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Advancing the Monetary Policy Toolkit through Outright Transfers

Sascha Buetzer

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Prepared by Sascha Buetzer*

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ABSTRACT: This paper argues that in reserve currency issuing economies at the effective lower bound, outright transfers from the central bank to households are both more equitable and more effective in achieving monetary policy objectives than asset purchases or negative interest rates. It shows that concerns pertaining to central banks' policy solvency and equity position can be addressed through a careful assessment of a central bank's loss absorbing capacity and, if need be, tiered reserve remuneration policies. It also spells out key differences to a debt or money financed fiscal stimulus, which are particularly pronounced in a currency union without a central fiscal capacity. The paper concludes by discussing broader institutional, political, and legal considerations.

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Author's E-Mail Address:	sbuetzer@imf.org

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1 Introduction

Even prior to the outbreak of COVID-19, most advanced economies had been stuck at or close to the effective lower bound (ELB) for several years. Due to persistently sluggish demand and insufficient fiscal support, central banks have been resorting to an ever expanding array of unconventional monetary policies in order to meet their price stability target and broader economic goals (Bützer, 2017). While expansionary monetary policy has been needed to stem off deflationary pressures, support growth, and stabilize employment, the employed measures – in particular negative interest rates, large scale asset purchases, and long-term lending operations – have been relatively untargeted and therefore limited in their effectiveness. They have also given rise to financial stability risks while exacerbating large pre-existing wealth inequalities.

As the link between monetary policy and inequality has been receiving increasing attention among the general public and in the literature, this paper will focus on an alternative tool for monetary policy implementation that is both more effective and more equitable in achieving monetary policy objectives. In an economy at the ELB with spare capacity, outright transfers (OT) from the central bank to private households would allow for a much more direct monetary policy transmission on prices and the real economy without creating undesirable financial stability risks such as asset price inflation or unsustainable credit growth. Moreover, in contrast to quantitative easing (QE),[1] OT would not contribute to greater wealth inequality and reduce, rather than increase, risks of fiscal dominance. It would also allow for a faster and less disruptive liftoff from the ELB. OT could be implemented within the existing payments infrastructure although the emergence of central bank issued digital currencies (CBDC) could facilitate its use and allow for a more structural integration in central banks' monetary policy toolkits (cf. Barrdear and Kumhof (2016) and Bindseil (2020)).

OT constitutes a special case of "helicopter money" which has been proposed as an addition to the monetary policy toolkit by many scholars such as Gali (2020), Boivin et al. (2019), Bernanke (2016), Sims (2016), Turner (2015a), Caballero et al. (2015), and Woodford (2012).[2] However, these papers have not focused on the inequality related aspects of different monetary policy tools and generally considered helicopter money in the form of monetary financing, which is distinctly different from OT with respect to its

[1] QE and asset purchases by the central bank are used interchangeably in this paper.

[2] The original idea goes back to Friedman (1969), although it has only gained renewed attention in recent years as central banks have been running out of traditional monetary policy space at the ELB.

political economy and institutional implications. In particular, it requires fiscal policy cooperation although a lack of fiscal support, often more politically than economically driven, has given rise to the problem and debate on unconventional monetary policy tools in the first place. Moreover, outright monetary financing - or even closer monetary-fiscal cooperation - is either taboo or explicitly prohibited in advanced economy jurisdictions such as the euro area. While legal complexities loom large in the case of OT, it could potentially be implemented within existing institutional frameworks in the euro area, a currency area where it could play a particularly useful role as outlined in this paper. A policy paper by Martin et al. (2021) touches on these euro area specific circumstances, although it does not contain a detailed assessment of the consequences for the ECB's balance sheet or policy solvency more generally, a gap that this paper tries to fill.[3]

The contribution of this paper to the literature is fivefold. It (i) adds a new monetary policy instrument to the discussion on whether - and how - monetary policy can take inequality concerns into account (Section 2), (ii) discusses the expected macroeconomic and distributional effects of OT, its calibration, and practical implementation, including central bank balance sheet accounting options (Section 3), (iii) presents policy solvency constraints and reserve remuneration considerations (Section 4), (iv) elucidates the differences to a debt or money financed fiscal stimulus (Section 5), and (v) assesses broader institutional and legal considerations (Section 6). Section 7 concludes.

2 Interest rates, asset purchases, and inequality

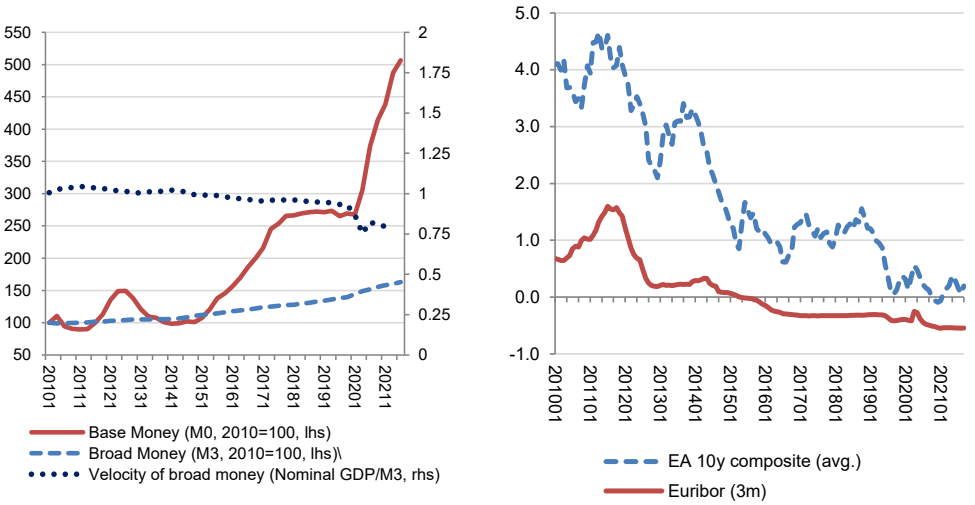
The key monetary policy tools employed by advanced economy central banks over the past years, lower interest rates and asset purchases, ultimately aim to lower the cost of credit and stimulate credit growth in the hope that this will lead to increased nominal demand and price pressures.[4] While this approach has been met with some success in supporting economic activity, it is a very indirect way of influencing broad money growth, inflation, and

[3]ECB and Eurosystem are used interchangeably in this paper.

[4]Note that QE can induce increased bank lending through the lowering of interest rates and not the expansion of base money itself. Contrary to common textbook presentations of the money multiplier, the expansion of base money has no direct or causal link to broad money growth, as newly created reserves can never leave the financial system or be "multiplied" out by banks, cf. Borio and Disyatat (2009), Sheard (2013), McLeay et al. (2014).

domestic demand (Fig. 1 and 2). In the euro area, inflation has remained subdued and far below its medium-term target of close to but below 2% since the start of QE in March 2015, despite the recent uptick.[5]

Fig. 1 Monetary policy transmission in the euro area



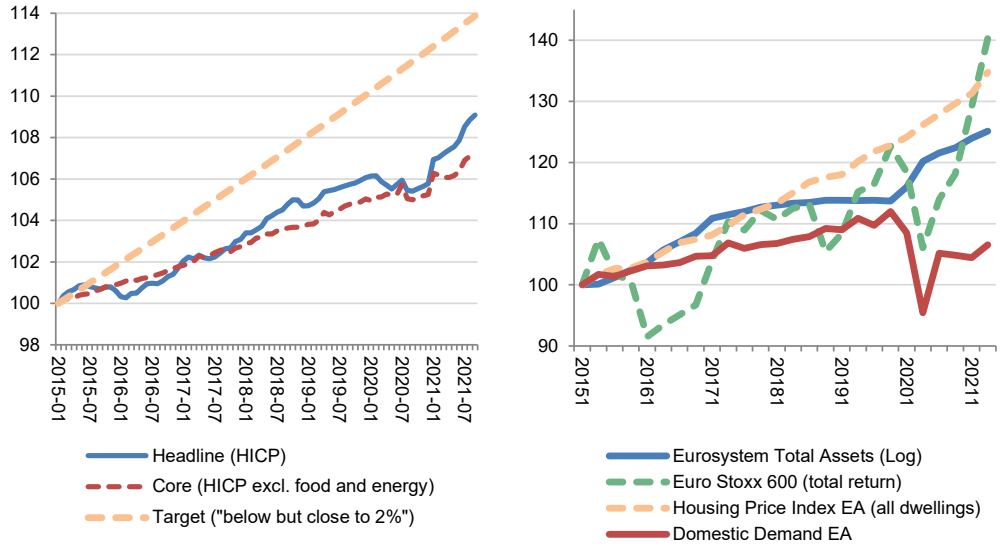
Sources: Haver, ECB

At the same time, asset purchases have contributed to a strong increase in asset prices, with financial assets mostly concentrated in the hands of households at the very top of the wealth distribution whereas real estate ownership is more evenly distributed. The effects of QE on income inequality can be expected to be more evenly distributed due to the positive impact on employment and since income inequality tends to be much less pronounced than wealth inequality to begin with (see Fig 3). Accordingly, Andersen et al. (2020) find a large impact on *wealth* inequality in a case study for Denmark based on household microdata, whereas other studies (cf. Kappes (2021), Bonifacio et al. (2021), Ampudia et al. (2018)) find mixed results, particularly for *income* inequality. The mixed evidence attests to the very heterogeneous effects of QE on households across the income and wealth distribution, depending on individual households' assets and liability structure, generally benefiting borrowers over creditors and owners of real estate over renters for example.[6] Moreover, it is important to distinguish between abso-

[5]At the current juncture, the inflationary pressures in the euro area still appear mostly attributable to temporary factors, including pandemic-induced global value chain disruptions, commodity price increases, base effects, and the reversal of the VAT rate cut in Germany.

[6]For a detailed overview of the wealth distribution in Europe see Eurofound (2021).

Fig. 2 Consumer and Asset Prices, 2015-2021



Sources: Haver, ECB

lute and relative measures of wealth inequality. A hypothetical 1% increase in net wealth for each household would not alter relative measures of wealth inequality but imply a huge rise in absolute inequality.[7] For instance, between the beginning of 2015 and the end of 2021, annual average growth rates of stock and housing prices in Europe have amounted to 5.8% and 5.1% respectively, contributing to a substantial increase in absolute wealth inequality between households. This can exacerbate the perception of "winners and losers" while the impact on relative indicators of inequality such as the Gini coefficient can be muted.[8]. OT, on the other hand, would have no such extreme heterogeneous effects on absolute inequality.

It is widely recognized that expansionary monetary policy measures such as QE played an important role in supporting growth and employment in response to negative shocks and weakening demand. This does not mean, however, that there aren't other expansionary monetary policy options, such as OT, that could have achieved better results in a more equitable and less distortionary fashion. While the ratio of (commercially created) broad money[9]

[7]Globally, the frequent divergence of relative and absolute indicators of inequality is a well documented phenomenon, cf. Niño-Zarazúa et al. (2017).

[8]The underrepresentation and underreporting of ultra-high net-worth individuals in survey and tax data based measures of inequality further skew results downwards, cf. Saez and Zucman (2020)

[9]This includes currency in circulation, whose quantity is driven by the demand from households, firms, and banks, rather than being exogenously "injected" into the economy

Tab. 1 Monetary aggregates in the euro area (end-2020, in €billion)

	Base Money (M0)	Broad Money (M3)*	
Bank reserves (minimum and excess reserves)	3,513		
Currency in circulation (banknotes, coins)	1,435	1,359	M1
Overnight deposits		8,895	
Other short-term deposits			M2
Deposits with an agreed maturity of up to two years		1,041	
Deposits redeemable at notice of up to three months		2,448	
Marketable instruments			
Repurchase agreements		100	
Money market fund shares		649	
Debt securities issued with a maturity of up to two years		29	
Total	4,947	14,521	

*seasonally adjusted

Source: ECB: Consolidated financial statement of the Eurosystem (base money), Monetary developments in the euro area (broad money)

to (central bank created) base money has collapsed in the aftermath of the financial crisis, the velocity of broad money has generally remained very stable except for a level shift at the beginning of the COVID-19 crisis due to the sudden fall in spending opportunities (Fig. 1 and Tab. 1 provide an overview of monetary aggregates in the euro area). This indicates that the effect of a QE driven expansion of base money on real activity has been limited, whereas providing households with purchasing power directly through direct transfers would likely lead them to increase their spending in line with their pre-existing preferences to save and consume in a mostly reopened economy. In the presence of an underutilization of resources, an increased broad money supply would have both real and price effects, such that the real demand for money increases.

A discussion of the drivers of the secular decline in real interest rates, including the role of central banks (Juselius et al., 2017), ultra long-run trends (Schmelzing, 2020), or the retrenchment of more redistributive fiscal policies since the early 1980s, declining effective demand (Blanchard, 2021), and rising wealth inequality (Mian et al., 2020) would go beyond the scope of this paper.

