-43. (link)

NGFS (2019). *A call for action – Climate change as a source of financial risks*, NGFS First Comprehensive Report, April. (link)

NGFS (2021). *Adapting central bank operations to a hotter world - Reviewing some options*, NGFS Technical Document, March. (link)

van ’t Klooster, J. and van Tilburg, R. (2020). “Targeting a sustainable recovery with green TLTROs”, *Positive Money Europe*. (link)