The Eurozone Needs Exit Rules\textsuperscript{a}

Christian Fahrholz\textsuperscript{b} \hspace{1cm} Cezary Wójcik\textsuperscript{c}

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Abstract
This paper argues that the key issue for defining and solving Eurozone’s difficulties lies in readjusting the relationship between the center and the periphery of the Eurozone. Our argument proceeds in two steps. First, a basic finance problem of a center-periphery system is captured by a game with perfect but incomplete information. To capture the essence of today’s crisis we analyze to what extent a ‘troubled’ periphery member of the Eurozone may negotiate a bail-out from the center due to the existence of a negative externality arising from its potential default. Second, we analyze how establishing ‘exit rules’, recently advocated also by Jacques Delors, would shift the center-periphery relationship in the Eurozone. We show that such rules may strengthen the Eurozone through four channels: i) improved external market discipline, ii) strengthened internal macroeconomic discipline, iii) increased enforcement power of the Eurozone over profligate members, and iv) reduced uncertainty.

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\textsuperscript{b} School of Economics and Business Administration and Graduate Program “Global Financial Markets” (Foundation “Geld und Währung” (Deutsche Bundesbank)), e-Mail: christian.fahrholz@uni-jena.de.
\textsuperscript{c} CESifo, Polish Academy of Sciences and Warsaw School of Economics; e-Mail: cezary.wojcik@sgh.waw.pl.
1 Introduction

With the sovereign debt crisis spreading across Europe there is no shortage of suggestions on how to save the Eurozone. The range of suggestions is broad. There are some that focus on long-term challenges (see for example Cooley and Marimon (2011) who advocate for debt rules) and the ones that address short-term stabilization issues (see for example de Grauwe (2011) on the role of ECB in stabilizing government debt markets or Delpa and Weizsaecker (2011) who opt for a creation of the so called Eurobonds as a way to enlarging Eurozone’s financial fire power). What unites many of the proposals is that they focus (predominantly) on economic factors and/or treat the Eurozone as a monolithic political organism.

This paper argues, however, that the key issue for defining and solving Eurozone’s difficulties lies in readjusting the relationship between the center and the periphery of the European Economic and Monetary Union (EMU). The challenge is to create institutions that shift Eurozone’s center-periphery relationship in a way that fosters fiscal discipline and stability. Our argument proceeds in two main steps. First, a basic finance problem of a center-periphery system is captured by a game with perfect but incomplete information. To capture the essence of today’s crisis we analyze to what extent a ‘troubled’ periphery member of the Eurozone may negotiate a bail-out from the center due to the existence of a negative externality arising from its potential default. After an exogenous shock the periphery makes decisions about whether to pursue a politically costly fiscal adjustment or to resort to a brinkmanship strategy to past part of these fiscal costs on to the center, given that ‘EMU stability’ is a common good. Second, we analyze how establishing ‘exit rules’, recently advocated also by Jacques Delors, would shift the center-periphery relationship in the Eurozone. We show that such rules would strengthen the Eurozone through four channels: i) improved external market discipline, ii) strengthened internal macroeconomic discipline, iii) increased enforcement power of the Eurozone over profligate members, and iv) reduced uncertainty. As such, such exit rules would decrease (and not increase!) the probability of an exit, or the breakup of the Eurozone.

We organize our paper in the following way. In Section 1, we give a short literature overview and show how the paper adds to it. In Section 2, we present the brinkmanship game. In
Section 3 we discuss some empirical and policy implications of exit rules. The final section concludes.

2 Literature

The Eurozone is a unique form of monetary union in the sense that it is a monetary union among sovereign states, and not a federal state with a common fiscal policy, like the US. It has been recognized early on that the absence of coordination of fiscal policies can be a potential “hazard area” in the construction of the Eurozone because of the interactions between domestic policies of member states (see Bordo and Jonung, 1999). In particular, it has been argued that member governments might be tempted to run up unsustainable debts and push the ECB to inflate them away or run up high levels of debts that would create negative spillovers for others (Baldwin, Gros and Laeven, 2010).

