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REDISTRIBUTING CENTRAL BANK PROFITS & LOSSES ACROSS THE EUROSYSTEM: THE EUROSYSTEM'S MONETARY INCOME

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ABSTRACT

National Central Banks (NCBs) of the Eurosystem pool profits and losses related to monetary policy operations to form the Eurosystem's so-called 'monetary income'. This is then redistributed – i.e. allocated – among NCBs according to respective capital keys (the participation shares of each NCB to the ECB's capital). Monetary income has relevance for current debates such as that concerning the high fiscal costs of an ample reserve regime as a result of the abundant reserves banks hold in the deposit facility of their respective NCBs. These costs are in fact redistributed through the allocation of monetary income. Nonetheless, exactly how monetary income is pooled and subsequently allocated between Eurosystem NCBs remains rather enigmatic. The aim of this paper is to explore how monetary income is both pooled and allocated. This seems a useful task beyond the aforementioned debate to dissipate other puzzling issues like the costs of TARGET2 imbalances. A more detailed dissemination from the relevant authorities as to the process by which profits/losses are pooled and subsequently allocated is however in our view warranted.

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Redistributing central bank profits & losses across the Eurosystem: the Eurosystem's monetary income

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Abstract

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1. Introduction

After the rise of interest rates in 2022, national central banks (NCBs) belonging to the Eurosystem – similar to the other central banks – began paying considerable interest to banks on the excess reserves (ER)[1] held by the latter in their respective NCB's deposit facility (DF) as a consequence of the several 'balance sheet policies' undertaken in former years.[2] At the present rate, and given current stocks of excess reserves, banks are receiving slightly less than €130 billion per year. This has sparked off some debate on how to avoid taxpayers paying a hidden subsidy of sorts to commercial banks (e.g. European Parliament, 2023; De Grauwe and Ji, 2023; McCauley and Pinter, 2024; Tucker, 2022).

A solution *a là* De Grauwe and Ji (2024) of increasing the mandatory reserve coefficient and paying zero interest on required reserves (RR) is problematic, since reserves are unevenly distributed among the euro area jurisdictions.[3] As a consequence, a higher reserve coefficient would in all likelihood adversely affect banks in Southern Europe where reserves are much less abundant than in Northern jurisdictions. Moreover, it would also appear that the ample reserve regime is here to stay given the enduring larger demand for reserves from banks (Åberg et al. 2021; Schnabel 2023, 2024; Altavilla et al. 2024) which compresses the space for increases to minimum reserve requirements (Hudepohl et al, 2024).[4]

A related issue concerns the distribution of the high fiscal costs of the DF. In the Eurosystem profits and losses associated to monetary policy operations are pooled by all NCBs to form the Eurosystem's so-called 'monetary income', which is then subsequently allocated among NCBs according to their

[1] Reserves are issued by the central bank and are used by commercial banks to execute interbank payments, to promptly meet cash withdrawals by customers, to comply with reserve requirements (if in place), as a financial buffer, and to fulfil regulations concerning safe assets. Central Bank Digital Currencies (CBDC) would give the general public direct access to this kind of money (Cesaratto and Febrero, 2023). For a further discussion of CBDC, see e.g. Pantelopoulos (2024a), Auer et al. (2024).

[2] This includes the numerous large-scale asset purchase programs (aka Quantitative Easing), in addition to other non-conventional measures (e.g. Targeted Longer-Term Refinancing Operations) (see e.g. Baglioni, 2023).

[3] The maldistribution may also concern different banks (say small and large) within a single jurisdiction (see e.g. Fricke, Greppmair, and Paludkiewicz, 2024).

[4] Two opposite opinions on the feasibility of a return to a scarce reserve regime (or 'corridor system') are, respectively, Borio (2023) and Altavilla et al. (2024).

respective capital keys (the participation shares of each NCB to the ECB's capital).[5] This pooling includes the interest payments on reserves held in the deposit facilities of NCBs.[6] Given that – as noted above – excess reserves are maldistributed among the euro area jurisdictions, one may then infer that NCBs in the jurisdictions where the proportion of excess reserves is above the country's capital key share the related 'excess' costs of the DF vis-à-vis the NCBs where the portion of excess reserves is below the country's capital key. This leads to the question of whether after the pooling and allocation of monetary income process some NCBs are indirectly subsidizing the banking system of other jurisdictions. This issue has been recently raised by Baglioni (2024). While we defer a full discussion of this issue to further research, in the present paper we deal with some preliminary methodological notions concerning monetary income that are often sidestepped or deferred to a literature that we found to be rather lacking (e.g. Belhocine et al, 2023; Sonnemberg, 2023). In our opinion this preliminary work will shed some light on the pooling and sharing of the costs of the deposit facility, which sits within a complex web of financial flows involved in the Eurosystem's monetary income, thereby allowing a more comprehensive analysis of the possible existence of unwarranted South-North financial flows. As a matter of fact, the process by which the monetary incomes of NCBs are pooled and subsequently allocated is still a rather little-known subject.[7]

In section 2 we shall introduce the concept of monetary income, while section 3 discusses in detail the single items that enter in its calculation, with sections 4 and 5 providing some hypothetical examples as to how monetary incomes are pooled and allocated between Eurosystem NCBs. Section 6 takes stock of the methodological results, with section 7 providing an exploratory analysis of the

[5] A NCBs' share of ECB capital is calculated using a key which reflects the respective country's share in the total population and gross domestic product of the EU.

[6] Broadly speaking, in the Eurosystem commercial banks have two major accounts at their respective NCB where they hold their reserves: a current account in which minimum reserve requirements are fulfilled, and a deposit facility, where any excess reserves above and beyond minimum reserve requirements are kept. Until the global financial crisis – in a way that was functional to the traditional corridor system – liquidity within the minimum reserve deposit account were typically remunerated at a rate higher than that of the deposit facility. During the past decade or so (after the adoption of a *floor system*), the remuneration on excess reserves offered by the two accounts on ER has often been identical, meaning that banks were indifferent as to where to hold them. However, after interest rates on ER held in the DF returned from mid-2022 in positive territory, in mid-2023, the interest rate paid on minimum reserves was brought to zero to somewhat reduce the costs of the ample reserve regime (ECB 2023a).

[7] This reminds of the uneasiness of economists when the German economist Werner Sinn raised the question of TARGET2, a topic that required sometime to be fully understood (Bindseil and König, 2012; Cesaratto, 2013; Febrero and Uxò 2013). Cesaratto (2023) provided a preliminary exploration of monetary income in the context of the debate on the fiscal costs of the ample reserve regime.

pooling and sharing of monetary income in the last ten years for three Eurosystem NCBs. Finally, the conclusion underlines the main methodological results and summarises some implications of our work for the ongoing debate with regard to the fiscal costs of excess reserves.

2. Monetary income

Table 1 shows a synthesis of the *Profit and Losses Accounts* of the Bank of Italy, the Bank of Spain and the Bundesbank for the years 2021-2023. The (perhaps) most important item contained in the Profits & Losses (P&L) accounts is 'net interest income' (item 1). This is the result of interest payment flows, most of which are related to monetary policy operations. Interest income and expenses related to monetary operations are then pooled (item 5.1), following some specific rules, and contribute towards the Eurosystem's 'monetary income' and then allocated (item 5.2) according to capital key. The net result of allocating monetary income is reported as item 5. The rationale of this process is of pooling and redistributing those interest flows that originated by decisions taken at the Eurosystem level and whose consequences on NCB's P&L accounts must therefore be shared.[8]

Table 1 – A selected synthesis of the P&L account of three Eurosystem NCBs (euro millions)

	2021			2022			2023		
	Buba	**BoI**	**BoS**	**Buba**	**BoI**	**BoS**	**Buba**	**BoI**	**BoS**
1. Net Interest Income [1.1-1.2]	2,501	7,262	4,369	3,954	5,787	4,190	-13,907	-5,675	-8,901
1.1. Interest Income	7,319	11,453	7,240	12,077	12,991	9,938	55,053	27,479	18,627
1.2. Interest expenses	4,818	4,191	2,871	8,124	7,204	5,748	68,960	33,155	27,528
5. Net monetary income allocated [5.1-5.2] (a)	-1,179	2,243	1,092	-2,204	2,380	1,353	-5,193	-1,139	3,147
5.1. Monetary income pooled	1,528	-2,034	-935	4,096	-1,162	-497	15,838	7,999	1,668
5.2. Monetary income allocated	349	199	140	1,893	1,213	851	10,656	6,869	4,821
[2+3] Net (financial) expenses (b)	-449	-82	-110	837	1,360	971	-451	-190	253
[6] Other net expenses	-1,535	-1,509	-59	-126	-916	-17	-190	-1,620	-19
[9] Operative expenses	1,967	1,916	566	2,183	1,863	594	3,121	2,120	642
11. Final profits [1+5-[2+3]-6-9] (c)	1,339	9,181	5,064	-1,144	5,860	3,995	-21,580	-7,125	-6,629
[2] Transfer from/to provision for general risks	1,339	2,000	3,279	-1,144	2,500	1,592	-21,580	-5,600	-6,629
[4] Distributable profits [11-2]	0	7,181	1,785	0	3,360	2,403	0	-1,525	-0.42

(a) Net monetary income includes minor figures concerning the recalculation of amounts of previous years
(b) Letters between parentheses indicate the items in P&L accounts in CB's Annual Accounts from to which they are related
(c) Final profits are gross of financial buffers. A negative figure stands for a loss

Source: CB Annual Accounts.