It is clear, however, that the decline in interest rates has had very heterogeneous effects on the wealth of individual households, which has led to discontent among certain parts of the population, particularly in Northern European countries such as Germany where a commonly heard narrative has been the "expropriation of the saver". While it would not be fair to crit-

by the central bank.

icize central banks for pursuing a data-driven monetary policy stance, one could ask the legitimate question whether central banks could have employed other expansionary monetary policy tools instead of pushing on an interest rate string at the ELB (cf. Bernanke (2020), Brunnermeier and Koby (2018). Not only is the effectiveness of the interest rate channel heavily impaired in a deep economic downturn when confidence is low and yields are depressed across the spectrum (Koo, 2011), it also creates new vulnerabilities through a potentially excessive increase in public and private debt. While not problematic *per se* if put to good use such as investment into physical infrastructure or human capital that increases an economy's potential output, much of the newly created private debt does not finance productive investments. Instead, new debt issuance has increasingly been funding share buybacks and dividends on the corporate side (Mason, 2015) and mortgages for (mostly already existing) real estate on the household side ((Turner, 2015a), p. 61 ff.). Such lending does not necessarily create much economic value in aggregate but does drive up asset prices, inequality, and debt vulnerabilities. Sustaining aggregate demand in this way seems neither sustainable nor equitable over the long run (cf. Minsky (1986), Mian et al. (2021), Giraud and Grasselli (2021)).

3 More effective and more equitable: Outright transfers (OT)

In contrast to QE and ultra-low/negative interest rates, OT would not only be more equitable by avoiding the negative side effects on wealth inequality, direct transfers to households would also be more effective and positively affect rebalancing processes within currency unions and the global economy. Rather than relying on an increase of private and non-central bank public sector debt, OT would simultaneously expand base *and* broad money without creating new liabilities for firms, households, and governments.[10] OT would raise the real net private wealth of the private sector, thereby setting in motion a virtuous cycle of increased consumption and investment, higher capacity utilization, and greater confidence. This section will discuss macroeconomic and distributional aspects pertaining to OT, how it could be calibrated to achieve monetary policy objectives, and different methods of implementing OT in practice. Accounting aspects and economic consequences

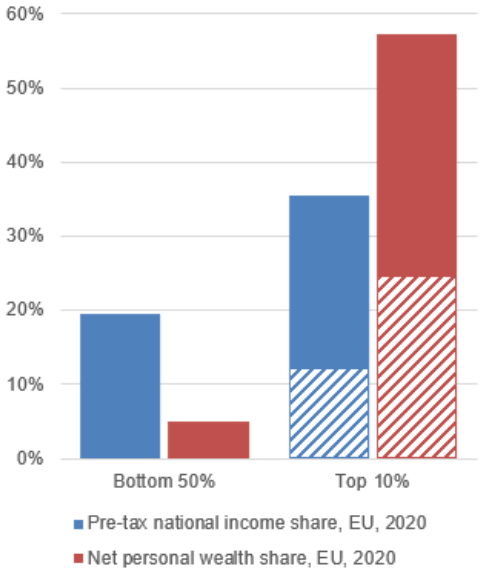
[10]The increase in broad money would be smaller than the amount of OT as the private and public sector's money demand would not increase exactly in line with OT, leading to an offsetting effect through early or accelerated repayments of outstanding debt.

of the corresponding newly created central bank liability will be analyzed in Sections 3.6 and 4, while Section 5 dives deeper into the differences to a debt or money financed fiscal stimulus.

3.1 Evidence from the MPC literature, survey data, and Ricardian considerations

The increase in disposable funds and purchasing power can be used by households to spend, save, or deleverage, depending on their financial position and marginal propensity to consume (MPC). It is reasonable to expect a household response that is similar to cash transfers from the government, as for instance implemented in the U.S. in response to COVID-19 or the great financial crisis (GFC). Studies have shown that such lump-sum payments have had sizable impacts in economies hit by negative demand shocks.[11] In a seminal paper on the effect of the the 2008 economic stimulus payments on household spending in the U.S., Parker et al. (2013) estimate an MPC of between 0.5-0.9 within the first two quarters of receipt, increasing further in following months. In a natural experiment study based on an exogenous and unanticipated cash transfer in Singapore in 2011, Agarwal and Qian (2014) come to similar conclusions, detecting an MPC of 0.8 over the first 10 months, which was mainly driven by the strong response of liquidity constrained households.

Fig. 3 Wealth and Income Inequality in the European Union



Source: World Inequality Database

The above mentioned studies have focused on transfers from the fiscal authority, which typically involved an element of means testing. It is therefore instructive to also look at survey data on how transfers from the central bank would be perceived. According to Djuric and Neugart (2017), individuals would spend about 38% of a direct transfer from the central bank in the same period, use 19% to pay down debt, and save the rest, based on a repre-

[11] See Sahm (2019) for an overview of the literature.

sentative panel of five thousand German households. van Rooij and de Haan (2016) not only find comparable results for a representative panel of two thousand Dutch individuals, but also that direct transfers would be much more favorably perceived by the public than other monetary policy measures such as asset purchases or negative interest rates on saving accounts. Specifically, helicopter money would decrease trust in the ECB among 18% of the respondents whereas purchases of public and corporate debt or negative interest rates on saving accounts would decrease trust among 23%, 30%, and 50% respectively. Similarly, a study by ING (2016) across 12 euro area countries and twelve thousand participants suggests that 54% of survey respondents would perceive direct transfers favorably whereas only 14% would be skeptical.

Survey data does not suggest the presence of significant Ricardian effects but rather spending behaviour that is comparable to empirical evidence from tax rebates or direct cash transfers from the government. Theoretically this should not be surprising as the empirical evidence for Ricardian behaviour by households in response to fiscal policy changes is not strong to begin with (Romer, 2009). Moreover, the associated public sector liability that arises from OT on the central bank balance sheet is not only more opaque and harder to understand for most households, it is also a permanent one that in principle never has to be rolled over or repaid, akin to a perpetual bond that is remunerated at the prevailing short-term interest rate on excess reserves. The effectiveness of OT in t=0 is irrespective of whether the central bank intends to keep the liability resulting from OT on its balance sheet forever, in which case it would either incur associated reserve remuneration costs or impose an implicit tax on the banking sector (cf. Section 4.5), or pay it down using future seigniorage. As discussed in detail in Section 5, unlike classical government debt, future servicing costs for the central bank would be *state-dependent* and only arise if the policy measure actually achieves its intended purpose of boosting nominal GDP at the ELB, thereby alleviating potential Ricardian effects. The same holds true for a potential inflation tax on the private sector or an implicit tax on the banking sector.[12] Ricardian effects are further attenuated as the NPV of future seigniorage itself is endogenous to whether and when OT is implemented (cf. Section 4.4).

Using a New-Keynesian DSGE framework, Gali (2020) shows that even with fully Ricardian households, helicopter money (in the form of a money-financed tax cut) would have a positive effect on aggregate demand and welfare due to the presence of nominal price rigidities. As prices take time

[12]For a more detailed discussion of related Ricardian considerations see Agur et al. (2022), Turner (2016b), and Turner (2016a).

to adjust, private net wealth would increase in both nominal and real terms, leading to an increase in aggregate demand.[13]

Relatedly, Benigno and Fornaro (2018) show that an economy characterized by weak aggregate demand, involuntary unemployment, and pessimistic expectations about the future can be lifted out of such a "stagnation trap" by aggressive policy interventions that shift growth expectations. Buiter (2014) formalizes how such an outcome can always be achieved through helicopter money in a theoretical model. Jorda et al. (2020) provide empirical evidence for the non-neutrality of monetary policy even over the long run due to hysteresis effects.

3.2 Positive spillovers and rebalancing

Beyond OT's immediate domestic effects, it also entails sizable positive spillovers to other economies within and outside a currency area as part of the increase in domestic demand will go into imports of goods and services. It would thereby promote intra-currency area rebalancing processes as it would be most impactful in those parts of the country or currency union where macroeconomic policy support is needed most. While the effect on countries' current account balances is not clear cut, OT would promote rebalancing in a broader economic sense by counteracting the divergence in real economic growth and competitiveness, which has been observed between many core and peripheral member countries since the adoption of the euro.

As households in regions that are hardest hit by a crisis are likely to have higher MPCs, e.g. due to an increase in unemployment or other cash constraints, one can expect a larger share of the transfer to be spent in such regions, boosting regional demand.[14] In regions that are relatively less affected by an economic downturn, more of the transfer will be saved. Moreover, the part that is being spent would have a greater impact on nominal price and wage growth relative to regions with a larger negative output gap. These

[13] Gali (2020), p. 10: "[T]o the extent that the money-financed tax cut raises the discounted sum of real seigniorage, current tax cuts will be perceived as net worth by each individual household (since they will not be fully offset by future tax increases), inducing an increase of individual consumption in partial equilibrium, i.e. given the initial level of output, prices and interest rates. (...) The resulting increase in aggregate consumption, combined with the assumed stickiness of prices, will then trigger several general equilibrium effects, including an increase in output and inflation (...). In a rational expectations equilibrium, the household's perceived increase in net worth that triggered such a response will prove to be correct ex-post, thus justifying the initial increase in consumption."

[14] This is confirmed by Drescher et al. (2020) who find considerable heterogeneity in the MPC across different European countries and a negative correlation with income, using microdata from the Eurosystem Household Finance and Consumption Survey.

regions would in turn become more competitive, further supporting intra-currency area rebalancing. While this effect would be particularly pertinent in the euro area with its lack of a central fiscal capacity and corresponding automatic risk sharing mechanisms, it also extends to other currency areas with heterogeneous regions hit by asymmetric shocks.[15]

QE in contrast is a fairly blunt tool that depresses yields across a currency area with the corresponding economic impulse from increased credit growth possibly being larger in those regions that are doing relatively well already due to a better growth outlook. Additionally, QE partly works through the exchange rate channel, i.e. a depreciation induced improvement of a currency area's current account. However, reliance on external demand and other countries' (more expansionary) policies is not a sustainable approach, especially for large currency areas, and can contribute to the widening of global imbalances.

The exchange rate effects of OT, on the other hand, are ambiguous. A strengthening economy, greater confidence, and higher interest rates would tend to attract capital inflows and lead to exchange rate appreciation whereas the monetary expansion could work in the opposite direction. In the euro area, OT would likely lead to a reduction of its current account surplus, in particular in countries such as Germany, where it has been significantly above a level that can be justified by fundamentals. By analogy, the current account deficit would widen in currency areas such as the U.S., where it has been negative to begin with.

3.3 Magnitude, calibration, and accounting

Like any other monetary policy instrument, OT would have to be employed judiciously, monitoring its effect on prices, output, and unemployment closely. As direct transfers could always be stepped up if need be, and given little practical experience, a cautious and gradual approach appears warranted.

While this paper does not intend to provide a quantitative general equilibrium assessment of OT, a back-of-the-envelope calculation can indicate an approximate figure that is required in order to achieve a certain desired impulse to nominal GDP.[16]

As Tab. 2 illustrates, OT would be particularly effective in a depressed economy with cash-constrained households, characterized by a high multiplier and MPC. If policymakers in the euro area wanted to achieve a boost

[15] Throughout this paper, currency area may refer to both a single country such as the U.S. or a currency union such as the euro area.

[16] Gali (2020) provides quantitative estimates for the effects of a money-financed fiscal stimulus, which would be broadly similar to those of OT.

to nominal GDP of ca. 1% (€100 billion), this would require a transfer of ca. €460 to every adult citizen (ca. 270 million) under the baseline assumption of an MPC of 0.8 (over four quarters) and a multiplier of 1, which is at the lower end of the spectrum of fiscal multiplier estimates at the ELB.[17] If one wanted to include citizens under the age of 18 as well, the number of recipients would be around 340 millions, reducing the individual transfer correspondingly to ca. 370 €. These numbers are very close to estimates by Renault and Savatier (2021) and an associated proposal by Martin et al. (2021), who reckon that a transfer of around 1% of GDP (or €385 per person, including children below the age of 15 with a weight of 50%) would be needed to generate a 1% boost to nominal GDP, half of which attributable to inflation. The estimate is also comparable to an early suggestions by Muellbauer (2014) to provide a transfer of €500 to each adult citizen in the euro area.

Tab. 2 Required amount of OT to achieve €100 billion (ca. 1 %) boost to euro area nominal GDP over four quarters.

Total (in billion)

MPC \ Multiplier	0.5	1	2
1	200	100	50
0.8	250	125	63
0.4	500	250	125

Per capita*

MPC \ Multiplier	0.5	1	2
1	741	370	185
0.8	926	463	231
0.4	1852	926	463

*assumes 270 million eligible recipients, based on adult population.

