

Seigniorage and central bank profits: searching for an alternative approach, and monetary developments of the recent past

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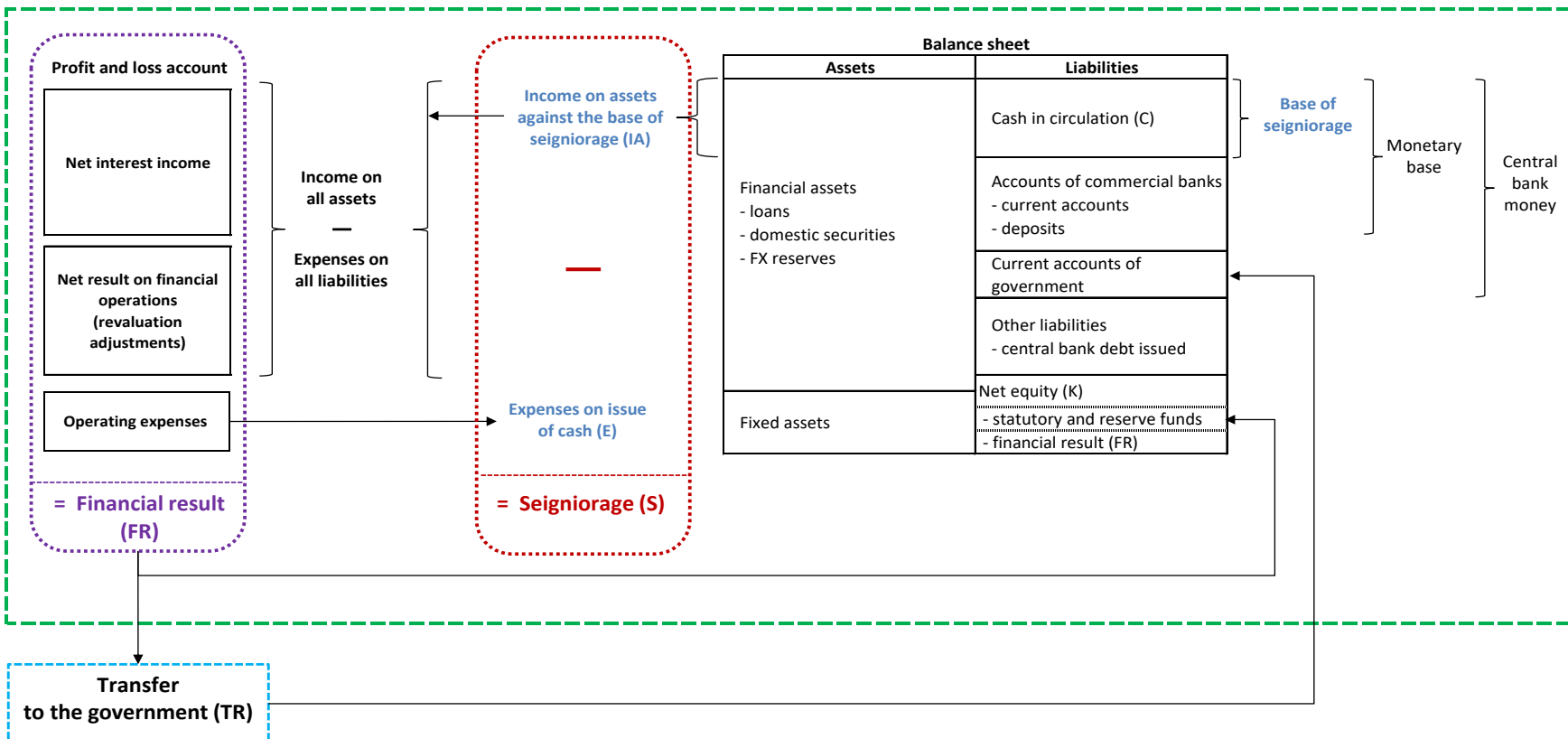
1. Motivation and research questions

- We started working on seigniorage roughly 10 years ago. Why? Initial (naive?) motivation:
 - often not very intuitive (oversophisticated and nontransparent) definitions
 - size of seigniorage – how large?
- Seigniorage is income stemming from currency issuance (currently it is an unobservable variable; simply part of central banks' – CBs' – total financial results)
- We seek to understand the nature of seigniorage in the context of the credit-based system in the world of developed financial markets
- Questions:
 - what is modern-day seigniorage?
 - what is its importance, together with CBs' profits, for the overall macroeconomic policy?
 - how were seigniorage and CBs' profits affected by recent (i.e., until 2019) monetary developments related to the use of unconventional monetary instruments?

