Jan Pieter Krahnen

Target Balances and Financial Crises

SAFE Policy Letter No. 71 | January 2019

SAFE | Sustainable Architecture for Finance in Europe
A cooperation of the Center for Financial Studies and Goethe University Frankfurt

House of Finance | Goethe University
Theodor-W.-Adorno-Platz 3 | 60323 Frankfurt

Tel. +49 69 798 33684 | Fax +49 69 798 33910
policy_center@safe.uni-frankfurt.de | www.safe-frankfurt.de

Target Balances and Financial Crises*

A reply to Fuest and Sinn (2018)
Jan Pieter Krahnen, Goethe University Frankfurt, SAFE and CEPR

22 January 2019

Abstract

Recently, Fuest and Sinn (2018) have demanded a change of rules for the Eurozone's Target 2 payment system, claiming it would violate the Statutes of the European System of Central Banks and of the European Central Bank. The authors present a stylized model based on a set of macroeconomic assumptions, and show that Target 2 may lead to loss sharing among national central banks (NCBs), thus violating the no risk-sharing requirement laid out by the Eurosystem Statutes.

In this note, I present an augmented model that incorporates essential features of the micro- and macroprudential regulatory and supervisory regime that today is hard-wired into Europe's banking system. The model shows that the original no-risk-sharing principle is not necessarily violated during a financial crisis of a member state. Moreover, it shows that under a banking union regime, financial crisis asset value losses at or below the 99.9th percentile are borne by private investors, not by taxpayers, and particularly not by central banks.

Therefore, policy conclusions from the micro-founded model differ significantly from those suggested by Fuest and Sinn (2018).

I. Introduction

In a recent paper, Sinn and Fuest (2018) examine a „self-liability requirement", i.e. the no-risk-sharing requirement, which, according to these authors, is enshrined in the Statutes of European System of Central Banks (ESCB) and of the European Central Bank (ECB) defining the mandate and the operations of the European Central Bank. As a result, monetary claims between the ECB and individual National Central Banks (NCBs), like money creating loans and Target balance surpluses or deficits, carry an interest cost, at the level of the prevailing refinancing rate, which the NCB as the borrower has to pay to the ECB as the lender. The refinancing rate is the main monetary policy instrument, and is therefore likely to reflect current market conditions. The profits from the operation of the central banks involved are cumulated and then distributed to the NCBs according to

* SAFE policy papers represent the authors' personal opinions and do not necessarily reflect the views of the Research Center SAFE or its staff.

their respective shares in ECB capital. The refinancing rate is risk insensitive by definition, in agreement with the no risk-sharing postulate already mentioned.

Fuest and Sinn then analyze the merit of the no risk-sharing assumption. Based on a stylized model of a banking crisis in one country belonging to the monetary union, the authors show that adherence to Target payment system rules may lead to real losses on the side of Target creditor countries. More specifically, in case of a financial crisis in one country, the respective NCB may be be unable to remit additional interest payment owed; where those payments are due to newly generated Target balances following, e.g., capital flight from that country.

The inability to access further cash implies a default of the NCB, inflicting a purchasing power loss on all other NCBs in the monetary union, where loss allocation follows the ECB capital key. Thus, the no risk-sharing assumption is violated and rules of the Statute is breached – „This ends the proof", as Fuest and Sinn conclude.

To derive their result, Fuest and Sinn define a financial crisis as an exogenous event, destroying NCB solvency forever, thereby ending its ability to pay interest rates on existing and newly emerging Target balances. Moreover, as the authors point out, in such a financial crisis situation, capital flight to other and healthier countries within the monetary union may become likely, increasing Target balance deficits even further.

The critical assumption in Fuest and Sinn's setup relates to the extreme consequences attributed to a financial collapse of the financial system in the Target debtor country: a once and for all loss of solvency of the banking system and, hence, its central bank. "We are concerned with the role of Target balances in the collapse of a national payment system that could lead to the insolvency of a national central bank" (Fuest and Sinn, 2018, p. 37).