The nature of such interactions (internal incentives and macroeconomic consequences) among different actors in multi-tiered systems has been systematically studied in the context of federations. For example, Rodden (2004) presents a game to study the role of central government commitment to no bail-out in the event of a debt crisis of subnational officials. In the game, subnational officials decide whether to pursue fiscal adjustment based on their belief about the credibility of the central government’s commitment. When the commitment is credible fiscal discipline is enforced by voters and credit markets. But if the central government’s commitment is not fully credible subnational officials face incentives to pursue unsustainable borrowing. In this framework, intergovernmental grants are at the heart of the commitment problem. If subnational governments were financed purely by local taxes voters and creditors would view the obligations of local government as autonomous. However, if central government’s tax capacity is high and sub-units rely on direct intergovernmental grants, one can expect a greater willingness of subnational units to avoid or delay adjustment, resulting in larger and more persistent deficits. After looking at the tax capacity of EU central units, the paper concludes that there is little risk of fiscal indiscipline in the EMU. Similar bail-out problems have also been modeled as a sequential game driven by the central government’s incentives by Wildasin (1997), who focuses on the structure of jurisdictions and by Inman (2003) who consider a range of other factors.
Though drawing on this literature, our approach is somewhat different. First, we explicitly consider a case of a monetary union. We assume that EMU stability is a public good and thus players have some willingness to pay irrespectively of the nature of fiscal institutions. Second, we focus on the ‘negative externality’ problem which is central to the current sovereign debt crisis of EMU in which refinancing difficulties of a small country like Greece which accounts for only 2% of the euro area’s GDP can trigger a systemic crisis for the whole EMU. The key question is to what extent a ‘troubled’ EMU member may negotiate a bail-out due to the existence of a negative externality arising from its potential default. We then analyze how establishing some sort of ‘exit rules’ can influence the ability of one EMU member to pursue such strategy.

3 The game

Consider a simple game played between the EMU’s center (CEN) which is characterized by current account surpluses and sustainable public debt position (think of Germany, France, Finland or the Netherlands) and the EMU’s periphery (PER) which suffers from the twin deficit problem (think of Greece, Portugal or Spain). Both players are concerned with preserving the smooth functioning of EMU – i.e., ‘EMU stability’ is a public good. The game shows to what extent a single PER may pass some of the ‘fiscal adjustment costs’ on to CEN. Given that PER’s potential default would create a negative ‘externality cost’ for the rest of EMU, an individual PER player may resort to a brinkmanship strategy. Within the scope and limits of such brinkmanship strategy CEN might be credibly threatened to reveal its willingness-to-pay for ‘EMU stability’ and thus PER may effectively elicit a bail-out. The structure of the game is displayed in extensive form in Figure 1.

Specifically, a single PER, (denoted as player $j = 1$, whereas $i = 1, ..., n$) has complete but imperfect information over a representative CEN (player $j = 2$) willingness-to-pay for EMU stability. The PER is faced with an adverse fiscal shock and faces an imminent risk of default. At the heart of the game is the bargaining between the PER, and CEN over sharing the costs of fiscal adjustment needed to safeguard ‘EMU stability’. These costs are denoted as
A deterioration of the public good ‘EMU stability’ entails above all costs for \( \text{PER}_i \). However, \( \text{CEN} \) will also suffer from a default as it has a stake in EMU. Hence, while \( \text{PER}_i \) will not accept costs higher than total \( C_i^F \) in exchange for contributing to ‘EMU stability’, \( \text{CEN} \) will administer financial assistance within the limits of their maximum willingness to pay if \( C_i^D > C_i^F \). Accordingly, \( \text{CEN} \) will have limited liability amounting to a share \( \lambda_i \) of total \( C_i^F \) with \( 0 < \lambda_i \leq 1 \). This is to say, \( \text{CEN} \) countries will at most transfer funds amounting to the full amount of \( C_i^F \) in the case of a particular \( \text{PER}_i \). The reason is that beyond that point their willingness to pay for preserving ‘EMU stability’ would be exhausted. The following proposition can be derived from these considerations:

\[
\lambda_i = \begin{cases} 
0 < \lambda_i < 1 & \text{if } C_i^F < C_i^D < 2C_i^F \\
1 & \text{else}
\end{cases}
\]

Bearing the entire \( C_i^F \) reflects each player’s maximum willingness to pay, i.e. each player’s cost tolerance in escalation processes of brinkmanship. The rationale of brinkmanship is that \( \text{PER}_i \) threatens to realize the overall worst pay-off represented in the disagreement point \( d \).

