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Abstract: Within the context of the Global Crisis, this paper examines the ongoing policy challenges in establishing a European framework for financial regulation and supervision. We do so taking into account the evidence provided during the crisis of pervasive spillover effects and cross-country interdependence. The paper applies game-theoretic models as tools to think about the cross-country aspects of European financial integration over time. Specifically, the paper applies the economic theory of alliances of Olson and Zechauser (1966) and the private provision of public goods of Bergstrom, Blume and Varian (1986). We contrast the non-cooperative Nash equilibrium allocation with cooperative (Coase) outcomes. The latter can be expected to obtain under zero transaction costs. We follow Coase in taking zero transaction costs as a benchmark to examine the factors that may favor (or hinder) cooperation in specific circumstances. We consider the importance of iterated interactions through the theory of repeated games, case studies, and experimental evidence to identify factors favoring or hindering successful cooperation. The total number of participants, time, foresight, multiple equilibria, leadership, the magnitude and volatility of gains and losses, imperfect and asymmetric information, decision and bargaining costs, monitoring, and enforcement are all important factors. In the paper we stress the importance of an institutional approach that minimizes obstacles to reaching cooperative outcomes. We highlight the need for effective procedures to deal with systemic risk, an agreed set of rules underpinning the single European financial market (e.g. state aid rules and a single rule book), and effective restructuring, resolution and crisis management mechanisms.

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I. INTRODUCTION AND MOTIVATION.

The Global Crisis became acute in the late summer of 2008. By the autumn, the combination of sharply falling economic activity and trade around the globe, along with severely impaired and dysfunctioning financial markets and institutions, brought to mind images and fears reminiscent of the Great Depression of the 1930s. The threat of a debt-deflation spiral loomed large.

A main difference between the Great Depression and the Global Crisis was in the policy responses. These included: first, an aggressive easing of monetary policies through interest rates cuts and central bank support through other policy tools, including the provision of emergency liquidity assistance; second, financial policies aimed at avoiding systemic financial collapse, including the provision of government capital injections and guarantees; third, expansionary budgetary policies; and, fourth, policies aimed at facilitating structural adjustments and long run stability and sustainability.

The Global Crisis affected almost all countries in an unprecedented synchronous way. Interdependence and spillover effects were widespread and costly. This was particularly so in the autumn of 2008 and in financial markets. More recently, the Global Crisis has had a significant impact on government debt markets, raising (again) issues of contagion and spillover effects.

Because of these unique features, the global crisis provides an opportunity to examine and reflect upon the practice and effectiveness of continental and global international policy coordination and cooperation in the financial stability space. In fact, in this space, the policy response to the crisis included a fifth and most important element: international cooperation. This element can most clearly be seen in the intensification of European coordination and in a

new, more inclusive form of global cooperation at the head-of-state level, namely the new G20 process.

Notably, during the crisis, although most actions were taken at the national level, there was an unprecedented willingness on the part of sovereign nations to consider and engage in joint action and to pursue a multilateral approach (e.g. on trade and on financial regulation and supervision) so as to avoid going backwards on international integration and globalization. In November 2008, at the peak of the crisis, the Heads of State of the Group of Twenty (G-20) met for the first time to discuss a cooperative policy approach aimed at restoring global financial and economic stability. This represented a turning point for international governance, both politically and psychologically. The meeting was followed up on April 2, 2009 with the G-20 summit in London and, again, on September 25-26, 2009, in Pittsburgh.

The tension between national action and international cooperation was also clear in Europe. Over time, the European Union has achieved an unprecedented degree of international integration. This is so in many dimensions (cultural, social, political, economic and financial), but the progress in European integration can be symbolized in two projects: the single European market and the single currency (the euro).

The single market and the single currency have required (and will continue to require) a degree of institutional maturity unmatched at the international level. Interdependence and spillover effects from unilateral national actions were extremely strong and visible during the crisis in the European Union in general, and in the euro area, in particular. In this context, it is not surprising that on October 12, 2009, euro area countries met for the first time at the level of Heads of State and Government. The meeting, which took place under French Presidency, aimed at drawing "a joint action plan for the Euro Area Member States and the European Central Bank in response to the current financial crisis."[1]

Already in October 8, 2008, the President of the European Commission, José Manuel Barroso, established a high-level group, chaired by Jacques de Larosière, to consider and propose changes to the European regulatory and supervisory architecture. The group reported on February 25, 2009. The main innovations recommended in the de Larosière Report were, first, the creation of a European Systemic Risk Board with a mandate to deal with macro-prudential systemic risk; and second, the creation of a European System of Financial Supervision comprised of three new European supervisory authorities dealing with banking, securities and insurance and occupational pensions. These new agencies will have binding powers when dealing with individual cases. They constitute the first ever supra-national operational supervisory authorities. The European Commission produced formal legislative proposals in the autumn of 2009. At the time of writing (June 2010), these proposals are under consideration by the European Parliament.

In the autumn of 2009, the Commission launched a public consultation on an EU framework for cross-border crisis management in the banking sector. The consultation included the crucial

[1] Available from the French EU Presidency 2008 website at http://www.eu2008.fr/PFUE/site/PFUE/lang/en/reunion_des_chefs_d_etat_et_de_gouvernement_de_la_zone_euro_21541.html

aspects of early intervention, recovery, and resolution. The results of the consultation were made available in March 2010.[2] The Commission announced that it will issue a formal Communication on the issue in the autumn of 2010.

All of the above is unique and suggests that the Global Crisis 2007 provides an opportunity to reflect upon the process of international policy coordination and cooperation and the conditions that might be necessary or lead to better outcomes. The reflection includes institutions, modalities, and effectiveness.

Accordingly, the purpose of this paper is to examine the conduct of policies by national authorities in an environment of pervasive interdependence and spillover effects. Olson (1965) argued that the model of decentralized provision of public goods could be successfully applied in a transnational context. The first example was the seminal contribution of Olson and Zeckhauser (1966) that created the economic theory of (military) alliances. They characterized deterrence as a pure public good among the members of the alliance. The framework can be adapted and applied to a wide variety of transnational issues including climate change, energy security, international trade, financial stability, and tax competition. Game theory is a useful tool for thinking systematically about international co-operation. Specifically, it provides a framework to identify the obstacles to and opportunities for co-operation in the absence of external enforcement.

In the paper, we apply the model of private provision of public goods of Bergstrom, Blume, and Varian (1986), to the case of financial stability, following the approach developed in Schinasi (2007) and Nieto and Schinasi (2007). In both cases, the benchmark is provided by non-cooperative Nash equilibrium. A number of propositions are standard.[3] For example, for the pure public goods case, Olson and Zeckhauser (1966) show that the public good is underprovided and that a large, wealthy nation bears a disproportionate share of the burden. These propositions are qualified for the case of joint products (within the framework of Cornes and Sandler, 1984). We will also discuss the possible emergence of cooperation. A starting benchmark is the case of costless bargaining considered by Coase (1960).[4]

In the paper, game-theoretic results will be presented in simple, intuitive terms. For the basic private provision of public goods model with two agents, the geometrical device of Cornes and Sandler (1986) will be used. The device will allow us to contrast non cooperative and cooperative solutions. We will also review the insights from the literature on repeated games and experimental and historical evidence. The various elements above provide a framework that can be used to evaluate institutions, rules, and practices of international policy co-operation. The specific examples we will consider pertain to financial stability.

[2] See http://circa.europa.eu/Public/irc/markt/markt_consultations/library?l=/financial_services/cross-border_management&vm=detailed&sb=Title

[3] For a rigorous presentation of the most relevant results see Bergstrom, Blume and Varian (1986). Cornes and Sandler (1986, 1996) present clear and complete textbook coverage and complete references to the literature.

[4] The general question of social cooperation, in the presence of pervasive externalities, that characterize common resources, has been investigated by 2009 Nobel Prize winner Elinor Ostron (1990).

The remainder of the paper is organized as follows. Section II presents the standard model of private provision of public goods and joint product goods. It defines financial stability as a pure public good and then later as a public good with both exclusive and non-exclusive benefits or what the literature labels a joint product. This section will describe and characterize the challenges of international co-operation and discuss circumstances favoring the emergence of effective cooperation. Section III examines and assesses selected actual attempts at European cooperation in the financial-stability space. It looks specifically at the control of state aid in the context of the single financial market; efforts to forge a new architecture for prudential supervision and regulation; and developments in the area of crisis management (including a tool kit to prevent and resolve troubled financial institutions). Section IV concludes.

II. EU Financial-Stability Challenges Viewed Through the Prism of Game-Theoretic Logic. [5]

A. The Relevance of 'Economic Theory of Alliances'

Given the difficulties involved, it is understandable that there is not much formal economic analysis of international collective action problems, no less within a European context – for example, those pertaining to the financial-stability challenges faced by the EU. The 'economics of alliances' approach analyzes the nature of 'equilibrium' outcomes that can arise when members of a group of optimizing decision makers share the benefits of a public good (or the costs of its absence) and must decide how to allocate their own scarce resources to contribute to its provision. Within this framework, the implications of a variety of decision- and policy-making processes can be modeled and analyzed.

It is an advantage of the 'economics of alliances' that one can analyze and then compare the characteristics of outcomes consistent with non-cooperative decision-making Nash equilibrium. Non-cooperative equilibrium assumes that decision makers act on their own "without any collaboration or communication with any of the others".[6] However, as we will show, the framework may also be used to discuss the possibility of and constraints on cooperation.

In this paper we apply the "Economic Theory of Alliances" to European financial stability challenges. The main idea is to think about financial stability as a good that provides both private and collective benefits to all members of the European Union (or of the euro area). Therefore, financial stability may be regarded as a public good (which may provide universal or/and exclusive benefits or joint products to different members of the group). The economic theory of alliances was designed to apply to situations like the one just described above.

[5] This section draws on the analysis in Berrigan, Gaspar, and Pearson (2009), Nieto and Schinasi (2007), and Schinasi (2007). The authors gratefully acknowledge the earlier contributions of their respective co-authors and their permission to draw on the work in the respective papers.

[6] John Nash, 1950, Ph.D. Dissertation, page 1.

B. Conceptual introduction and some intuition.

The EU framework for preserving financial stability can be likened to one in which each nation independently decides to devote part of its economic resources to provide for the stability of its national financial system—through market surveillance and the regulation and supervision of financial institutions including bank resolution policies. At the same time, no single over-arching entity devotes resources to safeguard the stability of the European financial system as a whole. Actual processes for and outcomes from European efforts to safeguard financial stability are the result of the amalgamation of decisions made by separate but integrated national financial systems.[7] Clearly the simplified description above is only a starting point as the EU framework is based on "close coordination of national policies". We postpone discussion of these important aspects of the European framework for later.

Within this simplified setting, and taking account of some of the differences between countries within Europe, three types of countries can be distinguished.