This assumption, however, is more than an oversimplification – it is a false representation of what defines a central bank as a part of a monetary union with an apex central bank, like the ECB in the Eurozone.[1]

But perhaps the false insolvency assumption in the Fuest-Sinn model is just an exaggeration, and the authors may then argue that even a weaker assumption, like a budget constraint on income paid out to the national government, for example, would lead to the same risk sharing result as in their original financial collapse model – are they right? I will investigate this argument in the following sections.I will argue that in today's financial markets with the existing set of regulatory rules, a financial crisis is expected to have quite different dynamics than assumed in the Fuest-Sinn model: a

[1] There is a rich literature discussing the solvency conditions of central banks, see for example Ricardo Reis „The mystique surrounding the central bank's balance sheet, applied to the European crisis", AER Papers and Proceedings 2013, pp. 1-7.

once and for all extinction of central bank solvency cannot happen – for a reason. In fact, Fuest and Sinn's description of the outcome of a financial crisis abstracts from any micro- and macroprudential regulatory and supervisory regime that today is hard-wired into Europe's banking system (the banking union, for short). I will therefore clarify whether the omission of the banking union regulatory regime is a forgivable sin in a model of a financial crisis – or else, whether it is a major omission, driving model results and policy implications.

To be more accurate to the features of today´s financial market in the European Union, I will complete the Fuest and Sinn's model by incorporating the regulatory framework („Ordnungspolitischer Rahmen") that has been developed with scrutiny over the past several years in the Eurozone. Building on earlier legal fundamentals, the regulatory framework of banking and financial markets in the Eurozone has been redesigned and greatly expanded since 2012, emphasizing the preclusion of government bailouts (including the loss of central bank claims) in banking.

As I will show in the next section, the banking union regulatory innovations, including newly introduced legal provisions for bank recovery and resolution, debt bail-in ability and more risk-sensitive equity requirements for banks, have direct implications on the key parameters of the Fuest-Sinn model. Default risk dynamics, debt pricing and bank exits become endogenous, with predictable effects on the balance sheet of central banks. These features can be readily incorporated into the stylized model – yielding a micro-founded representation of a financial crisis. Given the centrality of the crisis assumption in the Fuest-Sinn model, it may not come as a surprise that the micro-founded model extension leads to starkly different results.

The micro-founded model shows that loan pricing and collateral provision in lending are positively related to individual default risks of debtors. Moreover, today's banking regulation forces commercial banks to overcollateralize the claims held by central banks. Overcollateralization is achieved by setting minimum requirements for own capital and other private bail-inable debt instruments that are strictly junior to central bank claims.

Taken together, risk-sensitive loan pricing and a sufficient level of overcollateralization ensures the no risk sharing condition laid out by the Eurosystem Statutes (Hellwig, 2017; Krahnen, 2018).

Fuest and Sinn have made their argument very transparent by using a model-type formal argumentation. I will now adopt their setup and terminology, and incorporate the microfounded

financial crisis event into their model, leaving all other assumptions unchanged.[2] The model framework allows a clear identification of the effects of a financial crisis in one of the member states.

II. The original Fuest and Sinn argument and its completion

In this section, I will focus on the model in which a central bank may become incapable of settling the interest payments it owes due to target (im)balances. I will argue that their proof is incomplete, even if the extreme assumption of central bank insolvency is accepted for a moment.[3]

Let us assume a set of n countries labeled A, B...N, working in a monetary union with one apex central bank (ACB) and n national central banks (NCBs).

The following notation applies

A country experiencing a financial crisis

a size of country A (equal to its capital key, i.e. share in apex central bank equity), with $0 \leq a_i \leq 1$

M minimum reserve requirement to be held with the central bank, interest rate free

G money creation credit from national central bank to national banks;

Z interest income at ACB from money creation, Z=r(G-M), where

r statutory refinancing rate.

Rate r applies to all money creation credits from central banks to commercial banks, except for minimum reserve holdings which earn a zero interest rate.