In doing so, it can under identifiable conditions pass a share of the fiscal adjustment costs, \( C_i^F \), on the rest of the EMU members. If a credible brinkmanship evolves, then both players will not maximize their piece of the pie, but minimize their respective share of \( C_i^F \) during negotiations. The inherent bargaining problem is thus characterized by the tuple \((C_i, d)\) where \( C_i \subset R^2 \) is a vector combination of feasible (dis)utility allocations. The disagreement point \( d \) is the bargaining outcome if both parties’ negotiations break down. If \( \text{PER}_i \) and \( \text{CEN} \) cannot agree on an appropriate policy solution for \( \text{PER}_i \) that helps safeguarding ‘EMU stability’, a default will be triggered. This way the realization of \( d \) is equivalent to the

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\(^1\) We assume that the benefits are the same for both players as it renders the game simpler to solve. One may rightly argue that benefits can be different for, say, a big economy like Germany and, say, a small one like Greece. However, assuming an asymmetry of benefits does not change the general tone of our results.
occurrence of default costs $C_i^D$. Hence, the following costs arise in this game $G(C_i^F, d)$: ‘fiscal adjustment costs’, $C_i^F$, around which the bargaining revolves; if the according negotiations on distributing $C_i^F$ were to break down, then a default will occur, and both players will be stuck with the disagreement point $d$ comprising of the actual ‘default costs’ $C_i^D$ subject to $\lambda_i$.

The above sets-up basic characteristics of the brinkmanship game. Albeit some caveats apply: On the one hand, the question arises whether PERs should form a cartel to strengthen their brinkmanship vis-à-vis other EMU members. On the other hand, whether other EMU countries within the euro area can announce in advance that they will club together in order to punish the first country, which practices brinkmanship. This is to say that they might pursue an enter-deterrence game.\(^2\) We exclude both corner solutions as coordination problems and competition between all EMU members render both scenarios unlikely. If PERs try to coordinate their brinkmanship strategies then this may lead financial markets to discriminate more between both group of countries, PERs and CENs. Also, since only PER\(_i\) is facing an imminent default risk, other PERs will not be willing to join as it might signal the financial markets that they also face a risk of default. As to the second scenario, the coordination problem among CEN countries arises because of uncertainty regarding their future potential need for assistance.

Moreover, successful brinkmanship is dependent on two probabilities $p$ and $q_i$. From the perspective of a PER\(_i\), $p$ denotes the probability of encountering an ‘offish’ CEN or a ‘lavish’ one with a probability $(1 - p)$. The more offish the CEN, the lower is the probability of executing successful brinkmanship. Given that PER\(_i\) is a EU member and has a say in the decision-making process, we assume that values of $p$ are smaller than 1. At the same time $p > 0$ because Emu stability is a public good and CEN has some willingness to pay for it. Hence, we reject corner solutions of $p$, so that $0 < p < 1$. By the same token, the probability

\(^2\) The scope for an enter-deterrence game is limited also by the fact that due to problems of effective monitoring, assessing fiscal policy and identifying deliberate infringement to fiscal rules in EMU is a complicated issue (e.g. Jaeger and Schuknecht (2004) discussing it in the context of pro-cyclical fiscal positions and boom-bust phases). As regards boom-bust cycles within EMU please also refer to Backé and Wójcik (2008).
describes the likelihood of externalities by triggering voter alienation towards fiscal consolidation processes, i.e. incurring the electorate with the full amount of ‘fiscal adjustment costs’ \( C_i^F \). Uncertainty regarding the constituency’s reaction to the fiscal retrenchment processes may buttress PER’s bargaining position in negotiations vis-à-vis CEN. If the electorate was completely ‘Europhile’, then there would be no room for the government for incurring other EMU members with any form of externality costs as imposed fiscal austerity would not havoc any political upheaval. In fact, the according probability \( q_i \) would be zero in such circumstances. At the same time, we expect that voters as well as their delegated governments must also rank the benefits \( B_i \) as valuable. Otherwise, any efforts towards fiscal consolidation in PER would be unacceptable, and a government would be unable to craft consensus towards its contribution to safeguarding ‘EMU stability’. Hence, we exclude according corner solutions so that \( 0 < q_i < 1 \). There exists some political resources on the national level, which a government in PER may play off against CEN in intergovernmental European negotiations.

If the conditions for successful brinkmanship are met, then CEN will dance obligingly to PER’s tune and share some ‘fiscal adjustment costs’ \( C_i^F \) in terms of providing a bail-out. In the following paragraphs, we determine the Nash strategies, i.e. the mutually best responses which will eventually constitute a sub-game perfect Nash equilibrium of the brinkmanship game.

