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Europe's Policies for Restoring Global Prosperity

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I. INTRODUCTION AND MOTIVATION

Many aspects of the Global Crisis of 2007-09 provided incentives for countries to consider the benefits of greater coordination and cooperation in formulating and implementing policy interventions and solutions. Although the crisis is ongoing, some preliminary judgments can be made about the extent and effectiveness of cooperation both within the European Union and across the Atlantic. This paper identifies and discusses several areas in which cooperation has been enhanced and where spillovers and externalities are most likely being internalized through cooperative solutions to a greater extent than before. There are other areas where co-operation has been ineffective or non-existent. This analysis is set against the background of the global crisis and national, continental, and global policy efforts that have been considered and implemented.

In this paper we argue that the Global Crisis marks a turning-point in co-operation at the global level and in the European Union. The process we are witnessing is unprecedented. It is therefore useful to resort to theory in order to understand the relevance of the various evolutionary dynamics and to assess which forms of co-operation are most likely to be successful. The analysis is cast within a game-theoretic framework in which the outcomes of varying forms of collective co-operation can be assessed in terms of their ability to internalize spillovers and externalities. During the global crisis, the benefits and costs from policy-makers' actions depended on actions taken by others. Game-theory provides a natural conceptual framework and model set-up in which these effects can be rigorously considered.

The Global Crisis became acute in the late summer of 2008. By the autumn of 2008, 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 vicious debt-deflation spiral loomed large.

Shortly thereafter, Eichengreen and O'Rourke (2009) documented some of the facts. Key global macroeconomic indicators contracted sharply during the early stages of the Global Crisis by as much or more than during the Great Depression.[2] As examples, consider the dramatic contractions in global industrial output, the global volume of trade, and global equity prices that occurred during the early part of the global recession. The major differences

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[2] In Eichengreen and O'Rourke the comparison is made starting respectively in June 1929 and April 2008.

between this recent global crisis and the Great Depression are the policy responses that occurred world-wide.

In his American Economic Association Presidential Address delivered in Washington, DC on January 4, 2003, Robert E. Lucas observed, "Macroeconomics was born as a distinct field in the 1940's, as part of the intellectual response to the Great Depression. The term then referred to the body of knowledge and expertise that we hoped would prevent the recurrence of that economic disaster."[3]

This knowledge, experience, and hope was severely tested in the dramatic global policy responses to the Global Crisis. The global responses together involved different elements: first, easing of monetary policies through policy interest rates and the use of other operational tools, including the provision of emergency liquidity assistance; second, other policies aiming at avoiding systemic financial collapse, including the provision of government capital injections and guarantees; third, expansionary budgetary policies; and fourth, policies aiming at facilitating structural adjustment and long run sustainability. Although the most urgent actions were taken at the national level, policy responses to the Global Crisis have also included a fifth element of fundamental importance: the willingness of sovereign nations to engage in joint action and to pursue a multilateral approach (e.g. on trade) so as to avoid a retrenchment from international economic integration and globalization.[4]

These policy responses represent a turning point for global governance, both politically and psychologically. In November 2008, in the midst of the worst global financial crisis since the Great Depression of the 1930s, the Heads of State of the Group of Twenty countries (G-20) met for the first time to discuss and consider cooperative policy solutions aimed at restoring global economic and financial stability. This meeting was followed up on April 2, 2009 with the G-20 Summit in London and again on September 25-26, 2009 in Pittsburgh.[5]

The creation of this new G-20 process at the head of state level has been transformative in three important respects.

- First, international cooperation is now more inclusive, as the new G-20 process involves more heads of state from systemically-important emerging market countries. The economic area covered by the G-20 represents more than 80 per cent of world GDP.

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[3] See Lucas (2003).

[4] Eichengreen and O'Rourke (2009) document a sharp contrast between policy responses during the Great Depression and the most recent Global Crisis.

[5] See the respective Communiqués issued by the G-20 on April 2, 2009 on the UK Government's website and on September 27, 2009 on the US Government's website.

- Second, international economic and financial policy co-operation has been elevated to the highest political level – whereas previous attempts at global governance were held at the level of finance ministers and central bank governors.

- Third, European leadership in global governance – including from European institutions such as the European Commission and the European Central Bank – has been more evident, cohesive, and persuasive than previously. European leadership reflects decades of experience with supra-national institutions and rules.

Regarding this third element of transformation, the new G-20 process was initiated (in November 2008) and subsequently shaped and driven (at the summit in April 2009) by European leaders including the European institutions (such as the European Commission and the European Central Bank). One needs to look no further than the agenda and conclusions of the April 2, 2009 G-20 Summit where it is clear that both were driven significantly by the earlier policy discussions and policy responses within Europe aimed at restoring stability to the single European market.

The European Union has achieved a degree of international integration unmatched at the global level and in many dimensions (political, economic, financial, and social). Notably, Europe has made progress and gained experience in forging two important and relevant areas for global governance: the European Union has created a single European market and 16 of its member countries participate in the euro area. The Single Market and the Single Currency have achieved a degree of coordination and cooperation which is unmatched at the international level.

It is because of this progress that the European Union has been able to provide leadership-through-experience in forging multilateral discussions and solutions. And it is clear that Europe is determined to continue this role of leadership-by-example in the period ahead. At end-May 2009, for example, the European Commission unveiled its proposals for a comprehensive follow-up on the de Larosière Report proposals aimed at creating two European mechanisms or institutions for safeguarding European financial stability. Following the mandate obtained at the June European Council, the European Commission, on September 23, 2009, presented draft legislative proposals to set up the European Systemic Risk Board (ESRB) and the European System of Financial Supervision (ESFS). The ESFS consists of three new European Supervisory Authorities: the European Banking Authority (EBA), the European Insurance and Occupation Pensions Authority (EIOPA), and the European Securities Market Authority (ESMA).

European progress in forging pan-European and global solutions to problems was clearly visible in the most virulent phases of the current crisis. As might be expected of any nation state, EU member countries responded rapidly to the crisis by crafting national policies aimed at macroeconomic stabilization and at the avoidance of financial panic. The need for urgent action, decided at a national level, points to a fundamental tension that manifested itself during the Global Crisis. The tension is between the national and international dimensions of the crisis. One prominent characteristic of the Global Crisis is that it has affected the whole world. The degree of synchronization in developments and the speed of

propagation of disturbances are unprecedented. The EU is a group of countries for which the degree of economic and financial integration is highest among groups of nations. It is not surprising that conditions in the European Union required agreements on collective frameworks for action.

This paper tries to evaluate European progress in forging Europe-wide solutions to the Global Crisis. It also looks at the European response to the challenges of European economic and financial integration, as shaped by the Single Market and the Single Currency. In order to do so we resort to the theory of decentralized decision-making on the provision of collective goods or in the presence of significant spillover effects.[6] The framework has been traditionally applied to modeling market failures. However, more recently, it has been successfully applied to transnational issues. The first example was the seminal contribution of Olson and Zeckhauser (1966) that set-up the economic theory of military alliances. The framework can be applied to a wide variety of transnational issues including climate change, energy security, international trade, financial stability and tax competition. In the paper we will use the model of private provision of public goods of Bergstrom, Blume and Varian (1986) and the treatment of the joint products case in Cornes and Sandler (1984, 1994). In both cases the concept of non-cooperative decentralized equilibrium is Nash. Coase (1960) argued that the scope for co-operative equilibrium might be much broader than previously believed. We will also discuss critically the possibility of co-operative equilibrium. The theory provides us with a conceptual benchmark to evaluate institutions, rules, and practices of international co-operation.