The definitions of monetary income provided by various NCBs are (expectedly) consistent, so we mainly refer to the one offered by the Bank of Italy (2023). The *Eurosystem's monetary income* is the

[8] The Bank of Spain and the Bundesbank transfer the bulk of item 11 (i.e. final profits) in total to their respective Treasuries as dividends when the outcome is positive. By contrast as it is partly owned by private institutional agents, the Bank of Italy pays taxes out of item 11, then transfers a proportion to those private owners and, finally, sends what remains to the government.

result of the pooling of *NCBs' own monetary income*. This is derived from the profits or losses calculated based on certain interest income and expenses obtained from a list of *earmarkable assets* held by each NCB against a list composing its *liability base*. Both lists regard operations associated to the implementation of common monetary policy decisions, so it is understandable relative profits and losses and pooled are ultimately shared. The calculation of a *NCB's* own *monetary income* should be carefully distinguished from the NCB's own *P&L account*, as exemplified in Table 1.

If the analogy helps, the calculation of a NCB's own monetary income is similar to an income tax declaration in which some profit and losses are reported to a higher authority that will eventually bestow a positive or negative tax (a rebate). For instance, for the Bank of Italy (2023, p. 73), "the net result of the allocation of monetary income in 2022 [was] equal to €2,375 million (…).[9] This was the difference between the monetary income pooled by the Bank, amounting to a negative €1,162 million, and that redistributed [i.e. allocated] to the Bank, equal to a positive €1,213 million". This final positive or negative tax will contribute to the final financial result (item 11 of Table 1) of the NCB modifying the initial 'net interest income' (item 1). As the Deutsche Bundesbank (2024) explains: "The monetary income of the national central banks is initially reflected in profit and loss item 1 'Net interest income' [see Table 1], while any unequal allocation among national central banks is balanced out via profit and loss…'Net result of pooling of monetary income'".

Importantly, any transfers to and from the ECB are effectuated as transcriptions within the TARGET2 payment system.[10] For instance, the pooling of monetary income by the Bank of Spain to the ECB is finalised by the former incurring a TARGET2 liability vis-a-vis the ECB. Also, it is important to note that the ECB's own profit and losses do not contribute to the determination of the Eurosystem's monetary income: the ECB just reallocates the pooled monetary income of NCBs according to

[9] Net monetary income as shown in Table 1 includes €5 million, pertaining to the recalculation of amounts for previous years.

[10] TARGET2 is in principle a payment platform and T2 imbalances just accounting entries. *Lato sensu*, TARGET2 liabilities and claims may be however considered as central bank money that both the NCBs and the ECB issue (and accept) for their reciprocal intra-Eurosystem payments. In this capacity TARGET2 claims and liabilities contribute to the net international investment position (NIIP) of a country, and are recorded within the financial account balance in the balance of payments, in the sub-account 'Other Investment'. For a further discussion of NIIP, see e.g. Pantelopoulos (2024b).

capital-key, as noted above. In case the ECB is making losses it might, however, activate only a partial or a nil redistribution.[11]

3. Earmarkable assets and the liability base

To calculate its local monetary income to be pooled – that ultimately forms part of the Eurosystem's monetary income – each NCB refers to interest income and expenses relative to a list of '*earmarkable assets'* and to a '*liability base'* both referring to monetary policy operations. We may note here that these interest income and expenses are included in items 1.1 and 1.2 of Table 1. The process of pooling and allocation of the Eurosystem's monetary income as reflected in the 'Net monetary income allocated' (item 5 in Table 1) will modify the initial impact of these interest income and expenses.

Table 2 details the components of both *earmarkable assets* and *liability base* with the respective interest rate at which the income to be pooled is calculated. This rate is sometimes conventional and set equal to the rate on main refinancing operations (MRO), and not the rate actually perceived (see e.g. Bank of Spain, 2023, p. 63; Bank of Finland 2023, pp. 212-213). Both lists concern operations related to monetary policy (including the smooth functioning of the payment system).

Table 2 – Earmarkable assets and liability base

Earmarkable assets		**Liability base**
(a) lending to euro-area credit institutions relating to monetary policy operations (*effective* interest rate on refinancing operations)		(a') banknotes in circulation ($i = 0$)
(b) securities held for monetary policy purposes (public securities: i_{MRO}; corporate bonds: *effective* interest rate)		(b') liabilities to euro-area credit institutions related to monetary policy operations denominated in euros (*effective* interest rate: i_{RR} and i_{DF} on required and excess reserves, respectively).
(c) intra-Eurosystem claims arising from the transfer of reserves to the ECB (i_{MRO})		
(d) net intra-Eurosystem claims resulting from TARGET2 transactions (i_{MRO})		(d') net intra-Eurosystem liabilities resulting from TARGET2 transactions (i_{MRO})

[11] Moreover, we shall note in section 4 that in a couple of cases the ECB regulates interest payments with the NCBs via monetary income.

(e) net intra-Eurosystem claims related to the allocation of euro banknotes within the Eurosystem (i_{MRO})		(e') net intra-Eurosystem liabilities related to the allocation of euro banknotes within the Eurosystem (i_{MRO})
(f) a pre-set amount of gold holdings and gold receivables in proportion to each NCB's subscribed capital key ($i = 0$)		

Source: Bank of Italy (2024, p. 76; Bank of Spain, 2024, p.58)

As a reference rule governing the difference between what a NCB contributes/pools to the Eurosystem's monetary income and what it receives back, the Bank of Italy (2023, p. 74) suggests:

> "The difference between the *monetary income* pooled by each NCB and the amount redistributed to that NCB, which may be larger or smaller, …depends on two factors: (a) the first (*income effect*) relates to possible differences between NCBs regarding the interest income received on specific earmarkable assets and the interest expense due on some components of the liability base; (b) the second (*composition effect*) arises from the fact that the amounts of the above assets and liabilities in the NCBs' balance sheets do not generally coincide with their capital keys."

In other words, if the composition of earmarkable assets and liability base for each NCB were in line with their respective capital key, and if the same interest rate were applied on each asset or liability, then a NCB will pool the exact same amount of monetary income that it will subsequently receive back following the monetary income allocation process. This is not always the case, as we shall see. We shall also note that the mentioned 'reference rule' is not obviously (or only relatively) applicable to the cases of the net intra-Eurosystem claims and liabilities related to TARGET2 (items d and d' of Table 2) and to the allocation of banknotes (items d and d') (concerning the functioning of the payment system rather than monetary policy operations).

It should finally be noted that it is not necessarily true that, respectively, earmarkable assets bring profits and the liability base causes losses. For instance, with reference to the earmarkable assets listed in Table 2, item (a) contains refinancing operations that in the last decade have been associated with negative interest rates, bringing losses to NCBs; conversely, bank reserves comprised in item (b') on the liability side have been remunerated at negative rates again in the last decade, bringing profits to NCBs.

As mentioned, interest accrued/paid by a single NCB on earmarkable assets and liabilities are pooled contributing toward the Eurosystem's monetary income, and then allocated according to capital key. However, an additional rule dictates that: "Where the value of an NCB's earmarkable assets exceeds or falls short of the value of its liability base, the difference (i.e. the 'GAP') is considered to bear (or

produce) interest based on the marginal rate used by the Eurosystem for MROs" (Bank of Italy, 2023, p. 74).[12]

The rationale underpinning the 'GAP' is that if, for instance, *earmarkable assets* are greater than the *liability base*, it means that monetary policy operations have also fed non-monetary policy liabilities. Suppose that on the asset side of the balance sheet of NCB-A, refinancing operations are €100 (we suppose i_{MRO} = 4.5%) and on the liability side, banks excess deposits are €50 (we assume i_{DF} = 4%); the (negative) GAP is made up of a non-monetary policy liability item of 50, an item that balances the balance sheet. It would not be fair for NCB-A to pool a monetary income of €2.5 (€4.5 on refinancing operations minus €2 on deposits) as NCB-A is likely to pay interest on the non-monetary policy liabilities created by monetary policy operations; not knowing the interest rate actually paid**,** we conventionally assume it to be equal to i_{MRO}. Therefore, the pooled monetary income will be €4.5 on the refinancing operations on the asset side, €-2 on the liability side and €-2.25 on the GAP: hence €0.25.[13] Ultimately, the interest on the GAP is not equal to the €2.5 obtained as the difference between interest revenues and costs on refinancing and deposits, but to the negative interest that is assumed to be paid on non-monetary policy liabilities created by the increased pooled monetary assets.

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[12] Taking a NCB-balance sheet perspective, the following equation (inspired by Altavilla et al. 2023, p. 16) equates the sources and utilisation of liquidity. In the equation, some elements that correspond to items in Table 2 are indicated by the relative letter:

> *Regular and occasional lending operations (MRO, LTRO, TLTRO) (a) + outright asset purchases (SMP, APP, PEPP) (b) + Net foreign assets (c + f) + TARGET2-claims (d) + under-issue of banknotes (with respect to k-key) (e) = banknotes (a') + bank deposits of mandatory and excess reserves (b') + TARGET2-liabilities (d') + over-issue of banknotes (respect to k-key) (e') + [government deposits – ANFA]*

ANFA stands for "Agreement on Net Financial Assets", which sets rules and limits concerning NCBs' holdings of financial assets not related to common monetary operations but to other national tasks. The importance of the regulation is perceptible recalling that in the last decade it was rumoured that some NCBs had abused the power to purchase securities beyond the agreed transactions in order to carry out a stealth QE (even if through the GAP the regular utilization of ANFA is penalised). ANFA has a negative sign since is a source of liquidity.