Under this example, the transfers would require a *permanent* increase in central bank money of around €125 billion, which amounts to less than 1.5% of the Eurosystem's October 15, 2021, balance sheet size of €8.337 trillion. It would also amount to about 5x the Eurosystem's average yearly seigniorage of ca. €25 billion, meaning that all else equal, the reduction in central bank equity resulting from the newly created liability could be replenished within five years with the current annual level of seigniorage alone. Traditionally, seigniorage is largely transferred to the governments

[17]For the sake of simplicity, this calculation assumes no leakage of the stimulus to imports, which would rise and provide a boost to economies outside the currency area. This, in turn, would stimulate exports to these countries, albeit to a smaller degree. An MPC of 0.8 over four quarters is consistent with the literature (see Section 3.1) and a typical advanced economy savings rate of far below 20%. The COVID-19 induced increase in private saving rates in many advanced economies is likely to be a transitory phenomenon that is related to the restrictions in spending disposable income, in particular on services.

of member states according to their capital key but nothing prevents the ECB and the Eurosystem's central banks from withholding seigniorage to strengthen its equity position, which has indeed been common practice in recent years in the form of increased risk provisioning.[18]

3.4 Distributional considerations and transfer options

All monetary policy measures entail redistributive consequences of one sort or the other. Monetary policy should, however, strive to achieve its mandate as effectively as possible while minimizing the redistributive impact of its policies since active choices about redistribution should be undertaken by the government (cf. Section 6.2). Against this backdrop, OT appears more appropriate than alternative monetary policy measures at the ELB from both an economic and an institutional legitimacy perspective.[19]

Accordingly, direct transfers from the central bank should be distributed as equitably as possible. There are several dimensions to be considered by monetary policymakers when deciding on the potential recipients' eligibility criteria and relative magnitude of transfers.

3.4.1 Transfers of equal size

The most straightforward approach would be an equal absolute amount for every citizen, who are, after all, the ultimate "owners" of the central bank. This is consistent with the notion of central bank money being a form of social equity as characterized by Allen et al. (2020). While equal in magnitude, direct transfers would nonetheless have an element of progressivity as they would reduce relative inequality. Moreover, the welfare effect on lower income households would be higher due to the decreasing marginal utility of income. It would also be easy to introduce a further and more direct element of progressivity to equal transfers by taxing them at individuals' marginal tax rates according to the existing progressive national income tax schedule (as opposed to exempting them or taxing them at a flat capital income rate).[20]

[18] See Section 4 for a detailed discussion.

[19] To the extent that OT is successful in bringing inflation back to target and achieving broader economic goals, second round effects on wealth and income distribution are related to the central bank's mandate and not the policy measure itself.

[20] Unless exempted, OT would provide an additional source of tax revenue to governments. The same second round effect on tax revenues is, of course, similarly present with asset purchases. However, just like increased tax revenues that result from asset purchase programs, this would not be considered monetary financing or bear its political economy risks.

3.4.2 Transfers according to capital key

A second approach, that could be applied in the euro area, would be to distinguish transfers across different member states according to their capital key, which is based on a country's population size and GDP in equal measure. Economically stronger countries would be allocated a relatively higher per capita OT share, which may be justified on the grounds of fairness due to the likewise generally higher cost of living in these countries and the ownership structure of the central bank.[21] Alternatively, transfers could be adjusted by national consumer price levels directly to reflect differences in the cost of living. While these approaches could make OT more equitable from a purchasing power perspective, it would attenuate the rebalancing effect of OT to a certain extent (see Section 3.2). It would also be more complex to communicate and may therefore result in lower public acceptance and risk political division. By analogy, it seems hard to imagine higher government-provided cash transfers going to richer states within one country such as the U.S.

3.4.3 Means-tested transfers

A third approach would be to distinguish transfers according to income level and phase them out beyond certain thresholds, similar to government-provided cash transfers. Such transfers could raise their efficacy (and thereby require a smaller overall amount of OT) as lower income households have a higher MPC.[22] However, means-tested transfers would require a degree of co-operation from fiscal authorities and tax agencies to provide corresponding records, raising organizational and data privacy challenges. Moreover, while the reduction of excessive inequality is a desirable and important policy goal by itself to promote strong, sustainable, and inclusive growth,[23] fiscal policymakers are better placed and legitimized to undertake appropriate steps in the form of structural fiscal measures such as higher progressivity in the tax system and the provision of social security and public services. Against this backdrop, direct lump-sum transfers to households actually appear to be a more suitable policy tool for central banks than for governments, since the latter have a much wider array of tools to provide targeted support to the economy at their disposal.[24] Generally speaking, OT is not necessarily

[21] I am grateful to Olivier Blanchard for bringing this point to my attention.

[22] See Coenen et al. (2012) for a comparison of fiscal multipliers of general and targeted transfers.

[23] Cf. Ostry et al. (2019) and Berg and Ostry (2017).

[24] For instance, as Summers (2021) observed, instead of massive COVID-19 related cash transfers to most households (which far exceed the OT calculations in this paper), the U.S.

preferable to more targeted fiscal support at the ELB. OT should rather be considered in lieu of asset purchases if fiscal support is not forthcoming in sufficient ways, including to help achieve price stability objectives at the ELB, due to economic or political constraints, which loom particularly large in the euro area (see Section 5.5).

3.5 Practical implementation

There are different ways in which OT can be implemented in practice within the existing institutional frameworks and financial market infrastructure. This subsection will outline the following potential options and some key operational aspects: checks, CBDC, and perpetual targeted long-term refinancing operations (PTLTRO).

3.5.1 Checks and CBDC

The first option, and the one operationally most similar to government-provided cash transfers, would be to send out checks to every eligible recipient. Names and addresses could be obtained from publicly accessible electoral registers, circumventing fiscal authorities. Including minors would be more complex, but not unfeasible. Citizens can then deposit or cash these checks at any commercial bank, which in turn is credited the same amount in central bank money in the form of reserves upon delivering the check to the central bank.[25] The setup of a centralized digital register could allow the central bank to keep track of payments and prevent errors or fraud.[26] National or regional central banks' local branches, which have public cashiers' offices, could also be used to cash checks directly.

The introduction of a central bank digital currency, through which households could obtain direct access to central bank money, would greatly facilitate the delivery of direct transfers as it would obviate the need for commercial banks as intermediaries and allow the central bank to provide (and possibly withdraw) central bank money practically in real time. However,

government could have provided smaller but means-tested fiscal support to households in need and spent more on productive capacity enhancing investments in infrastructure or green technologies, thereby promoting long-term growth and containing risks of overheating.

[25] Commercial banks would have to accept these central bank checks just like cash, reserves, or government-provided stimulus checks.

[26] If electoral registers were not accessible to the central bank in certain countries, a centralized digital register could also allow citizens to claim OT payments in person or electronically upon provision of their national identity card or passport.

it would give rise to other challenges related to a CBDC payments infrastructure and associated financial stability considerations that go beyond the scope of this paper.[27]

3.5.2 Perpetual targeted long-term refinancing operation (PTLTRO)

A third option, perpetual targeted long-term refinancing operation (PTLTRO), has been proposed by Lonergan (2016). Its primary appeal would be that it could be easily implemented within current monetary policy frameworks by building on the existing established relationships and payments infrastructure between the central bank, commercial banks, and private households. Under PTLTRO, the central bank would provide perpetual zero-coupon loans to banks under the condition that loans of identical condition are passed on to households, akin to the current TLTRO setup in the euro area. Being administered through the banking system, this approach would not require much in terms of additional infrastructure, except for a centralized electronic loan register for monitoring purposes and to prevent abuse. Under this option, there may be the need for additional financial incentives for banks to act as intermediaries and to take on newly created reserves on their asset side, which would initially not be or negatively remunerated due to the economy being at the ELB. Banks could, for instance, be incentivized by a commission or administration fee, capped by the central bank at a few basis points, which would be deducted from the loan up front before it is extended to households. After liftoff from the ELB, different scenarios for reserve remuneration, including higher non-remunerated minimum reserves, are imaginable to preserve central bank policy solvency and will be discussed in Section 4.5.

3.6 Accounting for OT on the central bank balance sheet

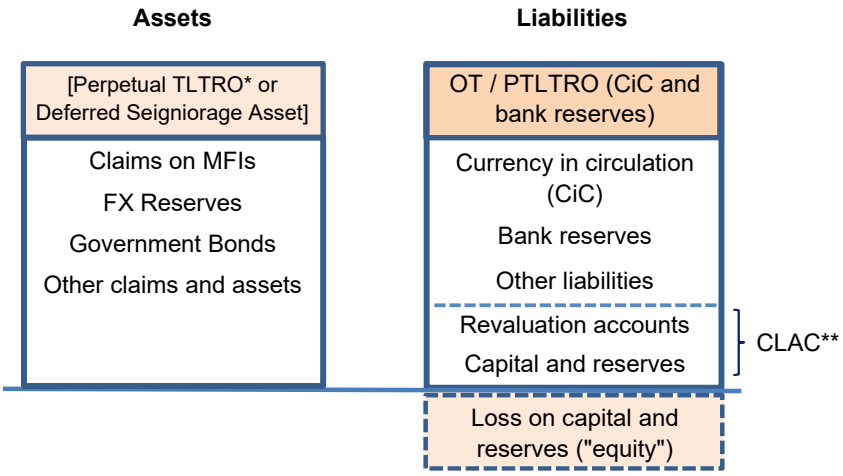
OT creates a new liability in the form of reserves. This liability is perpetual by nature as no corresponding interest bearing asset is acquired that could be sold to reduce the reserves again.[28]

[27] For a more in-depth discussion see for instance Bindseil (2020) and Kumhof and Noone (2018).

[28] For an in-depth discussion on the nature of central bank liabilities and whether they should be considered as such at all from a more holistic and legal point of view see Allen et al. (2020).

In order to balance its books, the central bank can either book an instantaneous loss to equity, potentially leading to a negative equity position, or create a new matching but not interest bearing asset, e.g. related to a PTLTRO operation and covered by future seigniorage gains. While booking such a deferred asset has been common practice at the Federal Reserve Bank of New York (Carpenter et al., 2013), a perpetual zero-coupon bond would have to be valued at its mark-to-market value of zero according to standard accounting rules and best practices regarding central bank transparency. As Stella (2002), Dziobek and Dalton (2005), and the IMF (2020) stress, adherence to prudent accounting standards is key for central banks' credibility. In effect, the central bank can therefore not circumvent recognizing a loss to its equity following OT. That being said, it could still find booking a corresponding asset preferable to a negative equity position as it creates a standalone position on the balance sheet, that can be easily traced over time and may facilitate communication with the public (see Fig.4).

Fig. 4 Stylized central bank balance sheet after OT

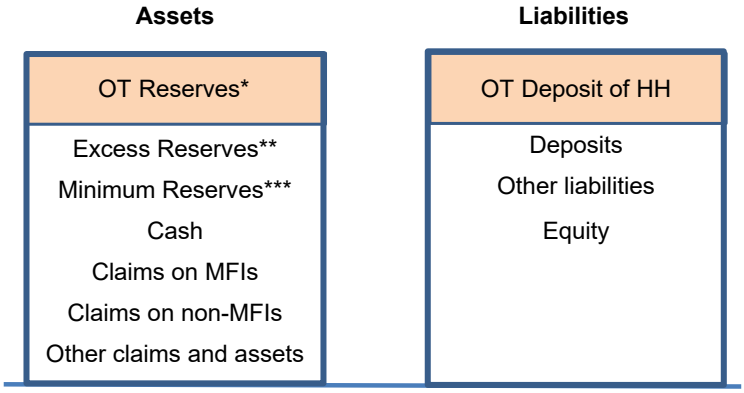


* TLTRO: targeted longer-term refinancing operation
** CLAC: conventional loss absorption capacity

For commercial banks, OT would cause a balance sheet extension as both deposits and reserves would increase by the same amount (Fig 5). While the effect on banks' income position would be broadly neutral initially, this could change over time subject to interest rate dynamics and central banks' policy choices regarding reserve remuneration (see Section 4.5).

For households, OT - implemented through either checks or PTLTRO - would lead to an increase in net wealth for each individual citizen in equal magnitude, corresponding to the decrease in the central bank's net wealth.

Fig. 5 Stylized commercial bank balance sheet after OT



*remunerated at at the policy rate on deposits or the rate on minimum reserves (policy choice by central bank to adjust reserve requirements upwards)
**remunerated at the policy rate on deposits (unless exempted due to tiering)
***remunerated at the rate on minimum reserves

This stands in stark difference to QE, which does not alter the net wealth of either sector mechanically but only through second round price effects, that impact individual households very differently.

Going forward, the central bank could choose to keep the negative equity position or the matching asset on its balance sheet indefinitely as it would not impinge on the central bank's ability to control inflation for moderate amounts of OT (see Section 4). Alternatively, it could choose to reduce its overall liabilities and thereby its outstanding stock of base money through the sale of other existing assets. Future policymakers could also opt to eliminate the OT liability entirely over time using future seigniorage, which would involve choices over the intertemporal distribution of seigniorage.[29]

Taking the ECB as an example, Article 33 of its Statute lays out provisions for the allocation of net profits and losses, which is determined by the Governing Council: "In the event of a loss incurred by the ECB, the shortfall may be offset against the general reserve fund of the ECB and, if necessary, following a decision by the Governing Council, against the monetary income of the relevant financial year". While the Statute is not explicit regarding losses that cannot be covered in a given year, the ECB has clarified that such losses would be offset with future income from seigniorage.[30]

[29] See Bunea et al. (2016) for a cross-country overview of seigniorage distribution policies and best practices.