2. Model of seigniorage creation and distribution: a CB balance sheet perspective

- Six simple accounting-based equations (next slide), derived from CB's balance sheet and its financial result

CB finances and the creation and distribution of seigniorage and financial results



Seigniorage:

- outcome of the workings of CB finances
- fully booked in the CB's financial result (no so-called "quasi-fiscal activities")
 - CBFi assumed
- linked to cash in circulation ("base of seigniorage"), which is entirely issued by the CB, i.e., including coins (cash-based definition of seigniorage)

2. Model of seigniorage creation and distribution: the six equations

- Creation

$$FR = S + OI \quad (1)$$

$$S = IA - E \quad (2)$$

- Distribution

$$FR = \Delta K + TR \quad (3)$$

$$TR = pr \cdot FR \quad (4)$$

$$pr = TR/FR \quad (5)$$

$$FS = TR/S \quad (6)$$

Symbols:

FR - financial result

S - seigniorage

OI - other CB net income

IA - income on assets against CB liabilities in the form of cash

E - expenses of a CB resulting from cash issuance

ΔK - amount transferred to CB's capital (net equity)

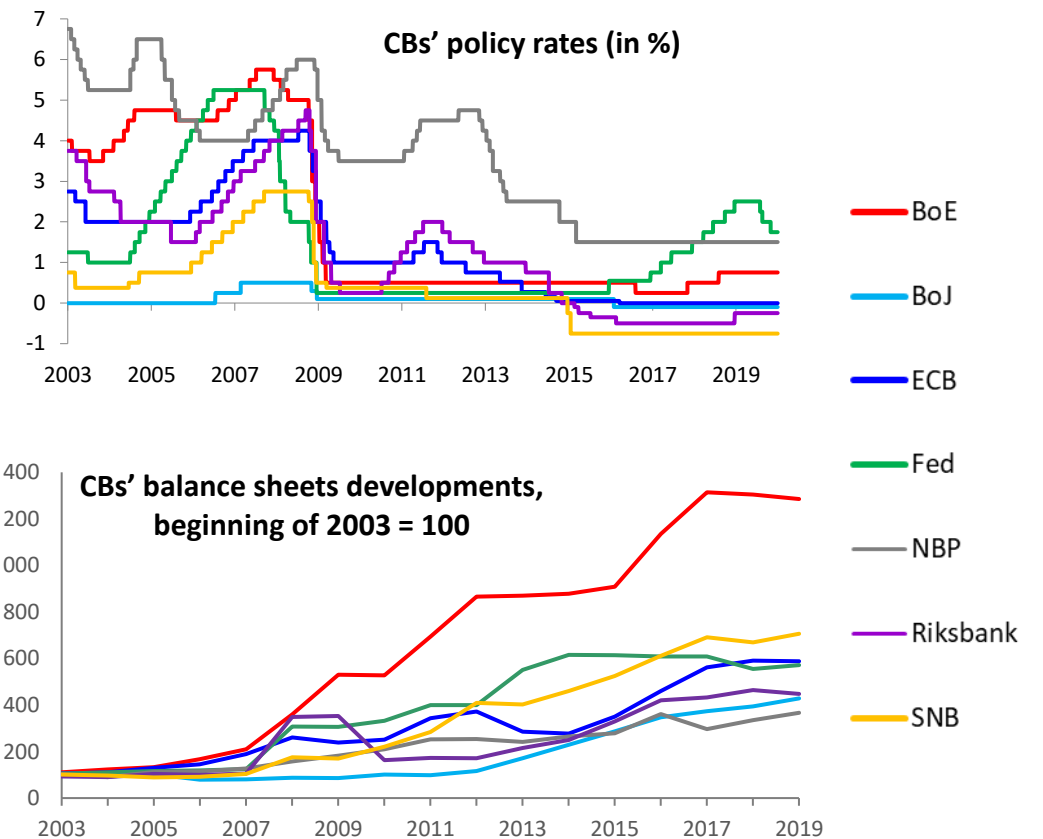
TR - amount transferred by the CB to the government

pr - payment ratio

FS - fiscal seigniorage

3. Some preliminary issues

- Understanding of “unconventional policies”
 - zero and negative nominal interest rate policies (ZIRP and NIRP, respectively)
 - expanded lending operations
 - asset purchase or “quantitative easing” (QE) programs
 - forward guidance (not considered)
- Additional aspects of CBs’ finances
 - composition of balance sheets and the structure of income statements
 - accounting framework (policies/principles)
- Seigniorage estimation technique
 - own database produced