From the equation it follows that the GAP is given by: *[(a) + (b) + (c) + (d) + (e) +(f)] – [(a') + (b') + (d') + (e')] = [government deposits – ANFA]*, in short *earmarkable assets – liability base = GAP = [government deposits – ANFA].*

[13] With reference to the previous footnote, this sounds like the case of *earmarkable assets (EA) – liability base (LB) = GAP = government deposits* (let us assume *ANFA = 0*). In this case *EA < LB*, the GAP has a negative sign (a liability, government deposits, must be added to equate the balance sheet). Since on this liability (negative GAP) NCB-A pays an interest, it must pool the loss through monetary income.

A corresponding argument applies on a positive GAP (i.e. where *earmarkable assets* are less than the *liability base*); in this case, NCB-A is financing its own investments with the liability base (issuing reserves) and will have to pool the corresponding (conventionally calculated) interest in the monetary income. [14]

As a practical reference with regard to earmarkable assets and the liability base, it is useful to include Table 3 as introduced by Bank of Italy in its latest *Annual Accounts* (2024) that we integrated with similar information provided by the Bank of Spain in the last two years (Bank of Spain 2024, p. 64).[15]

[14] This sounds the case of *earmarkable asset) – liability base = GAP = ANFA* (let us assume *government deposits = 0*). In this case *EA > LB*, the GAP has a positive sign (an asset, *ANFA*, must be added to equate the balance sheet). Since on this asset (positive GAP) NCB-A earns interest, it must pool it through monetary income.

[15] Lamentably, there is still a paucity of detailed information from NCBs on the formation of the monetary income and we invite them to replicate the effort already shown by the Bank of Italy and the Bank of Spain.

Table 3: Bank of Italy and Bank of Spain: breakdown of the net result of pooling monetary income – annual accounts (euro millions)

Breakdown of the net result of pooling of monetary income - 2023
(millions of euros)

	Eurosystem total	Pooled by the Bank of Italy (A)	Redistributed to the Bank of Italy (B)	Net result (B-A) (3)	Pooled by the Bank of Spain (A)	Redistributed to the Bank of Spain (B)	Net result (B-A) (3)
Lending to euro-area credit institutions	26,850	7,831	4,525	-3,306	2,147	3,176	1,029
Securities held for monetary policy purposes (subject to risk sharing)	8,483	703	1,430	727	1,297	1,004	-294
Securities held for monetary policy purposes (not subject to risk sharing) (1)	127,854	23,984	21,546	-2,438	N/A	N/A	N/A
Intra-Eurosystem claims equivalent to the transfer of foreign reserves to the ECB	1,335	225	225	-	158	158	-
Net intra-Eurosystem claims related to the allocation of euro banknotes	-4,817	1,877	-812	-2,689	6,933	-570	-7,503
Deposits held by euro-area credit institutions	-130,387	-7,850	-21,973	-14,123	-8,160	-15,423	-7,263
Intra-Eurosystem liabilities/claims resulting from TARGET transactions	14,172	-22,769	2,388	25,157	-16,146	1,676	17,823
Gap (2)	-2,730	3,998	-460	-4,458	N/A	-638	-638
Total		**7,999**	**6,869**	**-1,130**	**-13,771**	**-10,618**	**3,153**

(1) The BoI reports that: 'For the purpose of calculating monetary income, they are considered to bear interest at the marginal rate used for main refinancing operations. Therefore, the corresponding pooled income is different from interest income as recorded in sub-item 1.1' [see table 1 abobve]. The BoS does not report this figure separatedly, including the Securities held for monetary policy purposes (not subject to risk sharing) whithin the 'Gap'.
(2) BoI: ' Difference between earmarkable assets and liability base. Includes other minor components'. BoS: 'Non-earmarkable assets (non-shared mon. pol. portfolios + GAP)'
(3) Reported in the P&L accounts (see above item 5 of table 1). Net monetary income does not include the recalculation of amounts of previous years
Sources: BoI and BoS respective *Annual Accounts* 2024.

4. Calculation of net monetary income: earmarkable assets

We shall now divulge the process by which the net monetary income of a NCB is arrived at by considering how interest on earmarkable assets and the liability base is pooled and subsequently allocated. To keep things simple, we assume there are only two NCBs, and also presume that banks are not subject to any minimum reserve requirements. Further, for didactic purposes, in this and in the next section we shall proceed to calculate the net monetary income of a NCB by considering specific earmarkable assets/liabilities in isolation, as if they were the only item in the list.

(a) Lending to euro-area credit institutions relating to monetary policy operations

This item concerns refinancing operations (RO); these normally produce profits for a NCB at the official rates on MRO and LTRO. 'Normally', since, as already observed, in the last decade some refinancing operations were conducted by the ECB at negative rates determining losses. So both profits/losses are pooled to contribute to the Eurosystem's monetary income.

On the liability side, refinancing operations when effectuated correspond to the issuance of bank reserves and banknotes (registered as items in the liability base considered below).[16] The distribution of refinancing operations among NCBs does not follow their respective capital keys, since it depends on the demand for reserves and banknotes which are strongly dependent on local factors, although they are conducted at homogenous interest rates. Therefore, with regard to the

[16] After their issuance, reserves can move between Eurosystem jurisdictions, determining TARGET2 claims and liabilities (this is also recorded in Table 2 above).

above *reference rule*, we are in the presence of a *positive composition effect* but not an *income effect* (as the interest rate applied to the RO is the result of a common policy decision).

After some years in negative territory, from mid-2022 interest rates on refinancing operations became positive. Table 3 shows, for instance, that as a consequence, in 2023 the Bank of Italy pooled €7,831 million and received back €4,525, with a net contribution to the Eurosystem's monetary income of €3,306, a loss for this NCB. In this case the Bank of Italy was a net contributor to the Eurosystem's monetary income since Italian banks made relatively more use of TLTRO operations bringing profits to this NCB (i.e. an income effect). [17]

Let us now provide a simple example of pooling and sharing positive interest rates on refinancing operations (Table 4). Suppose that two NCBs have a capital share of 1/3 (NCB-A) and 2/3 (NCB-B), respectively. Commercial banks in the jurisdiction of NCB-A resort to TLTRO operations for €200 billion while those in the jurisdiction of NCB-B for €100 billion only, both disproportionally to their capital key.

Table 4 – Lending to credit institutions at positive rates

NCB-A			NCB-B	
TLTRO: +200	R: +200		TLTRO: +100	R: +100

Assuming a positive interest rate on this operation (i_{TLTRO} = 2%) and, for the sake of the argument, an interest rate of zero on deposits, i_R = 0:

- NCB-A will pool a profit of 200 x 2% = 4;
- NCB-B of 100 x 2% = 2.

The Eurosystem's pooled monetary income is equal to 6 which will be shared according to capital keys, i.e. NCB-A will receive 2, and NCB-B 4. Net monetary income is 2 – 4 = -2 for NCB-A and 4 – 2 = 2 for NCB-B. This means that although NCB-A initially registered in the P&L account an interest income of 4, it is reduced to 2. On the flipside, while NCB-B initially recorded an interest income of 2, in the end this is increased to 4. Net interest incomes are now distributed according to capital key.

[17] In 2022 when interest rates were for part of the year still in negative territory the Bank of Italy's net contribution was positive to the tune of €248 million; i.e. a profit for the Bank of Italy.

A case of negative interest rates on refinancing operations is that of the TLTRO refinancing operations that since 2016 (starting with TLTRO II and later with TLTRO III), and particularly between June 2020 and June 2022, were conducted at negative interest rates. Needless to say, this was advantageous for the banks and onerous for NCBs. Southern European banks particularly resorted to this source of liquidity (Altavilla et al, 2024, p. 18). In its *Annual Report* (2023) the Deutsche Bundesbank reports in this regard that it shared the cost with Southern banks 'via the common pool of monetary income':

> "[T]he Bundesbank's average share of the Eurosystem's total TLTRO III holdings, at around 18.9%, is well below the Bundesbank's capital share of 26.4%; the resultant disproportionately high interest expenses of the other national central banks are balanced out via the common pool of monetary income."

To provide a simple example of pooling and sharing negative interest rates on refinancing operations let us consider again Table 4 and our two NCBs with a capital share, respectively, of 1/3 (NCB-A) and 2/3 (NCB-B). As above, commercial banks in the jurisdiction of NCB-A resort to TLTRO operations for €200 billion while those in the jurisdiction of NCB-B for €100 billion only, both disproportionally to their capital key.[18] This time, however, we assume a negative interest rate on this operation (i_{TLTRO} = -2%) and again, for the sake of the argument, i_R = 0:

- NCB-A will pool a loss of -2% x 200 = -4;
- NCB-B will pool a loss of -2% x 100 = -2.

The Eurosystem's monetary income is equal to -6 which will be shared according to capital keys; i.e. NCB-A will receive -2 and NCB-B -4. Net monetary income is -2 - (- 4) = 2 for NCB-A, and -4 - (-2) = -2 for NCB-B. NCB-A that initially registered in the P&L account an interest expense of -4, sees it reduced to -2, while NCB-B that initially recorded an interest expense of -2, sees it raised to -4. In this case, net interest expenses are now redistributed according to capital key.

(b) Securities held for monetary policy purposes

In the last 15 years, the Eurosystem activated three main campaigns of large-scale asset purchase programs. The relative less ambitious Securities Market Programme (SMP) from 2010 concentrated its purchases on Southern bonds,[19] while the larger Asset Purchases Programme (APP) from 2015

[18] In this and in the next examples we assume that monetary policy operations take place at the beginning of the year, while monetary income is calculated at the end of the year.