The remainder of the paper is organized as follows. Section II sets out the language and logic of the economics of public goods and uses a specific game-theoretic framework to describe and characterize the challenges in the context of international policy co-operation. We will do so by considering the specific example of financial stability. Section III examines and assesses European achievements in five broad areas: monetary policy; the single European market, focusing on state aids rules; financial regulation and supervision; crisis management and public assistance to financial institutions; and global governance. Section IV concludes and draws some tentative lessons for the way forward in global governance.

II. EU FINANCIAL-STABILITY CHALLENGES VIEWED THROUGH THE PRISM OF GAME-THEORETICAL LOGIC. [7]

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, which provides logic for examining private solutions to collective action problems. The idea

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[6] See Cornes and Sandler (1996) for a comprehensive survey.

[7] 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.

is that in an environment with perfect information and costless bargaining, a mutually beneficial agreement will be reached whenever there is one.[8]

Coase's theorem was supposed to apply to bargaining among private-sector agents in an environment characterized by externalities or spillovers. However, the co-ordination of economic, social, cultural, and political policies by a group of countries such as those that make up the EU provides an interesting ground for applying the Coase theorem. In principle, it seems rational and reasonable to hope 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 a case, spillover effects can be internalized through negotiation and that negotiation can lead to efficient outcomes. The plausibility of an efficient outcome increases once we recognize that the number of players involved is limited and that by meeting regularly, in the context of various EU institutions, Committees, and Working Groups they benefit from ample opportunities to find mutually advantageous agreements. By definition when opportunities for mutually beneficial agreements have been exhausted a Pareto optimal solution has been reached.

As will be discussed in this section, the Coase equilibrium concept contrasts sharply with the Nash equilibrium concept. Under Nash the failure to internalize spillover effects in national decision making leads to suboptimal outcomes for all parties. This contrast in potential outcomes can be examined in many European policy contexts and investigated within an explicit model that applies a public-goods framework developed in the literature on the 'economic theory of alliances.' In particular, the basic insight from the seminal work of Mancur Olson (1965) is that the economic principles that apply to transnational military alliances also apply to a wide range of other transnational or cross-border issues such as those now being faced by European leaders and policy makers (see Sandler and Hartley, 2001).

The basic intuition of this approach to decision making can be conveyed through a simple two-country model of the national provision of public goods. In this section we draw on an application of the Olson framework developed by Nieto and Schinasi (2007) within the context of the EU challenges in safeguarding financial stability. In such a setting, it is convenient to use a graphical device presented in, for example, Cornes and Sandler, 1986, and applied by Schinasi, 2007 to the case of EU financial-stability challenges. Although the models developed in this section take on the nomenclature of financial stability challenges, this is purely semantic. As will become clear in Section 3 of the paper, the models developed can be generally applied to a wide range of European and global policy challenges, for example monetary policy and global governance.

The remainder of this section of the paper discusses the usefulness of this approach for examining EU financial stability issues as an example. The objective is to apply a way of thinking to evaluate the effectiveness of EU decision making in providing adequate, if not optimal, levels of European public goods.

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

A. The Relevance of 'Economics of Alliances'

Given the difficulties involved, it is understandable that there is not much formal economic analysis examining collective action problems within a European context – for example, 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 production. Within this framework, the implications of a variety of decision- and policy-making processes can be modeled and analyzed.

That this can help to sort through some of the difficult financial-stability issues in the EU can be made obvious. For example, EU stakeholders that share in the benefits of European financial stability (or who share the costs of its absence) can be viewed as having the option (1) to continue to make decentralized public-good decisions focusing primarily on national objectives or (2) to form coalitions that make joint and mutually advantageous allocations of coalition resources aimed at maximizing coalition public-good benefits.

Within the context of the models discussed below, Pareto optimal solutions would imply the full internalization of potential transnational externalities in the decision-making process (implying, for example, convergence of prudential regulation and supervisory practices). The most inclusive coalition would be all European countries; less inclusive would be the EU; even less inclusive would be the Euro area countries. Each coalition can have separate yet related objectives. One can also imagine a coalition of large countries or of small countries or both considering whether it is to their advantage to design a shared prevention and resolution framework of their own that optimizes the utilization of their joint resources.

It is an advantage of the 'economics of alliances' that one can analyze and then compare the characteristics of the optimal outcomes consistent with, on the one hand, a decentralized decision making process (for example, Nash equilibrium), and on the other hand, more cooperative decision making process, such as Coase's approach (which is consistent with Pareto-efficient equilibrium allocations for the group as a whole).

B. A Simple Case: Financial Stability as a Public Good.

The EU framework for resolving cross-border banking problems can be likened to one in which each nation independently decides to devote part of its economic resources to produce public goods that safeguard the stability of its national financial system—through market surveillance, and regulation and supervision of financial institutions, including bank resolution policies. At the same time, no single or collective entity devotes resources to safeguard the stability of the European financial system—or the amalgamation of these integrated national financial systems.[9]

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

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' 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 negative externalities that might be conveyed to the EU markets (e.g. by 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; and the models developed below carry several other interesting, and in our view important, implications for the current debate in Europe.

C. More Formal Analysis

Consistent with the features of the present EU framework for safeguarding financial stability, the logic of a simple model of 'pure' public goods 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 resolution of threats to the stability of the European financial system, such as the insolvency 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), which requires that the cost of producing both an index of private goods and the public good does not exceed the nation's income and (2) the presumption that each other country chooses an optimal resource allocation conditional on every other country doing likewise. The second constraint is relevant because all countries contribute to, and share the benefits of, the public good. Each country knows this and makes its decision presuming that all other member countries are also choosing optimal mixes of private and public goods conditional on all other countries behaving similarly. 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. Thus, in what follows size can be taken as providing some indication of the potential for (1) spillovers of negative externalities of financial difficulties to the wider European financial system and (2) 'spill-ins' of benefits of country-specific public goods to other countries in Europe.

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 optimal allocation of resources if all other countries maintain theirs. That is, the marginal benefits on other allies are ignored.

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:[10]

$$\max_{\{y^i, q^i\}} \left\{ U^i \left(y^i, \; q^i + q^j \right) \right\} \quad \text{subject to } I^i = y^i + p\, q^i \text{ for all i, j} = 1, 2 \ldots \text{n, } i \neq j, \qquad [1]$$

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).[11]

The standard equilibrium concept in the literature is Nash-Cournot. In Nash equilibrium, each agent when optimizing (1) takes the decision of the other agent as given. Using the budget constraint to eliminate the private good from the utility function, it is possible to write utility as a function of q^1 and q^2.