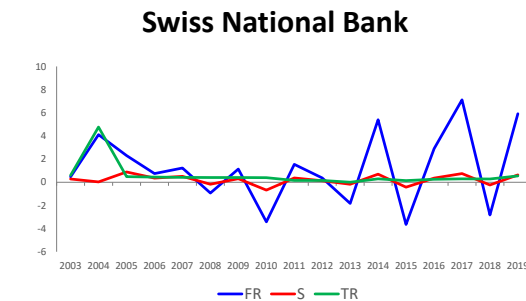
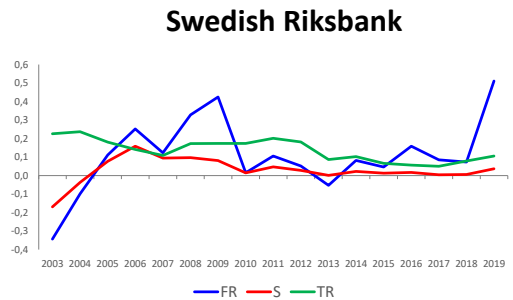
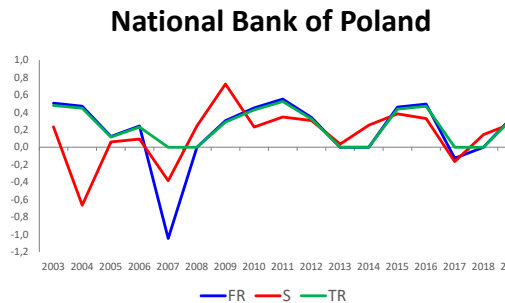
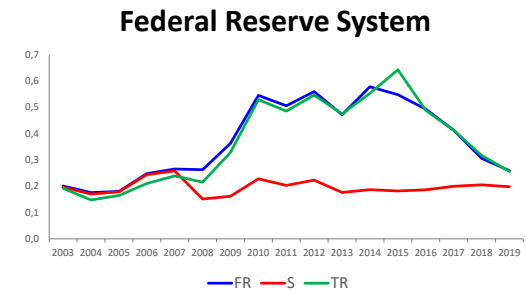
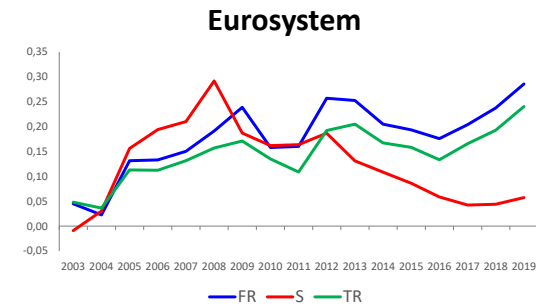
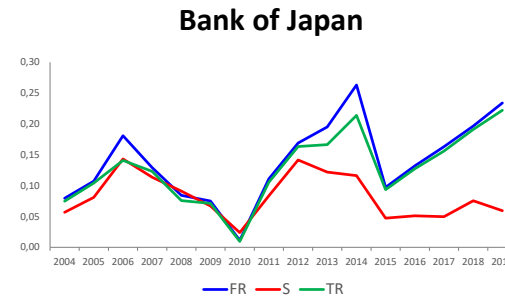
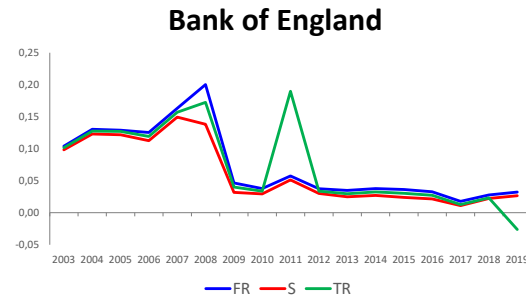


Estimates of seigniorage – 4 steps:

- 1) actual total income on all CB assets is calculated
- 2) the share of liabilities due to cash (banknotes) in circulation in the balance sheet total is determined
- 3) the income from assets calculated in the first step is multiplied by the share of liabilities from the issuance of cash in the balance sheet as calculated in the second step
- 4) the result obtained is diminished by the expenses on cash production = our estimate of seigniorage