- First, consider a large country in Europe whose economic and financial activities comprise a relatively large share of European activities. In providing for national financial stability (or not providing for it) the large country may be providing both 'exclusive' public goods, whose benefits are received by nationals, and 'pure' public goods, whose benefits are received by a large majority, if not all, European countries. For such countries, the provision and maintenance of financial stability can be seen as providing joint products: the 'exclusive' or national benefits of stability to its own citizens (which collectively amounts to a public good) as well as the positive externalities of stability conveyed through market integration and cross-border financial institutions to citizens of other nations whose financial systems are closely integrated: the public good from the European perspective. The widespread benefits of 'pure' public goods can arise, for example, because of the important role of the large country's markets, financial institutions, or market infrastructures in the integrated EU market place.

- Second, there are (small) countries in the EU whose financial activities are either small relative to EU activity or primarily domestic. In these countries, the resources devoted to safeguarding national financial stability can be seen as providing primarily 'exclusive' (local) benefits to their nationals.

- Third, and by contrast, there are countries in Europe whose size and, therefore, whose resources devoted to preserve financial stability are small relative to the potential

[7] In this simplified scheme, the "quality" (of the public good) is considered constant and the "quantity" varies across countries.

externalities that might be conveyed to the EU markets (for example, because of the failure of a large cross-border bank whose parent is licensed in the jurisdiction of this small country).

Taking these differences as given, the decision making problem faced by policy makers in the EU can be viewed as one in which an alliance of a large number of countries (27 in the EU or 16 in euro area) independently decide the resources to devote to financial stability in their own economies knowing that there is some unquantifiable threat of financial instability to Europe as a whole (i.e. contagion), for example, relating to cross-border bank problems. They do so in the knowledge, or at least the presumption, that they may both be conveying benefits to non-citizens and receiving benefits from the actions of other European countries. Because each nation knows this, there are incentives for some to free ride on the benefits provided by others (e.g. more prudential supervision) and thereby devote a lower level of resources to financial stability than is optimal collectively.

This is a dilemma faced by European policy makers that the models developed below make transparent. If each nation makes independent decisions in providing a public-good in the form of financial stability, then there is the possibility that each country will devote an insufficient amount of resources to safeguarding EU financial stability as a whole and, in some countries, perhaps an insufficient level of resources nationally as well. While well-known in welfare economics, this conclusion and its implications have rarely been analyzed within this financial-stability context. Moreover, the models developed below carry several other interesting and, in our view, important implications for the current debate in Europe.

C. More Formal Analysis

The logic of a simple model of 'pure' public goods, with reference to the EU framework to preserve financial stability, can be briefly summarized as follows. Each member of a group of countries (the EU) chooses an allocation of resources to produce a 'pure' public good that conveys benefits to other countries in the group. The benefits can be seen, for example, as the management of threats to the stability of the European financial system, such as the resolution of a pan-European bank. Each country chooses a resource allocation so as to maximize its own welfare subject to two constraints: (1) its income constraint (say, GDP); and (2) the contribution of others to the provision of the public good. While not an exact indicator, a country's GDP relative to total GDP of the alliance of countries (Europe) can be seen as proxy for the volume of the country's financial activities relative to the size of the European financial system. One can think of noteworthy exceptions, but they are ignored here for simplicity but can be explicitly accommodated in more elaborate models.

Characterized as such, the simultaneous decision-making process faced by each member of the alliance of countries has many of the features of a non-cooperative mathematical game, the solution of which is Nash *equilibrium*. The Nash solution is equilibrium

in the sense that no country has the incentive to alter its allocation of resources subject to the observed decisions of all others. Each country decides by setting (national) marginal benefit equal to marginal cost, thereby ignoring the effect of the decision on others.

Keeping the exercise relatively simple—and consistent with Olson and Zeckhauser (1966)—requires a number of important simplifying assumptions: (i) all countries share the benefits of a single pure public good (as opposed to an imperfect public or club good, with some exclusively private benefits); (ii) preferences of citizens in each country can be represented in a continuous and twice differentiable utility function; (iii) the cost of producing a unit of the common public good is fixed, valued in terms of the 'numeraire' private good, and is identical in each country; (iv) all decisions are made simultaneously; and (v) the public good produced by one country is the same as another (perfect substitutability).

The n-country model can be written as:[8]

$$\max_{\{y^i, q^i\}} \left\{ U^i \left(y^i , q^i + \sum_{j \neq i}^{n} q^j \right) \text{ s. t. } I^i = y^i + p q^i \right\} \text{ for all i, j = 1, 2. . n, i} \neq \text{j,} \qquad [1]$$

where y^i denotes the consumption of private good by individual i and q^i the contribution of individual i to the provision of the public good, p denotes the relative price (or cost) of the public good (using the private good as numeraire).[9] Most conceptual issues can be clarified by using the simple two agent case. For such a case, it is possible to use the budget constraint to eliminate the private good from the utility function, and possible to write utility as a function of q^1 and q^2. Therefore, in the two agents, two goods case it is possible to present all the main results and intuition on the basis of a graphical device (due to Cornes and Sandler, 1986).

For the two agents case equation [1] may be written as:

$$\max_{y^i, q^i} \{ U^i(y^i; q^1 + q^2) s.t. y^i + p q^i = I^i \} i = 1, 2$$

The basic idea that allows for the graphical representation derives from noting that:

[8] S A full mathematical description of the model and optimization exercise is beyond the scope of the paper. A textbook presentation is available from, for example, Cornes and Sandler (1996).

[9] As usual in microeconomics it is assumed that the utility function reflects non-satiation in both goods and convexity of preferences.

$$\max_{y^i, q^i}\{U^i(y^i; q^1 + q^2) s.t. y^i + pq^i = I^i\} = U^i(I^i - pq^i; q^i + q^j) i, j = 1, 2 and i \neq j$$

Therefore it is possible to consider a representation in the (q^1,q^2) space. In Figure 1 we start by considering agent's 1 problem. Let us consider initially the case when agent 2 does not contribute to the provision of the public good. Under such conditions the maximum that country one will be able to consume of the private good equals its income, I, and the maximum it can contribute to the provision of financial stability equals I/p. Confronted with the budget constraint corresponding to zero provision from the other agent the best country one can achieve is point 0 on Figure 1, where indifference curve 0 is tangent to the budget constraint.

Consider now an alternative situation in which country 2 contributes q^2 to the provision of financial stability. In these new circumstances country 1 can now afford to consume more, both of the private good and of the public good. Therefore, the budget constraint shifts out. Specifically, the maximum amount of the public good attainable is now (I/p)+q^2. The maximum amount of private good that country 1 can consume remains unchanged (because the contribution to the provision of financial stability has to be non-negative).

Since an increase in country 2's contribution to financial stability leads to a parallel outward shift in the budget constraint it is equivalent, for country 1, to an increase in income (with the qualification above concerning non-negative contributions to the provision of the public good). Therefore, if both goods are normal, an increase in country 2's contribution leads to an increase in private good consumption by country 1, to a reduction in country 1 contribution to the provision of financial stability and to an increase in the overall amount of resources devoted to financial stability. In other words, country one's best response or reaction function is negatively sloped in the space (q^1, q^2) – see Figure 2.

The optimization problem facing country 2 is similar. It follows that, in the same conditions, country two's best response or reaction function is also negatively sloped in the space (q^1, q^2). When both goods are normal goods an increase in country 1's contribution leads to an increase in private good consumption by country 2, to a reduction in country 2 contribution to the provision of financial stability and to an increase in the overall amount of resources devoted to financial stability.

Both countries reduce their contributions to the provision of financial stability in response to an increase in the other's efforts. However, when both goods are normal, the overall amount provided increases. It is, therefore, clear that reaction curve of country 1 (N1N1, in Figure 2) is more vertical than the reaction curve of country 2 (N2N2, in Figure 2). Under the conditions, a single Nash equilibrium exists and it is stable under simple adjustment mechanisms (see Bergstrom, Blume and Varian, 1986 or Fudenberg and Tirole, 1991)

The most relevant implications of the model are stated as Propositions C1-to-C5: [10]

[10] See Schinasi (2007) for a demonstration of these results.

- **C1: The Nash equilibrium is inefficient.** As is well known in other contexts, the (decentralized, non-cooperative) Nash-equilibrium level of resources devoted to financial stability would be suboptimal relative to the Pareto-optimal allocation.

No country considers the costs and benefits of its resource-allocation decisions in producing the pure public good for other European countries. Consequently, a sub-optimal level of the public good will be provided by a decentralized process compared to a coordinated one in which even only some of the positive externalities (benefits) from collective action can be internalized and distributed to all European countries. All of the shaded area in Figure 2 identifies feasible contributions to the provision of financial stability that lead to increases in the welfare of both countries.

- **C2: Exploitation of the large by the small**: Because of the model's decentralized decision-making process, some countries (smaller ones) may find it optimal to free-ride on the efforts of others (as implied by perfect substitutability in the provision of the public good). This would be reflected in the country distribution of the supply of the public good. More specifically, the optimal allocation of the burden of safeguarding financial stability (for example, the sharing of the costs of resolving a cross-border banking problem) falls disproportionately on the larger (higher income) countries—in the sense that they provide a share of the public good that exceeds their GDP share in the group of countries. That is, in the Nash equilibrium, a large country's share in providing the group's total public good will exceed its GDP share in the Union.

- **C3: Reaction functions (demand functions for the public good):** In the Nash equilibrium, member countries' propensities to provide the public good (that is, their policy reactions to a threat to their financial stability) will depend on four factors: country-specific income, the relative cost of producing financial stability, the aggregate amount of resources devoted to financial stability by other member countries, and the commonly perceived threat of financial instability. If all factors were in fact measurable, these derived policy reaction functions would be estimable.

- **C4: cooperation has the potential to improve on decentralized equilibrium:** as a corollary to C1, in case the players are able to coordinate effectively they have the opportunity to improve on the decentralized equilibrium.

It is important to recognize that C4 is a simple corollary of C1. If there are feasible opportunities to improve the situation of both countries then it logically follows that it is feasible to improve on the decentralized equilibrium through co-operation. In Figure 2 we identify the relevant geometric region by CC (for Coase). We will comment further on this below (see sub-section 2.D.).

- **C5: enlargement of the alliance is beneficial in the case of pure public goods:** The addition of new member countries (e.g., EU enlargement) would imply additional

marginal benefits to the group as a whole (more contributors) without a diminution in the benefits for existing member countries to the extent that public goods are non-excludable and non-rival (as the model assumes) and the threat to financial stability is not increased. [11]

These implications are conditional on the assumptions made and will change if some of the assumptions of the model are relaxed or altered. For example, if one allows for country differences in the marginal cost of producing the pure public good, optimal decentralized decision making would imply that the more efficient countries would take on a larger share of the EU wide costs regardless of their size. Thus, by relaxing this assumption, a country with a comparative advantage in providing, for example, efficient and relatively reliable clearing and settlement services might end up devoting a greater amount of resources to producing this particular good to the benefit of all of Europeans.