**Brinkmanship**

Given that both players’ maximum willingness to pay for ‘EMU stability’ corresponds to \( C_i^F \), we can normalize \( C_i^F = B_i = 1 \). Hence, we can transform the threat game \( G(C_i, d) \) to the form of \( \Gamma(\xi_i, d) \) with \( 0 < c_{ij} \leq 1, c_{ij} \in \xi_i, \xi_i \subset R_+^2 \). The standard assumption holds that \( \xi_i \) is a non-empty, convex and compact set comprising any convex combination of vector \( c_{ij} = (c_{i1}, c_{i2}) \).

In this game \( \Gamma(\xi_i, d) \) PER quasi maximizes the CEN’s share of ‘fiscal adjustment costs’ for safeguarding ‘EMU stability’. The bargaining may lead to a new outcome \( c_i \) for PER; by
the same token, PER\(_i\) burdens CEN with the share \(1 - c_i\). Accordingly, the players’ continuous utility functions \(u_{(i)}(c_{(i)})\) are:
\[
\begin{align*}
    u_1(c_{i1}) &= c_{i1} = c_i, \\
    u_2(c_{i2}) &= c_{i2} = (1-c_i). 
\end{align*}
\]

At the same time, the brinkmanship game \(\Gamma(\xi, d)\) still comprises of the disagreement point \(d\) – i.e. the realization of default costs \(C_i^D\) – and represents PER\(_j\)’s threat, where the pay-off is \((-1, -\lambda_i)\) in line with the proposition above.

Two different sub-games of \(\Gamma(\xi, d)\) due to complete but imperfect information have to be taken into consideration. First, PER\(_j\) does not know whether it will encounter an offish \((p)\) or a lavish \((1-p)\) CEN. In this context, specific default costs have to be considered. On the one hand, a single crisis has the potential to trigger further defaults of all \(n\) PER\(_j\) via contagion. This would be the overall worst pay-off from the viewpoint of CEN. Therefore, fearing such exorbitant costs the primary goal of CEN would be to sustain the support in each PER\(_j\) for safeguarding ‘EMU stability’. From this point of view, it may be more beneficial to be lavish. Second, CEN may display a rather reluctant attitude towards providing bail-outs because any obvious generosity would intensify moral hazard behavior which possibly does require transferring \(n\)-times of \(c_i\). Due to CEN’s ambiguous attitude towards providing extra funding, the PER\(_j\)’s pay-offs have to be weighted with a probability \(p\) for encountering an offish and \((1-p)\) for a lavish CEN.

The PER\(_j\)’s feasible set of strategies encompasses two choices: ‘consolidate’ or ‘not-to-consolidate’. The latter strategy consists of practicing brinkmanship on the basis of the premise that its national constituency would not accept consolidation measures. If PER\(_j\) chooses to ‘consolidate’ (i.e., no brinkmanship), it forgoes the opportunity to pass a share \(c_i\) of ‘fiscal adjustment costs’ on to CEN. This would certainly be the best choice from the viewpoint of CEN. When PER\(_j\) relies on a strategy of choosing ‘not-to-consolidate’, the outcome ultimately depends on the reaction of CEN. The latter player can choose a strategy of ‘bail-out’, ‘stall’ or ‘no-bail-out’. Thus, CEN’s retaliation may take the form of a ‘bail-out’,
but CEN may also withhold funding by practicing a strategy of ‘stall’ (negotiating fiscal
adjustment costs with PER,). Moreover, CEN may also choose a strategy of ‘no-bail-out’
which would imply to cut PER out. This outcome is congruent with the breaking off of
negotiations as depicted by the disagreement point $d$.