[30] European Central Bank (2017): "Almost every year since it was founded, the ECB has reported a net profit, but of course it is also possible for the central bank to make a loss. If the ECB recorded a loss, it would first use the money set aside in previous years. If this were not enough, the ECB might ask the national central banks of the euro area countries to cover the remaining loss with the income from their monetary policy

This is similar to the legal provisions at the Federal Reserve where realized losses would be booked as a deferred asset and lead to a suspension of remittances to the Treasury until the loss has been recouped with future earnings.[31]

As Buiter (2020b) have pointed out, the particular setup of the profit/loss sharing arrangement of the ECB and the Eurosystem's national central banks inherently creates economic and political instability risks from QE. This is due to the agreement that only a small part of the profits and losses arising from QE operations, which have led to concentrated holdings of national sovereign debt by individual national central banks, would be shared aross different national central banks[32] This problem would be obviated by OT, which would pool risks across the currency union (Section 5.4).

4 Central bank policy solvency considerations

This section will discuss aspects related to the impact of OT on the strength of the central bank balance sheet and potential risks to central bank policy solvency. These risks are not germane to OT per se but similarly apply to QE.

4.1 Negative central bank equity and policy solvency from a theoretical perspective

While a central bank that issues its own currency can never become financially insolvent as its liabilities can always be serviced, a sufficiently strong central bank balance sheet is nevertheless important to preserve policy solvency, i.e. the central bank's ability to independently control inflation.[33] In

operations. Any further amount may be recorded on the ECB's balance sheet, to be offset against any net income received in the future."

[31] Bonis et al. (2018): "Moreover, in the unlikely scenario in which realized losses were sufficiently large enough to result in an overall net income loss for the Reserve Banks, the Federal Reserve would still meet its financial obligations to cover operating expenses. In that case, remittances to the Treasury would be suspended and a deferred asset would be recorded on the Federal Reserve's balance sheet, representing a claim on future net earnings that the Reserve Banks would need to realize before remittances to the Treasury would resume."

[32] See Kyriakopoulou and Ortlieb (2021) for a more detailed discussion of the Eurosystem's current risk-sharing arrangements.

[33] While policy solvency typically describes the ability of the central bank to contain inflationary pressures, it could be argued that policy solvency is a symmetric concept that should similarly apply to containing the risk of deflation, with OT being the ultimate tool to preserve policy solvency in that direction.

the case of the Eurosystem's corridor system, where the interbank rate is closely tied to the deposit rate in the presence of large excess reserves, the ECB would have to raise the deposit rate on excess reserves in line with the main refinancing rate and incur the associated remuneration costs.

In order to preserve policy solvency over the medium term, a central bank needs to be able to cover its operational costs and the costs from its monetary policy operations, i.e. the payment of interest on reserves, through its seigniorage profits (cf. Del Negro and Sims (2015), Hall and Reis (2015)). Otherwise, it would be forced to meet its obligations by printing new central bank money, which may prevent it from running a sufficiently contractionary monetary policy. While there is no precise tipping point beyond which a central bank loses its policy solvency, its balance sheet strength can provide some orientation. The strength of the central bank's balance sheet can generally be assessed by estimating its capacity to absorb losses, which depends both on its current structure and assumptions about its future evolution.

Accordingly, negative central bank equity does not present a danger to policy solvency *per se* but only at unsustainable levels that would give rise to an explosive negative central bank equity path (cf. Stella, 1997). Reis (2016, pp. 36-37) derives a theoretical intertemporal solvency constraint, which illustrates the conditions under which a central bank can retain its policy solvency even in the face of large negative equity (or an equivalent deferred asset). It should be noted though that policy solvency also depends on much harder to gauge factors such as the public's confidence in the currency and expectations regarding the future path of monetary policy. In order to preserve the public's trust and safeguard its credibility, central banks should therefore always strive to maintain strong balance sheets that provide a large margin of safety to their loss-absorption capacities. In the extreme, the loss of confidence in a currency could lead to a currency crisis characterized by large-scale capital flight, rapid depreciation, and subsequent higher inflation due to increased import prices and domestic wage push inflation. However, this is not a realistic scenario under any reasonable calibration of OT in reserve currency issuing economies with strong institutions such as the euro area.

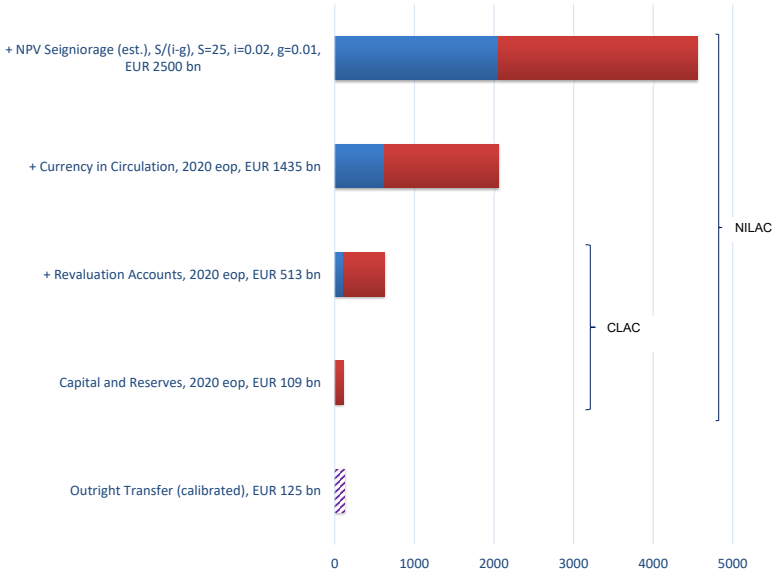
4.2 Assessing a central bank's loss absorption capacity

This subsection illustrates the assessment of a central bank's capacity to absorb losses by zooming in on the Eurosystem's balance sheet.

Following the approach of Buiter and Rahbari (2012), the Eurosystem's consolidated *conventional loss absorption capacity* (CLAC) stood at around €622 billion as of end-2020. The CLAC consists of capital and reserves (€109

billion) as well as revaluation accounts (€512 billion), which constitute unrealized gains on gold, foreign-exchange reserves, and securities. The Eurosystem's consolidated *non-inflationary loss absorption capacity* (NILAC), which additionally includes the outstanding stock of currency in circulation and discounted future seigniorage gains, is a multiple of the CLAC. Using conservative and non-explosive assumptions for annual seigniorage growth (1%) and the discount rate (2% in line with target inflation), the net present value of future seigniorage, which in 2020 stood at around €25 billion, amounts to around €4.5 trillion (Fig. 6). This NILAC/CLAC ratio of around seven is very close to estimates by Buiter and Rahbari (2012).

Fig. 6 Eurosystem non-inflationary loss absorption capacity (NILAC)



Sources: Haver, ECB, own calculations

4.3 Negative central bank equity and policy solvency from an empirical perspective

While unproblematic at moderate levels, negative central bank equity can pose risks to the central bank's policy solvency if it approaches or even exceed the central bank's NILAC. In such a situation, absent a recapitalization through the fiscal authorities, this could lead to a loss of confidence in the central bank to control inflation, excessive money growth, and eventually a currency crisis (cf. Stella, 2008).

While there are well-known examples of central banks losing policy solvency due to excessive monetary financing and the subsequent deterioration of central bank balance sheets such as the Weimar Republic or Zimbabwe and Venezuela more recently, there are also plenty of examples of prudent central banks operating with negative central bank equity for prolonged periods of time without negative repercussions on their ability to control inflation, preserve a stable currency, or maintain credibility among the general public. Prominent examples include Chile, Israel, or the Czech Republic (cf. Benecka et al. (2012)). Ryan-Collins (2015) provides a case study of Canada which pursued close monetary-fiscal cooperation between 1935-1975 without concomitant high inflation.

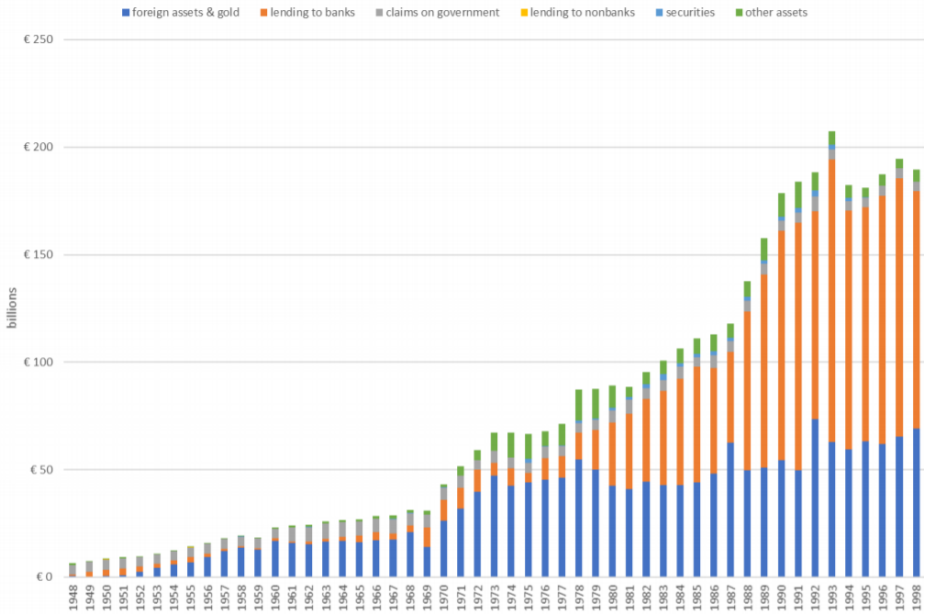
A less well-known case is post-WW II Germany, where its central bank[34] effectively operated with negative central bank equity throughout many years in the first decades of its existence (Bibow, 2018). This was due to the costs associated with the currency reform of 1948, including costs for the recapitalization of commercial banks after the war. In later years, the appreciation of the Deutsche Mark following the end of the Bretton Woods system in 1971 gave rise to large FX valuation losses (see Figures 7 and 8). Accountingwise, in order to avoid an outright negative equity position, a claim on the government was booked on the asset side of the balance sheet, the so called "Sonderposten Ausgleichsforderungen" (broadly translating to "special item: equalizing claim"), that has been remunerated with 1% p.a. and remained on the Bundesbank's balance sheet up to this day, with amortization slated to begin in 2024.[35] This approach was repeated by the Bundesbank in 1990 following the reunification of West and East Germany. Although the informal market exchange rate had been around 8 Eastern German *Mark der DDR* per Western German *Deutsche Mark*, Eastern German households were allowed to exchange their currency at much more favorable official rates of 1 up to a fixed amount and at a rate of 2 beyond that for political reasons (Zinsmeister, 2009), contributing to an increase in the money supply and inflation as a result of the skewed conversion rates. The associated costs to the Bundesbank's balance sheet were assumed by the German government through another special item on its asset side, the so-called "Ausgleichsfonds Währungsumstellung" (broadly translating to "Equalization Fund Currency Conversion"), which amounted to ca. €30 billion in 1994.

Above examples, including that of Deutsche Bundesbank as a paragon of monetary stability, illustrate that negative central bank equity is no issue per se for central bank policy solvency at moderate levels. Rather, it is the

[34] Bank deutscher Länder between 1948-1957, Deutsche Bundesbank afterwards.

[35] Deutsche Bundesbank (2020), p. 60.

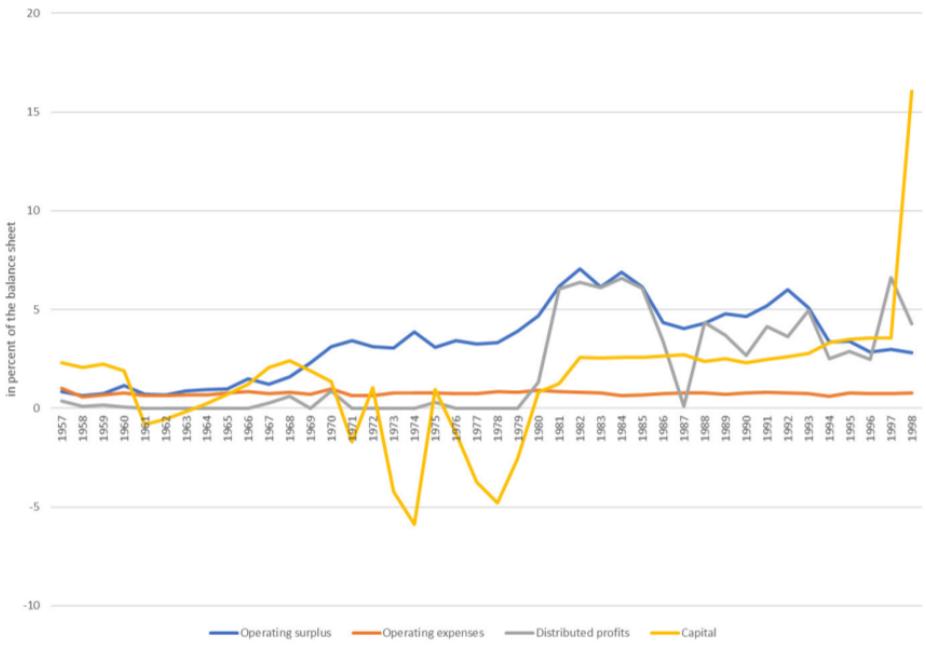
Fig. 7 Bundesbank asset composition,1948-1998



Source: Bibow (2018), Deutsche Bundesbank.
Note: Claims on government constitute "Ausgleichsforderungen".

strength of institutions and monetary policy frameworks that matters, which allows central banks to independently pursue an appropriately tight (or lose) monetary policy stance. These findings are corroborated by Bindseil et al. (2004), who show that negative central bank equity at varying levels does not impinge on central banks' abilities to control interest rates. However, they also caution that maintaining a strong balance sheet position remains generally advisable for political economy reasons. A weak equity position could weaken a central bank's perceived independence or entice the central bank to pursue loser policies than warranted in an attempt to shore up profitability. Empirical analysis by Adler et al. (2016) suggests a negative link between a central bank's financial strength and its performance in controlling inflation, although a meta-analysis of the literature by Hampl and Havranek (2018) indicates that this nexus is not particularly strong. Benecka et al. (2012) detect the presence of strong non-linearities, with results driven by financially very weak outliers.