D. Coase Equilibria as the More Desirable Outcomes (a first pass)

It is possible to improve on the de-centralized Nash equilibrium through collective action or bilateral (or multilateral) negotiation. For example, starting from point N, if, for example, country 1 would increase its contribution, it would be possible for country 2 to increase its contribution so as to ensure that 1 would move along its indifference curve, while country 2 would improve its welfare. The entire shaded area in Figure 1 includes pairs of contributions that are Pareto superior to the Nash equilibrium.

In 1960, Ronald Coase stated a tautology with far-reaching implications for the solution to collective action problems. This tautology became known as the Coase Theorem. It provides a device for examining private solutions to collective action problems. The idea is that in an environment with perfect information and costless bargaining, a mutually beneficial agreement will be reached whenever there is one.[12]

Coase's theorem was developed to apply to bargaining situations in private markets among private agents in which there are costs and benefits associated with externalities or spillovers. The classic example is the case of straying cattle that damages crops on neighboring land. However, Coase's theorem appears to be equally applicable to bargaining situations involving groups of countries (such as the EU) when national-government decisions pertaining to economic, social, cultural, and political policies are associated with externalities or spillovers.

In principle, it seems rational and reasonable to think that the fundamental intuition from the Coase Theorem can apply in Europe to a very broad range of policy decisions (Gaspar, 2006 formulated this question). In such cases, spillover effects can be internalized through

[11] This result follows from the pure public good formulation and the implicit assumption that risk is invariant to the number of countries. If one introduces idiosyncratic risk and the risk of contagion the result would not follow.

[12] Coase (1960) is the original reference. See Bowles (2004, pages 221-232) and Shavell (2004, page 84).

negotiation and collective action, which in turn can lead to more efficient outcomes. The plausibility of more efficient outcomes increases once it is acknowledged that the number of decision makers is limited and that by meeting repeatedly – within the context of various EU organizations, Committees, and Working Groups – decision making and outcomes can benefit from ample opportunities to communicate, share information and analyses, and find mutually advantageous agreements. Given the existing framework, it is reasonable to observe that Europe today is far from a situation in which nations and their decision makers act in isolation on their own "without any collaboration or communication with any of the others".[13] By definition, when opportunities for mutually beneficial agreements have been exhausted a Pareto optimal solution has been reached.

The Coase Theorem predicts an outcome along the CC line in the northeast part of Figure 2, in the portion bounded by the two indifference curves corresponding to the Nash equilibrium. In the context of EU financial regulation and supervision, the expression "close cooperation among the competent national authorities" may be interpreted as the challenge of managing the transition from a non-cooperative Nash equilibrium to an efficient collective action outcome along the CC line. In some areas of European integration and cooperation it is reasonable to argue that such a transition has already been successfully completed.

As will be discussed further later, although potentially useful for examining EU processes for coordination and cooperation, the Coase Theorem has important limitations. In a nutshell, the theorem assumes costless bargaining. Specifically, the theorem implies the absence of transactions' costs and the existence of perfect and symmetric information. Some examples of how departures from these assumptions affect outcomes will be examined in the remainder of the paper. One point is immediately clear from the observation of Figure 2, however: there are multiple efficient allocations (meeting the Pareto criterion and individual rationality). Any effective solution to the negotiation process or collective action problem must be able to focus on one single solution. Such an outcome is not necessarily easy because country 1 welfare improves and country 2 welfare declines as the solution moves from south-east to north-west in Figure 2.

As already discussed, it seems that in the European Union conditions are in place to benefit from an application of Coasian thinking to collective decision making. First, the number of players involved is limited. Second, the game is repeated as the financial stability framework is applied and reformed over time. Third, "close cooperation" takes place in the context of a number of committees and working groups where responsible policy-makers and experts identify the relevant issues and work to find acceptable solutions. Fourth, the members of these groups are well aware of the problems identified in the relevant literatures (and more).

In the remaining sub-sections of section 2, the paper discusses extensions and interprets the basic model in order to build a conceptual framework to assess institutional change in the EU financial system and its ability to safeguard financial stability. The next sub-section introduces the case of 'exclusive' or 'impure' public goods. In the literature, these cases are known as joint products cases for reasons that will be explained below.

[13] See quotation from Nash above.

E. A more complicated case: the joint products model.

Countries in Europe provide financial-stability public goods whose benefits are also country-specific and convey exclusively to economic agents residing within the country. For example, countries in Europe have country-specific deposit insurance schemes that protect domestic depositors in segments of the national banking system that are exclusive retail, domestic financial institutions (such as, for example, the Sparkassen in Germany). More generally, the geographical distribution of banks' customers – with proximity playing a very important role – implies that some aspects of financial stability will accrue in accordance with well-defined territorial patterns.

By contrast, there are elements of the EU financial safety net that require domestic public expenditures and public maintenance but that nevertheless convey public good benefits across a large part, and in some cases the whole, of the European financial landscape. For example, there are costs associated with the European framework of prudential regulation and with operating financial infrastructures in European countries – such as large-value payments systems.

Once the possibility of 'exclusive' or 'impure' public goods is acknowledged and accounted for, the nature of the decision-making process within a country and among a group of countries changes – as do the country and potential collective benefits. In particular, while the set up of the model is the same as before, the public good conveys two types of joint benefits: 'exclusive' public-good benefits that convey only to the citizens of that specific country, and 'fully shared' public-good benefits to all other members of the group of countries (i.e. non contagion or absence of European systemic crisis)[14]. A key parameter in this model is the share of 'exclusive' benefits to the producing country relative to total benefits to all of Europe.

With the introduction of 'exclusive' benefits (i.e., 'impure' public goods), Nash reaction functions can become nonlinear and upward sloping – due in part to the possibility of complementarities between the goods provided by different agents (countries). This implies that there could be a multiplicity of Nash equilibriums even though all goods are 'normal' goods (in the sense that demand rises/falls with income).[15] This contrasts with the results reported in sub-section C: for the case of pure public goods if both goods are normal there is a unique Nash equilibrium.

The implications of this more complicated model can be summarized as follows.

[14] Clearly, the distinction of only national and European aspects of public goods provision is a simplifying assumption. For example, some important aspects of deposit-taking and credit provision will be associated with very pronounced concentrations at the sub-national (regional) level. On the other side, some international bank conglomerates have a truly global reach. However, the generalization to a multi-layer case is straightforward.

[15] A full mathematical description of the model and optimization exercise is beyond the scope of the paper. A textbook presentation is available from, for example, Cornes and Sandler (1996).

- **E1: Nash equilibrium is inefficient:** As in the 'pure' public good model, other countries' welfare are unaccounted for in each country's decisions and so the resulting Nash equilibrium is still sub-optimal compared to one in which the decision making process internalizes spillover effects.

- **E2: Exploitation is mitigated (relative to the case of pure public goods):** The greater are the exclusive benefits to a particular country relative to total benefits, the lower will be the extent to which the cost of providing shared benefits will fall disproportionately on larger countries.

This is because as exclusive benefits take a greater share of total benefits (and as national financial stability becomes the exclusive benefit), smaller countries may capture fewer shared benefits and devote more of their resources to produce exclusive public goods. In other words, when there are country-specific benefits, small countries have a greater incentive to produce the public good (financial stability). As the exclusive benefits relative share to total benefits approaches one, market solutions and the formation of 'clubs' or 'coalitions' are capable of yielding solutions that achieve more efficient equilibrium outcomes (for example, consider the special coalitions between the Nordic and the Benelux countries to safeguard financial stability). This occurs because when there are exclusive country-specific benefits, more of the benefits of a public good are received by the country producing it. Accordingly, equilibrium outcomes are associated with a greater association between a country's benefits received and costs incurred, which is welfare-improving for all country members concerned.[16]

- **E3: Demand functions:** the pure public goods model can be nested into the joint products model. The determinants of demand functions in the latter case are as in the former. However, in the standard pure public goods model, income enters the model in the same way as spill-ins.[17] In the case of joint products, the demand for the public good is influenced in two ways by the increase in other countries' effort devote to the provision of the good: indirectly through full income and directly through spill-ins.

- **E4: Reaction functions:** In the pure public goods set-up, if both the private and public good are normal goods the slope of the reaction function will be negative. However, in the joint products case the reaction curves can be positively sloped even when all goods are normal. This requires that the pure and impure public goods are strong complements.

[16] Empirical evidence suggests that the public-good benefits of deposit insurance are mainly local. This outcome is consistent with this proposition, namely that because the benefits are local or exclusive, deposit insurance is provided locally by national authorities. Moreover, there would appear to be few incentives for a transnational scheme for deposit insurance, although this need not exclude the possibility and the existence of benefits of harmonization across jurisdictions.
In the literature on the economic theory of alliances, the joint products model was developed because of an empirical challenge. With available data up to 1964, the burden-sharing pattern across NATO countries seemed in line with the exploitation hypothesis (Olson and Zeckhauser, 1966). However, in the late 1960s and 1970s the hypothesis no longer seemed to apply (see Sandler and Hartley, 1995) for a review and complete references to the relevant literature.

[17] Full income aggregates income with the value of spillins from other countries' provision of the public good. The concept is due to Bergstrom, Blume and Varian (1986).

- **E5: Possibility of Multiple Equilibria**: In cases in which the reaction functions are positively sloped (and non-linear), there may be multiple equilibria (that may be ranked in accordance with the Pareto criterion) [18].

- **E6: Endogenous alliance size (the effects of thinning):** joint products with different degrees of rivalry in consumption lead to the possibility of benefits associated with the partially rival goods. In such cases, new members will be admitted only as long as the marginal benefits from cost sharing exceed the marginal costs from dilution of the benefits from (partially) rival goods (thinning).

The literature on the economics of alliances suggests that the existence of joint products could in reality make it easier to agree on collective action and coalition forming than the case of the pure goods model. As Sandler and Sargent (1995) demonstrated, a joint-products' view may result in a coordination game where one of the Nash equilibrium would have all countries contributing to the collective action. If the 'pure' public-good benefits are a sufficient share of total benefits, then contributing to the activity may even be a dominant strategy. That is, if coordination allows countries to take advantage of country-specific benefits as well as excludable public benefits, then the payoff pattern may be more conducive to encouraging all countries to make contributions to the 'fully shared' public-good. Thus, the mix of joint products and their public-ness can influence how coalitions and alliances are formed.