Figure 1 represents the indifference-curve maps for both agents and the respective Nash reaction functions. If both goods are normal, it is possible to show that Nash reaction curves will be downward sloping with the reaction function of individual 1 steeper than that of individual 2. These assumptions ensure the existence and uniqueness of the Nash equilibrium (see Bergstrom, Blume and Varian, 1984) again as shown in Figure 1 below.

The most relevant implications of the model are stated as Propositions C1-to-C5: [12]

- C1: The Nash equilibrium is inefficient. As is well known in other contexts, the (decentralized, non-cooperative) Nash-equilibrium level of resources devoted to European financial stability would be suboptimal relative to the Pareto-optimal allocation of resources consistent with maximizing EU welfare (rather than each individual countries' welfare). Even though each country optimally chooses to allocate resources to produce a private/public good output mix (conditional on simultaneous optimal 'response' choices by others as well), the resulting European equilibrium will not be Pareto optimal. That is so because 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.

- C2: 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

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[10] See part 1 of the Annex for a fuller mathematical description of the model and optimization exercise.

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

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

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 alliance.

- C3: 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: in the context of the current debate, if a greater matching of benefits received and costs incurred to preserve financial stability are to be achieved, then at least some form of coordination of resource allocation decisions, if not full internalization of the externalities, would be required. The mandate of the ad hoc EU group to consider cross-border implications for EU financial stability can be seen as a move in this direction if some form of coordination results.

- C5: 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. [13]

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 for financial transactions, might end up devoting a greater amount of resources to producing this particular good to the benefit of all of Europeans.

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[13] 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.

D. Coase Equilibria as the More Desirable Outcomes

It is possible to improve on the de-centralized Nash equilibrium through collective action. For example, starting from point N, if, for example, individual 1 would increase his contribution, it would be possible for individual 2 to increase her contribution, so as to ensure that 1 would move along his indifference curve, while benefiting herself. The entire shaded area includes pairs of contributions, which are Pareto superior to the Nash equilibrium.

The Coase Theorem predicts an outcome along the PP line in the northeast part of Figure 1, in the portion bounded by the two indifference curves, corresponding to the Nash equilibrium. 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 to an efficient collective action outcome along the PP line. In many areas, it is reasonable to argue that such transition has already been successfully completed. In any case, it is also important to bear in mind the limitations of Coase's Theorem. In a nutshell, it assumes costless bargaining. Specifically, the theorem implies the absence of transactions' costs and the existence of perfect and symmetric information. Some examples on how departures from these assumptions affect outcomes will be examined in the remainder of the paper.

As already argued, it seems that in the European Union conditions are in place to favor such an outcome. First, the number of players involved is limited. Second, the game is repeated as the financial stability framework is applied 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). See, in particular, the discussion in sub-section III.E. Section 3 will discuss these issues.

E. A more complicated case: Impure public goods

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 safety net such as prudential regulation or parts of financial infrastructures in European countries – such as large-value payments systems– that require domestic public expenditures and public maintenance but which nevertheless convey public good benefits to nonresidents across the European financial landscape.

Once the possibility of 'exclusive' or 'impure' public goods are 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. 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 equilibria even though all goods are 'normal' goods (in the sense that demand rises/falls with income).[15]

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

- E1: The simultaneous decisions of countries still results in Nash equilibrium. Consistent with 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 affects. Achieving a more efficient Coase equilibrium allocation of resources would require that all other countries benefits and costs be appropriately taken into account..

- E2: 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'

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[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] See part 2 of the Annex for a fuller mathematical description of this model. 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 impure goods provided by different agents (countries). This implies that there could be a multiplicity of Nash equilibria even though all goods are 'normal' goods (in the sense that demand rises/falls with income).

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: As the exclusive benefits relative share to total benefits increases, the benefits of collective action through cooperation and alliances declines. In the limit, when benefits are all exclusive, there are no shared pubic-good benefits between countries to internalize.

- E4: 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 (in the interval -1 to - ∞). 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 (Figure 2).

- E5: 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).

- E6 In the joint products case, there is more scope to approximate the Coase outcome..[17]

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

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[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.

[17] 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).

mix of joint products and their public-ness can influence how coalitions and alliances are formed.

III. COORDINATED AND EUROPEAN INITIATIVES TO ADDRESS ECONOMIC, MONETARY, AND FINANCIAL-STABILITY IMBALANCES

As indicated in the previous section, one can see the benefits of varying degrees of coordination and cooperation in decision making as a continuum running from decentralized decision making that leads to Nash-Cournot equilibrium to fully cooperative decisions that lead to Coase equilibrium. In this section, we will evaluate progress so far in forging European solutions to policy challenges in the following areas and discuss where along the continuum outcomes can be seen: Euro-area monetary policy; the European ingle market and in particular state aid in the financial sector; supervisory and regulatory reform initiatives and financial stability; bank insolvency resolution regimes; and global governance.

As will be discussed, European decision making and the associated outcomes have worked better in some areas than in others. Difference in effectiveness can be traced to some extent according to whether or not coordination and cooperation has been institutionalized or whether decision making and coordination have remained at the sole discretion of national authorities. For example, at one extreme is euro area monetary policy, which has been successful in part because coordination and cooperation have a well defined institutional framework and mandate (the European System of Central Banks and the European Central Bank and price stability). At the other extreme is financial stability policy, which has been less effective at the European level in part because the policy tools are under the purview of national authorities and committee structures provide only limited opportunities for coordination and cooperation. In the middle ground is the process of European integration towards a single market, an area in which there are European rules, formal agreements, and institutions that help the process along, although much remains to be done by national authorities to continue to remove national barriers to even greater integration.

These and many other issues will be discussed in this section.

A. Monetary Policy

The single monetary policy applies to the euro area. Monetary policy operates, in normal times, through the Central Bank's control over a money market interest rate, which applies uniformly over the monetary area. Monetary policy is therefore indivisible. In the euro area the primary goal of monetary policy is to maintain price stability, in the euro area as a whole, over the medium term. The responsibility for the conduct of monetary policy is entrusted to the ECB, the central bank of the euro area. In the language of economic theory, monetary stability in the euro area is a pure public good for the citizens and firms of the participating countries. The ECB and the European System of Central Banks also promote the smooth operation of payments systems and contribute to the stability of the financial system. The complexity of the notion of stability of the financial system will be discussed in the following sub-sections.

The global nature of the crisis made its first appearance on Thursday, August 9, 2007. One relevant piece of information was the announcement by BNP Paribas that it could not ensure the fair valuation of the assets of three of its funds due to exposures to the US sub-prime market. In the morning, traded volumes fell sharply in money markets while interest rates suffered a sudden and significant increase to elevated levels, well above the ECB's minimum bid rate. In this context, the ECB was the first central bank to act: it provided € 94.8 billion on the day to 49 banks that submitted bids at the fine-tuning operation. Following the operation, money market spreads over the minimum bid rate returned to normal levels at about 5 basis points. Further liquidity provision operations continued on the following days, albeit in declining amounts. The ECB's interventions helped stabilize the short end of the money market. However the situation remained stressful for longer maturities. Volumes traded were particularly low. In order to extend normal market conditions to longer maturities the ECB decided to conduct, on August 22, a supplementary Long Term Refinancing Operation, in a pure variable rate tender, for an amount of € 40 billion. 146 banks bid € 126 billion with bids ranging from 3.80 percent to 5.00 percent. Nevertheless, strains persisted at longer maturities in the money market.