[19] The SMP did not create excess reserves, as commercial banks held the reserves within fixed-term deposit accounts.

and the Pandemic Emergency Purchasing Programme (PEPP) from 2020 was undertaken according to capital keys (10% of the assets were bought by the ECB).[20] Therefore, there is no *composition effect* here. Purchases were decentralised; i.e. conducted by each NCB but with different risk-sharing rules.

NCBs contribute to Eurosystem monetary income an interest income on monetary policy securities calculated, notably, according to two different rules according to the regime of risk sharing proper to the assets purchased. Public securities purchased under APP and PEPP were excluded from risk-sharing and "are considered to bear interest at the marginal rate used by the Eurosystem for MROs" (Bank of Italy 2023, p. 74).[21] Risk on corporate bonds is shared and they "bear their *actual* interest" (ibid).

Since interest income on monetary policy securities not subject to risk sharing is calculated at a conventional rate equal to the marginal rate on MRO, it may differ significantly from the actual interest income which is included in the 'Net interest income' as reported in the P&L Account (item 1 of Table 1 above) (Bank of Italy, 2024, p. 26, fn 22). In other words, revenues from public sector securities purchased under the APP and PEPP (but not those under the SMP) enter the NCB budget according to their *actual* interest rate, but for the calculation of monetary income their revenue is calculated at a 'fictional' interest rate (equalling to i_{MRO}). This rule does not apply to corporate bonds where revenues are pooled and allocated at their actual rates. Thus there exists an *income effect* for corporate bonds (since actual rates differ on the variety of bonds purchased by each NCB) but not for public securities.

Since in case of public securities neither a *composition effect* (purchases have been operated according to capital keys) nor an *income effect* (an equal interest rate is used) are present, what each NCB pools is precisely equal to what it will receives back. This is perfectly consistent with the postulate that if there is no risk sharing on public securities there is also no profit sharing. The

[20] The famous, but inactivated, OMT operation launched by Mario Draghi in 2012 would have focused on single troubled jurisdictions. The same applies to the Transmission Protection Instrument (TPI) approved in July 2022. Only temporary deviation from capital keys were permitted during PEPP to cope with tensions in specific jurisdictions.

[21] The rules on risk sharing in monetary policy operations are summed up by Bank of Italy (2024, p. 10). Risk on the bank assets bought under the two campaigns of support of banks' covered bonds CBPP I & CBPP II were also excluded from risk sharing.

important conclusion here is that since nothing is shared, the entire *actual* revenues obtained from public securities remains at the respective NCBs.

To elucidate the point, we provide a simple example precisely focused on public securities with the two NCBs of the previous example (Table 5). In this case, a large-scale asset purchase operation is implemented where a total of €300 billion of public securities are purchased, where each NCB purchases securities in its own jurisdiction according to capital key, again 1/3 (NCB-A) and 2/3 (NCB-B). This operation leads to the creation of reserves (a liability) deposited in the deposit facility where commercial banks earn a rate i_R (reserves are included in the liability base – i.e. item (b), as we shall see in the next section).

Table 5 - A public securities purchase operation

NCB-A			NCB-B	
Bonds: +100	R: +100		Bonds: +200	R: +200

We can now calculate the virtual net monetary income on public securities for each NCB that is pooled and subsequently allocated. We assume i_{MRO} = 2% and, for the sake of the argument, i_R = 0%.[22] We have:

- NCA-A interest income to be pooled = 100 x 2% = 2;
- NCA-B interest income to be pooled = 200 x 2% = 4.

Total monetary income pooled is = 6. This is redistributed according to capital key; i.e. 2 to NCB-A and 4 to NCB-B. Net monetary income is therefore zero for both. In other words, each NCB confers to the pool precisely what it receives back from it. In the end, in this case the exercise of pooling and allocation has no effect, and not surprisingly since both the income and the composition effects are absent. NCB-A will retain the income on its capital key share of public securities purchases, calculated at the *actual* interest rates, and the same will apply for NCB-B.

An *income effect* would be present if we had considered corporate assets whose income is pooled at the actual rates which plausibly differs among jurisdictions. Another case is if the public securities purchasing operation had not been implemented according to capital keys but, say, to rescue a specific jurisdiction, as in the case of the mentioned SMP or of Draghi's famous OMT 2012 statement.

[22] To reiterate, in our examples we assume that all the items, except for those under scrutiny, are irrelevant (or a zero-interest rate is applied to them).

In this case if, say, the Bank of Italy were authorised to buy a certain amount of domestic public bonds, with the risk shared over the entire Eurosystem, it seems natural that the Bank of Italy would have to share with other NCBs the relative revenues.[23] During the APP (launched 2015) and PEPP (launched 2020) the idea was instead that risk for public securities remained mostly national. The modalities and results of Table 5 reflect these last experiences: no risk and correspondent revenues are shared on public securities. The Deutsche Bundesbank (2021, p. 75) seems to confirm this interpretation when it writes:

> "It is assumed that no income is generated from […] the covered bonds purchased under the CBPP and CBPP2 as well as the government bonds (including regional government bonds and bonds issued by eligible agencies located in the euro area) purchased under the PSPP and PEPP generate income commensurate with the applicable main refinancing rate, as the ECB Governing Council has ruled out the possibility of pooling the risk and returns arising from these instruments among the national central banks."

A partial exception to the uniform composition rule concerned PEPP purchases that, in some instances, could temporarily deviate from a NCB's capital key to pacify tensions in specific markets (see ECB, 2023b, 2024a). Looking at Table 3 we may indeed observe that in 2023 what the Bank of Italy pooled as income from the 'Securities held for monetary policy purposes (not subject to risk sharing)' (€23,984 million), was only roughly returned to it (€21,546). In this specific case Italy's net contribution to the pool (€2,438) was presumably due to the sharing (at a conventional rate) of interest revenues from the (authorised) purchase of domestic government assets above its assignment.

A further complication regards the case in which asset purchases were to be implemented by a NCB in other jurisdictions of the monetary union, as transpired during the APP and PEPP. This generates TARGET2 imbalances and is dealt with below (point (d)).

(c) Intra-Eurosystem claims arising from the transfer of reserves to the ECB.

This item refers to the claims in euro that NCBs have recorded on their balance sheets vis-à-vis the ECB for the transfer of foreign reserves (according to capital key) in its favour when the Eurosystem was established (or when a new NCB enters the Eurosystem). In summary, the ECB includes on the assets side of its balance sheet the foreign reserves it has obtained and in counterpart a euro-denominated debt vis-à-vis the NCBs, which in turn report a claim in their balance sheet. This claim

[23] We guess that the same applied to the Securities Market Programme, the limited program of purchases of government bonds by Southern NCBs launched during the course of 2010.

is included in earmarkable assets in the same way as any other intra-Eurosystem credit/debit (such as those related to TARGET2 and adjustments related to the issuance of banknotes, as we shall shortly see); it has no redistributive effect as the income pooled on these claims (at the conventional i_{MRO} rate) and credit of each NCB are both aligned to its capital key. Table 3 shows that, for instance, in 2023 both the Bank of Italy and the Bank of Spain pooled an amount of income precisely equal to that redistributed to them.

(d) Net intra-Eurosystem claims resulting from TARGET2 transactions

In a particular set of circumstances, payments across euro area jurisdictions may generate T2 imbalances consisting of claims held by some NCBs vis-à-vis the ECB mirrored by liabilities by the remaining NCBs vis-à-vis the ECB. On these liabilities NCBs pay monthly interest at the prevailing marginal interest rate that the ECB transfers to the remaining NCBs. Therefore at a first glance, it would be envisioned that T2 imbalances entail losses for some NCBs and symmetric profits for the remaining NCBs. However the rules concerning the pooling and allocation of monetary income prescribe that at the end of the year each NCB can deduct (i.e. must transfer) its aggregate losses (profits) from (to) the Eurosystem's monetary income. This has two results:

- (1) T2 imbalances have no final effect on the NCB own actual P&L account since the deduction (addition) from (to) the NCB's transfer to the Eurosystem's monetary income cancels out the initial T2 losses (profits) incurred over the year;
- (2) In the calculation of the Eurosystem's monetary income the losses brought by some NCBs are precisely cancelled out by the symmetrical profits brought by the remaining NCBs, so the net effect on monetary income is nil (i.e. nothing is redistributed).

As Cour-Thimann (2013, p. 29) authoritatively explained when, a decade ago, the controversy over TARGET2 blew up:

> "Target balances are de facto not remunerated within a cohesive monetary union. (…) First, it is important to recall that the size or distribution of Target balances have no impact on the monetary income of the individual NCBs within the Monetary Union. Target balances in first instance bear monthly payments at the prevailing marginal interest rate in the main refinancing operations (in full allotment equal to the main refinancing rate). These interest payments flow from NCBs with Target liabilities via the ECB to NCBs with Target claims. However, at year-end, when the NCBs pool their monetary income net of expenses in the context of the income-sharing scheme, these interest payments are taken into account and thus offset. Still, in the context of perceived risk on the cohesion of the Monetary Union, the fact that the Target balances accrue the monthly interest payments might be seen as remunerating such risk."

The rationale for this eventually ineffective accounting rule is provided in the last passage: in the case where a country with T2 liabilities leaves the union during the year – thereby reneging its T2 debt – it would have at least paid an interest on its T2 liabilities during the year (which is 'returned' if it doesn't eventually leave). Symmetrically, the NCB with T2 claims receives a remuneration for the risk it has incurred over the year (of seeing its T2 claims renegaded), and 'returns it' when, at the end of the year, the risk has not materialised.