Fig. 8 Bundesbank profit and losses, 1957-1998



Source: Bibow (2018), Deutsche Bundesbank.
Note: Negative capital driven by FX valuation effects.

4.4 OT vs. QE effects on balance sheet strength, seigniorage, and ease of exit

While OT would be highly effective in lifting an economy out of a low growth and inflation equilibrium, a cautious approach in employing OT is warranted as it creates an unmatched liability for the central bank and a corresponding instantaneous reduction in central bank equity. However, as OT in the magnitude suggested in Section 3.3 would only constitute a small fraction of the NILAC, the expected losses on equity resulting from the newly created and unmatched reserves would not present material risks to policy solvency.

At the same time, this also underscores why OT should be strictly limited to exceptional circumstances in the current fractional reserve banking system.[36] These circumstances arise when other more traditional monetary policy levers have been exhausted (see Section 2) and fiscal policy is either economically or politically incapable of providing the needed support to an economy that is operating with spare capacity at below-target inflation.

[36]Theoretically, direct transfers could become *modus operandi* of monetary policy implementation in a potentially welfare improving full-reserve banking system (cf. Kumhof and Benes (2012), Baeriswyl (2017)).

It should be noted that the long-term general equilibrium effects of OT on the strength of the central bank's balance sheet could well be positive as it would contribute to a faster economic recovery, higher growth in real money demand, and ultimately greater seigniorage. Future seigniorage is endogenous to monetary policy operations and difficult to forecast as it depends on a host of different factors. In "normal" pre-crisis times with full allotment and little excess reserves, seigniorage tends to increase with nominal GDP growth as money demand grows and the interest rate differential between a central bank's assets and its monetary base, remunerated at zero (currency in circulation) and the short-term policy rate (reserves), is strictly positive for an upwards sloping yield curve.

While OT would lead to a more direct reduction of central bank equity up-front, it is therefore not clear *a priori* whether it would outweigh the costs and risks of large-scale asset purchases in terms of the expected net present value (NPV) of future seigniorage for a given desired amount of monetary stimulus.[37]

QE not only exposes the central bank to a potential increase in excess reserve remuneration costs but also to mark-to-market losses on the central bank's assets. While the cost to the central bank of OT is more direct and transparent as no corresponding asset is acquired, the cost of QE is more akin to a contingent liability, which may or may not be greater than that of OT in NPV terms for a similar monetary policy impulse on inflation. As inflation and bond yields pick up, the central bank would either have to sell assets acquired under QE at a loss - which it may be pressured to do in order to absorb excess liquidity - or incur mark-to-market losses if it chooses to hold on to its assets temporarily or til maturity. These mark-to-market losses - which would be reflected in the central bank's annual financial statement according to standard accounting practices - would be amplified by actual losses from a more adverse interest rate differential between its assets and liabilities, if liabilities are remunerated at the policy rate. The central bank therefore faces a much larger interest rate risk under QE than under OT, making exiting from it more difficult.

Figure 9 illustrates the potential losses to the Eurosystem's balance sheet that may arise from OT and QE, both calibrated to have the same expected impulse on nominal GDP, in year 1 following an increase in the deposit rate from its current level of -0.5%. Based on the calculations in Section 3.3, the example assumes that €125 billion of direct transfers would be needed to

[37] Naturally, as long as QE fails to bring up inflation and interest rates, it generates sizable profits for the central bank. In this case, however, QE not only fails to achieve its raison d'être, it would also come at the cost of rising financial stability risks, wealth inequality, and risks to the central bank balance sheet over the medium term.

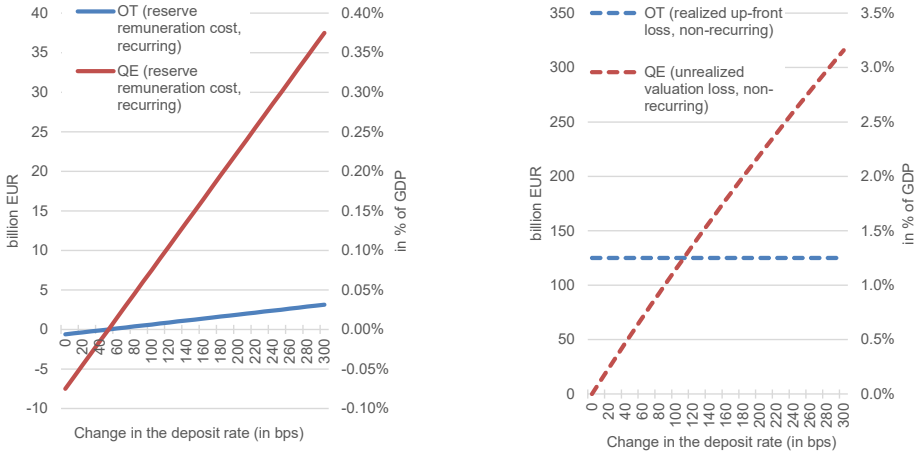
provide a 1% boost to nominal GDP. It is not straightforward to derive the equivalent amount of QE needed to achieve a similar effect on nominal GDP as estimates in the literature vary a lot across time, countries, and researchers (Fabo et al., 2020), with interest rate policy and QE becoming increasingly ineffective as interest rates fall and the yield curve flattens (Gopinath (2021), Bernanke (2020), Brunnermeier and Koby (2018)). Agur et al. (2022) provide empirical estimates regarding the effectiveness of an expansion of the monetary base on inflation, finding that the nexus is very weak and potentially insignificant when inflation is low, central bank independence is high, and fiscal deficits are small. This precisely describes the circumstances laid out in this paper under which OT should be considered.Against this backdrop, and informed by the literature on the actual and expected effectiveness of QE (cf. Dell'Ariccia et al. (2018), Hutchinson and Smets (2017)), the example conservatively assumes required asset purchases of €1,500 billion, around 15% of GDP, to achieve a 1% impulse to nominal GDP.[38] The associated central bank balance sheet expansion is more than an order of magnitude higher than under OT, underscoring that due to its much more direct transmission, OT can achieve the CB's monetary policy goal(s) much more effectively.

In order to gauge the potential valuation losses from a rise in interest rates, it assumes that the acquired assets have a weighted average maturity of 8 year and an average return of 0%, similar to the ECB's actual portfolio. The example further assumes that these are zero-coupon bonds, such that their duration is equal to the weighted average maturity, and a parallel shift of the yield curve following an increase in the deposit rate by the same amount. Moreover, no reserve tiering or new net asset purchases are assumed. While this is a highly stylized example, it nevertheless allows to visualize some key differences in the costs of OT and QE. Under OT, an upfront non-recurring loss of €125 billion would be incurred, with recurring reserve remuneration costs being fairly small for all deposit rate increase scenarios, ranging from -€0.6 billion p.a. for a negative deposit rate of -.5% and €3.1 billion p.a. for a deposit rate of 2.5%. Under QE, these effects are reversed. Although there is no upfront cost to QE, it exposes the central bank to large interest rate risks through both reserve remuneration expenditures, with costs ranging from -€7.5 billion p.a. to €37.5 billion p.a., and (one-off) valuation losses ranging from €0 billion to €316 billion. While valuation losses may not have to be realized if assets are held til maturity, they would nonetheless have to be booked against the central bank's revaluation accounts or even its equity.

[38]This is for illustrative purposes only. As stated above, the amount could vary a lot in both directions depending on macroeconomic circumstances and the shape of the yield curve.

From a risk-return perspective, OT may therefore be preferable to QE as it is more costly up-front, but less costly and risky down the road. This tradeoff i.a. depends on the shape of the yield curve and the associated amount of asset purchases needed to achieve a certain level of stimulus. With OT being easier to calibrate to the desired level of stimulus, it has the additional advantage of being more transparent and predictable in its consequences for the balance sheet. Future research could undertake a more comprehensive comparison that assesses the efficacy of OT vs. QE in a dynamic setting that takes into account the position in the business cycle, the level and shape of the yield curve, as well as other potentially relevant circumstances.

Fig. 9 Stylized costs of OT and QE following an increase in interest rates: Recurring (left panel) and non-recurring (right panel)



Note: The amounts of OT (€125 billion) and QE (€1,500 billion) are based on estimates to achieve a stimulus to nominal GDP of €100 billion (around 1% of GDP). The starting deposit rate is assumed to be -0.5%. See text for details and assumptions.

It should be noted that the the maximization of profits - or minimization of losses - is not a policy objective of the central bank by itself. However, above profit-loss considerations are relevant in so far as they may impact the conduct of monetary policy. The following section will discuss central banks' options to preserve policy solvency, including potential reserve requirement and remuneration policies.

4.5 Preserving central bank policy solvency: The role of reserve requirements and remuneration

In principle, if an overheating economy warrants monetary tightening, central banks can start by adjusting its forward guidance and reducing the size

of their balance sheet through open-market operations, i.e. by mopping up excess liquidity through selling the assets they have acquired over the past years, which would induce a steepening of the yield curve.[39] Central banks can also raise deposit and lending rates to further shift up rates at the short end of the yield curve. While this would curb inflation, it would also create large costs for central banks given the expansion of central bank balance sheets, which is unlikely to be unwound significantly anytime soon (see Section 5.3).

In order to preserve both policy solvency and the health of its balance sheet, central banks could in principle tier reserve remuneration rates in an upswing to achieve a sufficiently high effective policy rate without incurring high reserve remuneration costs. This would be analogous to the tiering of deposit rates at the ELB currently pursued by the ECB, which is partially offseting the costs of negative interest rates for banks and supporting their profitability.[40]

Such tiering would allow for newly created reserves to be remunerated at zero or any level below the desired policy rate (see also Fig. 4 and 5). However, this would require adjusting minimum reserve requirements (MRR) upwards to cover these reserves in order to anchor interbank rates close to the main deposit rate on excess reserves.[41] As excess reserves are reduced over time, the interbank rate would start trending closer to the main lending rate again. It would be the central bank's prerogative to remunerate either all minimum reserves or just the fraction that is attributable to OT at below its policy rate. Fig. 10 shows the corridor of past policy rates in the euro area and illustrates a hypothetical path forward under a scenario, in which policy rates are gradually raised, excess reserves reduced, and minimum reserves remunerated at the main refinancing rate or zero, whichever is lower.

The practice of actively using reserve requirements - and their (non-)remuneration - as a policy tool has gone out of fashion at advanced economies' central banks in favor of open-market operations since the early 1980s, whereas they still play a prominent role in emerging market economies such as China.[42]

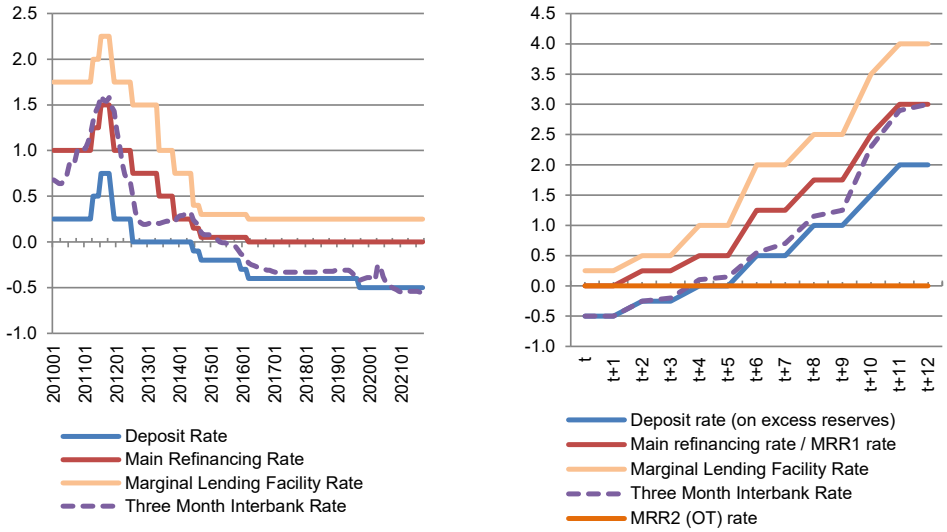
[39] This may be harder in the euro area than in other currency areas due to concerns over the effect on spreads between euro area countries.