The pay-offs are as follows: If PER, chooses a strategy of ‘consolidate’, then it receives zero,
whereat CEN receives the entire benefits of secured ‘EMU stability’, i.e. further smooth
operation of euro area, amounting to 1. If PER, chooses to ‘not-to-consolidate’, CEN can
‘bail-out’, ‘stall’ or ‘no-bail-out’. In case of ‘bail-out’ PER, receives the aspired alleviation of
‘fiscal adjustment costs’ in amount of $c_i$ and CEN receives a pay-off $(1 - c_i)$. If CEN chooses
to ‘stall’, PER, may be stuck with default costs amounting to $(-q_i)$. This pay-off hinges upon
PER, ’s likelihood of losing public support for fiscal retrenchment and consequently
defaulting. Simultaneously, CEN receives the pay-off $(-q_i \tilde{\lambda}_i + 1 - q_i)$ or $(-q_i \sum_{i=1}^{N} \tilde{\lambda}_i + 1 - q_i)$
in case when defaults spread among all PERs. If CEN chooses ‘no-bail-out’ then both players
will encounter a country-specific default scenario and will forgo the mutual benefits of ‘EMU
stability’. PER, will also have to bear the full burden of ‘fiscal adjustment costs’ thus
realizing its overall worst pay-off $(-1)$, while CEN will have to administer subsidiary
financial assistance within the bounds of its limited liability amounting to $(-\tilde{\lambda}_i)$.

A brinkmanship strategy has to meet some conditions. A successful brinkmanship has to be
effective and acceptable. The effectiveness condition of such brinkmanship rests on the extent
of PER, ’s default: As CEN is increasingly affected by costs, a PER, ’s threat gains more
credibility. In this respect, the probability of default is subject to a critical threshold: If this
probability is too small, CEN cannot be coerced into providing financial assistance. However,
the credibility of the brinkmanship strategy is also dependent on whether the outcome is
acceptable to PER, . If the probability of a default is too high and, hence, the acceptability
condition cannot be accomplished, then PER, will have to ‘consolidate’. In turn, this player
will entirely incur the envisioned ‘fiscal adjustment costs’ for sustaining ‘EMU stability’.
The PER\textsubscript{i} ’s brinkmanship will be successful if it constitutes a credible threat. PER\textsubscript{i} ’s brinkmanship will be effective, if the expected pay-off for CEN from ‘bail-out’ is higher than from a decision to ‘stall’, especially when taking into account possible contagion, i.e. defaults spilling over to other PERs. Therefore,

\[ (-q_i \sum_{i=1}^{N} \lambda_i + 1 - q_i) < (1 - c_i). \]

Accordingly, the minimum probability \( q_{i,min} \) has to be:

\[ q_{i,min} > \frac{c_i}{\sum_{i=1}^{N} \lambda_i + 1}. \]

The probability \( q_{i,min} \) is the lower bound of the brinkmanship for PER\textsubscript{i}. Below this level CEN would choose a strategy of ‘no-bail-out’, even if it is lavish. However, with a probability of \( p \) PER\textsubscript{i} may feel that the strategy ‘not-to-consolidate’ is too risky with regard to encountering an offish CEN. At the same time, PER\textsubscript{i} will encounter a lavish CEN with a probability of \((1 - p)\), which will choose a strategy of ‘bail-out’ given that the effectiveness condition holds. Thus, for a given \( 0 < q_i < 1 \) PER\textsubscript{i} will pose a probabilistic threat, if its expected pay-off is higher than a zero pay-off from choosing to ‘consolidate’:

\[ (-q_i p) + c_i (1 - p) > 0. \]

After resolving we obtain:

\[ q_{i,max} < c_i \frac{1-p}{p}. \]

Accordingly, the acceptability condition depends on values for \( p \). Therefore, values for \( p \) have to be below a critical threshold. Otherwise, \( q_{i,max} \) would have to be even smaller than \( q_{i,min} \) for some high values of \( p \). That would render any brinkmanship fruitless as it indeed becomes effective but not acceptable. From the proposition \( q_{i,min} < q_{i,max} \) it follows that the upper bound is:

\[ p_{max} < \frac{\sum_{i=1}^{N} \lambda_i + 1}{\sum_{i=1}^{N} \lambda_i + 2} < 1. \]
If the probability \( p \) for an offish CEN satisfies the acceptability condition, then the following proposition must be valid:

\[ p^* \in P^*, \quad P^* := \{ p^* | p^* < p_{\text{max}} < 1, p^* \in \mathbb{R} \}. \]

Regarding \( q_{i,\text{min}} \), the probability \( q_i \) in a brinkmanship strategy has to remain below the critical threshold \( q_{i,\text{max}} \). Above that value \( \text{PER}_i \) will refrain from a strategy of ‘not-to-consolidate’. Therefore, for every given probability \( 0 < p < 1 \) the probabilistic threat is credible when a country-specific \( q_i^* \) is an element of the finite set \( Q_i^* \). The according proposition is:

\[ q_i^* \in Q_i^*, \quad Q_i^* := \{ q_i^* | q_{i,\text{min}} < q_i^* < q_{i,\text{max}}, q_i^* \in \mathbb{R} \}. \]