We may modify the example of Table 5 in order to introduce some T2 imbalances (Table 6). In the modified example NCB-A purchases domestic government bonds in a financial market located in jurisdiction B – where international investment funds presumably operate – as part of a public securities purchase programme. In practice, NCB-B (say the Bundesbank) buys €100 billion of country A public securities in its jurisdiction (say Frankfurt) on the behalf of NCB-A (say the Bank of Italy) which 'pays' by booking a T2 liability. According to the ECB, this has been the main source of TARGET2 imbalances after 2015 (e.g. Eisenschmidt et al. 2017).

Table 6 – NCB-A purchases country A bonds in a market located in the jurisdiction B

NCB-A			NCB-B	
Bonds: +100	T2: +100		T2: +100	R: +100
			Bonds: +200	R: +200
			Commercial bank	
			R: +300	D: +300

We assume that securities offer no return and reserves are not remunerated, but that T2 liabilities require paying say 2% (our assumed interest rate on MRO) over the year. If payments are made as 'accounting annotations' (i.e. result in an increase in T2 liabilities), on 31 December, the two NCB balance sheets would appear as transcribed below in Table 7:

Table 7 - NCBs pay/receive a return on T2 liabilities/claims, annotating such payment in their P&L accounts

NCB-A			NCB-B	
Bonds: +100	T2: +102 Equity: -2		T2: +102	R: +100 Equity +2
			Bonds: +200	R: +200
			Commercial bank	
			R: +300	D: +300

We can now calculate each NCBs' monetary income that must be pooled. Given the hypothesis, the only earmarkable asset (or liability) are TARGET2 claims/liabilities.

With interest on T2 claims/liabilities set at i_{MRO} = 2%, profits/losses reported to the Eurosystem would be:

- NCB-A= - 2% x T2 = – 2% x 100 = -2 (this loss corresponds to a new T2 claim for NCB-A)
- NCB-B = 2% x T2 = 2% x 100 = 2 (this profit corresponds to a new T2 liability for NCB-B)

The Eurosystem's monetary income would thereby equate to zero. There is nothing to share here. TARGET2 is also irrelevant for the 'Net (or gross) profits for the year' (Table 1) for both NCBs since their respective loss or profits ('positive or negative equity') – although initially counted in the 'net interest income' (item 1, Table 1) – are later compensated by the corresponding deduction in the 'income declaration' to the Eurosystem. De facto, interest on TARGET2 claims/liabilities are thereby irrelevant both in the NCBs' own P&L account and for the Eurosystem's monetary income: if a NCB has a T2 liability (claim) and makes monthly payments (receives profits) over the year, at the end of the same year it will deduct those payments (add those profits) from (to) the income it confers to the Eurosystem's monetary income. This is shown below in Table 8. Finally, the TARGET2 losses and profits conferred to the Eurosystem's monetary income cancel out so there is no 'dividend' (positive or negative) from TARGET2. Table 8 shows that the final outcome is analogous to that of Table 5 in which purchases were done by each NCB in its own jurisdiction.[24]

Table 8 - NCBs deduct/add losses/profits from/to the monetary income declared to the Eurosystem

NCB-A			NCB-B	
Bonds: +100	T2: +102 Equity: -2		T2: +102	R: +100 Equity: +2
T2: +2 (conferral of losses to MI)			T2: -2 (conferral of profits to MI)	
NET			NET	
Bonds: +100	T2: +100		T2: +100 Bonds: +200	R: +300

Table 3 (above) showed that in 2023 the Bank of Italy pooled a T2 loss of € 22,769, whereby it received back a 'rebate' of €2,388. Similar results are reported by the Bank of Spain. We must take a moment to explain such a result since we expected a zero 'rebate' (net-result). Let us first recall that while the monthly payments on the T2 liabilities were reported among the interest expenses in

[24] It makes sense that NCB-A should not pay a penalty for having executed large-scale asset purchases in the most efficient way, e.g. in other jurisdictions.

the Bank of Italy's 'Net interest income' (item 1 of Table 1), the 'discharge' of these payments in the calculation of the monetary income to be pooled with the Eurosystem de facto zeroed those interest expenses for the calculation of the NCB final financial result. This is considering only the NCBs, as there remains a positive difference, the mentioned 'rebate' due to the ECB liability position on TARGET2.

It must be recalled that the ECB has a debit T2 balance vis-à-vis the NCBs (not specifically vis-à-vis the Banca d'Italia or the Bank of Spain) on which it pays interests at the i_{MRO} rate. This interest income on TARGET balances is allocated on a capital key basis, within the net result of the redistribution of monetary income. The Bank of Italy in 2023 recorded, for instance, a benefit of 16.85% of the total interest expense paid by the ECB which explains the above mentioned 'rebate'.

The size of the ECB's T2 debit balances are mainly related to the purchases of monetary policy securities (the ECB participated in both APP and PEPP by buying 10% of bonds). Euro area commercial banks, however, have account relationships only with the NCBs and not with the ECB. As a result, the purchases by the ECB were facilitated through NCBs, according to capital key, by booking a T2 liability vis-à-vis each NCB. On these liabilities the ECB paid an interest rate that account for the above 'rebate'.[25] It seems therefore that the ECB employs monetary income to regulate some payments with the NCBs.

(e) Net intra-Eurosystem claims related to the allocation of euro banknotes within the Eurosystem. The issuance of banknotes in the Eurosystem by each NCB should in principle be in line with their respective capital key (with 8% of the issuance appanage of the ECB). Nonetheless, as the issuance of banknotes is dependent on the public's demand (i.e. the demand for banknotes is endogenously determined), whether a single NCB has issued an amount of banknotes above or below its capital key entitlement is only calculable ex post.

[25] In the notes to the ECB's 2020 balance sheet, with reference to the item 'Other liabilities within the Eurosystem (net)', ECB (2021, p. 49) observes that "…in 2020 this item consisted predominantly of the TARGET2 balances of euro area NCBs vis-à-vis the ECB. […] The increase in the net TARGET2 liability resulted mainly from the net purchases of securities under the PEPP and the APP, which were settled via TARGET2 accounts."

Any eventual over-issuance is penalised, and any under-issuance 'rewarded', at the rate applied to refinancing operations.[26] Yet as in the case of T2, any possible profit (or loss) as a consequence of a NCB under-issuing (over-issuing) banknotes realised over the year is de facto deleted, as profits made by under-issuing NCBs are precisely offset by the losses incurred by over-issuing NCBs, so from the point of view of pooled Eurosystem monetary income there is nothing left to redistribute once the pooling and allocation process is complete.

For instance, suppose that given the demand for banknotes in the respective jurisdictions, NCB-A issues €80 and NCB-B €220 billion of banknotes. With the respective capital keys of 1/3 and 2/3, the ex-post entitlements would be 100 and 200 respectively. NCB-B will then pay a penalty during the year to the Eurosystem on its over issue (20€) at the MRO rate (i.e. i_{MRO}) by booking a TARGET2 liability and NCB-A will be remunerated in a symmetrical manner due to its under issuance (20€) (by way of positing a TARGET2 claim). Having paid a penalty, NCB-B will report a loss to the Eurosystem's monetary income, while NCB-A will report a profit. The net effect for both NCB-A and NCB-B is nil. As in the case of T2, such accounting rules are enforced as if a euro area member were to leave the monetary union after having over-issued euros during the year relative to its respective capital key (in this case, NCB-B), it would have at least paid interest during the year (which is returned if it doesn't leave).

Interestingly, Germany overissues banknotes (see e.g. Deutsche Bundesbank, 2022). For example, at the end of 2023, the Deutsche Bundesbank (2024, p. N/A) reported that while in principle it could distribute €377,036 million of banknotes, the value of the euro banknotes actually issued was €920,705 million (€543,670 million more than its allocated amount). On this difference an interest rate equal to the i_{MRO} rate was paid by the Bundesbank over the year (that via ECB was transferred to under-issuing NCBs). The Bundesbank subsequently pooled this loss via the pooling of its monetary income. On the other hand, the Bank of Italy in 2023 issued banknotes below its assignment. Table 3 above shows indeed that the Bank of Italy pooled €1,877 million of monetary income with regard to banknote issuance and received back a negative 'rebate' of €-812 million. To this end, the Italian central bank reported in its P&L account a loss concerning the allocation of banknotes of €-2,689 million. An even larger post-pooling loss was reported by the Bank of Spain

[26] 'The respective share of the total value of euro banknotes in circulation due to each central bank in the Eurosystem is calculated on the last business day of each month in accordance with the key for allocating euro banknotes' (Deutsche Bundesbank, 2022, p. 42).

that pooled €6,933 million and received back a negative 'rebate' of €-570 million for a final loss of €-7,503 million.

Why the €-812 million and €570 million residuals for the Bank of Italy and the Bank of Spain, respectively? As much as in the case of TARGET2 residuals, there should be zero residuals. We must refer again to the role of the ECB. Although the ECB is allocated an 8% share of the total value of the euro banknotes in circulation, the ECB does not technically put banknotes into circulation. Banknotes are always put into circulation by the NCBs that have a relationship with the euro area banking system. The value of banknotes in circulation found in the balance sheets of the NCBs is a conventionally adjusted value: if the total value of banknotes in circulation of the whole Eurosystem is 100, 8% is conventionally allocated to the ECB and the remaining 92% is allocated to the NCBs in proportion to their respective capital keys. The difference between the amount of banknotes issued by each NCB according to capital key and the actual amount issued is offset by intra-Eurosystem claims/liabilities (different from TARGET2 balances but always remunerated at the MRO rate). The relative profits or losses are then pooled and shared via monetary income, an operation that in practice cancels them out. The 'residual' concerns the ECB that, against the 8% of banknotes on its balance sheet, matures a claim against the NCBs for the same amount. Against this claim, all NCBs pay interest to the ECB (€-4,817m in 2023) according to capital key; the Bank of Italy's share (capital key of 16.85%), for instance, corresponds precisely to a payment of €-812m.