F. Coase's perspective: a fuller discussion.

The very simplified presentation and discussion of the Coase Theorem in sub-section D. fails to do justice to the relevance of Coase's insights for the problem at hand. In 1991, Coase was awarded the Nobel Prize in Economics. According to Oliver Williamson (2008), the introduction of contracts as the driving force underlying economic transactions and outcomes was the essence of Coase's contribution from his seminal papers (Coase, 1937, 1946, 1960). Prior to Coase's analyses, economics had concentrated primarily on the science of choice. Coase advocated the need to complement this traditional perspective with an analysis of contracts, thereby bringing together law, economics, and organization theory.

As does most of the economics literature, sub-section D above focuses on the Coase Theorem – that is, on cases in which there are zero bargaining (or transaction) costs. The argument covers only a very small part of Coase's contribution confined to sections III and IV of the 1960 paper. The case of zero transactions costs was meant by Coase to be an introduction to the much more relevant case of non-negligible transaction costs (see Coase's Nobel Lecture –

[18] For a proof of this implication of product complementarity of pure and exclusive goods in the joint product model see Cornes and Sandler (1986) pp. 118-21, following Cornes and Sandler (1984).

Coase, 1991). The Coase Theorem is best regarded as an extreme benchmark and starting point for further analysis. In the extreme case, Coase (1960) showed that the details of liability for damages would not affect efficiency in resource allocation. Costless bargaining in competitive environments would be sufficient to eliminate inefficiencies.

A world of zero transactions costs is obviously very far from experience. To make the point clear it suffices to quote (again) from Coase (1988): "Another consequence of zero transaction costs, not usually noticed, is that when there are no costs of making transactions, it costs nothing to speed them up, so that eternity can be experienced in a split second." The remark suggests the importance of looking at how long run interactions may facilitate cooperation. This is a specific way of identifying institutions that lead to more efficient outcomes. The example in sub-section C of this paper suggests that this is not easy. In Figure 2, all feasible allocations that improve on the Nash equilibrium violate the reasonable constraint that each decision maker's action be a best response to the other's action. In other words, for all allocations in the gray area, each country has an incentive to defect (if it can get away with it).

Clearly, consideration of the future may eliminate (or limit) defection. In game theory, a model of repeated games is the simplest set up that allows for the endogenous modeling of strategic interactions over time. Within repeated games, the most intuitive and technically easiest case is that of low or no discounting (so that future matters the most).

The intuition of repeated games is well captured in the so-called "folk theorem."[19] The main point is that when agents are sufficiently patient there are many outcomes that can be obtained as equilibria. More specifically, for patient individuals (with discount factors sufficiently close to one), every payoff that is feasible and individually rational can be sustained as an equilibrium. The intuition is simple: For patient decision makers, any finite gain from a short term deviation from the equilibrium will eventually be offset by a reduction in the payoff into the indefinite future. It follows that any equilibrium that respects the individual rationality constraint will ensure compliance of a deviating decision maker through the threat of pushing him to that lower bound in every subsequent period.

One problem with the "folk theorem" is that it requires unrelenting punishment of deviating behavior even when it is very costly for the punisher. Punishment may not be an equilibrium action for the punisher when the relevant time comes. In game theory, such strategies are said not to be "sub-game perfect".

James Friedman (1971) derived a result concerning sub-game perfect equilibria for repeated games with discounting. He showed that any outcome that is strictly superior (in the sense of the Pareto criterion) to a static Nash equilibrium can be sustained by a sub-game perfect equilibrium when the discount factor is sufficiently close to one. Fudenberg and Maskin (1986) extended this result by showing that in the case of two players – or, for any (finite) number of players when an additional "full dimensionality" condition holds – "any individually rational payoff vector of a one-shot game of complete information can arise in a perfect equilibrium of the infinitely repeated game, if players are sufficiently patient." The Friedman result shows

[19] See Fudenberg and Tirole (1991) and Fudenberg and Levine (2009) for rigorous presentation, interpretation and references to the literature.

that all points in the gray lens (in Figure 2) can be supported as sub-game perfect equilibria of a repeated game when agents are sufficiently patient.

Fudenberg and Levine (1991) derived a very general set of results for the case of private information when there is no discounting. More recently, Fudenberg and Levine (2007) proved that the results for games with public monitoring can, under well specified conditions, be approximated for games with private monitoring and communication.

The "folk theorem" and its extensions show that when agents are sufficiently patient, there are many allocations that can be obtained as Nash equilibria, including efficient allocations. In Figure 2, in the one-shot game, all allocations inside the gray lens are socially feasible and Pareto superior to the Nash equilibrium. According to Friedman (1971), they can be supported in Nash equilibrium, for the repeated game for a discount factor sufficiently close to one. The good news is that efficient outcomes (co-operative) can be supported in equilibrium. The importance of this point cannot be over-estimated. It opens an avenue to use the theory of repeated games to explain endogenously how players can be motivated to depart from their short run (selfish) interests in the absence of external enforcement. This kind of endogenous mechanism can be used to explain the emergence of trust and cooperation in society. A fascinating example is provided by North and Weingast (1989) who look at the transformation of economic institutions in England in the wake of the Glorious Revolution.[20]

However, since many allocations can be supported as equilibria, game theory has low predictive power. That is, any socially feasible allocation that is individually rational can be obtained as equilibrium.

Problems associated with multiple solutions (equilibria) have been known and explicitly recognized for a long time (at least since Edgeworth's Mathematical Psychics of 1881). Edgeworth identified the locus of possible contracts between two parties as the set of allocations that cannot be disturbed by the voluntary consent of both parties and ensure to each greater utility than in the absence of a settlement. Edgeworth stresses the evils of indeterminate contracts, deadlock, and the irreducible opposition of interests. Nevertheless, he goes on to argue that it is in the best interest of both parties to agree on some contract and that we would expect them to be able to do so. In contrast, Samuelson (1947) writes: "… from any point off the contract curve there is a movement towards it which would be beneficial to both individuals. This is not the same thing as to say, with Edgeworth, that exchanges will in fact necessarily cease somewhere on the contract curve; for in many types of bilateral monopoly a final equilibrium may be reached off the contract curve." Samuelson is clearly right and in line with the findings from the "folk theorem" and extensions.

In this respect, Coase (1988) makes a crucial remark: "Samuelson asserts as "an empirical statement of fact" that people, in the situation analyzed by Edgeworth, will not necessarily end up somewhere on the contract curve. This is no doubt correct, but a fact even more significant is that normally we would expect them to end up there."

[20] See Greif (2006) for a complete overview, further examples and references to the literature.

Is Coase's optimism warranted? It does seem to be in line with experimental evidence (see, for example, Ledyard, 1995, Roth, 1995 and Dal Bó, 2005). Dal Bó introduces the memorable notion of "the shadow of the future": "when there is always a future, as in infinitely repeated games, the credible threat of retaliation casts "the shadow of the future" in every decision and can overcome opportunistic behavior and support cooperation, thereby solving the tension between private incentives and the common good." Nevertheless, according to the experiments performed by Dal Bó, cooperation increased in some cases in which cooperation was a possible equilibrium action but not in others. More explicitly, learning supports cooperation in some cases but not in others. The identification of conditions favoring cooperative outcomes is a priority area for future theoretical and empirical research. In any case the results show that the identification of cooperation as a possible equilibrium is not sufficient for the emergence of cooperation. The experimental literature has produced few robust and general results. Dal Bó's finding that the prospect of future interaction improves cooperation is a key exception. In addition, Ledyard (1995) finds that marginal payoffs and communication have a systematic effect on individuals' ability to cooperate. These findings are in line with the results from the models presented in sub-sections C and E above.

Another relevant strand of research is associated with Elinor Ostrom. She looked at real-world cases of decentralized, voluntary solutions to common property resource management (e.g. water resources and fisheries). Her seminal work is collected in Ostrom (1990). She documents a number of successful cases in which individuals have been able to tackle the challenge of common property resource management. Ostrom's research identifies conditions favoring the emergence of effective collective action mechanisms and the characteristics of enduring arrangements. Her findings may be summarized (in simplified form) as follows:

The emergence of successful and enduring solution to collective problems is more likely when:

1. The number of actors involved is limited.
2. There are players with assets or abilities that allow them to play a leadership role.
3. The number of participants needed to ensure the viability of an agreement is small.
4. Players have long horizons (low discount rate).
5. Players have similar interests (complementary in action).
6. Opportunities exist for easy ex ante communication and ex post monitoring.
7. Graduated sanctions for non-compliance are in place.
8. There are effective conflict resolution mechanisms.

As stressed above, transactions cost are pervasive. Coase's research programme envisaged investigating the organization of economic exchange and activity in the presence of transaction costs. But what are transaction costs? Carl Dahlman (1979) described them as

"search and information costs, bargaining and decision costs, policing and enforcement costs," and was quoted with approval by Coase (1988).

Research on transaction costs and on the possibility of the emergence of decentralized solutions to collective action problems is very active today. The issue is far from closed. Nevertheless, the game theoretic models, the experimental evidence, and the case studies reviewed in this section provide a set of principles that can be used in the examination of particular cases. In our reading of the lessons from theory, experimental evidence and case studies are remarkably consistent.

In section III we apply these lessons to examine the way forward for financial supervision and regulation in the European Union.

III. European supervisory and regulatory framework to maintain financial stability[21].

In the EU, financial market integration is part of the Single Market process and is, thereby, actively promoted by institutions such as the European Commission and the European Central Bank. Financial integration unambiguously favors competition, liquidity, and cost minimization. It also expands opportunities for profitable investments and for risk spreading and risk diversification. Moreover, it allows economic entities to smooth consumption over time, thereby expanding the opportunity set and increasing welfare (see, for example, Kalemli-Ozcan and Sørensen, 2008 and Jappelli and Pagano, 2010).

By contrast, the impact of European financial integration on the ability to maintain financial stability is ambiguous. On the one hand, a large and integrated market allows, as mentioned above, for additional scope for risk spreading and risk diversification. On the other hand, integration increases inter-connections across borders. Therefore, it increases the potential for spillover effects, especially when extreme events occur, and creates potentially destabilizing opportunities for regulatory arbitrage.

The framework for EU cross-border banking regulation and supervision derives from banking directives, first adopted in the context of the Single Market Programme of 1985-92. It is comprised of four main elements: **EU-wide rules** (implying a degree of harmonization across member states), **mutual recognition** of national rules, enforcement of all rules based on **national responsibility** (in line with home-country control), and **close cooperation** among competent authorities at both EU and national levels. Application of the framework varies, depending on the legal structure of the bank (i.e., whether it is a branch or subsidiary) and its business model, in particular, the extent to which it engages in cross-border business and has cross-border exposures. As pointed out in section 2, the principle of close cooperation among

[21] This section draws, in part, on material from Berrigan, Gaspar, and Pearson (2009).

the competent authorities reflects the aim of reaching a cooperative solution. It is, therefore, worthwhile to examine how cooperation works.