The ECB distinguishes the monetary policy stance from monetary policy implementation. The former, in normal circumstances can be assessed on the basis of a money market interest rate. Monetary policy implementation, in contrast, is performed in the context of the operational framework, and is used, for example, to maintain orderly money market conditions and adequate provision of liquidity to banks.

On July 3, 2008, the ECB announced that it had decided to increase its key interest rates by 25 basis points. The decision was based on the ECB's assessment of the prospects for price developments and risks to price stability.

However the situation and prospects changed fast over the summer. Clear signals of a sharp economic slowdown in the US and elsewhere became apparent. More dramatically, since September, a perverse feedback spiral between economic and financial developments threatened to take hold. The failure o Lehman Brothers on September 15 became the emblematic event, marking the transition to the acute stage of the Global Crisis.

Again the ECB reacted rapidly and forcefully. Starting in October it has lowered key policy rates by a total of 325 basis points. The minimum bid rate was adjusted from 4.25% to 1%.

The first move, taken in October 8, 2008, was part of an unprecedented joint action on the part of the ECB, the Bank of Canada, the Bank of England, the Federal Reserve Board, the Riksbank, the Swiss National Bank and the Bank of Japan. All of these monetary authorities with the exception of the Bank of Japan announced reductions in their policy rates. This dramatic announcement was the culmination of a continuous process of consultation among central banks around the world – following earlier precedents for joint action. Already in December 2007, the ECB launched, in co-operation with the Federal Reserve System, US dollar liquidity provision operations, in connection with the Federal Reserve System's Term Auction Facility. US dollar liquidity was made available against the standard list of collateral

for the Eurosystem's credit operations. Measures taken in cooperation with other central banks clearly underline, in the language of the model, the importance of spillover effects associated with access to central banks' liquidity. These manifest themselves through payments and securities settlement systems.

On October 8, the ECB made two additional changes. First, it announced the switch to fixed interest rate tender with full allotment. The measure aimed at easing banks uncertainty concerning the amount they could obtain from the tender. Second, the corridor of interest rates, defined by the deposit facility (floor) and the marginal lending facility (ceiling) was narrowed to 100 basis points (from 200 basis points).

On October 15, the ECB extended the fixed-tender, full-allotment procedure to cover also Long-Term Refinancing Operations. The ECB also extended the list of eligible collateral. Finally on May 7, 2009, the ECB announced that it would launch refinancing operations with maturity of 12 months. The operations are conducted under fixed rate tender with full allotment. It also decided to purchase euro-denominated covered bonds. Finally it included the European Investment Bank in the list of counterparties for Eurosystem's operations.

It is possible to summarize all measures taken by the ECB under four headings:

- Adjustment in key interest rates: interest rates were lowered 325 basis points since October 2008. For example the minimum bid rate was lowered from 4.25 to 1 per cent.
- Liquidity support mechanisms: adjustments in the operational framework:
  - Use of fine-tuning operations;
  - Conduct of fixed rate tenders with full allotment;
  - Expansion of the list of eligible collateral;
  - Temporary narrowing of the interest rate corridor;
  - Lengthening of maturity for Long-Term Refinancing Operations.
- Acquisition of selected assets: Purchase of euro-denominated covered bonds.
- Co-operation with other central banks in the area of monetary policy and in the management of liquidity in foreign currencies.

The centralization of the responsibility for the conduct of monetary policy in the hands of the ECB allowed for an effective response of monetary policy to the Global Crisis. The ECB responded quickly and forcefully as events unfolded. It also co-operated effectively with central banks from the rest of the world decisively contributing to crisis management at the global level.

B. European single market and state aid to financial sectors and non financial sectors

In a seminal paper, written as early as 1939, Hayek defended that economic union, involving the removal of impediments to the free movement of goods, services, people and capital is a pre-condition for a political union, aiming at inter-state peace. Hayek points to the absence of any historical example of a political union without economic union. Economic union does not appear as a fortunate concomitant of political union. It is instead a necessary condition for its sustainability. More explicitly, in Hayek's view, in the absence of economic

union, the divergence of national interests would strain unity and, eventually, would lead to the fragmentation of the union.

Conversely economic integration is a tremendous force pushing towards political union. Market intercourse allows a multiplicity of interests to be reconciled in the market place. The creation of multiple, unstable and heterogeneous coalitions of interests contributes to limit the relevance of special interest politics thereby fostering the political cohesion of the Union.

The Single Market is a common good of all Member States. It needs protection against the possibility of encroachment from individual countries. The European Union Treaty itself includes such safeguards namely in competition policy and state aid rules. These rules aim at a level playing field in the 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 87-89 of the Treaty establishing the European Community. Article 87 establishes that, in general, state aid is contrary to the common market. It then lists a number of exceptions to the rule. The intent, of the last paragraph of article 87 allows to Council to decide by qualified majority, on proposal from the European Commission, on further exceptions. Article 88, in turn, 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 88, paragraph 3 imposes the obligation to notify the European Commission. Failure to notify renders aid incompatible with the common market. National courts and authorities will then be under obligation to recover the aid granted.

Article 87, paragraph 3,b allows state aid in order "to remedy a serious disturbance in the economy of a Member State". It permitted the flexibility needed to respond to the Global Crisis. The Commission has reacted very rapidly to notifications frequently during weekends and even within 24 hours.

The Global Crisis created strains on the Single Market from two different channels. The first stems from the need to intervene to prevent a financial meltdown. The second is associated with the fact that the global crisis made the vulnerability of various manufacturing firms evident. The necessary adjustment involves potential (and actual) job losses and it is socially and economically painful. Firms and workers solicited and have been offered state aid. In both cases, state support must be provided in such way as to minimize disruptions to the Single Market and the level-playing field.

In the late summer and autumn of 2008 a financial meltdown was threatening. 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 (Table 1). 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 fundamental to avert financial meltdown with dire economic and social consequences.

At the same time the potential for spillover effects among Member States and disruptions to the Single Market was also quite clear and present. A good example is provided by the broadening of deposit insurance offered by Ireland in September 2008. The scheme, as originally designed could have led to a massive re-location of deposits from other countries to Ireland. Other Member States, starting with the UK, were pushed to follow. The need for collective action became pressing. The European Commission reacted swiftly and the ECOFIN Council agreed to raise the minimum amount of deposit guaranteed.

More generally, the Commission, through a series of Communications (see Table 2) has 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 context of the crisis, the presence of strong spillover effects was so evident that no further comment is necessary.

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, in particular to financial institutions, does not give rise to disproportionate distortions to competition and to the principle of a level playing field. Relevant measures have been collected, are clearly defined, and have limited duration. Relevant information is in the public domain. For example, according to the Commission's "Overview of State Aid National Measures Adopted as a Response to the Financial / Economic Crisis" (see Tables 3, 4 and 5). The Commission considers state aid to the financial sector (66 cases, Table 2), to the non-financial sector (55 cases, Table 4) and, finally, cases under formal investigation (9 cases, Table 3). All cases under formal investigation pertain to the financial sector.