4. Main results: intro

- **Analyzed CBs:**
 - euro area (ECB)
 - Japan (BoJ)
 - Poland (NBP)
 - Sweden (Riksbank)
 - Switzerland (SNB)
 - United Kingdom (BoE)
 - US (Fed)
- **Time span:**
 - 2003-19
 - with two subperiods:
 - before GFC: 2003-7
 - 2008-19
- **Results in % of GDP (mostly)**



Symbols:

- FR - financial result (in the case of the SNB distributable annual result)
- S - estimated seigniorage
- TR - transfer to the government (in the cases of the CBs of Belgium, France, Japan, the Netherlands, Portugal, Slovakia and the United Kingdom also includes paid income tax)

4. Main results: seigniorage and CBs' profits creation

All 7 CBs	2003-19	2003-7	2008-19	Change in p.p.
Financial result	0.3258	0.3497	0.3161	-0.0336
Seigniorage	0.1218	0.1222	0.1216	-0.0006
Other income	0.2040	0.2275	0.1945	-0.0330

4 CBs from larger economies	2003-19	2003-7	2008-19	Change in p.p.
Financial result	0.1924	0.1421	0.2123	0.0702
Seigniorage	0.1166	0.1383	0.1081	-0.0302
Other income	0.0758	0.0039	0.1043	0.1004

3 CBs from smaller economies	2003-19	2003-7	2008-19	Change in p.p.
Financial result	0.5010	0.6126	0.4545	-0.1581
Seigniorage	0.1285	0.1018	0.1396	0.0378
Other income	0.3725	0.5109	0.3148	-0.1961

- **Annual seigniorage flow typically amounted to less than 0.4% of GDP (after 2007 continued to be roughly on the same level as in the subperiod 2003-7)**
- **Financial results are positive and larger than seigniorage ($FR > S$). Since 2008 growing divergences between S and FR have been observed, which translated into a diminishing share of S in CBs' FR (except for the NBP)**
 - CBs' profits creation and their tendency to nominal increase, given the declining rates of return, was above all possible due to the strong growth of the size of CBs' balance sheets
 - seigniorage is still an important economic variable underlying CBs' profit formation
- **CB from the smaller economies are a distinct group** (FX reserves and open positions!)
- **Main factors influencing the size of S and CBs' FR :**
 - total size of the balance sheet
 - stock of cash
 - rate of return on CBs' assets

Main factors shaping seigniorage and financial results' developments in CBs, 2008-2019 vs 2003-2007	4 CBs from larger economies				3 CBs from smaller economies		
	BoE	BoJ	ECB	Fed	NBP	Riksbank	SNB
1. Size of balance sheet (BS)	+	+	+	+	0	+	+
2. Cash (C)							
2.1. Volume (C/GDP)	+	+	+	+	+	-	+
2.2. Ratios:							
2.2.1. C/BS	-	-	-	-	0	-	-
2.2.2. C/MO	-	-	-	-	0	-	-
3. Rate of return on CB assets	-	-	-	-	+	+	-
3.1. Main policy interest rate	-	-	-	-	-	-	-
3.2. Risk premia	+	+	+	+	0	+	+
3.3. Impact of the exchange rate	0	0	0	0	+	+	-
3.3.1. Gold price	0	0	0	0	0	0	-

Legend: "0" – no major change (neutral factor), "+" – increased impact (positive factor), "-" – decreased impact (negative factor).

4. Main results: seigniorage and CBs' profits distribution

Average transfers to the government by the CBs:
2003-7 vs 2008-19

CB	2003-19	2003-7	2008-19	Change in p.p.
BoE	0.07/0.38 ^a	0.13	0.05/0.48 ^a	-0.08/0.35 ^a
BoJ	0.13	0.11	0.13	0.02
ECB	0.15	0.09	0.17	0.08
Fed	0.36	0.19	0.44	0.25
NBP	0.24	0.25	0.23	-0.02
Riksbank	0.14	0.18	0.12	-0.06
SNB	0.59	1.34	0.28	-1.06
Average ^b				
- larger economies ^c	0.26	0.13	0.31	0.18
- smaller economies	0.32	0.59	0.21	-0.38

^a Numbers on the right side include remittances by the BEAPFF to the government.

^b Calculated as arithmetic mean.

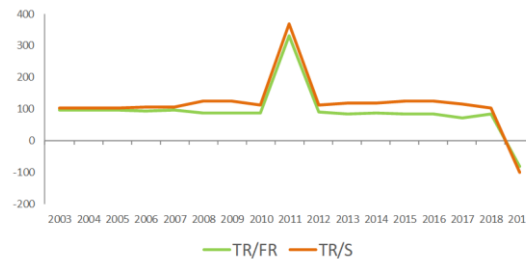
^c In the case of the BoE, the BEAPFF remittances to the government are included.