There are presently less than 50 EU cross-border banking groups – from a total of more than 8,500 banks – with significant holdings of cross-border assets and liabilities. All other banking institutions have primarily national businesses and exposures. Accordingly, the overwhelming majority of banking institutions, in principle, can be well regulated and supervised within the decentralized EU framework because it takes advantage of the local knowledge and expertise of local supervision.[22] By contrast, supervision of the cross-border exposures of the larger banking groups would seem to require additional efforts to ensure that relevant spillover effects are effectively internalized. The issue is central for safeguarding EU financial stability as cross-border banks are important in the EU banking sector (e.g. cross border banks hold more than 68% of total assets of the EU banking sector).

Thus, except for the 50 or so cross-border banks, current EU decentralized arrangements for banking regulation and supervision would seem to be appropriate in the sense that the territorial scope and nature of bank activities more-or-less matches national responsibilities for regulation and supervision.

In contrast, cross-border banks have restructured their organizations to profit from the integrated single market for financial services. Many have centralized key functions irrespective of their legal structure (branch-based or subsidiary-based). As business models and internal organizational structures change, the supervision of individual legal entities within a banking group becomes increasingly less relevant. At the same time, the risk of duplication of reporting and inconsistent supervisory requirements increases. The case of cross-border banks illustrates what in the de Larosière Report has been identified as the lack of a consistent and harmonized set of core rules. According to the Report, national specificities should be identified and eventually eliminated when their removal would: (i) improve the functioning of the single market; (ii) avoid distortions of competition or regulatory arbitrage; (iii) improve the efficiency of cross-border financial activity in the EU. Implicit in the foregoing is the necessity to co-operate in crisis management.

In the context of EU regulation and supervision, the expression "close cooperation among the competent national authorities" may be interpreted as the challenge of managing the transition from a non-cooperative Nash equilibrium (point N in the graph) to an efficient Coasian collective-action outcome that is Pareto optimal (along the CC line in the graph). The discussion above suggests that in some dimensions the supervisory and regulatory framework

[22] We do not mean to imply that all is well regarding supervisory frameworks and practices in individual EU member states. Garcia, Lastra, and Nieto (2009) survey and analyze EU member states' supervisory frameworks and practices and find that they diverge widely among EU members. They find (on pp. 244-45) that not all supervisors have the tools necessary to induce effective remedial action for banks whose capital decline below minimum regulatory levels or who engage in excessive risk taking. In particular, they find that "not all supervisors can levy fines, remove errant managers, impose stricter capital requirements, require a remedial plan, appoint a special inspector, impose condition on the chartered bank, or restrict business activities including the prohibition of any capital expenditure. Not all supervisors can curtail owners' voting rights, initiatee reorganization or winding-up procedures, or appoint a conservator to run it." Supervisory powers to prevent asset transfers also varies widely across EU member states.

in the EU already approximates such a situation. At the same time, current arrangements do not seem sufficient for banking groups with substantial cross-border activities.

European financial integration is an evolving reality. Europe's financial landscape, before the crisis, was becoming, gradually (but rapidly) more integrated. The pace of change appeared to have stepped up with the creation of the euro area. The introduction of the single currency has had very pronounced (and measurable) effects on cross-border activities, especially in money markets and in bond markets[23]. Jappelli and Pagano (2010) affirm that money and government bond markets became fully integrated almost immediately with the introduction of the euro[24].

In general terms, the remarks above point to a fundamental tension between a financial regulatory and supervisory architecture based on the exercise of national responsibilities founded on home-country control, and mutual recognition, on the one hand, and the active promotion of European financial integration effectively encouraging private organizations to ignore national borders, on the other hand.[25] The Global Crisis brought the relevant issues into sharp focus. The most integrated financial markets – money markets and bond markets – were also the most affected by the crisis. Interbank money markets have been repeatedly affected by a heightened perception of counter-party risk. Moreover, in the autumn of 2008, emergency measures taken to limit financial turmoil risked segmenting the Single Market along national lines.

In the next three sub-sections we will examine from the perspective of game theory the progress in EU cross-border cooperation in three important financial-stability areas: (1) state aid to financial organizations; (2) cross-border financial supervision and regulation; and, (3) crisis management, bank re-structuring, and orderly crisis resolution.

A. The European Single Financial Market and State Aid.

The Single Market provides common economic and financial benefits to citizens of all Member States. In the language of section 2, the Single Market is a European public good. It needs protection against the possibility of encroachment or free-riding from individual countries. The European Union Treaty includes such safeguards in the form of a competition policy and state aid rules. Competition policy is an exclusive competence of the Union; and, together with state aid rules, it aims to create and maintain a level playing field in the single

[23] See Annual Financial Integration Reports released by the European Commission and by the ECB.

[24] The turmoil in sovereign debt markets that started in the autumn of 2009 and reached an acute stage in May 2010 is particularly relevant for financial stability given the cross-border relevance of government bonds. Clearly there are important policy spillovers in this area. Nevertheless we do not discuss the issue in the paper. In the European Union relevant issues pertaining to euro area governance are under discussion by a high-level task force, chaired by van Rompuy, President of the European Council, The task force will complete its work in early autumn 2010.

[25] See, for example, Padoa-Schioppa, 2004, for an early formulation of the problem and extensive references.

internal market. State aid rules, in particular, constrain the ability of governments to distort the functioning of the single market. The core provisions on state aid rules are in articles 107-109 of the Treaty on the Functioning of the European Union[26]. Article 107 establishes that, in general, state aid is contrary to the common market, and it lists a number of exceptions to the rule. Paragraph 3, of article 107 allows the Council to decide, by qualified majority, on a proposal from the European Commission, on further exceptions. Article 108, paragraph 2, allows the Council to decide by unanimity (on application from a Member State) that aid that the latter granted or intends to grant is compatible with the common market. More importantly article 108, paragraph 3, imposes the obligation to notify the European Commission. Failure to notify renders aid incompatible with the common market. National courts and authorities are then obligated to recover the aid granted.

The Global Crisis created strains on the Single Market that originated in the actions of Member States' competent authorities through two different channels: (1) actions to prevent a financial meltdown,- and (2) actions associated with mitigating the impact of the crisis on the vulnerability of some manufacturing firms. This paper focuses exclusively on the financial sector.

In the late summer and autumn of 2008, some financial institutions faced the possibility of massive withdrawals of deposits and other sources of funding. The borderline between illiquidity and insolvency became blurred. Governments stepped in to guarantee deposits and other bank liabilities and also to foster re-capitalization[27]. The amounts approved for capital injections, guarantees on bank liabilities, relief of impaired assets, and liquidity and bank funding support are enormous. They represent 43.6 per cent of the GDP in the European Union and 36.5 per cent in the euro area. Amounts effectively granted are smaller but still sizable at, respectively, 11.8 and 11.1 per cent. Government support was deemed as necessary to avert a financial meltdown and the associated and potentially dire economic and social consequences.

At the same time, there was the clear and present danger of spillover effects among Member States and disruptions to the Single Market. A good example is the unilateral broadening of deposit insurance by Ireland in September 2008. The unilateral reform of Ireland's deposit insurance scheme, as originally designed, could have led to a massive re-location of deposits from other EU countries to Ireland. In the heat of the moment, other Member States, starting with the UK, had little alternative except to follow. The immediate need for collective action became pressing.

Article 107, Paragraph 3, b allows state aid "to remedy a serious disturbance in the economy of a Member State". In the event, it permitted the flexibility needed to respond to the Global Crisis. The Commission reacted very rapidly to notifications frequently during weekends and even within 24 hours. In the case of Ireland, the European Commission reacted swiftly and the ECOFIN Council agreed to raise the minimum amount of deposit guaranteed. In our view, this is a clear example of a coincidence of a strong crisis-management imperative, the need for decisive action at the national level, and the possibility of far-reaching and

[26] Corresponding to articles 87-89 of the Treaty establishing the European Community.
[27] See Table III.2.1. (page 63) in European Commission, DG-ECFIN, 2009.

evident spillover effects for other EU Member States financial systems. It is a situation that called for crisis-management coordination and collective action.

More generally, the Commission, through a series of Communications (see Table 1) provided a framework for proper use of government support in the context of the Global Crisis. It defined three main criteria indicating that state aid should: (1) be well-targeted; (2) be proportional to the goal pursued; and (3) minimize spillovers and distortions.

In the framework of the European Union, aid schemes are reviewed every six months to avoid that aid measures last longer than necessary. In other words, the Commission's guidelines aim to ensure that state aid to financial institutions does not give rise to disproportionate distortions to competition and adheres to the principle of a level playing field. Relevant aid measures are clearly defined, have limited duration and a complete list is available for public scrutiny.

One aspect of the process of review of state aid by the European Commission which was widely reported relates to the examination and approval of restructuring plans. The main considerations are to ensure that the organization receiving aid returns to viability without the need for continued state support and that competition in the relevant markets is not permanently distorted. Cases examined included RBS, Lloyds, ING, KBC, LLBC and Dexia. In many cases restructuring involved divesting in relevant business areas to make sure that the corporations benefiting from state aid did not get an unfair advantage in the market place. By limiting the gains to organizations receiving state aid, competition policy helps (indirectly) to mitigate moral hazard.

State aid granted in the context of the Global Crisis and the European Single Market highlights a number of very important points. First, European state aid rules proved compatible with the urgent need to avoid a systemic financial meltdown and to provide support to mitigate the social and economic consequences of the crisis. Clearly, the collapse of an institution, located in any one Member State, could, in the midst of financial turmoil, lead to systemic consequences spreading throughout the Single Market. The global fallout could also be considerable. In the language of the game-theoretic framework presented in section 2, the avoidance of a systemic collapse is very close to the extreme concept of a pure public good. Forceful, effective action is in the best interest of Europe and of the rest of the world.

Second, the framework that protects the integrity of the Single Market originates in the Treaty. Market integration is at the core of the process of European integration. Therefore, preserving the existences and stability of the Single Market is a key common good for all Member States. This is the prime justification for competition policies and state aid rules. In general terms, recipients of aid have to produce a restructuring program that allows them to return to viability under "normal" market conditions. At the same time, fair conditions for competition should be available to the recipient firm's competitors.

A crucial question is: Are the EU rules sufficiently robust to avoid the fragmentation of the Single Market under severe crisis circumstances? There are reasons to be optimistic. As described above, the Single market is a rules-based construction that is resilient and self-correcting. Deviations from a level-playing field have to be justified and temporary. The Treaty

and subsequent jurisprudence foresee corrective measures in cases of violations on the part of Member States. European institutions, the European Commission, and the European Court of Justice all play crucial roles. At the same time, the Global Crisis has shown that Member States are well aware of the interdependencies and spillover effects associated with the Single Market and, therefore, welcome the role of the Commission in the protection of competition in the single European market.