Fuest and Sinn assume a financial shock, called a financial collapse, in country A. The shock fully destroys the value of bank assets in A for all times. If subsequently there are new additions to an existing Target debt balance in country A, e.g. due to capital flight from A to B,...N, and there is no further room for money creating credit in A, e.g. through ELA lending facility, then the central bank in country A generates no current income that allows to settle the statutory interest payment (rate r) with the apex central bank, including the newly generated Target balances.

In this situation, the central bank in country A is said to be insolvent, and all other NCBs in the monetary union experience a loss (i.e. an opportunity loss) relative to their capital key, because

[2] In earlier work, the author has claimed that under an exit scenario from the monetary union, Target imbalances may pose a challenge, as these open claims – not being credit claims in a strictly legal sense – may require a negotiated settlement, or a plain carry-over to the new central bank balance sheet, see Krahnen 2018. The exit scenario is not considered in Fuest and Sinn 2018.

[3] We have expressed some cautious doubts about the tenability of their legal argumentation, but do not delve into this matter here, as it appears to be of secondary importance for the paper's main argument. In addition, the question whether or not a NCB exposure under an international Target payment system qualifies as a type of redeemable credit, even if it there is no way to call the "loan", nor are there any limits in transferring the claim to a different institution, like an autonomous central bank after an exit decision, should perhaps better be discussed by involving legal scholars.

neither the outstanding target balances nor the newly generated additions to the balances, e.g. due to capital flight, will be properly paid interest on.

The critical step in this argumentation relates to the central bank „insolvency" implied by a financial collapse, erasing its capital. Postponing the question, for a moment, whether central bank solvency and central bank capital can be conceived in strict analogy to a commercial bank at all, I focus first on the zero asset value assumption following a financial crisis.[4]

The value of central bank assets in the Fuest-Sinn model following a „financial collapse" is assumed rather than derived in the paper; an economic explanation would have to consider the solvency of central bank debtors, i.e. the loan book value (and expected repayments) of that country commercial banks. This raises the question of whether the ad-hoc assumption of a *financial collapse* can be micro-founded, given the operation of a modern banking system – which operates subject to a microprudential regulatory regime with risk-based capital standards, like in the Eurozone or in the US.

In order to incorporate a „financial collapse", I now look at the balance sheet of an exemplary commercial bank, and define

α nominal value of bank assets

α^r risk-weighted value of bank assets, where $\alpha^r = \alpha(1-\theta)$, and θ is a weighted average of risk factors θ_i, one for each asset i, and $0 \leq \theta_i \leq 1$. The lower is the value at risk[5] of asset i, the smaller is its risk factor θ_i. Risk factors are defined by the regulator, asset weights are chosen by the bank;[6]

D nominal value of senior (non-subordinate) debt claims, including deposits and liabilities vis-a-vis the central bank;

C nominal value of capital, the sum of paid-in equity plus subordinate, bail-inable debt (TLAC, MREL)

C^r minimum capital requirement, where C^r is set by the regulator, and x defines the minimum capital requirement, say 8%.

$$C^r \geq x \cdot \alpha^r \qquad (1)$$

[4] In a one-country-one-central bank economy, central bank insolvency cannot happen. See for example Reis 2013: „Insofar as its liabilities are supported by the fiscal authorities (which is not fiscal backing), the central bank cannot be insolvent separately from the solvency of the overall government".

[5] The value at risk is the dominant risk measure used in today's capital standards of banks. The VaR is a specified quintile of the loss distribution, typically at the 99% or 99.9% value. Therefore, a value-at-risk of x Euros implies that with probability 1 % (0.1%, respectively) the loss experience may exceed the value of x Euros.

[6] For example, risk weights are 1 for loans to households and firms, 0 for government bonds issued by OECD countries, and they are between zero and one for lending to firms or households, depending on collateral values. The weights are supposed to reflect an average degree of riskiness of asset classes.

Inequality (1), the private liability promise, reflects the capital requirement banks have to fulfill at all times in order to keep their legal franchise. C^r comprises various financial instruments, depending on type of bank and its size, collectively labeled as TLAC (total loss absorbing capital, for large banks) or MREL (minimum required eligible liabilities, for smaller banks) capital items in the balance sheet of the bank. The common characteristic of all these instruments is their strict bail-in ability and, therefore, their role as loss absorbing capital.