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 systemic financial meltdown and to provide support of mitigate the social and economic consequences of the crisis. Clearly financial collapse of an institution located on 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 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 stems from the Treaty itself. Market integration is at the core of the process of European integration. Therefore, preserving the Single Market is a key common good for all Member States. That 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 in

open 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? Our tentative answer is positive. 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 case of violations on the part of Member States. European institutions, the European Commission, and the European Court of Justice play a crucial role. 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, clarifying the relevant rules of the game.

C.   European cross-border financial regulation and supervision

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.[18] It is comprised of four main elements: EU-wide rules (implying a degree of harmonisation 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.

In the EU, financial market integration is part of the Single Market process and is, thereby, actively promoted. Financial integration unambiguously favors competition and cost minimization. Its impact on financial stability is, however, ambiguous. On the one hand, a large and integrated market allows for additional scope for risk spreading and risk diversification. On the other hand, integration increases inter-connections cross-border making it more likely that disturbances in one country will manifest themselves elsewhere. There is a tension between a policy orientation encouraging private entities to ignore national borders while maintaining key regulatory and supervisory responsibilities at the national level. How this tension is addressed in the EU is the theme of this section (and the next).

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 as it takes advantage of the local knowledge and expertise of local supervision.[19] By contrast, supervision of the cross-border exposures of the

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[18] This section draws on Berrigan, Gaspar, and Pearson (2009).

[19] 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

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larger banking groups would seem to require additional expertise and could benefit from a more centralized approach in which local knowledge is less important.

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 PP line in the graph). In many areas of EU banking regulation and supervision it is reasonable to argue that such a transition is close to being successfully completed, including in cross-border cooperation.

EU policy makers have recognized for some time that there is the potential for externalities and spillover effects from the cross-border exposures of large complex financial institutions and in the supervision for them. As a result, the EU approach to reforming banking regulation and supervision has been a gradual intensification of cross-border cooperation among the relevant national authorities. A key building block of the reform has been the establishment of Lamfalussy process. In particular, the Level 3 committees constitute an important element in solving the collective action problem, as identified by Coase, through voluntary cooperation.[20] In addition, the EU has over time, designed and created information-sharing and coordination mechanisms, mostly informal and non-binding. These mechanisms to date have operated in the context of EU committees (for example, the Banking Supervision Committee) and have been made explicit in the form of memoranda of understanding for information sharing and coordination in supervision. Specifically, an EU-wide MOU on cross-border cooperation between national supervisors, central banks, and finance ministries has been in place since 2005 and has been extended to cover all the main financial sectors with effect from July1, 2008.[21]

These EU mechanisms for information sharing and cooperation are in addition to the EU's participation in international and global forums where regulatory and supervisory information sharing and cooperation occurs, for example within the Basel Committee on Banking Supervision, the Financial Stability Board, and the various forums under the auspices of the International Monetary Fund. While it is the case that financial integration has progressed farther in the EU and, in particular in the euro area, than elsewhere in the world, it is also the case that global financial integration has also progressed. Therefore, spillover effects and externalities also operate at the global level, albeit to a lesser extent, in most cases.

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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.

[20] See Speyer (2008) for a complete presentation of the Lamfalussy framework.

[21] See Berrigan, Gaspar, and Pearson for further details.

Taken together, all of these EU measures constitute substantial progress in responding to the growing cross-border dimensions in EU financial markets. Accordingly, the EU can be seen as being well past the non-cooperative Nash outcome in many of the relevant dimensions of cross-border banking regulation and supervision.

Having said this, the systemic financial crisis has revealed significant weaknesses in the framework for supervising financial institutions in all of the major financial centres. It is reasonable to observe that the weaknesses revealed in EU cross-border regulation and supervision are no worse, and probably less severe, than the weaknesses revealed in banking supervision as a whole including for banks with little or no cross-border exposures. Indeed, a reasonable case can be made that in the cross-border dimensions of banking supervision the situation is closer to internalizing externalities because of the manifold cooperation agreements, meetings, and professional relationships in which information, analysis, and assessments are shared and discussed in EU, international, and global forums.

As a result of the systemic financial crisis, 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. This has encouraged EU leaders, policy makers, and institutions to reconsider the potential benefits of a pan-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 (see Box on Timeline for EU Financial Architecture Reform).

The culmination of this fairly rapid process is manifest in the Commissions legislative proposals of September 23, 2009, which would establish an approach that would enhance the EU's ability to safeguard European economic stability as well as national financial stability. The legislation proposes the establishment of two new bodies at the European level.

First, at the macro-prudential level, the legislation would establish the European Systemic Risk Board with the responsibility for identifying and assessing EU systemic risks and vulnerabilities. It could issue warning and make recommendations, but it would have to rely on 'moral suasion and peer pressure' to convince those who are warned to change their behavior.

Second, 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. The ESFS would be responsible for harmonizing the European 'rule book' for national supervisors and would also have the authority to resolve disagreements between countries and to coordinate actions during a crisis, which the Commission will have the authority to declare.

Although the Commission's legislative proposals shift some of the responsibility for safeguarding financial stability to the European level, the independent powers of these new bodies are limited so as not to infringe on existing national authorities. Most importantly for

some countries, both new bodies will have to conduct their activities and fulfill their responsibilities without impinging on member countries' fiscal prerogatives and priorities. Thus, the new supervisory authority at the EU level will not have the authority to declare an institution insolvent and thereby impose fiscal obligations on a member country; this authority will remain with the national authorities. The proposals will not become law until approved by European and national lawmakers.

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 internalize even further the spillover effects that originate in the national orientations that now prevail, presumably move the situation closer to a more desirable Coasian outcome, and thereby increase efficiency and stability at the same time. Only then will the European regulatory and supervisory framework be up to the requirements of the Single Financial Market. This would help to manage systemic financial risk within the EU. By doing so Europe would make a major contribution to global financial stability.

One supervisory area where the current situation may be far from a Coasian equilibrium and, accordingly, where there are significant remaining challenges is crisis management and in particular the resolution of troubled (near insolvent or insolvent) financial institutions with significant cross-border exposures. This is an area where there are acknowledged and significant potential weaknesses and spillover costs for taxpayers that have been amply demonstrated by the most recent crisis. This is discussed next

D. European bank insolvency resolution regimes

One of the important lessons from the global financial crisis is clearly stated by the Basel Committee on Banking Supervision in its consultative document issued for comment on September 17, 2009.[22]

> "Existing legal and regulatory arrangements are not generally designed to resolve problems in a financial group operating through multiple, separate legal entities. This is true of both cross-border and domestic financial groups. There is no international insolvency framework for financial firms and a limited prospect of one being created in the near future. National insolvency rules apply on a legal entity basis and may differ depending on the types of businesses within the financial group. Indeed, few countries, if any, have tools for resolving domestic financial groups – as distinct from individual deposit-taking institutions – in an integrated manner in their own jurisdictions."