Third, state-aid control may (indirectly) help to control moral hazard, by examining and approving restructuring plans and through coordination among competent authorities in Member States, namely by clarifying the "rules of the game."[28] In both roles – that is, in containing moral hazard and helping coordination -- state-aid control has the potential for playing an anchoring role, given that the competition authority (the European Commission) moves last. Some further comments on these issues will be made in sub-section C below.

In the language of section 2, Member States, well aware of the dangers associated with the possibility of free-riding or encroachment by national authorities in the context of the single European market, have resorted to third-party enforcement through the European Commission and the European Court of Justice. This institutional framework offers strong assurances protecting a level-playing field.

B. European cross-border financial regulation and supervision.

The global crisis revealed significant weaknesses in the framework for supervising financial institutions in all major financial centers. As a result, there is now greater recognition in the EU of the need for closer cooperation to minimize the costs of cross-border spillovers and negative externalities. The crisis has shown that supervision of individual financial institutions in isolation is not enough. Large and interconnected financial organizations may create system wide disturbance. The same applies to market infra-structures – e.g. payments systems and securities settlements systems. The cross-border challenges are particularly complex. It is necessary, therefore, to deal with financial systemic risk through macro-prudential supervision at the European level. But, even at the micro-level, it is necessary to organize regulatory and supervisory activities so as to internalize the cross-border dimension. As identified in the de Larosière report (see above) this entails a single rule book for financial supervision applied consistently throughout the single market in order to ensure a level playing field and to avoid regulatory arbitrage. It also calls for a dispute settlement mechanism in case of conflicting practices by national supervisory authorities.

EU leaders and policy makers were energized by the crisis to reconsider the European financial-stability framework or architecture. The European Commission has assumed a leadership role in the process of formulating recommendations for establishing a new European financial framework and architecture aimed at safeguarding EU financial stability

[28] See Nguyen and Praet (2010) and Dewatripont, Nguyen, Praet and Sapir (2010) for more detailed comments along these lines.

(see Box 1 on Timeline for EU Financial Architecture Reform). The process started on October 8, 2008 when President Barroso established a high-level group, chaired by Jacques de Larosière, to consider and propose EU financial sector reforms.

The culmination of this process is manifest in the Commissions legislative proposals of September 23, 2009, following the recommendations in the de Larosière report (released on February 25, 2009) to enhance the EU's ability to safeguard European economic stability as well as national financial stability.[29] At the time of writing (June 2010), the legislative proposals were progressing in the context of a process of co-decision (involving both the Council of Ministers and the European Parliament). The proposed European supervisory reform foresees the creation of a European Systemic Risk Board[30] and three new European supervisory authorities: the European Banking Authority,[31] the European Insurance and Occupational Pensions Authority,[32] and the European Securities and Markets Authority.[33]

The proposed legislation addresses problems both at the macro-prudential and at the micro-prudential level. At the macro-prudential level, the draft legislation proposes to establish the European Systemic Risk Board with the responsibility for identifying and assessing EU systemic risks and vulnerabilities. The new organization may issue warnings and make recommendations.

At the micro-prudential level, the legislation would establish a new European System of Financial Supervision (ESFS) comprised of three separate supervisory authorities to oversee institutions providing banking, securities, and insurance and pension financial services. If enacted into law, the ESFS will have (i) the responsibility to establish a single European 'rule book' for national supervisors (ii) the authority to resolve disagreements between different national authorities and (iii) competence to coordinate actions during a crisis (which the European Commission will have the authority to declare).

In the jargon of the models described in Section 2, the objective of this new EU approach to financial supervision and surveillance would be to provide conditions favoring the emergence of cooperative and efficient solutions. Such solutions internalize even further the unavoidable spillover effects deriving from national orientations that now prevail. The proposals should be regarded as opening an evolutionary process. The creation of the EFSB and the ESFS provide structures where enduring interaction will take place. They facilitate communication and information sharing among the competent authorities as well as peer review and monitoring. Theoretical results as well as empirical and experimental evidence all suggest that these reforms would encourage and support cooperation.

The establishment of a single European rule book in the area of financial supervision would be a further important step in the direction of a level playing field in the Single Market. It would complement the state aid rules discussed in the previous sub-section. However, as in

[29] At the time of the writing of this paragraph (June 2010) the European legislative process was on-going and the package was on track for approval.
[30] COM (2009) 499, 23.09.2009.
[31] COM (2009) 501, 23.09.2009.
[32] COM (2009) 502, 23.09.2009.
[33] COM (2009), 503, 23.09.2009.

Dixit (1996), it is clear that the situation is too complex and the way is too uncertain to allow for any presumption of optimality.

The new architecture will face difficult challenges. For example, while the European Systemic Risk Board has responsibilities for macro-prudential supervision and systemic risk at European level, it lacks specific instruments to prevent and to manage those risks. Once the ESRB has identified a specific risk, it can signal warnings and make recommendations to specific country authorities, but compliance will depend on actions taken by the authorities and not the ESRB. Schinasi (2009) stresses that the recommendations of the ESRB are not binding and the responsibility for taking policy action remains in the hands of national authorities. The ESRB has been conceived as a reputational body that will have to depend on its high-level composition[34] to provide weight to its recommendations.

The ESRB will also be granted the right to get all relevant information to assess systemic risk. As documented in Schinasi (2009), the proposed legislation imposes the obligation to provide all information necessary for the performance of the ESRB's duties on the European Supervisory Authorities, the National Central Banks, and other relevant national authorities. Proper and timely access to information is likely to be one of the most formidable tests the newly established ESRB will face and have to overcome if it is to be successful in managing systemic risk.

At a more general level, the relation between monetary stability and financial stability both at the level of the definition of the monetary policy stance and of monetary policy implementation will likely be a central issue that raises many questions and challenges.

One financial-stability policy area where the current situation may be far from a Coasian equilibrium is the framework for financial-crises management and in particular the resolution of troubled (near insolvent or insolvent) financial institutions with significant cross-border exposures. In the language of game-theory the problems are twofold. First, in the context of a crisis (in particular one with significant cross-border spillovers), supervisory authorities will be pressed by the complexity of the situation and by the urgency of action. In the absence of effective and timely coordination mechanism, information asymmetries will severely test the ability to formulate and implement solutions during crisis periods when opportunities for communication will be limited and the costs of waiting prohibitive. Second, intervention by supervisory authorities in troubled financial organizations is justified by the protection of consumers and investors, by concerns about contagion and systemic stability, and to minimize costs to taxpayers. The latter mandate could create conflicts of interest and present tradeoffs for different national authorities in choosing between solutions that protect national taxpayers and those that safeguard European financial stability. Such conflicts are particularly likely and costly when it comes to the burden sharing of the costs of resolution. Therefore, it is safe to conclude that when it is necessary to intervene in large, interconnected

[34] The main decision-making body of the ESRB, the General Board, will be composed by voting and non-voting members. The voting members will be the President and Vice-President of the ECB, the governors of the national central banks, a member of the European Commission and the chairpersons of the three new European supervision authorities. The non-voting members will be High-Level Member State representatives (on behalf of the competent national supervisory authorities) – one per country – and the President of the Economic and Financial Committee.

cross-border active financial organizations in a crisis, cooperation is made difficult by high costs of bargaining and communication, asymmetric information, and conflicting preferences. Resolution of systemically important international financial institutions is discussed next.

C. European bank insolvency resolution regimes

The regime to deal with distressed banks is a key component of the regulatory and supervisory framework. Unfortunately it is one of the aspects that has been least discussed.[35] European policy makers have attempted to address this issue over the years, but it has taken a long time to reach a consensus and the outcome has been regarded as unsatisfactory for resolving institutions – as the crisis has revealed.

As early as 1988, the EU tabled a proposal for a directive on the resolution of credit institutions. However, it was not until 2001 that the Directive on Reorganization and Winding-up of Credit Institutions was finally adopted (Directive 2001/24/EC). Moreover, it is only recently that the directive has been transposed, into national legislation, in all member countries. There is not much literature analyzing this directive, but authors seem to agree that it has not advanced the convergence or integration of EU member states' resolution regimes very far.[36, 37]

[35] The situation is changing fast. See, for example, Dewatripont, Rochet and Tirole (2010) and Claessens, Herring and Schoenmaker (2010) which also include complete references. The official community is also moving along this track (see, for example, Basle Committee on Banking Supervision (2010) and European Commission (2010).

[36] According to Čihák and Nier (2009): "The Directive stipulates that the competent authorities of the home country that granted the banking license has sole power to initiate and implement all reorganization measures provided for in the law of the home country and that these measures have full effect throughout the EU. This adopts the "single-entity" and "universality principles for all European banking institutions and ensures that resolution measures taken by the home authority apply equally to all cross-border branches. These principles do not however apply to the case where a banking institution entertains (wholly-owned) subsidiaries in a different country within the EU. Such a subsidiary is viewed instead as a legally separate entity with a separate license. For subsidiaries, therefore, it still holds that insolvency proceedings can be brought in every jurisdiction where a failed bank maintains an establishment. This is an important constraint, because much of the recent cross-border expansion in European banking markets has been through subsidiaries. Matters become very complex for a LCFI [large complex financial institution] with numerous branches and operationally-integrated subsidiaries."

[37] Likewise, according to Garcia, Lastra, and Nieto (2009): "The objectives of the Directive 2001/24/EC are rather narrow and, in accordance with the objectives of the treaty, mainly aimed at the elimination of "any obstacles to the freedom of establishment and the freedom to provide services within the Community." The directive is neither particularly aimed at preserving EU financial stability nor at limiting public and private costs of bank crisis resolution. Directive 2001/24/EC does not seek to harmonize national legislation concerning reorganization measures and winding-up proceedings (including a common rule of bank closure), rather it ensures mutual recognition and coordination of these procedures by the member States of the EU, based upon the principle of home-country control, as well as the necessary cooperation between authorities. It embraces the principles of unity and universality single entity approach to liquidation, and the equal treatment of creditors. In spite of the far reaching effects, the Directive is subject to interpretation as the definition of reorganization measures and the definition of winding-up proceedings contained in the Directive are open definitions. As a result, the

As Claessens, Herring, and Schoenmaker (2010) make clear, the resolution of cross border systemic financial institutions is particularly problematic. In the context of the Global Crisis they present several case studies. The case of Lehman Brothers at the global level, and of Fortis at the European level, are particularly clear. As stressed before, the need to act, quickly and forcefully within a crisis situation implies that action will have to be taken in a national context. It is so for mainly two reasons. First, the financial costs and risks associated with rescue operations will be borne ultimately by national taxpayers. Second, the resolution and insolvency regime, as well as the authority to determine resolution, are set in national legislation.