(f) A pre-set amount of gold holdings and gold receivables in proportion to each NCB's subscribed capital key.

It was decided to include gold among earmarkable assets, for a total amount fixed for the entire Eurosystem and broken down for each NCB according to the capital key. Therefore, since for the purposes of monetary income calculation each NCB includes an amount of gold (and gold-equivalent claims transferred to the ECB) aligned with the capital key, there are no redistributive effects – the more so since, as seen in Table 2 "Gold is not considered to generate interest" (Bank of Italy, 2023, p. 74).

5. Calculation of net monetary income: liability base

(a') Banknotes in circulation

Refinancing operations and the other sources of liquidity that we find among the earmarkable assets (point (a)) must be matched by corresponding liabilities. Refinancing operations create base money

that consist of banknotes and reserves. Banknotes do not generate any sort of interest rate per se so this item is irrelevant for the actual formation of monetary income (nonetheless as divulged above, the uneven allocation of banknotes among NCBs leads to interest payments, but the related profits and losses are later zeroed through pooling etc.).

(b') Liabilities to euro-area credit institutions related to monetary policy operations denominated in euros

This item concerns the other component of base money consisting of mandatory (or required) reserves (RR) and excess reserves (ER). In a classical corridor system (or scarce reserve regime), RR are held by banks at their respective NCB, and yield an interest rate equivalent to that applied to MROs, while excess reserves are normally held in the deposit facility (DF) but yield a lower interest rate.

This applies also to a floor system (or ample reserve regime, see ECB, 2024b), but variations are possible. As already noted, for instance, given the high returns banks were receiving on excess reserves held in the deposit facility in the Eurosystem, the ECB since July 2023 brought the remuneration of RR to zero so as to reduce 'the overall amount of interest that needs to be paid on reserves in order to implement the appropriate stance' (ECB, 2023a) – a 'mini tiering' *a la* De Grauwe (2023). Be this as it may, the losses NCBs bear on remunerated reserves are pooled and shared. Importantly, the distribution of excess reserves and related losses are not however in line with respective capital keys. And since the interest rate applied is uniform, a composition effect is active here, but not of an income effect.

Let us take the example of Table 6 (reproduced below as Table 9) in which NCB-A purchases domestic government bonds in a financial market located in a foreign jurisdiction (i.e. in jurisdiction B) as part of a public securities purchase programme. For simplicity we suppose that mandatory reserves do not exist and that all reserves are deposited in a deposit facility that yield a positive interest rate, say, i_{DF} = 1%. As usual we neglect the other items (or assume they yield a zero-interest rate).

Table 9 – NCB-B bears the costs of excess reserves

NCB-A			NCB_B	
Bonds: +100	T2: +100		T2: +100	R(DF): +100
			Bonds: +200	R(DF): +200
			Commercial bank	

			R: +300	DF: +300

We can now calculate each NCBs' monetary income to be pooled. Given the hypothesis, the only liability base's component producing an income (or loss) is the deposit facility. If the DF yields a return to commercial banks of, say i_{DF} = 1%, each NCB's monetary expenses to be pooled would therefore be:

- NCB-A = - 1% x R(DF) = – 1% x 0 = 0
- NCB-B = - 1% x R(DF) = -1% x 300 = -3

The Eurosystem's monetary income would equate to -3, which will be redistributed according to capital keys; i.e. NCB-A would receive -1 and NCB-B -2. NCB-A will receive a net monetary income of -1 – 0 = - 1. Hence, even though NCB-A would initially report in its P&L account zero interest income, following the pooling and allocation process it would incur a net monetary income (a loss) of -1. By contrast, NCB-B will post a net monetary income of -2 – (-3) = + 1 in the aftermath of the pooling and allocation process; i.e. NCB-B reported in the P&L account an interest expense of -3, but after the positive result of the net monetary income will see the loss reduced to -2. In this way, the cost of the excess liquidity is re-proportioned so that each NCB bears its k-key share (in the period 2015 to mid-2022 a negative interest rate penalised excess reserves, so that NCBs collected a positive income; this was then pooled and allocated as per the usual process).

(d') Net intra-Eurosystem liabilities resulting from TARGET2 transactions
This item has already been dealt with in the earmarkable asset side.

(e') Net intra-Eurosystem liabilities related to the allocation of euro banknotes within the Eurosystem

This item has also already been dealt with in the earmarkable asset side.

6. Some methodological results

The Eurosystem's monetary income is the result of each NCB pooling their interest income and expenses associated with monetary policy operations or the functioning of the payment system. This pooled monetary income is then shared/allocated according to each respective NCB's capital key. There will be a redistribution if either a composition and/or an income effect are present. A

composition effect indicates that the weight of a specific earmarkable asset or liability for a single NCB weighs on the Eurosystem aggregate above or below capital key. By contrast, an income effect is indicative that the interest rate of a specific asset or liability differs among NCBs. In absence of a composition and/or income effect, whatever monetary income a NCB transfers to the Eurosystem corresponds to the amount it will receive in return.[27] There is in fact a relevant case related to a monetary policy operation in which the two effects are not present so that no effective redistribution takes place, namely:

(i) Pooling revenues on public securities – when based, as stipulated for a APP and PEPP, on a uniform interest rate and their purchases following a k-key asset composition – does not generate neither a composition nor an income effect. Since the process of pooling and reallocating is ineffectual, de facto each NCB does retain the whole actual income obtained from the domestic public securities bought according to its capital key share of QE. This result is perfectly consistent with the non-risk sharing feature of public sector purchases by the NCBs under the said programs.

There are two other important cases related to the functioning of the payment system in which the exercise of pooling and redistributing local P&L has important effects on NCBs' P&L, but nil effects on monetary income, that is not clearly interpretable through composition nor via income effects:

(ii) The pooling of TARGET2 local losses by some NCB and of their mirror profits by the other NCBs. This is such that the net contribution of T2 to Eurosystem monetary income is zero and there is nothing to redistribute. Moreover, for each NCB the pooling of the T2 losses and profits incurred during the year erase any trace of these payments in local P&L accounts (that is T2 P&L mattered for the initial net interest income, item 1 of Table 1, but not for final profits, item 11). This implies that de facto there are no penalties on T2 liabilities (and symmetrically, no rewards for T2 claims).

(iii) The issuance of banknotes in violation of capital keys (in a sense interpretable as a composition effect). This is 'punished' (over issuance) or 'rewarded' (under issuance) but – similar to TARGET2 imbalances – does not present any final consequences either on the aggregate monetary income and (after pooling) on the NCBs' local P&L accounts. Also in

[27] An interest deducted or paid on the 'GAP' between earmarkable assets and the liability base also contribute to each NCB's pooled monetary income.

this case, de facto there are no penalties on banknote over issuance (and no symmetric profits on under issuance).

Conversely, regarding other monetary policy operations:

(iv) A composition effect is present with an asymmetric resort to refinancing operations by NCBs, either at negative or positive interest rates;

(v) A composition effect is also present with regard to the reserves held in a deposit facility, either at negative or positive interest rates;

(vi) Finally, the outright purchase of corporate bonds presents an income effect. This is consistent with the risk-sharing components of APP and PEPP.

In these last three cases there is an effective sharing and redistribution after the pooling of local P&L. Pooling and sharing of monetary income modifies the initial net interest income of a NCB (item 1 of Table 1). The above methodological exploration of a still rather unknown aspect of the Eurosystem's architecture is relevant for the ongoing debate on the current costs of the deposit facility for NCBs, costs that are indeed pooled through monetary income.

It is in fact helpful to dissipate ambiguities or fill some omissions regarding monetary income in some contributions to the debate. A study for the International Monetary Fund (Belhocine et al, 2023, p. 10), [28] for instance, seems to believe that the pooling of income on government securities held for monetary purposes is somehow effective (as if this income disappears in a common pot and nothing comes back):

> "NCBs retain income on their holdings of national public debt to the extent that the actual rate of return exceeds the "reference rate," currently defined as the MRO rate. An amount calculated by applying the reference rate is remitted to the ECB for pooling and redistribution irrespective of whether the actual rate of return exceeds or falls short of the reference rate. Among the top-five NCBs, Banca d'Italia and Banco de España enjoy the largest excess of actual rates of return on their national public debt holdings over the reference rate; the Bundesbank, in contrast, retains essentially nothing. Income on supranational, institutional, and most private sector debt is fully pooled."

To this end, the authors argue that in the case of Bank of Italy: "To offer one example of the impact of these rules, Banca d'Italia does not benefit from the full gross income on its Italian sovereign

[28] Galli e Neri (2023, p. 12), Baglioni (2023, p.9, fn 10) and Cecchetti and Hilscher (2024, p. 27) rely on Belhocine et al. (2023) as a correct interpretation regarding the pooling and allocation of monetary income within the Eurosystem.

bondholding: it may only retain actual income less an amount calculated at the MRO rate" (ibidem). These passages clearly miss that, at least in the case of non-shared risky assets, whatever amount NCBs pool, the identical amount is returned to them (see section 2 above), and NCBs retain the entire actual revenues from their share of QE. This may solve the puzzle of Baglioni (2024) who wonders why NCBs share the income on government securities bought in APP and PEPP, but not the risk. He is correct when he argues that: "The bottom line is that the internal rules of the Eurosystem imply that the income from the securities, held for monetary policy purposes, is pooled (up to the MRO rate) among the NCBs, while the related risk is mostly not shared" (2024, p. 14). Our analysis has shown that that the income (at a conventional rate) over non-risk sharing securities is pooled and redistributed, and eventually neither risk nor profits are shared (both a composition and an income effect are indeed absent). Only pooled income (at the actual rate) from risk sharing bonds leads to a redistribution of revenues given the presence of an income effect.