Many of the financial institutions that were at the center of the crisis and which encountered liquidity problems and were subject to rumors of insolvency received very large government subsidies and capital injections in the United States and in many EU countries (Insert a summary Table of DG COMP's list of EU member country interventions). Had there been more effective resolution and wind-up regimes, it is likely that government subsidies

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[22] See Basel Committee on Banking Supervision (2009).

would not have been as large and that a greater number of financial institutions could have been closed and liquidated in a more orderly fashion. The risk now is that institutions that received state aid will require continuing subsidies and will be unable to provide sufficient credit for sustaining potential growth.

Compared with the areas discussed so far in this section, the situation regarding bank insolvency regimes is the closest to the suboptimal Nash outcome. As the BCBS consultative document suggests, the situation is far from what would be considered optimal and significant challenges remain. Although this problem is a global one – and pertains to complex global banks licensed in other jurisdictions such as the United States – the challenges and solutions would seem to be unique within the EU. Why? As noted earlier, at the same time that financial integration is being encouraged and pan-European institutions are emerging, the regime for supervising them and resolving problems has remained national.

EU member countries and European institutions – notably the European Commission and the ECB – have recognized these challenges for some time and have endeavored to forge consensus solutions to deal with the winding up of troubled and insolvent banking institutions. However, this area is fraught with practical and political difficulties ranging from significant difference in the laws and regulations governing bankruptcy to differences in the powers of supervisors to declare a bank insolvent. As a result, there has been little movement in the direction of creating a European approach to resolving banking problems.

Consider the case of the resolution of Fortis, formerly a bank with significant operations in Belgium, Luxembourg, and the Netherlands. Up until September 28, 2008 when it was rendered insolvent, Fortis had a complex multi-national holding structure – a bank holding company incorporated in Belgium: banking subsidiaries incorporated in the Netherlands and Luxembourg; an investment management subsidiary incorporated in Belgium; an insurance business with three subsidiaries; and other business subsidiaries in the United Kingdom, France, Germany, Turkey, Russia, and the Ukraine.[23]

In late September 2008, Fortis encountered liquidity problems, primarily the result of large withdrawals by business customers, amid rumors of insolvency. On September 28th, a press release indicated a burden sharing arrangement in which the Benelux countries would partially nationalize the Group by injecting €11.2 billion. In the event, by October 3rd it became clear that this arrangement would not be implemented. Instead, each government rescued the national parts of Fortis incorporated within their own jurisdictions.

The Basel Committee has drawn the following lessons from this one example:

- "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, which did not involve intervention through statutory resolution mechanisms;

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[23] For further details and analysis see Čihák and Nier (2009).

- The usefulness of formal supervisory crisis management tools appears to be limited in a situation where the institution needs to be stabilized rapidly and at the same time the continuity of business needs to be ensured in more than one jurisdiction. For example, some formal tools, when disclosed, can further undermine market confidence or may trigger termination and close-out netting events in financial contracts, with counterproductive effects;

- The Fortis case illustrates the tension between the need to maintain financial stability, for which a bank under certain circumstances needs to be resolved in the public interest and with public support, and the position of the shareholders of such a bank (i.e. dilution of their stake). Currently, Dutch and Belgian financial supervisory legislation does not permit effective special measures to be taken to resolve individual banks in a manner which maintains financial stability in urgent situations and which overrides the rights of shareholders; and

- Despite a long-standing relationship in ongoing 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 resolution."

Thus it is clear from the Fortis case that differences across EU countries in laws, regulations, and delegated authorities to governments, courts, and regulators provide formidable obstacles to the timely and low-cost resolution of banking institutions regardless of whether they are entirely incorporated in one jurisdiction or in several; needless to say the resolution obstacles are more difficult to overcome in the case of banks that are incorporated in several jurisdictions and for nonbank financial institutions. [24]

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 [adopted] by 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.[25, 26]

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[24] For further analyses, see Hupkes (2000), Garcia, Lastra, and Nieto (2009), and Čihák and Nier (2009).

[25] 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

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In light of the crisis, further initiatives have been taken both within the context of the ECOFIN and the Commissions work. Regarding the former, in October 2007 the ECOFIN established principles of crisis management and in June 2008 it adopted the crisis management Memorandum of Understanding. These initiatives were aimed at enhancing voluntary cooperation and fiscal burden sharing in the resolution of cross-border institutions. But they are suggestive and non-binding. Moreover, countries have found it difficult to cooperate during this crisis because of the pace and virulence of the market turbulence and its impact on financial institutions.[27]

As discussed earlier, the de Larosière report also recommended further actions. Recommendation 13 of the report states that a transparent and clear framework for managing crises should be developed; that all relevant authorities in the EU should be equipped with appropriate and equivalent crisis prevention and crisis intervention tools; and that legal obstacles which stand in the way of using these tools in a cross-border context should be removed, with adequate measures to be adopted at EU level.[28]

E.   Global governance

Policy responses to the ongoing global economic and financial crisis represent a turning point for global governance, both politically and psychologically. In November 2008, in the midst of the global financial, the Heads of State of the Group of Twenty countries (G-20) met for the first time to discuss and consider cooperative policy solutions aimed at restoring global economic and financial stability. This meeting was followed up on April 2, 2009 with the G-20 Summit in London.[29]

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."

[26] 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 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.

[27] Čihák and Nier (2009) agree with this assessment.

[28] See de Larosiere (2009), recommendation 13.

[29] See the G-20 Communiqué issued by the G-20 on April 2, 2009 on the UK Government's website.

The creation of this new G-20 process at the head of state level has been transformative in three important respects. First, international cooperation is now more inclusive, with the new G-20 process involving more heads of state from systemically-important emerging market countries. Second, global financial stability considerations have been elevated to the highest political level – whereas previous attempts at global governance in this important area were held at the level of finance ministers and central bank governors. Third, European leadership in global governance – including from European institutions such as the European Commission and the European Central Bank – has been more evident, cohesive, and persuasive than in previous attempts at global governance.

This process moved forward during the G-20 Summit in Pittsburgh held during September 25-26, 2009. Among the many smaller achievements, the G-20 Heads of State came to an historic agreement about the scope of the G-20 process and the fact that it replaces the G-8 in the areas of economic and financial policies. At the Pittsburgh Summit, leaders agreed new global frameworks for three important aspects of economic and financial policies covering : (1) global economic growth and adjustment, (2) a global financial regulatory system, and (3) reform of the governance of the international financial institutions. Although these are formidable achievements, only time will tell whether this process will be successful in capturing the benefits of greater cooperation and coordination of economic and financial policies. Some are already concluding that progress within the new G-20 process has already peaked and slowed and that the urgency for moving ahead and implementing the more difficult reforms has diminished. However, it is correct to say that the major achievement in Pittsburgh was the recognition of the G-20 itself as the major world forum on economic and financial issues.