When the endogenous effectiveness and acceptability conditions for the parameters \( p \) and \( q_i \) are satisfied, \( \text{PER}_i \) will resort to brinkmanship. CEN’s response to \( \text{PER}_i \)’s brinkmanship is to transfer ‘fiscal adjustment costs’ amounting to the share \( c_i \). This is equivalent to \( \text{PER}_i \) passing the respective portion of ‘fiscal adjustment costs’ on to current EMU members, i.e. the bail-out in the face of such negative externalities. The remainder of the analysis focuses on the Nash bargaining solution for distributing \( \text{PER}_i \)’s ‘fiscal adjustment costs’ – we analyze each player’s portion of such fiscal costs.

**Bargaining**

An NBS is characterized by complete information. It is finite in that only one offer and no counter-offers are possible when bargaining. The bargaining revolves around sharing the ‘fiscal adjustment costs’ of safeguard ‘EMU stability’. Given that all characteristics of the game are common knowledge, the players look ahead and anticipate the reciprocal best responses.

The game \( \Gamma(c_1, d) \) is completed by a Nash bargaining on the non-empty, convex and compact set comprising any convex combination of vector \( (c_1, c_2) \) in \( \mathbb{R}^2 \). According to the NBS it has to be dealt with Pareto-efficient solutions only. The particular share \( c_i \) of ‘fiscal adjustment...
costs’, which PER can load on to CEN, is the bargaining outcome. The NBS is derived from the Nash product (NP) weighted with the respective bargaining power:

$$\max_{c_i} NP(\Gamma(c_i, d)) = (u_i(c_{i1}) - u_i(d_i))^{\alpha_i} (u_2(c_{i2}) - u_2(d_2))^{\beta_i}$$

with \( c_i \geq d_j, c_i \in \xi_i, \alpha_i \geq 0, \beta_i \geq 0 \), and \( \alpha_i + \beta_i = 1 \).

Given the players’ utility functions the maximization problem in light of \( d = (-1, -\lambda_i) \) is:

$$\max_{c_i, c_2} \Gamma(c_i, d) = (c_i + 1)^{\alpha_i} ((1 - c_i) + \lambda_i)^{\beta_i}.$$ 

The according first-order condition is:

$$\frac{dNP}{dc_i} = \alpha_i (c_i + 1)^{\alpha_i} ((1 - c_i) + \lambda_i)^{\beta_i} - (c_i + 1)^{\alpha_i} \beta_i ((1 - c_i) + \lambda_i)^{\beta_i - 1} = 0.$$ 

After rearranging we receive the equilibrium solution:

$$c_i^* = \begin{cases} 
\text{not defined} & \text{if } \frac{(1+\lambda_i)\alpha_i - \beta_i}{\alpha_i + \beta_i} \leq 0 \\
0 < c_i \leq 1 & \text{if } 0 < \frac{(1+\lambda_i)\alpha_i - \beta_i}{\alpha_i + \beta_i} \leq 1 \\
1 & \text{else}
\end{cases}.$$ 

It becomes obvious that CEN’s actual willingness to pay for bailing out PER depends on the distribution of bargaining power. The less bargaining power \( \beta_{-i} \) CEN exhibits, the higher are the values for \( c_i^* \). Consequently, PER can elicit more funds amounting to \( c_i^* \) from CEN as their bargaining power \( \alpha_i \) increases, hence, having other EMU members over the barrel. We recall that \( c_i^* \) is the share of ‘fiscal adjustment costs’ \( C_i^F \) that is acceptable to CEN. With respect to the complete brinkmanship game \( \Gamma(c_i, d) \) the NBS is, hence,

$$\text{NBS: } \Gamma^*(c_i, d) = (c_i^*, (1 - c_i)^*).$$

Considering the specific characteristics of the NBS, the combination of both players’ Nash strategies can also be represented in terms of their respective reaction functions \( R_{ij} \). Due to complete information PER can anticipate CEN’s optimal choice. Hence, its own best response is:
From the perspective of CEN the best reaction is:

\[
R_1(c_1) = \begin{cases} 
\text{not defined} & \text{if } \frac{(1+\lambda_1)\alpha - \beta_1}{\alpha + \beta_1} \leq 0 \\
0 < c_1 \leq 1 & \text{if } 0 < \frac{(1+\lambda_1)\alpha - \beta_1}{\alpha + \beta_1} \leq 1 \\
1 & \text{else}
\end{cases}
\]