The resolution of cross-border financial institutions represents a most revealing example of the fundamental tension alluded to above between a decentralized, national financial regulatory and supervisory architecture founded on home-country control and mutual recognition, on the one hand and a Single Market and European financial integration that actively encourages private organizations to ignore national boundaries, on the other hand. The example is most revealing because there are reasons why voluntary cooperation will not be effective in this context.

It is worthwhile to spell out the reasons: First, solvency problems affecting systemically important financial institutions (SIFIs) have been rare events. From the viewpoint of the game-theoretic framework there is not enough repetition to support cooperative outcomes based on iterated interaction. The problem is made worse given that contagion and systemic risk imply that several SIFIs will be affected at the same time. It is therefore easy to perceive them as unique events requiring unique solutions. If that is the perception then the outcome is likely to be close to a non-cooperative of Nash equilibrium. Second, support and rescue operations entail financial costs and financial risks. These financial burdens have to be shared among relevant stakeholders. At the *ex post* stage burden sharing is a zero-sum game. According to national legislation the authorities' fiduciary responsibilities are representative of national taxpayers. Moreover, bargaining about financing is an obstacle to effective information-sharing. Freixas (2003) has shown that truthful revelation of information can only be predicted in game-theoretic equilibrium when the sharing rule does not depend on the information provided. This cannot be achieved when crisis-time bargaining and information-sharing are progressing in real time.

Third, in a financial crisis action is pressing. The costs of waiting are very high. Therefore the costs associated with communication and bargaining are severe. It is hard to imagine a situation further from the conditions of the Coase Theorem. More explicitly, improvised cooperation, based on the perception of collective gains, is not likely to be enough to support effective or even approximately effective cooperation. Compared with the other areas discussed earlier in this section, the situation concerning early intervention,

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range of measures foreseen by national law and falling under the Directive's definition of reorganization measures and winding-up procedures is rather varied. In addition, the responsible authority (administrative or judicial) and the grounds that trigger the reorganization and winding up procedures vary within EU countries." The paper further analyzes the directive in some detail and recommends revisions to it that more directly aim at maintaining financial stability and minimizing the costs of resolution.

restructuring, resolution, and liquidation of cross-border, systemic financial institutions is closest to the sub-optimal, non-cooperative Nash outcome. *Ex ante* institutional arrangements are necessary.

The Basle Committee (2009) has made a number of comments with respect to the experience with Fortis. From our viewpoint the crucial remarks are:

"The Fortis case illustrates the tension between the cross-border nature of a group and national frameworks and responsibilities for crisis management. This led to a solution along national lines (…) Despite a long-standing relationship in on-going supervision and information sharing, the Dutch and Belgian supervisory authorities assessed the situation differently. Differences in the assessment of available information and the sense of urgency complicated the situation."

As the Basle Committee highlights, the case of Fortis is particularly telling as it involves the three Benelux countries (certainly among the closest integrated countries in the world at the forefront of European integration). If voluntary cooperation did not work well in this case it can hardly be expect to perform reliably, in general.

One of the lessons of the global crisis is that many systemically important financial institutions (SIFIs) collectively engaged in excessive risk taking and leverage. This ultimately posed risks to global economic and financial stability. After the fact, it is clear that one factor that may have contributed to this is the moral hazard associated with the presumption of SIFIs and their creditors and shareholders that they would not be allowed to fail because of their size, complexity, and interconnectedness.

A solution to this problem that is taking shape is to create 'ex ante' incentives for avoiding excessive risk taking by SIFIs. One element of this is the establishment of a wind up procedure (perhaps accompanied by an ex ante private pre-funded financing mechanism) that is fully transparent, legally binding, operationally implementable, and capable of liquidating and closing an errant SIFI without resort to taxpayer funds. In effect, such a procedure would provide clear ex ante incentives to avoid excessive risk taking because the cost of insolvency would be liquidation and not rescue. That is, this policy can prevent crises by making it clear that the 'end game' for a SIFI that engages in excessive risk taking and gambling for resurrection by SIFIs is its demise.

We represent the more general situation of moral hazard, schematically in Figure 3. Starting from the right-most box we list the criteria that are relevant to evaluate outcomes. The idea is to reconcile the European single financial market with financial stability, thereby resolving the fundamental tension discussed in this paper. Policy-makers want to achieve such an outcome in a way that is compatible with a highly performing financial system evaluated by its ability to efficiently allocate available savings to investment opportunities; to provide instruments for risk spreading and risk diversification; to produce and provide relevant information and, finally, to provide payments services. A highly performing financial system is, in turn, strongly associated with growth and development.

In turn, the objectives of financial regulation are: to protect consumers and investors; to minimize the use of taxpayers' money; and, finally, to reduce the likelihood of systemic financial crises and to reduce their costs when they occur.

Figure 3 suggests that no matter how resilient individual financial organizations or the overall financial system may be it is not realistic to assume that the probability of distress in individual banks or of a systemic event is negligible. That is so because individual organizations and the system are subject and interact with micro and macro-disturbances. If the disturbance is sufficiently severe even a very resilient system will collapse.

Actions taken by individual actors (e.g. bank managers and bank supervisors) crucially depend on the outcome in the event of distress. This explains the first instance of moral hazard in Figure 3: the likelihood of distress depends on preventive and risk management actions by relevant actors. Actors' incentives, in turn, are dependent on their beliefs and expectations concerning the end game. After the manifestation of distress, the crisis management process itself creates a second opportunity for moral hazard as beneficiaries of aid try to make the best of the situation from their own specific viewpoint (e.g. they may gamble for resurrection).

The bottom line of this way of seeing the challenge is obvious. Clarity about the rules of the game, in general, and the end game, in particular, is crucial in order to contain moral hazard by providing corrective incentives for risk management.

It is foreseen (EC Commission, 2010b) that, in October 2010, the European Commission will publish a complete action plan for crisis management. It will include a set of tools for prevention and resolution of failing banks. A full legislative proposal is envisaged for the spring of 2011 with the aim of reaching political agreement before the end of the year.

IV. CONCLUSION.

"Ideally, a situation should be reached in which the group of European supervisors works collectively as a single supervisor, when needed. This is required when the problems involved are area-wide – because of the institutions or markets involved – or there are concerns of systemic problems spreading across borders", Willem Duisenberg, 2000.

The Global Crisis provides us with an opportunity to reflect on the circumstances of international cooperation. The crisis motivated urgent action at the national level and with a national focus. Indeed most policy actions taken were national.

At the same time, the Global Crisis was associated with very strong international linkages and spillover effects. Nowhere were they stronger than in the European Union. This motivated an unprecedented willingness on the part of sovereign nations to engage in joint action and multilateral cooperation. Such willingness was manifest in countries commitment to multilateral organizations (e.g. the WTO) and in their initiatives to organize multilateral processes in innovative ways (e.g. meeting of the G-20 and of the Euro Group at level of Heads of State and Government).

The focus of this paper is financial stability and policy cooperation in the EU.

In the paper, we use the language and logic of game theory to examine conflict and cooperation in the formulation of policies to safeguard European financial stability. In the context of the Global Crisis, we examined the on-going opportunities and challenges to establish a new European framework for financial supervision and regulation. We contrasted the extreme cases of the Nash non-cooperative equilibrium and Coase equilibria. We reviewed theoretical results, experimental evidence, and case studies that suggest that self-sustained, spontaneous (improvised) cooperation is more likely when: first, the situation is repeated and the time horizon of relevant players is long; second, there are ample opportunities for monitoring and communication (information exchange); third, the number of players needed for an effective solution is limited; fourth, players have similar (compatible) interests; fifth, there are graduated penalties for deviating behavior (gradual incentives).

In the paper we examined three areas of policy relevant for the financial system: competition policy; European supervisory framework for financial supervision and regulation (follow-up for de Larosière report); and the very specific case of intervention and resolution of distressed cross-border systemic financial organizations.

In the paper we argued that both European financial integration and systemic stability at the European level should be regarded as European public goods (in the context of models such as those of Olson and Zechauser (1966) and Bergstrom, Blume and Varian (1986)).

In the context of the Global Crisis, EU competition policy was implemented to avoid distortions to competition and to ensure a level playing field in the European single financial market. The

European Commission allowed scope for urgent action to foster systemic financial stability while at the same time it maintained pressure for the adoption of remedial actions to protect the single market. We argued that the competition framework was able to achieve its objectives under pressure because it relied on a clear ex ante institutional allocation of responsibilities (competition policy is an exclusive responsibility of the EU) and on a long experience of compliance in many different sectors of economic activity.

In the area of European regulation and supervision, the Global Crisis energized EU leaders and policy makers to reconsider the European financial-stability framework/architecture. The European Commission assumed a leadership role in the process of formulating recommendations for establishing a new European financial framework and architecture aimed at safeguarding EU financial stability. The process started with the proposals from Larosière Group established by EU Commission President Barroso. The legislative process is now in progress according to the co-decision procedure. According to the proposals, a new European Systemic Risk Board (ESRB) is being created to deal with macro-prudential issues. Additionally, three new supervisory authorities are being created at the European level: the European Banking Authority (EBA), the European Insurance and Occupational Pensions Authority (EIOPA) and the European Securities Markets Authority (ISMA). In our view, the new framework constitutes important progress. It creates, among other important elements, a relevant forum to review systemic risks and authorities mandated to create a "single rule book" leading to uniform supervisory practices within the single market. The new legislation starts a process which, as time goes by, may gradually approach cooperative solutions.

Last but not least, we examined the questions of resolution of cross-border, systemic financial institutions. We argued that, under current rules, the situation is not far from a non-cooperative Nash solution. Once authorities have to face the challenge of rescuing financial organizations in the context of a systemic event, conditions are not conducive to the spontaneous emergence of effective cooperative solutions. In particular, *ex post* authorities are under tremendous time pressure – leading to very high bargaining and communications costs – have conflicting goals – for example concerning sharing the financial costs and risks – and will be reluctant to share information. Once a crisis is in full swing, authorities no longer have feasible efficient solutions to choose from. The way forward is to have ex ante an institutional framework in which solutions can be quickly developed and implemented without the bias for national solutions to dominate European ones. Such an institutional framework would help in reaching international cooperative outcomes and help to contain many varieties of moral hazard.

To quote Duisenberg (see epigraph to this concluding section): "… a situation should be reached in which the group of European supervisors works collectively, as a single supervisor, when needed."