[40] "ECB introduces two-tier system for remunerating excess liquidity holdings", European Central Bank, Press Release, 12 September 2019, https://www.ecb.europa.eu/press/pr/date/2019/html/ecb.pr190912_2~a0b47cd62a.en.html

[41] The Federal Reserve only started remunerating reserves in 2008, following the expansion of its balance sheet.

[42] See for instance Feinman (1993) for the U.S., Deutsche Bundesbank (1995, pp. 119-130) for Germany, and Schobert and Yu (2014) or Geiger (2010, pp. 78-83) for China. At the low levels prevailing in advanced economies, reserve requirements do not constrain money creation from commercial banks as these are always provided with the needed re-

Fig. 10 Interest rate corridor in the euro area: Past (left panel) and hypothetical future path under OT (right panel)



Sources: Haver, ECB, own simulation

Given large legacy central bank balance sheets and excess reserves in advanced economies, the approach of foregoing this monetary policy tool may need to be reconsidered in order to find the best policy mix to remove tail risks to central bank policy solvency and to deal with potential above-target inflationary pressures in the macroeonomically least disruptive manner.[43]

Naturally, the benefits of actively using reserve requirement and remuneration policies have to be weighed against their costs, foremost the tax that it imposes on the banking sector. Such a tax, akin to financial repression, cannot be avoided but could theoretically be passed on to banks' customers (similar to current negative deposit rates). However, this would be a feature, not a bug, as it would amplify the desired contractionary effect.[44]

serves ex-post against the provision of adequate collateral (cf. Borio and Disyatat, 2009). Accordingly, some countries such as the U.S., Canada, or Australia have abolished reserve requirements altogether or set them to zero. In countries with much higher and varying reserve requirements, such as China, minimum reserve requirement rates are actively employed as a monetary policy tool to manage liquidity.

[43]Bindseil (1997, p. 44) notes that "even if the reserve requirements are reduced for other reasons to zero for some while, the instrument should be preserved such that it could be reactivated any time. This would contribute to the confidence of economic agents into the capacity of the central bank to determine in all eventualities the scarcity of central bank money and thus to control indirectly its purchasing power."

[44]Widespread financial repression in advanced economies after WW II helped to reduce high public debt levels without discernible adverse effects on economic growth or the functioning of the financial sector, cf. Reinhart and Sbrancia (2015).

Moreover, given that the ECB's current tiering and TLTRO III system provide substantial implicit transfers to banks of what would otherwise have been seigniorage gains accruing to the general public, it is hard to argue that the tiering of reserves in the opposite direction during the recovery phase should not be permissible. This may also be justifiable due to the favorable treatment of banks vis-à-vis other private sector firms, be it through the right to originate money through credit, implicit subsidies from government guarantees, or by being exempted from sales/value-added taxes in the provision of financial services.[45]

A solvent fiscal authority could, of course, always choose to recapitalize the central bank on its own volition, obviating the need for tiering. However, this may not be realistic or feasible for several reasons, see Section 5. OT and tiering would thereby expand options to smooth the intertemporal consolidated budget constraint of the state including both the central bank and fiscal entities.[46]. Over time, excess reserves would decline organically as nominal GDP and demand for money and required reserves increase. Additionally, using seigniorage to reduce any negative central bank equity position resulting from OT or QE would reduce reserves by an equivalent amount.

Naturally, the introduction of active reserve requirement and remuneration policies cannot be looked at in isolation. After all, the banking sector would be in a much better position to absorb associated costs in a cyclical upswing, which had been enabled and supported by the central bank's policies (QE and/or OT) in the first place. Such an upswing would bring about higher credit volumes, lower non-performing loan ratios, increased net interest margins due to a steepening of the yield curve and a corresponding increase in profits from maturity transformation. The net effect on bank profitability - and financial stability - may therefore well be positive from a general equilibrium perspective depending on the extent and calibration of the reserve tiering. While a comprehensive general equilibrium cost-benefit analysis is beyond the scope of the paper, future research into the tradeoffs involved with actively employing reserve requirement policies vis-a-vis other policy choices could provide valuable insights.

[45] Bindseil (1997, p. 1) points out that the non-remunerated reserve requirements tax "may be efficient from the point of view of the theory of optimal taxation or it may be perceived as a 'fair' price for some central bank services for the private banking sector." Relatedly, Deutsche Bundesbank (1995, p. 126) mentions a number of justifications for the non-remuneration of minimum reserves: "[B]anks opportunity cost deriving from the minimum reserves is accompanied by a number of concessions and competitive advantages, such as the low-interest funding available through the discount window and the fact that minimum reserve balances may also be used as working balances, with the Bundesbank, moreover, providing relatively generous short-term finance (...)".

[46] Reis (2016, p. 17) makes a similar point for seigniorage more broadly.

As OT would create much fewer new reserves than QE to achieve the same impact on inflation, the costs to the banking sector associated with the tiering of reserves would be far smaller (Fig. 9), underscoring the advantages of OT over QE also over the medium-run with a view to the unwinding of expansionary monetary policy stances. For instance, the creation of €125 billion in OT would - if fully tiered - create an annual cost to the banking sector of only €2.5 billion for an interest rate differential between required and excess reserves of 200 bps. This would be significantly lower than foregone seigniorage revenue from the current tiering system for excess reserves remuneration, which had lowered Eurosystem banks' interest rate expenditures on excess reserves by close to €5 billion between October 2019 and December 2020 (Deutsche Bundesbank, 2021). It would also be far below the foregone seigniorage revenue from lending below the policy rate under TLTRO III, where direct transfers from the Eurosystem's central banks to its commercial banks could amount to an annual subsidy of around €11 billion for an outstanding volume of €2.2 trillion and an interest rate differential of 50 bps if all banks satisfy the lending target (Da Silva et al., 2021).

In conclusion, while it is highly unlikely that central bank policy solvency would be at risk for moderate levels of negative central bank equity that are well below a central bank's NILAC, this risk can be addressed by the judicious tiering of reserves if need be. Tiering might be desirable to increase central bank equity faster in order to rebuild central bank policy space. It would also allow the central bank to avoid any potential explosive dynamics if negative central bank equity increases to unsustainably high levels. However, the central bank should remain mindful of the costs that tiering would impose on the banking sector and/or bank customers. Policy solvency is therefore a policy choice of the central bank for moderate levels of negative central bank equity.

4.6 A more active role for fiscal and structural policies to support price stability objectives

Generally speaking, there can be other policies outside the control of the central bank that would be more effective in curbing inflationary pressures than raising interest rates, selling assets, or raising reserve requirements, which tend to be rather blunt tools that all come with individual drawbacks. For instance, in the current environment it could be argued that interest rate hikes might not be the best tool to curb inflation if price pressures are primarily driven by non-monetary factors such as supply chain disruptions, real private and public underinvestment, corporate market power, pandemic

related sectoral reallocations from services to goods, one-off fiscal support measures, or trade barriers, and regulations. In order to safeguard stable prices in the least disruptive manner to the economy, the employment of fiscal and structural policies to reduce inflationary pressures and increase potential output might be more growth-friendly and equitable.

For instance, the semiconductor shortage, which had large knock-on effects on the price of cars and consumer goods in 2021, was i.a. attributable to high and rising demand from cryptocurrency mining, drawing scarce global real resources away from productive and welfare enhancing activities and eventually leading authorities in several countries to ban cryptocurrency mining outright. Another example are imputed rents from owner-occupied housing, which have risen markedly in line with higher housing prices. Expanding housing supply and/or tightening macroprudential policy tools while exempting first-time home buyers could dampen price pressures and improve affordability for large parts of the population. Over the medium term, targeted public policies that promote an efficient allocation of resources, competition, innovation, and strategic investments to address supply-side bottlenecks or market failures can both boost growth and dampen price pressures (cf. Hasanov and Cherif, 2019).

In the case of an economy where "too much money is chasing too few goods", fiscal policy can play an important role in curbing excessive inflationary pressures by reducing purchasing power - and removing money from circulation - through levying higher taxes and paying down debt. While progressive taxation reduces the disinflationary impact due to high-income earners' lower MPC, it could nonetheless be desirable to ensure fair burden-sharing. On the spending side, containing current expenditures on items with a low multiplier could likewise attenuate inflationary pressures without strong adverse effects on growth.

In line with the fiscal theory of the price level (FTPL), similar to how expansionary fiscal policy (or OT) would help to achieve price stability objectives at the ELB, a contractionary fiscal policy should do so in an overheating economy. The optimal mix of fiscal, structural, and monetary policies should take the tradeoffs involved with either into account, informed by country-specific circumstances.

5 Distinct differences to debt-financed fiscal stimulus and monetary financing

While it has been argued that OT would be equivalent to the issuance of short-term government debt from a consolidated public sector balance sheet perspective,[47] this argument does not stand up to closer scrutiny. This section provides an overview of a number of important but often overlooked differences between central bank issued liabilities and government issued debt, summarized in Table 3.

Tab. 3 Differences between OT, QE, and a debt or money-financed fiscal

	OT	QE	permanent QE	Money-financed fiscal stimulus	Debt financed fiscal stimulus
State-contingent liability	x	x	x	x	Not usually
Perpetual liability / no rollover risk	x		x	x	Not usually
Direct and significant effect on real economic activity and consumer prices	x			x	x
Can be employed rapidly	x	x	x	May require lengthy coordination	x
Not subject to fiscal rules	x	x	x		
Does not require fiscal cooperation or ability/willingness to support economy	x	x	x		
Can be imployed irrespective of fiscal space / market access	x	x	x	x	
Does not violate monetary financing prohibition / taboo	x	Under certain limits			x
Does not give rise to fiscal dominance risks	Not for moderate amounts	Not for moderate amounts			Not for moderate amounts
Does not create an unmatched liability for the central bank		x	x	x	x
Does not give rise to central bank solvency concerns	Depends (i.a. on amount)	Depends (i.a. on amount)	Depends (i.a. on amount)	Depends (i.a. on amount)	x
Currency union specific (no or very limited central fiscal capacity)					
Improves risk-sharing in a currency union	x	To a limited extent	To a limited extent	Depends	
Contributes to intra-currency area rebalancing	x	To a limited extent	To a limited extent	Depends	Depends
Contributes to external rebalancing	x	Depends (demand vs. exchange rate)	Depends (demand vs. exchange rate)	x	x
Can be implemented at the country level					x

5.1 A state-contingent and perpetual liability

As described in the preceding sections, OT would create a long-term liability for the central bank - and thereby the public sector - that would traditionally

[47] See for instance Rogoff (2019) or Borio et al. (2016).

be remunerated at the short-term deposit rate on excess reserves. As central banks set the policy rate based on price developments, the rate at which the OT liability would be remunerated is *state contingent* in contrast to short-term debt issued by the government. While the short-term rate which a government faces is usually closely tied to economic developments and the central bank's policy rate, there may be large deviations, in particular in a currency union in times of crisis, when the interest rate paid on short-term debt can vary considerably across different countries and be substantially higher than the deposit rate on reserves. The central bank will therefore only find itself in the situation of (potentially) having to remunerate the newly created reserves if they actually had their intended effect, i.e. a rise in nominal GDP driven by a mix of higher real economic activity and inflation.

This makes OT liabilities much more akin to a perpetual GDP-linked bonds or floating rate consol than to short-term government debt with fixed coupons and maturity. Although increased issuance of perpetual and potentially GDP-linked government debt would indeed be economically desirable (cf. Soros, 2020), historically much higher long-term interest rates may have prevented the emergence of such markets. Moreover, the issuance of longer dated or even perpetual debt is often being complicated by myopic public debt management strategies that display a bias towards issuing short-term debt, which - while cheaper in the short-run - exposes a country to interest rate and rollover risks in the future (The Economist, 2020). Although improvements to the type and maturity structure of public liabilities could be made irrespective of the presence of OT, OT would help to diversify the composition of the consolidated public sector's liabilities.

As Turner (2015b) shows, the state-dependent character of OT liabilities renders OT fully effective even in the presence of fully Ricardian households.[48] Beyond the state-dependency of the newly created liability, central banks' control over the way reserves are remunerated is another important distinction to short-term government debt (see Section 4.5).

Besides a principal that never has to be repaid, interest payments on the OT liability are made in central bank money, another distinguishing feature to government debt. Accordingly, OT liabilities do not face any *rollover risk* and are not exposed to speculative attacks or sudden stops, something experienced by several European countries at the height of the euro crisis (cf. Krogulski et al., 2019).[49]

[48] Any Ricardian effects, whose presence is unlikely to begin with, particularly at the ELB (see for example Choi and Devereux, 2006), are further attenuated by OT's perpetual character.

[49] In principle, a central bank could of course choose to unconditionally backstop national government's debt to eliminate local currency rollover risks (cf. Agur et al., 2022).