Symbols:

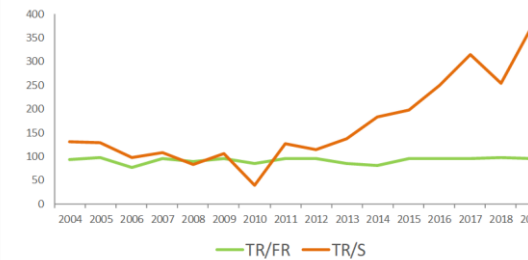
TR/FR - payment ratio (equation 5)

TR/S - fiscal seigniorage (equation 6)

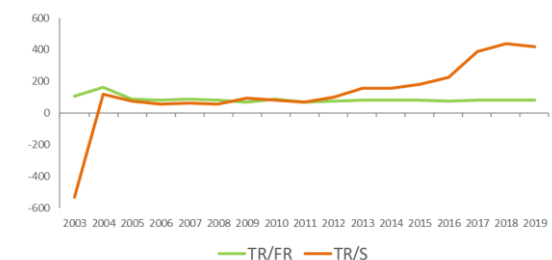
Bank of England



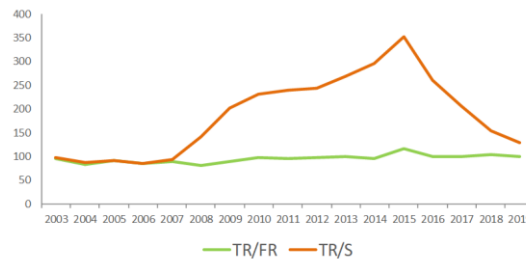
Bank of Japan



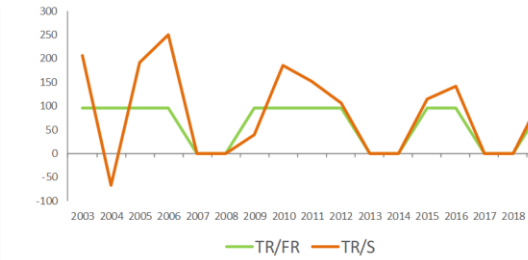
Eurosystem



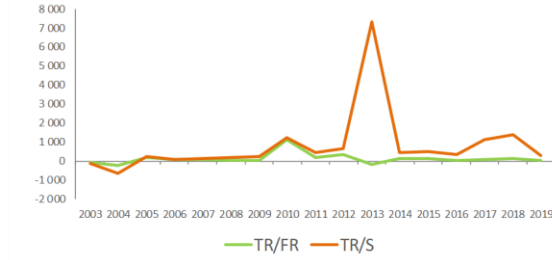
Federal Reserve System



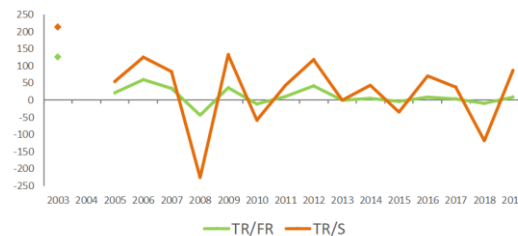
National Bank of Poland



Swedish Riksbank



Swiss National Bank



- In the longer run seigniorage was entirely transferred to the state budget
- Average fiscal seigniorage ratio was above 100%, with the tendency to increase in the second subperiod
- A major part of CBs' profits originate from other activities than the issue of cash („OI" variable), after 2007 increasingly reflecting assets expansion resulting from QE operations
- In the 4 larger economies, a surge of average CBs' transfers to governments was observed mainly due to conducted QE (principally reflecting the return of their interest payments made earlier to CBs)
- Different situation of the 3 CBs from the smaller economies – average transfers to the government were smaller after 2008 than in the preceding subperiod

5. Further research: three main topics

- Covid-19 and CBs' seigniorage, financial results, and transfers to the government
 - expansion of QE operations
 - negative (or low) interest rate policy (ZIRP and NIRP)
 - decreasing yields
 - growing cash issuance (except of Sweden)
- CBs' exit policies and their possible impact on future seigniorage, financial results and transfers
 - growing interest rate risk of CBs' balance sheets
- Central Bank Digital Currency (CBDC) and seigniorage
 - CBDC as legal tender
 - role of cash

Thank you!
All comments are welcome!

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