The players’ reaction functions \( R_\phi \) constitute the unique sub-game perfect Nash equilibrium incorporating a specific NBS of the entire game \( \Gamma(\varsigma, d) \) and \( G(C_i^F, d) \) respectively for every fixed \( \bar{p} | \bar{p}^* \in P' \) and \( \bar{q} | \bar{q}^* \in Q' \). This is to say that for effective and acceptable brinkmanship, CEN’s response to PER’s credible brinkmanship strategy is to burden itself with ‘fiscal adjustment costs’ \( C_i^F \) amounting to the share of \( c_i \). Thus, PER passes the respective ‘fiscal adjustment costs’ on to other EMU members.

It is important to note that this outcome is primarily related to the parties directly involved in the negotiation process. It goes without saying that the exogenously invoked limited liability can be altered. However, increasing CENs’ willingness-to-pay would not change the general tone of the analysis as long as it is assumed that ‘EMU stability’ represents a joint public good and there is some positive willingness-to-pay. However, PER’s brinkmanship vis-à-vis CEN, can be a particular round in the ‘boxing match’. A new exogenous shock may mark the starting point for another round of the outlined threat game. Hence, the institutional set-up of the EMU prepares the ground for brinkmanship, whereas ‘crisis’ acts as a catalyst within the overall process.
4 Exit rules: policy and empirical implications

The game shows that in the current EMU set-up of the center-periphery relationship a ‘troubled’ periphery member can effectively negotiate a bail-out from the center due to the existence of a negative externality arising from its potential default. We now analyze how establishing ‘exit rules’, recently advocated also by Jacques Delors, would shift the center-periphery relationship in the EMU, so that such brinkmanship behavior is limited and fiscal discipline strengthened. We do not inquire here into the exact form of the rules. Jacques Delors has proposed that “(…) the new treaty should make it possible to kick a country out of the Eurozone if a majority of 75 percent are in favor”. However, there is a wide range of possible solutions, from voluntary to obligatory and from automatic and discretionary rules (see Figure 2).

While the exact form of the rules may shape the magnitude of outcomes, for now we are just interested in a general direction of how allowing for an exit would change the ‘rules of the game’ within the EMU. Currently, EU provisions stipulate that an exit is not possible. This forms a legal equivalent of an implicit guarantee that member states will support each other to prevent an exit whatever the circumstances. It is widely seen that such guarantee has given rise to a moral hazard, both for the markets and member states, and has allowed a small country like Greece to hold the entire Eurozone hostage. First, at the economic end, because of the guarantee, markets have for many years been taking far too many risks by treating, for instance, Greek and German bonds in essentially the same way. This has led to a reduction in market discipline, lower interest rates and has provided easy access to capital, which in turn has led countries like Greece to indulge in excessive fiscal spending. The resulting imbalances are now threatening the solidity of the Eurozone. Second, at the political end, the guarantee has shifted the political bargaining power to the profligate countries and given them leeway to pass part of their political and economic adjustment costs on to the rest of the Eurozone. Since the problems in Greece generate a negative externality for the other members, the Eurozone has little choice but to provide a bail-out. As a result, there is no credible enforcement mechanism. Greece has again failed to meet its fiscal targets and if the framework of the Eurozone does not change it will fail to deliver yet again.
What will exit rules change then? The simplest empirical implication of our game is that one needs to find how such rules will alter the key parameters of the game in a way that will limit the scope for effective brinkmanship. There are at least three parameters where exit rules may have a bearing.

First, exit rules are likely to increase $\beta_{i,j}$ the bargaining power of CEN and decrease the $\alpha_{i}$, the bargaining power of PER$_i$. The smaller $\alpha_{i}$ and the higher $\beta_{i,j}$, the less funds can PER$_i$ elicit from CEN. Thus, exit rules would increase the political bargaining power of Eurozone members vis-à-vis the profligate countries. Their power to enforce fiscal and structural reforms in the profligate countries would increase because exit rules would become a bargaining chip in their negotiations with these countries. Their negotiation position and enforcement power would be increased.