Now turn to the actual capital level chosen by bank management, which typically is significantly above the regulatory minimum – not the least to avoid an accidental breach of the regulatory minimum, the implied penalty fee, and supervisory intervention, caused e.g. by a sudden fall in some asset prices in the bank's trading book. The actual capital level chosen is labeled C, where

$$C \geq C^r \qquad (2)$$

in normal times.

C is the result of an optimizing behavior of the individual bank, and may be driven by considerations in addition to regulatory minimum capital rules. For example, concerns about macroeconomic cycles, measurement errors by the supervisor, expected tax, legal or supervisory policy changes, and differences in individual risk aversion may all lead commercial banks to increase their capital buffers beyond the minimum C^r stipulated by the supervisor (see e.g. Gropp and Heider 2009).

In order to fulfill capital requirement (1) at any moment in time, a commercial bank may either increase its equity capital C by issuing new shares, or it may lower the size of its loan book α by terminating old and reducing new loans, and/or by de-risking outstanding loans, e.g. through tougher collateral provisions.

Since, given the regulatory rules, C and α^r are set by bank management´s decision, the risk level borne by senior debt instruments D is endogenous, being a function of capital standards C^r.

Finally, the expected value of bank assets, $E(\alpha)$, needs to be modelled as well. The value of $E(\alpha)$ crucially depends on the implemented regulatory rules which, in the case of the Eurozone, have recently been defined in the banking union (BU) package. Enacted stepwise since 2012, the package includes the BRRD insolvency regime, the SSM supervisory mechanism, the SRM resolution rules and its executing agencies (SRB and 19 national agencies), as well as several side regulations supporting orderly liquidation and/or management of outstanding bank exposures in a potential financial crisis. Supporting institutions include the national deposit insurance schemes, the ESM as a government-financed backstop, and the ESF as an industry-financed backstop. Moreover, there is a compact regulation for derivatives exposures under the EMIR regime.

The aim of the extensive BU package is to render the private liability promise in equation (1) effective. Now, from the basic bank balance sheet identity of commercial banks,

$$C+D=\alpha \qquad (3)$$

and inserting (1) and (2) leads to

$$\alpha[1-x(1-\theta)] > D \quad (4)$$

In words, the asset value of the bank, its loan book value, after being hit by a shock in the far end of the loss distribution, i.e. the 99 or 99.9 percentile of the assumed loss distribution, is larger than the nominal amount of its senior liabilities – of which central bank claims are a part of.

Inequality (4) is the main insight gained from extending the Fuest-Sinn model. It shows that under a banking union regime, financial crisis asset value losses at or below the 99.9th percentile are borne by private investors, not by taxpayers, and particularly not by central banks. The reason is simple: commercial bank liabilities *vis-a-vis* central banks are not counted as bail-inable debt instruments, and therefore are not part of the TLAC/MREL package. This package, however, is set according to bank asset liquidation values. Recall that estimated asset liquidation values are the basis for defining minimum capital requirements, using a value at risk model, typically applying a 99 or 99.9 percent confidence level.

Let us return to the model discussion. I have shown that the loss mutualization result in Fuest-Sinn model scenario is due to a neglect of private capital and loss absorption rules recently strengthened in Eurozone banking. Once these microprudential liability rules are incorporated in the macroeconomic "toy model" of Fuest and Sinn, the worrying findings by the authors largely disappear and their radical conclusions are no longer convincing.

On a deeper level, the simple Fuest-Sinn model applies to a world without bank capital standards, banking supervision and resolution policies. Note that a model without these shortcomings may lead to some value losses, as claimed by Fuest and Sinn, if and only if a loss incidence beyond the 99.9th percentile is considered, which may be envisaged as an Armaggedon-type of systemic crisis. In this case, the asset value loss in the banking system may well surpass the size of the equity buffer, thereby damaging the value of the senior debt – of which central bank claims are a part of.