In the jargon of the models considered in Section 2, the state of global governance prior to the crisis was already reasonably well beyond the suboptimal Nash equilibrium, in part because of the various forums in which information sharing and policy discussions occur. In the areas of macroeconomic policies these discussions have been occurring for decades and they have improved policy making and even some convergence over time. Relatively new to these discussions has been cooperation in the financial-sector policy areas – which originated in the aftermath of Asian crises in 1997 and later the creation of the Financial Stability Forum in 1998 and the transformation of the Interim Committee of the IMF into the International Monetary and Financial Committee. There should be little doubt that these innovations in global governance, together with the more recent head-of-state G-20 process, have improved the ability of the international community to more effectively internalize the negative externalities associated with informational and analysis gaps as well as differences in national priorities and policies. The global framework for governing finance has been much improved by these efforts. The outcome of the Pittsburgh summit, recognizing the preeminence of the G-20 on global economic and financial matters is an important stage in the process of political and psychological change in global governance triggered by the Global Crisis.

In addition, what the new G-20 process has revealed is that the European Union has achieved a degree of international integration unmatched at the global level and in many dimensions (political, economic, financial, and social). Notably, Europe has made significant

progress and gained experience in forging two important and relevant areas for global governance: the European Union has created a single European market in goods, services, and increasingly in finance; and 16 of its member countries have successfully created and managed a single currency and single monetary institution, which adapted during the crisis to contribute significantly to European and global policy efforts to restore financial stability during the current crisis.

It is because of this progress that the European Union has been able to provide leadership-through-experience in forging multilateral discussions and solutions. And it is clear that Europe is determined to continue this role of leadership-by-example in the period ahead. At the end 2008, President Barroso commissioned the de Larosière Group to propose financial sector reforms, a project that culminated in the de Larosière report which recommended the creation a new European architecture for safeguarding EU financial stability. This was well ahead of the proposals from the other major financial centers and thus paved the way for reform efforts. Following on this, at end-May 2009, the European Commission unveiled its proposals for a comprehensive follow-up on the de Larosière Report proposals aimed at creating two European mechanisms for safeguarding European financial stability proposed – the European Systemic Risk Board and the European System of Financial Supervision. This process has culminated (for now) in the September 23rd issuance of legislative proposals creating the new institutions which are now being considered by EU member legislatures and the European Parliament.

Despite these formidable European and global successes in the governance of finance, there are many areas that require further close cooperation if Coasian outcomes are to be reached, which in the case of global finance translates into restoring and sustaining global financial stability. Three such areas are discussed here. [30]

First, although authorities in all of the major financial centres agree that the over-the-counter derivatives markets need to be effectively regulated, creating an effective regulatory framework is likely to pose significant operational and politically contentious challenges. Over-the-counter derivatives markets constitute a global network of counterparty relationships among and between systemically important financial institutions (SIFIs). In effect, this network is the global interbank money market at the core of the global financial system. It provides 'utility' financial services that affect indirectly many aspects of company and household finance.

Genuine reform efforts in this area will require changes on many fronts: legal, process, architecture, cross-border cooperation, and leadership. There are differences in reform proposals across the Atlantic and fierce competition between the major financial centres; but there is also much common ground. These markets are truly global and systemic. Uncoordinated solutions will not work. Solutions that fall short of global solutions could lead to the persistence of regulatory arbitrage, complexity, opacity, and systemically threatening

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[30] See also Schinasi (2009).

counterparty relationships. For these reasons, continued leadership, including at the head-of-state level, may be required to forge a consensus that a global regulatory framework and platform is necessary to regulate the activities in these markets and conduct continuous effective surveillance over them.

Second, it is widely acknowledged that some global financial institutions were deemed too big to fail, and the crisis has revealed some were too big to manage and too difficult to save without massive injections of taxpayer monies. Reform efforts are aiming to address these issues by creating regulatory and supervisory frameworks more capable of overseeing SIFIs and resolution regimes capable of orderly liquidations and closures. This is one possible approach and only time will tell if reform proposals lead in the right direction.

Before such an approach is engraved in stone, greater reflection is warranted on alternative approaches. Over the years, authorities in all of the major financial centres have through explicit policies or inaction either promoted, encouraged, or acquiesced to the emergence of these very large global institutions often on the grounds of claims of economies of scale and scope. However, the extensive economics and finance literatures are inconclusive about the actual gains of economic efficiency from economies of scale and scope alleged and sought by universal banks, financial holding companies, global financial conglomerates, and other SIFIs. It may well be the case that economies of scale – for example, having a global platform for foreign-exchange trading – can be mostly, if not entirely captured by more specialized institutions that are large and global but that would be more transparent, easier to manage, and less difficult to regulate and supervise. In light of the empirical evidence and the recent crisis, surprisingly very little serious discussion has been heard on the optimal or appropriate size, scope, complexity, management, and governance of private financial institutions.

Accordingly, leaders and policy makers should be asking: What exactly are the inter-temporal efficiency gains to their societies of combining M&A, asset management, securities origination and underwriting, foreign exchange trading, commercial banking, and other financial services all under one roof in relation to the inter-temporal social costs now being experienced? Can the alleged gains be captured by more specialized institutions that are less likely to generate the social costs? It would seem entirely appropriate for these and other important related subjects to receive as much analytical and policy attention as the efforts now being expended on formulating reforms of the surveillance, regulation, supervision, and governance framework for overseeing these SIFIs.

A third unmet global governance challenge is that of objective surveillance of global financial markets free from national and political influences. One alternative is to create a new independent entity with a fully professional staff whose only remit is to identify sources of systemic risk and vulnerabilities, including emanating from specific countries or financial systems. Effective objective surveillance would require that this entity be politically independent and capable of holding countries to account for the negative externalities created by their financial systems and policies without consequences for their budget or mandate. Vesting one of the existing international financial institutions (that is, the BIS, FSB, or IMF) with the mandate and necessary authorities is a possibility, but the operational entity

performing these tasks must be free to communicate its assessments and recommend actions without being subject to political or national pressures to nuance or change its analysis and judgment.[31]

IV. CONCLUDING REMARKS.

In this paper we have looked at the Global Crisis that started in 2007, focusing on international linkages and spillover effects that made the situation and effectiveness of policy action in any one country dependent on actions being taken elsewhere. The magnitude and speed of spillovers, observed during the Global Crisis is unprecedented. We focused on examples of policy in the European Union because, given that Europe is the most integrated continent in the world, one could expect policy interdependence to be strongest.

We have used game-theoretic modeling to provide conceptual clarity. Specifically we resorted to the Economic Theory of Alliances (Olson,1965 and Olson and Zechauser, 1966). The framework has already been applied, in the literature, to a wide variety of transnational issues including climate change, energy security, international trade, financial stability and tax competition. In this paper we contrast a non-cooperative Nash equilibrium with an efficient co-operative Coase equilibrium. The model makes it possible to consider, in detail, for specific institutional arrangements and situations ("rules and circumstances of the game") whether the outcome of interaction among policy makers will be approximating Nash or Coase. The outcome is seen to depend on international and on national institutional arrangements, on the territorial distribution of the net benefits from policy actions, on the completeness and symmetry of available information, on transactions and bargaining costs and on the ability to credibly commit to future policy action. For example we have emphasized the importance of the result that if national and collective benefits are complements and the national component is important it may be relatively easy to solve the collective action problem and approximate Coase. In contrast when transactions costs are important, information is asymmetric and the collective gains from co-operation small (compared to the distribution across countries) the outcome can be expected to come close to the non-cooperative Nash solution.