It should be noted, however, that just like other expansionary policies, OT faces an inflation or real resource constraint, based on the economy's real production capacities.[50] At the same time, future contributions to base money growth from interest payments on OT reserves would be small and could be sterilized at the discretion of the central bank.

5.2 Differences to a money-financed fiscal stimulus

Cecchetti and Schoenholtz (2016), among others, have argued that direct transfers from the central bank would be equivalent to a money-financed fiscal stimulus of equal magnitude. Despite some obvious similarities, this is an oversimplistic and incorrect assertion.

First, it neglects the legal and institutional context under which central banks in advanced economies operate, which - in the case of the euro area - explicitly prohibit monetary financing while OT could potentially be implemented within existing institutional frameworks (see Section 6.3 for a discussion of associated legal complexities). Indeed, a different treatment appears justified as the political economy implications and fiscal dominance risks are quite different (see Section 5.3).

Second, although acquired government bonds could theoretically be held on the central bank's balance sheet indefinitely (similar to the quasi-permanent nature of OT), there may be political or legal pressures to reduce the stock of government debt held by the central bank after a crisis. Anticipating such unwinding and future contractionary effect, the effect of a money-financed fiscal stimulus on the spending patterns of households and firms may be smaller than an OT operation of equal magnitude.[51]

Third, while OT could be implemented instantaneously by the central bank with the appropriate technical infrastructure in place (see Section 3.5), a money-financed fiscal stimulus - even if legal - would raise complex coordination issues, in particular in a currency union with many member states, and be subject to considerable time lags.

Fourth, the risk of fiscal inaction, implementation lags, and pro-cyclicality, which has been a commonly observed feature of fiscal policy across many

However, this would be at odds with the ECB's legal framework and monetary financing prohibition. Accordingly, while the ECB's OMT program was effective in bringing down spreads following its announcement in 2012 it did not eliminate them and can only be employed in the presence of strict country-specific conditionality.

[50] For an analytical presentation of the real resource constraint that fiscal and monetary policymakers jointly face, see Buiter (2020a).

[51] This argument also applies to the simultaneous increase of fiscal deficits and government bond purchases by central banks on the secondary market, that have been common place in many countries during the COVID-19 crisis.

countries (Fatás, 2019), is a major part of the raison d'être for OT in the first place. So while OT may be a useful addition to the monetary policy toolkit even in the presence of appropriate fiscal policy due to its unique characteristics as described in this paper, the biggest argument for its introduction would be overcoming fiscal policy inadequacies in the pursuit of macroeconomic stability through a rapid and data-driven mechanism. In the case of the euro area, the pursuit of optimal fiscal policy is further constrained by outdated and sub-optimal fiscal rules (see Section 5.5).

5.3 OT reduces risks of fiscal dominance and enables faster liftoff from the ELB

With central banks holding a large amounts of government bonds on their balance sheets as a a result of different asset purchase programs,[52] central banks will face difficult choices regarding if, when, and how fast these holding should be unwound in the future. While central bank officials have been stressing that this will be guided by macroeconomic conditions, debt sustainability and broader economic stability considerations will inevitably factor into these decisions, in particular with a view to countries where elevated debt-to-GDP ratios will not be sustainable under a less favorable r-g differential. These debt sustainability considerations extend beyond their macroeconomic and fiscal dimension to central banks' balance sheets, which would be directly exposed to large losses in the case of a currency union member's default. It remains to be seen how the ECB will deal with this challenge, including the requirement imposed by the European Court of Justice (ECJ) that government bond purchases by the ECB are only permissible under the Treaty on the Functioning of the European Union (TFEU) as long as these are strictly temporary in nature (Mersch, 2020). It is clear, however, that the *de facto* scope to raise interest rates to counter inflationary pressures is constrained by the extent to which high and rising government debt is held by the central bank as also expressed by the House of Lords (2021). If central banks had chosen to employ OT rather than QE in the past, these fiscal dominance risks and exit challenges would pose much less of a challenge now and going forward. In the future, a switch from QE towards OT could help to prevent the build-up of associated risks further.

By the same token, OT would actually present the "drawback" that the more rapid liftoff from the ELB would obviate the need for purchases of government debt, thereby potentially driving up government yields and leading

[52] In the euro area, for instance, 26% of all outstanding government debt was held by the Eurosystem as of end-2020 (Martin et al., 2021).

to faster mark-to-market losses for existing assets on central banks' balance sheets than they would otherwise have occurred. If policymakers wanted to remedy this drawback, OT could in theory be combined with a type of yield curve control (YCC) in order to support (nominal) debt sustainability without the need for continued large asset purchases.[53] And naturally, the central bank should continue to fulfill its lender of last resort function in response to liquidity risks or speculative attacks.

It is beyond the scope of this paper to discuss strategies to address debt overhang and solvency risks in detail. Beyond what is achievable through higher real GDP growth, it is largely a distributional issue to be determined by public choice between higher taxes, lower expenditures, inflation, financial repression, and – if need be – outright debt restructuring or reprofiling. As certain combinations are better suited to ensure a strong, equitable, and green recovery from the crisis, these choices should be informed by the large body of literature on the growth and distributional effects of different measures. In any case, the distributional choices that are required to ensure debt sustainability should be taken through the political process and not indirectly by central banks through their balance sheet operations.

5.4 OT improves risk sharing in a currency union without a central fiscal capacity

OT constitutes a liability that is shared across a currency area. This may not matter much in a currency area that just comprises one country such as the U.S. or Japan, where a central fiscal capacity allows for a sizable degree of risk sharing in a crisis situation where different areas may be very differently affected. However, the absence of such a central fiscal capacity - or other forms of meaningful fiscal risk sharing elements such as the large-scale joint issuance of debt instruments - have long been identified as the key shortcoming in the euro area's institutional design, also in view of other missing features of a optimal currency area such as labor mobility and synchronized business cycles across regions.[54] During the height of the euro crisis between 2010 and 2012, the premature withdrawal of fiscal support and lack of adequate risk sharing mechanisms hampered effective crisis responses and contributed to the double-dip recession that the euro area was experiencing in 2012 in contrast to other advanced economies (cf. Bützer, 2017).

[53] See Higgins and Klitgaard (2020) for a discussion of Japan's recent experience with YCC and Garbade (2020) for an analysis of YCC in the U.S. in the 1940s.

[54] See for instance Godley (1993) for a prescient assessment. Berger et al. (2019) and Barkbu et al. (2018) offer proposals to reform the EMU fiscal architecture in order to allow for greater risk sharing.

Accordingly, countries in the euro area have been much more susceptible to rollover risks and diverging interest rates as witnessed during the euro crisis, creating large negative spillovers for other euro area countries and the global economy. Consequently, and in view of the difficulties in establishing a central fiscal capacity, greater risk-sharing through the central bank balance sheet would lower risks and refinancing costs in aggregate, improve economic conditions for all member countries, and raise welfare across the currency area. While such increased risk-sharing is already happening to a certain extent in the context of the ECB's asset purchases and expansion of its balance sheet, profits and losses from QE are explicitly not being pooled across national central banks. OT would be more transparent and less prone to risks of fiscal dominance and moral hazard concerns pertaining to the mutualization of public debt. It could thereby usefully augment OMT, which has been effective in removing tail-risks and preventing economic collapse in the euro area in the summer of 2012 (cf. Altavilla et al., 2014).

Although the creation of the Next Generation EU recovery fund in the magnitude of €750 billion and the concomitant issuance of joint debt in response to the COVID-19 shock will at last introduce a small element of much-needed risk sharing across the euro area, it is explicitly temporary in nature and therefore does not constitute a true "Hamiltonian moment". Moreover, due to the lengthy political approval process and legal challenges, the disbursement of funds will come with a long time lag that is far removed from the initial contractionary shock in early 2020. As the disbursement will be stretched over several years between 2021-2026, yearly amounts relative to GDP will generally be fairly small, in particular when just looking at the grant element of €390 billion.[55] While providing some fiscal space to countries in the future, the recovery fund does not obviate the need to create an euro area-wide mechanism for a jointly financed macroeconomic response to deteriorating economic conditions that can be rapidly employed such as OT.

5.5 OT addresses political economy constraints to pursuing optimal fiscal policy

Beyond the technical differences between OT and a debt or money financed fiscal stimulus, OT could remedy some of the most problematic and outdated constraints to pursuing optimal fiscal policy. These are particularly pertinent in the euro area, on which this section will therefore focus.

While the fiscal policy response to the COVID-19 shock in 2020 has been

[55] See Darvas (2020) for estimates by year and country.

forceful in the euro area, calls for a swift return to fiscal consolidation and adherence to fiscal rules have already been growing louder, raising concerns that the policy mistakes of 2010-2012 will be repeated once again.

Unless the fiscal rules are adjusted substantially, they will continue to enshrine a contractionary bias due to the systemic underestimation of potential output which in turn determines the permissible structural balance.[56] This would be especially relevant for Southern European countries, which - despite having been hardest hit by both the euro crisis and the COVID-19 crisis - would face the biggest consolidation pressures from the current fiscal rule framework given their highly elevated debt ratios.[57] The current fiscal rules also hinder the use of fiscal space to undertake pareto-improving investments, for which the scope might be much larger than previously thought as pointed out by Blanchard (2021) and Mian et al. (2021).

In principle, fiscal rule reform could take the form of drastic simplification towards a nominal expenditure rule (Gaspar (2020), Darvas et al. (2018)) or even the abandonment of quantitative targets in favor of qualitative standards, that take changing macroeconomic and country-specific circumstances into account (Blanchard et al., 2021), foremost the secular improvement in the *r-g* differential over the past decades.

However, as changes to the fiscal rule framework require unanimity among EU members, it is unlikely that the needed comprehensive reforms to fiscal rules will occur, even if a majority of member states and European citizens wanted to see these amended. This economic detrimental and rather undemocratic status quo could be remedied to a certain extent by OT. It could counteract the effects of pro-cyclical fiscal consolidation, which could derail a nascent recovery in 2022 and beyond, and help to prevent lasting economic scarring and macroeconomic instability.

Further distinguishing it from a fiscal operation, OT would be grounded in the central bank's monetary policy framework and guided by the central bank's mandate, insulating key macroeconomic stabilization objectives, in particular regarding inflation and deflation risks, from political myopia and electoral cycle considerations.

Central banks, with their highly-trained technical staff and expert senior

[56] Cf. Heimberger and Kapeller (2017). See also Jarocinski and Lenza (2016) for an empirical assessment of the extent of the underestimation of potential output and Aiyar and Voigts (2019) for a theoretical model that elucidates the structural underestimation bias in traditional output gap calculation techniques.

[57] While the ESM could provide liquidity to a cash-strapped EU country, stringent fiscal-rules determined conditions may not only be difficult to implement politically but could also undermine growth and thereby long-term debt sustainability. Moreover, the ESM's size would not be sufficient in the case of a systemic crisis or a large country case.

management, are well-placed to help their economies overcome such inadequacies and, of course, have been doing so in years past (Draghi, 2020).[58]

6 Central Bank Independence, Institutional Legitimacy, and Legal Considerations

While the previous sections have outlined economic and practical implementation aspects of OT, this section discusses broader institutional aspects and associated concerns with regard to central banks' independence, legitimacy, and legal considerations.

6.1 Central bank independence

The idea of direct transfers from the central bank has been criticized in the past on the grounds that while it could constitute an effective monetary policy tool, it could raise unwarranted expectations among politicians and the general public that such transfers can be made at will in the future, irrespective of economic conditions. This, in turn, could endanger the independence of the central bank and its ability to fulfill its mandate.

Examining this argument closer, however, reveals that the exact same argument could be made for any type of central bank policy, be it the lowering of policy rates or asset purchases, both of which affecting a government's refinancing costs much more directly. In fact, OT would help to attenuate fiscal dominance risks vis-á-vis other policy instruments at the ELB as described in Section 5.3.

Moreover, it is precisely for such risks that strong institutional safeguards for the separation between the central bank and fiscal authorities exist, including independent decision making mechanisms that guard against political abuse, independent of the type of chosen monetary policy instrument. While it is correct that a strong central bank balance sheet, whose equity position does not require fiscal support to avoid breaching its NILAC, supports central bank independence, the central bank would not come close to that limit for any reasonable calibration of OT (see Section 4.2). In addition, and as discussed in Section 4.4, it is not evident that the central bank's balance sheet would be weaker under OT than under a large asset purchase driven expansion of its balance sheet in net present value terms.

In any case, it would be key to clearly communicate to the public that OT is an extraordinary policy measure that is geared towards the extraor-

[58] See Section 6.2 for a discussion of institutional legitimacy considerations.

dinary circumstances at the ELB. The volume - and potential future rounds - of OT should be strictly conditional on inflation dynamics, e.g. in the form of pre-determined quantitative thresholds beyond which OT would be inadmissible. For instance, the "Sahm" rule (Sahm, 2019), which proposes automatic cash transfers to households to stabilize economies in view of impending recessions as indicated by an increase of the three-month moving average of the unemployment rate by 0.5 percentage points or more over its trough during the preceding twelve months, could provide rules-based guidance for the timing of OT. As the economy lifts off from the ELB, no more OT would be needed as the central bank could revert to its more traditional interest rate tools. Furthermore, adherence to prudent and transparent accounting standards, as outlined in Section 3.6, would be essential to preserve and strengthen people's trust in the central bank's actions.