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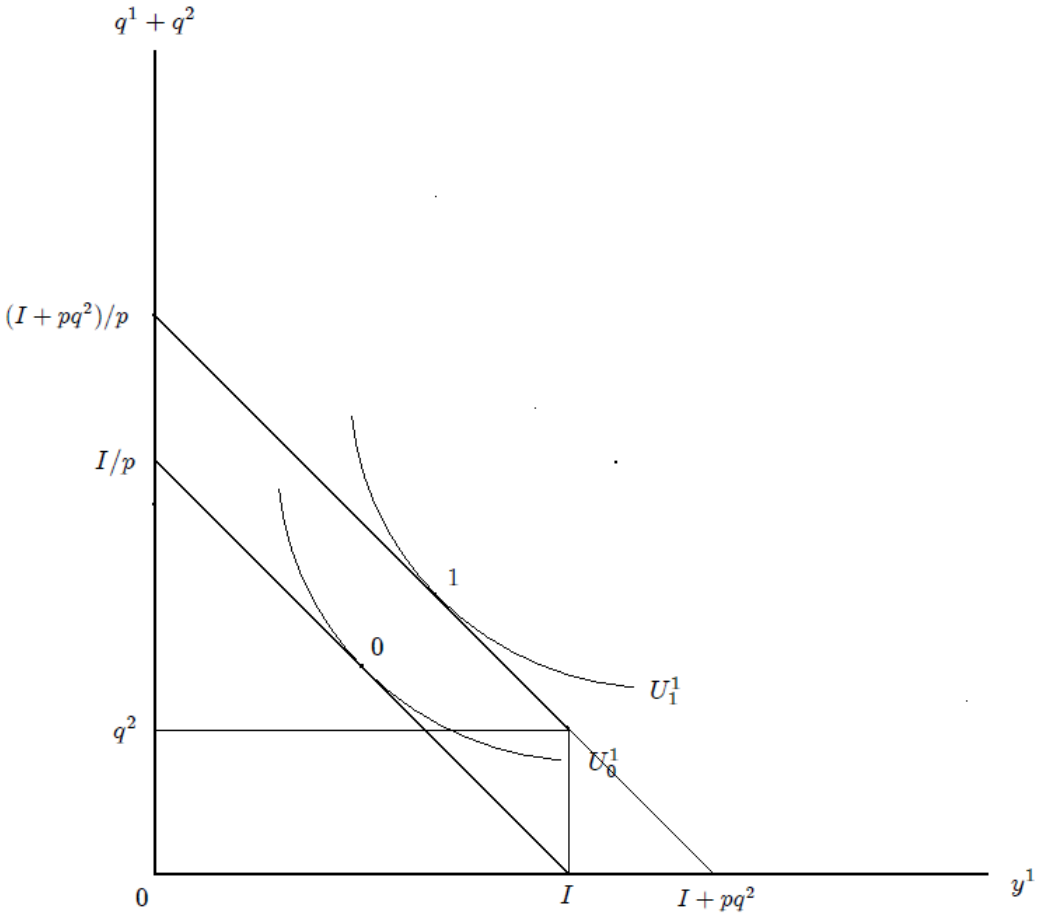

Figure 1: Agent one's response to public good provision by another agent.

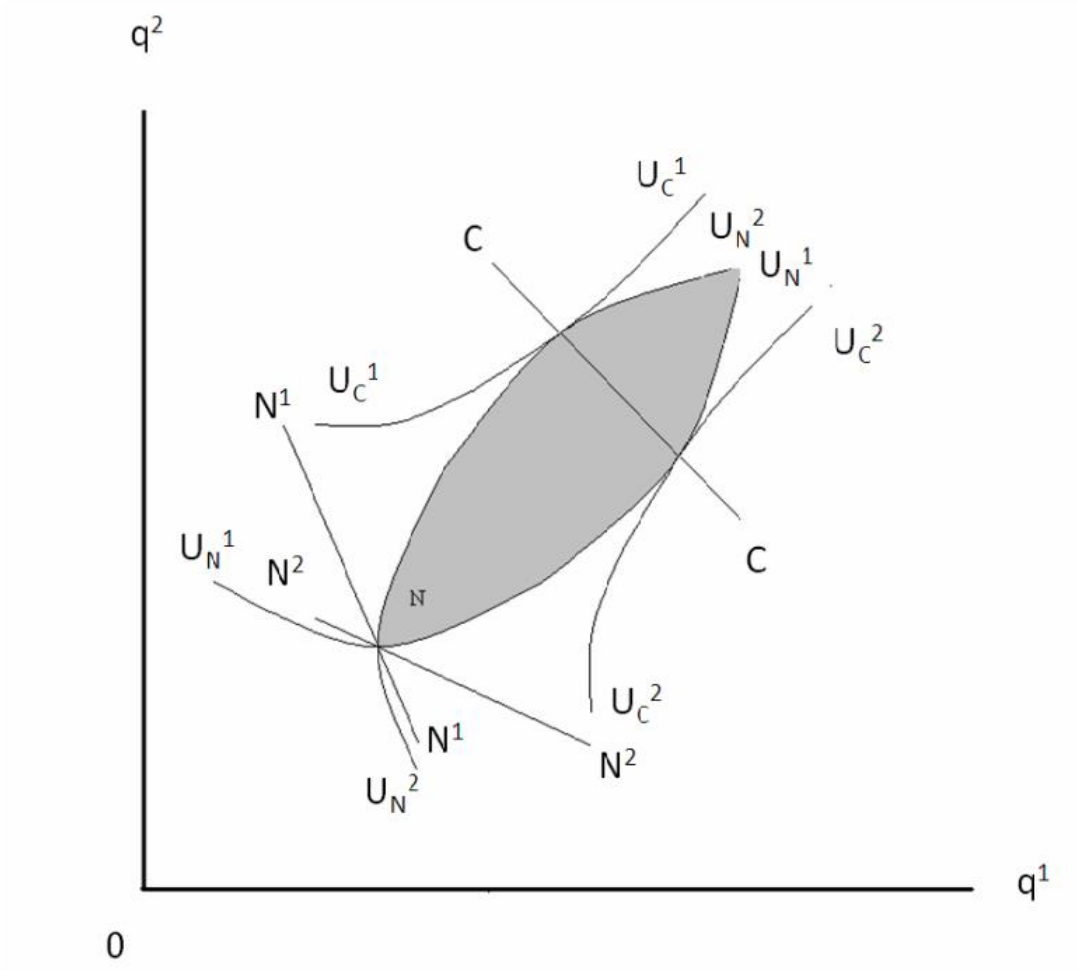

Figure 2: Nash and Coase in the Private Provision of Public Goods Model.

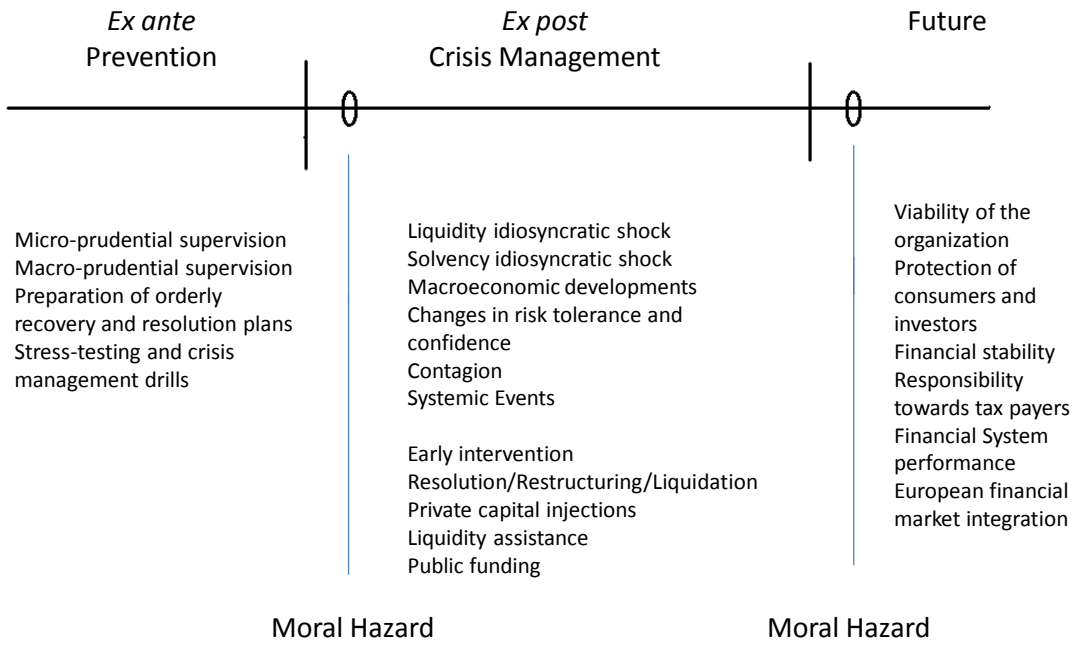

Figure 3: Supervision and regulatory framework for financial stability and the end game.

Box 1: Timeline for EU Financial Architecture Reform

October 8, 2008: President Barroso establishes the high-level group headed by Jacques de Larosière to consider and propose EU financial sector reforms.

February 25, 2009: The de Larosière Group issues its report recommending the creation of a European Systemic Risk Council (now Board) to improve the assessment and identification of EU "systemic risk" at the macro-prudential level and a new European System of Financial Supervision comprising supervisory agencies for banking, securities, and insurance and occupational pensions institutions at the micro-level.

March 2009: EU communications in which the de Larosière recommendations receive broad EU endorsement with some reservations about not removing sovereign fiscal authority regarding the costs of maintaining financial stability.

May 27, 2009: European Commission Communications details its plans for drafting legislation and implementing reforms, endeavoring to have a new system operating in 2010.

June 19-20, 2009: Brussels European Council Presidency conclusions agree overall outline of reforms with reservations about sovereign fiscal responsibility and binding mediation.

September 23, 2009: European Commission issues draft legislation proposals foreseeing the creation of a European Systemic Risk Board and European Supervisory Authorities.

Current status (as of June 2010): co-decision (involving the Council of Ministers and the European Parliament) underway. It is foreseen that the new Authorities will be functioning in 2011.

Table 1: Measures taken by the Commission concerning state aid to combat the crisis (reverse chronological order from October 2008 to August 2009)

Date	Measure
19 August.2009	Communication from the Commission on The return to viability and the assessment of restructuring measures in the financial sector in the current crisis under the State aid rules
10 August.2009	DG Competition's review of guarantee and recapitalisation schemes in the financial sector in the current crisis
7 April 2009	Communication from the Commission - Temporary framework for State aid measures to support access to finance in the current financial and economic crisis (consolidated version)
29 February 2009	Communication from the Commission on the Treatment of Impaired Assets in the Community Banking sector
25 February 2009	Communication from the Commission on the Amendment of the Temporary framework for State aid measures to support access to finance in the current financial and economic crisis
17 December 2008	Communication from the Commission - Temporary framework for State aid measures to support access to finance in the current financial and economic crisis
5 December 2008	Communication from the Commission on Recapitalisation of financial institutions in the current financial crisis: limitation of the aid to the minimum necessary and safeguards against undue distortions of competition
25 October 2008	Communication from the Commission on The application of State aid rules to measures taken in relation to financial institutions in the context of the current global financial crisis

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