Analogous ambiguities concern interest income related to TARGET2 imbalances. Some authors like Sonnenberg (2023) seem to believe that monthly interest payments made or received by NCBs on their respective T2 liabilities and claims are the last word, thus neglecting that they are rendered ineffective by the pooling of related profits and losses in monetary income. Belhocine et al. (2023, p. 12) are very ambiguous on this issue just remarking that "little attention was paid to their remuneration [of T2 claims and liabilities], for the simple reason that the reference rate is the MRO rate, and the MRO rate was zero": In the light of the above, TARGET2 imbalances have, after pooling, a nil impact on NCB final profits (or losses).

All in all, although the net monetary income received as reported in the P&L accounts of NCBs is a relative small item, it plays a relevant role in the de facto removal of huge inter-NCB interest flows related to TARGET2 imbalances (and to the uneven allocation of banknotes), and softens the impact on a single NCB of specific monetary and interest rate policies. When policy interest rates are relatively high, like in the present environment, this last redistributive role may be significant.

To substantiate the last assertion, in the penultimate section we outline a preliminary interpretation of the patterns of monetary income pooled by (and redistributed to) three main NCBs in the last decade more or less. This will also contribute to assess the ongoing controversies regarding the costs of excess reserves where the process of pooling involves other items.

7. Monetary income: a birds-eye glance at the Bundesbank, Bank of Italy and Bank of Spain

In this section we sketch a preliminary and impressionistic analysis of the dynamics of monetary income for the years 2015-2023. We especially focus on the North-South redistributive flows by considering data from three representative NCBs (Bundesbank, Bank of Italy and Bank of Spain). In view of present debates, we shall also look at the financial flows from/to commercial banks over this period. Tables 10-12 present some selected data from the P&L accounts of the aforementioned NCBs.

Table 10: Bundesbank – selected data from the P&L accounts (millions of euro)

		2015	2016	2017	2018	2019	2020	2021	2022	2023
1	**1. Net interest income**	2,299	3,319	4,172	4,920	4,643	2,870	2,501	3,954	– 13,907
2	**1.1. Interest income**	3,260	3,704	5,174	6,161	5,936	5,473	7,319	12,077	55,053
	of which									
	Publ. bonds related to mon. policy:									
4	*SMP*	1,684	1,366	1,091	884	614	350	142	3	1
5	*PSPP*	-11	-78	-258	-35	113	-150	524	2,295	2,011
6	*PEPP*	0	0	0	0	0	-386	-1,221	-374	509
7	Refinancing operations:	40	0	0	0	0	0	0	0	5,018
8	*(LTRO)*	0	0	0	0	0	0	0	0	0
9	Intra Eurosystem claims (TARGET2)	279	63	0	0	0	0	0	7,298	41,653
10	Bank deposits (a)	248	1,047	2,174	2,448	2,366	2,726	4,756	0	0
11	**1.2. Interest expenses**	-962	-386	-1,002	-1,241	-1,293	-2,603	-4,818	– 8,124	– 68,960
	of which									
12	Refinancing operations (b)	0	54	328	330	338	1,773	4,003	2,045	0
13	Bank deposits (RR+DF)	0	0	0	0	0	0	0	2,942	41,066
14	Intra Eurosystem claims (Banknotes)	142	31	0	0	0	0	0	3,035	20,454
15	**5. Net monetary income** (15=17-16) (c)	133	25	-389	-170	-138	-779	-1,179	-2,204	-5,182
16	5.2 Monetary income pooled	2,160	2,508	3,146	3,381	3,115	1,903	1,528	4,096	15,838
17	5.1 Monetary income received	2,293	2,533	2,758	3,211	2,977	1,124	349	1,893	10,656
18	**11. Final profits** (d)	2409	2,713	3,077	3,990	4,325	-2,424	1,339	-1,144	-21,580
19	Financial buffers	-780	2,314	1,175	1,557	-1,526	-2,424	1,339	-1,144	-21,580
20	*To the State (20=18-19)* (e)	3,189	399	1,902	2,433	5,851	0	0	0	0
21	*P&L with commercial banks (21=7+10-12-13)*	288	993	1,846	2,118	2,028	953	753	-4,987	-36,048

Notes: (a) Bank deposits generate a revenue for the CB when they pay a negative interest rate. (b) Refinancing operations generate a negative revenue for the CB when conducted at negative rates (e.g. TLTRO until late 2022). (c) It includes minor figures concerning the recalculation of amounts of previous years. (d) Final profits are gross of financial buffers. A negative figure stands for a loss. (e) Distributable profits

Source: DB Annual accounts; Sabine Mauderer, press conference presenting the DB 2023 Annual Report, Frankfurt, February 2024

Table 11: Bank of Italy – selected data from the P&L accounts (millions of euro)

		2015	2016	2017	2018	2019	2020	2021	2022	2023
1	**1. Net interest income**	5,436	6,095	6,944	8,330	8,595	7,667	7,262	5,787	-5,675
2	**1.1. Interest income**	5,569	6,384	7,904	9,079	9,534	9,980	11,453	12,991	27,479
	of which									
	Publ. bonds related to mon. policy:									
4	*SMP*	1,188	995	856	734	563	349	173	49	33
5	*PSPP*	358	1,427	2,845	3,870	4,393	4,971	5,535	6,517	8,124
6	*PEPP*	0	0.0	0.0	0.0	0.0	468	997	1,746	3,224
7	Refinancing operations:	139	2	0	0	0	0	0	2	7,831
8	*(LTRO)*	132	0	0	0	0	0	0	0	7,702
9	Intra Eurosystem claims (Banknotes)	19	4	0	0	0	0	0	336	2,107
10	Bank deposits (a)	1.0	43	267	293	223	244	925	451	0
11	**1.2. Interest expenses**	-133	-288	-960	-749	-939	-231	-4,191	-7,204	-33,151
	of which									
12	Refinancing operations (b)	0	243	908	661	837	2,273	4,166	2,040	0
13	Bank deposits (RR+DF)	0	0	0	0	0	0	0	872	7,850
14	Intra Eurosystem claims (TARGET2)	102	27	0	0	0	0	0	3,922	22,769
15	**5. Net monetary income** (15=17-16) (c)	170	723	1,233	1,234	1,373	1,755	2,243	2,380	-1,139
16	5.2 Monetary income pooled	1,403	1,010	641	765	553	-1,016	-2,034	-1,162	7,999
17	5.1 Monetary income received	1,571	1,733	1,887	2,135	1,916	734	199	1,213	6,869
18	**Final profits** (d)	6,015	6,916	8,378	8,895	10,756	10,196	9,181	5,860	-7,125
19	*Financial buffers*	2,200	2,920	2,920	1,500	1,500	2,500	2,000	2,500	-5,600
20	*To the State* (e)	3,174	3,466	4,928	6,865	8,876	7,315	6,801	2,980	-1,725
	20-(4+5+6)	1,628	1,044	1,227	2,261	3,920	1,527	96	-5,332	-13,106
21	*P&L with commercial banks*	140	-198	-641	-368	-614	-2,029	-3,241	-2,459	-19
	(21=7+10-12-13)									

Notes: (a) Bank deposits generate a revenue for the CB when they pay a negative interest rate. (b) Refinancing operations generate a negative revenue for the CB when conducted at negative rates (e.g. TLTRO until late 2022). (c) It includes minor figures concerning the recalculation of amounts of previous years.
(d) Final profits = Gross profits. Data taken from the main text of Bank of Italy's Annual Accounts. (e) To the State = (Taxes + Net profits to the State).
Source: Bank of Italy, *Annual accounts*.

Table 12: Bank of Spain – selected data from the P&L accounts (millions of euro)

		2015	2016	2017	2018	2019	2020	2021	2022	2023
1	**1. Net interest income**	4,061	4,548	5,062	6,055	6,100	4,638	4,369	4,190	-8,901
2	**1.1. Interest income**	4,179	4,774	5,725	6,768	6,764	6,352	7,240	9,938	18,627
	of which									
	Publ. bonds related to mon. policy:									
4	*SMP*	971	848	752	639	497	358	194	73	57
5	*PSPP*	407	1,514	2,471	3,227	3,319	3,855	3,855	5,101	4,351
6	*PEPP*	0	0	0	0	0	300	300	810	1,023
7	Refinancing operations:	112	1	0	0	0	0	0	0	2,147
8	*(LTRO)*	100	0	0	0	0	0	0	0	2,129
9	Intra Eurosystem claims (Banknotes)	39	9	0	0	0	0	0	1,008	6,933
10	Bank deposits (a)	0	32	242	397	352	383	1,011	686	0
11	**1.2. Interest expenses**	-118	-226	-663	-713	-664	-1,715	-2,871	-5,748	-27,528
	of which									
12	Refinancing operations (b)	0	185	636	675	623	1,696	2,863	1,454	0
13	Bank deposits (RR+DF)	3	0		0	0	0	0	1,216	8,160
14	Intra Eurosystem claims (TARGET2)	112	28	0	0	0	0	0	2,771	16,146
15	**5. Net monetary income** (14=17-16) (c)	-90	220	528	606	474	832	1,092	1,353	3,147
16	5.2 Monetary income pooled	1,220	1,024	818	958	888	-249	-935	-497	1,668
17	5.1 Monetary income received	1,128	1,244	1,355	1,533	1,354	516	140	851	4,821
18	**11. Final profits** (d)	3,618	4,593	5,017	5,914	6,461	5,249	5,064	3,995	-6,629
19	Financial buffers	1,348	2,968	3,141	3,715	4,209	3,114	3,279	1,592	-6,629
20	***To the State 20=18-19*** (e)	2,270	1,625	1,876	2,199	2,252	2,135	1,785	2,403	0
21	*P&L with commercial banks (21=7+10-12-13)*	110	-152	-394	-279	-271	-1,313	-1,852	-1,984	-6,013

Notes: (a) Bank deposits generate a revenue for the CB when they pay a negative interest rate. (b) Refinancing operations generate a negative revenue for the CB when conducted at negative rates (e.g. TLTRO until late 2022). (c) It includes minor figures concerning the recalculation of amounts of previous years. (d) Final profits are gross of financial buffers. A negative figure stands for a loss. (e) Distributable profits

Source: BdE, Annual accounts.