Accordingly, and similar to considerations on monetary finance (cf. Agur et al., 2022), OT would only be suitable for central banks with strong institutional frameworks that provide safeguards against undue political interference and risks of abuse. The ECB, for instance, would be well placed to implement OT, given its independence, strong operational framework, and analytical capacities.

At the same time, economies without these central bank characteristics do not typically face the problem of idle domestic capacities at the ELB and associated deflationary pressures, which OT is geared towards addressing. Moreover, unconventional policy measures such as direct transfers or government bond purchases may have adverse effects on confidence, capital flows, and the exchange rate in less developed economies due to generally weaker institutional safeguards, a lower level of reserves, and an associated higher susceptibility to sudden stops.

In contrast, in reserve-currency issuing economies, OT would strengthen confidence - and possibly the exchange rate - as it would support a strong and swift economic recovery without jeopardizing price stability or central bank policy solvency. While being a reserve-currency issuing economy is itself endogenous to the pursuit of prudent macroeconomic policies and robust institutional frameworks, in the described circumstances OT may actually be the more prudent - and central bank independence enhancing - policy choice than the available monetary policy alternatives.

6.2 Institutional Legitimacy

Modern central banks generally try to achieve their policy goal(s) by working through the financial sector while not directly interacting with households

and non-financial firms.[59] A major critique of direct transfers to households pertains to such transfers being outside the realm of eligible monetary policy instruments within the division of powers and responsibilities between different public entities. According to this argument, direct transfers are a type of fiscal policy, which should only be undertaken by the government through its fiscal authority. Members of the government, legislature, and the general public could see OT as a quasi-fiscal activity beyond the central bank's mandate, involving direct losses on the central bank's capital. As OT would likely be politically controversial, it would not be appropriate for the central bank to rely on an arguable interpretation of the flexibility provided in central bank laws (see Section 6.3) and introduce OT under its own discretion, which could risk exposing the central bank to legal and political challenges.

While these are legitimate concerns, they are attenuated by a number of factors:

(i) It is widely agreed that questions of redistribution should be the prerogative of fiscal policy, undertaken by government officials through targeted measures in the tax and spending system. From this perspective, OT would be preferable to QE given that its redistributive consequences would be largely neutral and much less opaque. OT would also avoid the distortion of asset prices and risk of both financial and real resource misallocation, thereby making it a lot more justifiable from an institutional legitimacy perspective as a market and distribution neutral monetary policy choice at the ELB.

(ii) Every monetary policy measure has fiscal consequences, with interest rate policy and asset purchases being no exception. Whether a policy is more monetary or fiscal in nature, should not exclusively be judged by whether it relies on credit creation and the financial sector as an intermediary, but to what extent it redistributes wealth and income within an economy. Moreover, while it is true that OT would result in a direct loss to a central bank's equity, asset purchases similarly expose the central bank to losses over the medium term, which are, however, much more opaque and uncertain by nature.

(iii) Beyond interest rate cuts and asset purchases, some central banks have resorted to even more extreme measures, such as equity purchases by the Bank of Japan or the tiered reserve remuneration system of the ECB, which effectively constitutes a transfer of central bank profits to the banking system that would otherwise have accrued to the general public. While there

[59] As van 't Klooster (2020, p. 4) points out, "central banks today tend to focus their activities on lending to banks and trading in government bonds, valuable metals, and other safe assets. Lending directly to citizens and firms, in contrast, is not usually an explicit part of the central bank toolbox. (...) Where central banks are not actually constrained in their choice of instruments, the choice for a narrow toolbox can be understood as a constitutional convention."

may be economic arguments in favor of such measures, these policy tools appear less straightforward from an institutional legitimacy point of view as they directly benefit one group - such as asset owners and bank shareholders in the above examples - more strongly than the rest of society, even if they have a net positive effect on the economy as a whole through second-round effects.

(iv) Lastly, central banks and their officials do not operate without accountability to the public or outside democratic processes in major advanced economies. They act with the objective to achieve their politically given mandates as stipulated - and constrained - by the relevant legal provisions. Reserve currency issuing central banks adhere to strict reporting requirements and are subject to the rule of law in front of the relevant courts.

6.3 Legal considerations

This subsection touches on legal aspects of OT, with a focus on the euro area, where legal disputes over monetary policy and the problem of insufficient fiscal support have been front and center of the policy debate over the past years. It is not meant to provide a legal judgment but provide a discussion of key considerations.

Although advanced economy central banks have traditionally tried to fulfill their mandate by relying on the financial sector to provide (and absorb) credit, this does not imply that other means of conducting monetary policy such as OT should not be explored, particularly if they can achieve policy goals more effectively without exacerbating inequalities or financial stability risks. That being said, OT would constitute a significant departure from more established forms of monetary policy operations due to its much more direct interaction with the non-financial sector, questioning the fundamental tenets of modern central banking law, which could pose a major constraint for its introduction and subject it to legal and political challenges.

Therefore, if OT were to be introduced by a central bank, it should ideally have a sound and clear legal foundation in the central bank law. As public entities governed by public law, central banks can only do what is authorized by law (the "legality"/"attributed powers" principle of administrative law). In relation to monetary policy tools, central bank laws establish objectives, functions, and specific powers. To legally conduct OT, the law should provide explicit or at least implicit powers to conduct that operation. Although it is up to each authority to interpret its central bank law, central bank laws currently do not typically provide a clear and unambiguous legal foundation for OT.

To illustrate this point, while the Statute on the ESCB and the ECB

explicitly allows for open market and credit operations (Article 18), it also allows for the use of "other instruments of monetary control" (Article 20) which can be decided under an exceptional decision-making procedure by the Governing Council if deemed necessary to fulfill the central bank's mandate.[60] However, given the vagueness of this article, it is not unambiguously clear whether it would cover OT- a direct and permanent increase of both base and broad money - as also reflected in former ECB president Mario Draghi's remark who called it an "interesting concept" that "clearly involves complexities, both accounting-wise and legal-wise" (Draghi, 2016). Former ECB chief economist and governing council member Peter Praet considered OT to be legally feasible, stating that in principle the ECB "can issue currency and (...) distribute it to people", while calling it "an extreme sort of instrument" (Praet, 2016). It is important to note that OT would not violate the monetary financing prohibiton in the Statute (Article 21), contrary to the proposals floated by Gali (2020), Boivin et al. (2019), Sims (2016), or Turner (2015a).

It is also worth recalling that Article 2 of the Statute not only tasks the ESCB with maintaining price stability but - without prejudice to the objective of price stability - to support the general economic objectives of the European Union, which i.a. include full employment, social progress, economic, social and territorial cohesion, solidarity among member states, and a sustainable balance of payments.[61] Beyond being more effective at achieving price stability, the general economic objectives would likewise appear better served by OT than QE. Moreover, while Article 2 would not be sufficient as a legal basis for the ESCB to conduct OT, it does require the ESCB to pursue its goals "favouring an efficient allocation of resources". From an economic perspective, this would similarly favor OT over QE as OT would not have a distortionary impact on relative prices.

While a court case against OT would be all but guaranteed, concerns

[60] European Union (2016): Article 20: "The Governing Council may, by a majority of two thirds of the votes cast, decide upon the use of such *other operational methods of monetary control as it sees fit*, respecting Article 2. The Council shall, in accordance with the procedure laid down in Article 41, define the scope of such methods if they impose obligations on third parties."

[61] Article 2: "In accordance with Article 127(1) and Article 282(2) of the Treaty on the Functioning of the European Union, the primary objective of the ESCB shall be to maintain price stability. Without prejudice to the objective of price stability, it shall support the general economic policies in the Union with a view to contributing to the achievement of the objectives of the Union as laid down in Article 3 of the Treaty on European Union. The ESCB shall act in accordance with the principle of an open market economy with free competition, favouring an efficient allocation of resources, and in compliance with the principles set out in Article 119 of the Treaty on the Functioning of the European Union."

that loomed large in prior court cases, in particular regarding the monetary financing prohibition and corresponding quantity and time limits to asset purchases, would not apply to OT. While not binding in the current COVID-19 crisis context, legal pressures to enforce issue share limits by constraining the share of outstanding government debt that the ECB may hold are likely to ramp up in the coming years due to the monetary financing prohibition.

OT could also allay the concerns expressed by the German Constitutional Court regarding the proportionality of the ECB's action and its distributional impact as redistributive effects and financial stability risks would be kept to a minimum. More generally, it would be hard to fathom a court ruling, either on the German or European level, that would deny the ECB the opportunity of direct transfers as an operational method of monetary control after having criticized and/or limited alternative policies in previous rulings based on concerns which OT would not be subject to. It would also be difficult to imagine from a broader political and institutional perspective as OT would likely garner overwhelming public support, in particular vis-á-vis continued asset purchases and negative interest rates. Moreover, and as described in Section 4.5, direct transfers from the central bank to private agents are already a de facto element of the monetary policy toolkit in the euro area as the current tiering of reserves and TLTRO III lower the Eurosystem's remittances to the fiscal authorities and its ability to increase provisions for general risks (cf. Da Silva et al. (2021), Deutsche Bundesbank (2021)). In contrast to OT, these implicit targeted transfers are more opaque and less equitable as they only accrue to commercial banks.

As regards the option of using reserve requirement policies more actively, the Statute is very clear, stating that "[s]ubject to Article 2, the ECB may require credit institutions established in Member States to hold minimum reserve on accounts with the ECB and national central banks in pursuance of monetary policy objectives. Regulations concerning the calculation and determination of the required minimum reserves may be established by the Governing Council" (Article 19).

To conclude, OT would constitute a monetary policy innovation, that would address many of the concerns raised in previous lawsuits against the ECB. There would, however, be legal uncertainty regarding the interpretation of Article 20, that would ultimately require a ruling by the ECJ. Against this backdrop, it would generally be desirable to have an endorsement for OT by the legislature, including a corresponding central bank law amendment, to remove legal uncertainties. Such an amendment should spell out the conditions under which OT can be employed to provide safeguards against abuse (cf. Section 6), akin to existing central bank laws in many countries that allow central banks to provide credit to the government under certain quali-

tative and quantitative conditions.

7 Conclusion

In an economy at the effective lower bound, well-calibrated outright transfers from the central bank to households would constitute an equitable and effective monetary policy tool to achieve price stability objectives and stimulate aggregate demand. In both regards, OT would be superior to asset purchases and negative interest rates. Moreover, OT would automatically provide stronger policy support in those regions of a currency area that are particularly hard hit by an economic shock due to different marginal propensities to consume, which, in turn, would contribute to internal and external rebalancing. In practice, OT could be operationalized through physical checks, CBDC, or perpetual zero-coupon targeted long-term lending operations, building on the existing financial market infrastructure and payment systems.

The benefits of direct transfers have to be weighed against their costs as they create a liability for the central bank that is not matched by interest bearing assets. This can create a risk for a central bank's policy solvency when taken to unsustainable levels. At the same time, prolonged large-scale asset purchases not only carry similar risks to central bank equity, they exacerbate already large pre-existing wealth inequalities, rely on new and potentially excessive credit creation, distort relative prices, and give rise to concerns of fiscal dominance. For moderate and carefully calibrated amounts of OT, that are strictly conditional on inflation dynamics, the risk of policy solvency appears small in reserve currency issuing economies with strong monetary and fiscal institutions, robust central bank balance sheets, and well-established safeguards in place to prevent unwarranted or excessive use. In order for a central bank's negative equity to remain well below its non-inflationary loss absorbing capacity, OT should be reserved as a monetary policy tool for stagnation traps, characterized by sizable slack and depressed interest rates. Even under those extraordinary circumstances, more targeted fiscal policy measures, that are means-tested and raise the economy's productive capacities in a sustainable, green, and inclusive way, would in principle be more desirable if politically and economically feasible.

That being said, OT is distinctly different from a debt-financed fiscal stimulus as the arising central bank liability would be state-contingent, not subject to rollover risk, and entail an implicit risk-sharing element across different fiscal entities of a currency area. It could therefore provide a particularly important and welfare-improving addition to a currency union that

lacks a central fiscal capacity such as the euro area. Although similar in its immediate economic impact, OT is also different from a money-financed fiscal stimulus as it reduces rather than increases the risks of fiscal dominance relative to asset purchases on the secondary market. Moreover, a money-financed fiscal stimulus is legally prohibited in the euro area and would, even if permitted, require the cooperation of fiscal policymakers.

While the fiscal response to the COVID-19 crisis has been rightfully large in most advanced economies, it remains to be seen whether the post-GFC mistakes of pre-mature fiscal consolidation will be avoided this time around. If not, direct central bank transfers to households would constitute a powerful addition to the monetary policy toolkit that would help to achieve policy objectives in an effective and equitable manner.

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PUBLICATIONS

Advancing the Monetary Policy Toolkit through Outright Transfers

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