The question whether or not capital standards are tough enough to ensure the value-integrity of senior debt at all times is a legitimate question for the safety standards defined by the regulator: setting higher TLAC/MREL standards will lower the likelihood of an asset loss at the senior debt level even further. As a consequence, the claim by Fuest and Sinn that increasing Target liabilities will lead to a default of the relevant central bank is not confirmed by the model – for their claim (statement III

in the paper) to be true, the central bank would need to fund banks that violate the capital standards defined by the Basel accord.

III. Policy conclusions

Finally, the policy conclusions emerging from the augmented version of the Fuest-Sinn model point in a different direction than those advocated by the original authors. In their paper, the incapacity on the side of the national central bank in the crisis country to pay even the central bank refinancing rate on a future (negative) Target balance caused, e.g., by the capital flight of its residents, leads the authors to recommend a periodic settlement of balances by means of gold or other real assets.

The augmented model presented in the present note no longer suggests any type of settlement among Target participants, let alone real settlement. The policy insight produced by our micro-founded model opoint the spotlights at banks' capital standards. If the level of required minimum capital is believed to fall short of the desired level of asset value needed to protect senior debt fully, like central bank claims, then the policy conclusion is straightforward: increase the minimum capital requirements, TLAC or MREL, and define a limit to the reduction of risk weights through internal risk modelling. This process of capital increase and/or risk reduction needs to be continued until the required level of capital, equity and bail-in debt taken together, has reached a sufficiently high level.

To be clear on this point, by increasing capital *any* desired level of safety can be achieved. The tradeoff to an increase in capital is the cost to society of a reduced supply of saving deposits, with a high level of safety and liquidity, that banks are able to offer. The tradeoff between a reduction in default risk and the supply of liquidity and (savings) debt instruments to the public allows for a reasonable policy discussion that merits „the sweat of the noble", the debate among academics and regulators about reasonable capital standards.[7] This debate may well lead to a re-calibration of such standards in order to achieve the overall goal in today's world of banking regulation: the replacement of government bank bailout guarantees by credible buffers of private loss absorbing capital.

Therefore, policy makers should invest their energy into strengthening the new world of banking regulation – rather than attending a sideshow on the meaning of payment system balances for central bank solvency. [8]

[7] See for example Admati and Hellwig (2013) in their famous book in which they make the case for a significant increase of equity requirements.

[8] There is one exception to the above statement that I have to admit: the case of country A exiting the monetary union. But this case has been deliberately left out of the Fuest and Sinn model – probably because the exit scenario is hard to imagine, its consequences are even harder to predict – and the role of Target balances in such a scenario is likely to be of little importance.

The results presented in this paper underscore the importance of Tier1 equity capital adequacy and bail-in credibility under the SSM regime, as well as the feasibility of bank resolution under the SRB regime. Overall, the results in the note refute the central claim in Fuest-Sinn's essay by showing that Target imbalances *per se* do not pose an existential threat to a monetary union built according to Eurozone principles.

Literature

Admati, A. and M. Hellwig (2013), The Bankers' new clothes: What's wrong with banking and what to do about it, Princeton University Press.

Fuest, C. and H.-W. Sinn (2018), Target risks without Euro exits, CESifo Forum 19 (4) December, pp. 36-45.

Gropp, R. and F. Heider (2009), The Determinants of Bank Capital Structure (September 17, 2009). Review of Finance, Vol. 14, pp. 587-622, 2010.

Hellwig, M. (2017), Precautionary recapitalisations: time for a review, Discussion Paper Series of the Max Planck Institute for Research on Collective Goods 2017_14, Max Planck Institute for Research on Collective Goods.

Krahnen, J.P. (2018), Über Scheinriesen: Was TARGET-Salden tatsächlich bedeuten. Eine finanzökonomische Überprüfung. SAFE White Paper No. 56, August 2018.

Reis, R. (2013), The mystique surrounding the central bank's balance sheet, applied to the European crisis", AER Papers and Proceedings 2013, pp. 1-7.