As is widely known, 2015 to mid-2022 was characterised by a zero rate on the MRO, a negative rate on the DF interest rate policy, and by an aggressive balance sheet policy (Rostagno et al., 2021). On the one hand, negative interest rates on excess liquidity produced an interest income for NCBs. On the other hand, this was accompanied by increasing interest expenses due to the negative rates on longer term refinancing operations (this cost was particularly acute between 2020 and mid-2022 when seeking recourse to ECB credit by banks was particularly attractive).

Over this period, the Bundesbank (Table 10) mostly incurred a negative net monetary income following the pooling and allocation process, while net monetary income was instead positive for the other two NCBs (Tables 11 and 12). In this same period, interest payments on T2 imbalances (despite T2 imbalances increasing) and on under/over-issuance of banknotes had a negligible or nil role, given that i_{MRO} was zero (the reader should recognise by now that, whatever the level of i_{MRO}, the net impact of TARGET2 on the P&L account, once considered monetary income, is eventually zero). The reader will as well acknowledge that interest revenues on the no risk-sharing public securities purchases programs will not lead to any redistribution. The mentioned pattern of monetary income was the likely result of a relatively larger resort of southern banks to TLTRO operations (bringing interest expenses to southern NCBs), and of the modalities of APP and PEPP that generated abundant reserves in some northern jurisdictions (thereby producing interest

revenues to northern NCBs). Through the pooling and reallocation of interest costs and revenues, this double movement generated a north to south NCB monetary income redistribution.

Line 21 of Tables 10-12 provides a rough indication of the net interest flows over the period between the local commercial banks and their respective NCBs.[29] Because of the reasons provided in the previous paragraph, during the period 2015 to mid-2022 the net interest flow was favourable to the Bundesbank vis-à-vis domestic banks, whereas for the two southern NCBs the interest flow was favourable to local banks.

Things changed radically with the rise of interest rates from mid-2022. NCB revenues from refinancing operations returned in 2023 to positive territory, particularly for the Bank of Italy given the larger resort of local banks to TLTROs. The costs of excess reserves held in the deposit facility also became exorbitant. This outcome sparked off the debate regarding the fiscal costs of the ample reserve regime (as noted earlier in the paper). Costs regarding net transfers to banks (as shown in the last line in Tables 10-12) have been particularly onerous for the Bundesbank, modest for the Bank of Spain, and negligible for the Bank of Italy (where recourse to TLTRO was extensive).

With respect to the result of pooling and allocation via monetary income of the high DF expenses (especially for the Bundesbank) and of the TLTRO revenues (particularly for the Bank of Italy) from mid-2022, NCB monetary income was redistributed from the south to the north, at least for Italy, albeit not for Spain, which had an amount of reserves closer to its capital key.[30]

As explained above, with regard to T2 imbalances and the misallocation of banknotes, the process by which monetary incomes are pooled and allocated has the function, de facto, of cancelling out profits or losses from the NCBs' P&L accounts on these items. The reallocation was, in a sense, unfavourable to the Bundesbank, partially mitigated by a reallocation of monetary income in its favour due to the high interest expense on its over-issuance of banknotes.

Despite sharing with the Bundesbank the high costs of excess reserves, the pooling of expenses associated with T2 liabilities, as well as the already mentioned volume of reserves held in the deposit facility, maintained the Bank of Spain's net monetary income in positive territory. Although the Bank

[29] This is a rough indicator since the local interest income and expenses for the NCBs are then pooled and reallocated through monetary income (while of course symmetric income and expenses for commercial banks would not change).

[30] Table 3 above shows that in 2023 the Bank of Italy entered in its P&L account a final loss, after pooling and reallocation, concerning the deposits of banks of €14,123 million, a figure larger than its initial loss of €7,850. The Bank of Spain reported a final loss €7,263 against an initial loss of €8,160 (Bank of Spain, 2024, p. 64).

of Italy shared with Spain a large debtor position in terms of T2, a relatively low amount of pooled expenses on bank reserves plus a conspicuous 'GAP' brought Italian net monetary income for the first time into negative territory.[31] Further, while remaining muted for the Bank of Italy, net transfers to banks (line 23) accelerated in the last two years for the Bank of Spain and especially for the Bundesbank. All in all, European banks have been, nevertheless, net winners vis-à-vis their respective NCBs (in the sense that recent times have more than compensated for the less 'advantageous' years – i.e. from 2015 to mid-2022).[32]

All this considered, both the Bundesbank, the Bank of Italy and the Bank of Spain have witnessed their final profits (line 18) worsening the initial net interest income (i.e. pre-pooling, line 1; see also Table 1). To this end, in 2023 all NCBs resorted to their accumulated financial buffers to bring transfers to the State to zero (Bundesbank and Bank of Spain), that remain negative for the Bank of Italy once after a negative tax contribution is considered.[33] Both in 2021 and 2022 for which Bundesbank data are also available, the Bank of Spain and the Bank of Italy appear to have pursued, in continuity with previous years, a quite prudential financial provision policy compared to Frankfurt.

Regarding profit transfers to the State (line 20), over most of the period considered all NCBs posted favourable results, predominantly as a result of APP and PEPP policies; the Bundesbank and the Bank of Italy could return to the State the interest income earned on the purchased securities, neutralising the de facto fiscal costs associated with this portion of public debt (though not the Bank of Spain, with part of the difference funding financial buffers and another part its net balance with banks). Nonetheless in the last two years, such transfers to the government have dramatically shrunk and negative transfers have been avoided (but not for the Bank of Italy) so far by NCBs eroding their accumulated financial buffers, as noted above. Considering NCBs as part of the consolidated public sector, this erosion equates nonetheless to an overall loss of public net wealth (Cecchetti and Hilscher 2024, p. 6). The major factor underpinning this result has to do with the impressive remuneration of the large stocks of excess reserves, which monetary income has spammed over all

[31] This high GAP was possibly due to a high value of ANFA (see footnotes 12 and 14 above). The 'Annual average Net Financial Assets according to ANFA' in 2023 was (in EUR billion) €111.0 for Italy, €-124.0 for Germany, €-22.5 for Spain (source: ECB).

[32] Italian banks are an exception in 2023 because of their modest stock of excess reserves.

[33] Final (gross) profits for the Bank of Italy were €-7,125 million in 2023. The tax deduction for the bank was €2,340 million and recourse to financial buffers €5,600 million. We thereby obtain a net (positive) profit of €815 million most of which the Bank of Italy transferred to the Treasury. However, without the negative tax, net profits would have been € -1,525 as indicated in Tables 1 and 10.

NCBs determining some not irrelevant subsidies from some NCBs to the banking system of other jurisdictions.

8. Conclusion

This paper has shown the nature, composition and rationale behind the process by which monetary incomes are pooled and subsequently allocated between Eurosystem NCBs, which thus far has been an almost unknown element of Euro area monetary governance. Our contribution will be helpful to dissipate many ambiguities/omissions present in some recent papers that have touched this topic upon with regard to, for instance, presumed interest payments associated with TARGET2 imbalances and to the uneven issuance of euro banknotes. Analogously, we also shed light on related ambiguities, namely surrounding the pooling of interest income from securities purchased during the course of various large-scale asset purchase programmes. Moreover, the paper has clarified questions concerning the pooling and reallocation of interest income and expenses associated with refinancing operations and excess reserves. This last aspect has a direct impact on the ongoing debate over the exorbitant fiscal costs of excess reserves in the Euro area (and elsewhere), which has so far been omitted a full discussion as to the role of how Eurosystem NCB monetary income's are pooled and allocated. While postponing a complete policy discussion of this issue, we may argue here that once the pooling and allocation of monetary income is given full consideration, the uneven costs of excess reserves due to their irregular distribution in the Euro area brings about a south to north redistribution, as anticipated in Cesaratto (2023) and argued by Baglioni (2024). We also show that negative interest rates on excess reserves inflicted on banks in the last decade cannot justify the present huge remuneration which is currently leading to the depletion of NCBs accumulated financial buffers. Taking into account that banks benefited in the same period by negative rates on refinancing operations, a preliminary glance of the data confirms that the present net transfers to banks is not justified at least from this point of view. Indeed, how to reconcile a monetary policy regime based on ample reserves while simultaneously minimising the fiscal implications of excess reserves is still an open and challenging question.

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