Second, exit rules are likely to increase the perceived parameter $p$, the probability of encountering an ‘offish’ CEN or a ‘lavish’ one with a probability $(1 - p)$. The more offish CEN, the lower is the probability of executing successful brinkmanship. Exit rules will be an equivalent of putting a cap on CAs’ willingness-to-pay. This will decrease the amount of the perceived guarantee. If exiting the Eurozone were openly allowed, the markets would have no choice but to price non-zero probability into their risk assessment and thus better differentiate – not only in crisis times, but also in good times – country risk among Eurozone sovereign bonds. External market discipline would intensify.

Third, exit rules are likely to decrease the probability $q_i$, that describes the likelihood of voter refusal of fiscal consolidation processes. In this case, the PER government will be more likely to choose ‘consolidate’ rather than ‘not-consolidate’ strategy. Exit rules would enhance domestic discipline because they would shift internal political economy incentives. They would in essence increase the perceived costs of leaving (now largely hidden) in relation to the short-term costs of fiscal adjustment. Domestic discipline would be strengthened.

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3 See also Fahrholz and Wójcik (2011).
Moreover, exit rules may provide also added benefit of decreasing market uncertainty, which would support the political and economic adjustment process. Currently, nobody knows what the legal procedure for leaving could be, what the costs would be, and how they would be distributed. Clarifying this would limit the scope for disruptive speculation with all its detrimental effects on the real economy. Financial uncertainty would be mitigated.

What is the feasibility of establishing such rules? Opponents towards exit rules may argue that merely initiating a discussion on exit rules would open up a Pandora’s box at a moment when Europe is badly in need of stability. Quite the opposite is true. Opening up such discussions would help stabilize today’s mess because Europe’s laggards would receive the clear message that the world has changed and there is a limit to the Eurozone’s willingness to pay for their negligence. The pressure to deliver would increase.

Some commentators may argue that there are no exit rules in the US monetary union, the blueprint for the Eurozone. Although true, such view overlooks the unique nature of the Eurozone. It is a monetary union among sovereign states, and not a federal state with a common fiscal policy, like the US. While increasing European political integration might be a step in that direction, it is naïve to think that the Eurozone can make any substantial progress sufficiently quickly to avoid another blow somewhere in the near future. Europe is standing on the brink of a precipice between the undesirable now and the desirable future. It does not want to move backwards, but going forward is risky – this is when creativity is needed.

Some may also worry that exit rules would run counter to the political ideal of creating an irrevocable monetary union as the basis for a political union. We share this ideal, but just the opposite is true. Paradoxically, exit rules would decrease (and not increase!) the probability of an exit, or the breakup of the Eurozone. This is because, as suggested above, spelling out the exit rules would give the Eurozone what it so badly needs, i.e. enhanced market discipline, stronger enforcement power of the Eurozone, more internal discipline in the profligate countries and reduced market uncertainty.

The closest parallel to this positive feedback effect is the lender of last resort facility. A promise to provide unlimited funding to the banking sector decreases the probability of using public money because of the positive impact of such promise on the banking sector’s stability.
Evidence can be also found in political science and in the history of national states struggling with preserving their internal integration. Their experience suggests that when secession is not permitted, pressure for it rises. When secession is openly allowed many would-be secessionists cease to press so hard for it.

5 Conclusions

This paper argues that the key issue for defining and solving Eurozone’s difficulties lies in readjusting the relationship between the center and the periphery of the Eurozone. We present a game that captures a basic finance problem of a center-periphery system. The model shows that in the current EMU set-up of the center-periphery relationship a ‘troubled’ periphery member of can effectively negotiate a bail-out from the center due to the existence of a negative externality arising from its potential default. The set-up is conducive to fiscal indiscipline. Against this backdrop, we analyze how establishing ‘exit rules’, recently advocated also by Jacques Delors, would shift the center-periphery relationship in the Eurozone in a way that would foster stability. On the basis of the model we show that such rules may strengthen the Eurozone through four channels: i) improved external market discipline, ii) strengthened internal macroeconomic discipline, iii) increased enforcement power of the Eurozone over profligate members, and iv) reduced uncertainty.
Figure 1. Game display
Figure 2. A typology of exit rules

Exit Rules

Voluntary

Rule-based

Automatic

Types of voting:
- Majority
- Unanimity
- Veto

Non-Voluntary

Discretionary

Non-automatic

Legal & economic procedures:
- Costs
- Contracts / Legal aspects
- Exchange rate issues
References

Cooley and Marimon (2011)
Delpa and Weizsaecker (2011)
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