In the paper we consider five area of policy in the European Union:

- Monetary Policy.
- The Single Market and State Aid to Financial and Non-Financial Sectors.
- Financial Supervision and Regulation.
- Bank Insolvency Resolution Regimes.
- Global Governance.

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[31] A different kind of reform is proposed by Adams and Sadun (2009). They call for the creation of a global economic council (Gleco), a ministerial body with decision-making powers overseeing the proper functioning of the global economy and the stability of the international financial system by providing close political support and strategic guidance to all IFIs.

The first two policy areas are exclusive competence of the European Union. Monetary policy is indivisible and the responsibility for its conduct belongs to the decision-making bodies of the independent European Central Bank. The primary objective of the Bank is to maintain price stability, over the medium term, for the euro area as a whole. It also contributes to preserving financial stability. We concluded that the centralization of the responsibility for the conduct of monetary policy in the hands of the ECB allowed for an effective response of monetary policy to the Global Crisis. ECB's proved timely and effective as events unfolded. It also co-operated effectively with central banks from the rest of the world decisively contributing to crisis management at the global level.

Competition policy (including state aid rules) is also an exclusive competence of the European Union. The responsibility for its conduct is entrusted to the European Commission. The Global Crisis, in particular in the autumn of 2008, required quick and forceful (national) action to stop a financial meltdown and to mitigate the consequences of the crisis. At the same time it was of crucial importance to avoid immediate negative spillovers and to ensure a level-playing field in the Single Market. The Commission acted quickly to allow Member States' policy actions, in line with state aids rules, while, at the same time, clarifying the general framework for national action. Moreover re-structuring must follow in order to ensure a return to normal competitive market conditions and practices. The process is on-going and it is therefore too early for a final verdict. However Treaty provisions, past judicial decisions concerning state aid rules, the clarity of the framework put forward by the European Commission in various Communications, and the collective interest of Member States in the proper functioning of the Single Market justify optimism.

The Global Crisis made apparent weaknesses in the area of banking supervision and regulation. As a result of the systemic financial crisis, 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. This has encouraged EU leaders, policy makers, and institutions to reconsider the potential benefits of a pan-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 (see Box on Timeline for EU Financial Architecture Reform).The culmination of this fairly rapid process is manifest in the Commissions legislative proposals of September 23, 2009. The legislation proposes the establishment of two new bodies at the European level. First, at the macro-prudential level, the legislation would establish the European Systemic Risk Board with the responsibility for identifying and assessing EU systemic risks and vulnerabilities. Second, at the micro-prudential level, the legislation would establish a new European System of Financial Supervision comprised of three separate supervisory authorities to oversee institutions providing banking, securities, and insurance and pension financial services.

[INSERT PARAGRAPHS ON RESOLUTION AND GLOBAL GOVERNANCE + ONE PARAGRAPH TO WRAP UP]

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 System 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 for implementing reforms.

Annex: The Models

1.   Decentralized decision-making for 'pure' public goods.

Preferences of European citizens in country i (= 1, 2, ..., n = 27) can be represented by the continuous and twice differentiable utility function,

$$U_i = U_i(y^i, Q, T) = U_i(y^i, q^i + Q_{-i}, T), \text{ where:} \qquad [1]$$

y^i is a composite private good produced by country i,

$Q = q^i + Q_{-i}$ is the aggregate amount of the 'pure' (or fully shared) public good,

q^i is country i's production of the pure public good,

$Q_{-i} = \sum_{j \neq i}^{n} q^j$ is the production of the public good by countries other than i , and

T is a measure of the commonly perceived threat to the group's financial stability.

The simple sum Q of the q^i's embodies the notion of a 'pure' public good in which each country's public good, q^i, yields fully shared benefits that are identical to those of any other country's q. This 'substitutability' of public goods implies the possibility of *free riding*.

Each country faces the income constraint [2] in which the value (cost) of a unit of the private good is 1 and the cost of the public good in terms of the numeraire private good is p:

$$I^i = y^i + p q^i . \qquad [2]$$

[1] implies that each country's welfare depends on the decisions of other countries (as denoted by Q). Thus, country decisions have the characteristics of a *Nash* game.

The Nash problem for each country (i = 1, 2, ..., n=27) can now be formalized as,

$$\underset{y^i, q^i}{Max} \ \{U_i(y^i, q^i + Q*_{-i}, T)\} \text{ subject to } I^i = y^i + p q^i, \text{ where,} \qquad [3]$$

$$Q*_{-i} = \sum_{j \neq i}^{n} q^j * \text{ represents the best-response provision of public goods by all countries other}$$

than i, given i's allocation of resources; this is also country i's *best-response spill-in* of benefits from the provision of public goods by all other countries.

Assuming that all countries individually provide a positive amount of the public good, q^i, a *Nash equilibrium* consists of country allocations of resources that solves [3] for all countries. The first-order conditions for optimization are satisfied when each country chooses the mix of private and public goods that equates the marginal rate of substitution between private and public goods to the relative marginal costs of producing both, i.e., when for all

i, $MRS_{Qy}^i = p$. By contrast, the Pareto-optimal provision of the public good is derived by maximizing each country's utility [1]subject to: (1) the constancy of other allies' utility levels and (2) the European resource constraint, the simple sum of the country resource constraints,

I. The resulting first-order condition for reaching this optimum is that the *sum of the group of countries* MRSs are equal to the relative cost of a unit of the public good, p, or

$$\sum_{j=i}^{n} MRS_{Qy}^{j} = p.$$ Thus, in the Nash equilibrium, countries collectively provide an amount of

the pure public good that is below the socially (Pareto) optimal level.

2.   Generalization to allow for 'exclusive' public goods.

Alternatively, the public good, q, can be seen as conveying two kinds of benefits: an 'exclusive' country-specific benefit, x^i, and a fully shared benefit, z^i. Assume each benefit is provided in fixed proportions to the resources allocated to produce q: $x^i = \alpha q^i$ and $z^i = \beta q^i$, with $\alpha + \beta = 1$. If $\alpha = 0$, then the pure public model results. If $\alpha = 1$, then all public good benefits are country specific.

In this general model, country i receives *spill-ins* $Z_{-i} = \beta Q_{-i}$; European wide benefits, which are assumed to be additive among the member countries, amount to $Z = z^i + Z_{-1} = \beta(q^i + Q_{-i})$. Each country's utility function can now be represented as,

$$U_i = U_i (y^i, x^i, Z, T) = U_i (y^i, \alpha q^i, \beta(q^i + Q_{-i}), T). \qquad [4]$$

In parallel with equation 3, a country's Nash problem can now be characterized as,

$$\underset{y^i, q^i}{Max} \ \{U_i (y^i, \alpha q^i, \beta(q^i + Q*_{-i}), T)\} \ \text{ subject to } \ I^i = y^i + pq^i. \qquad [5]$$

If $\beta = 1$ ($\alpha = 0$), equation 5 is equivalent to a pure public good model. If $\alpha = 1$ ($\beta = 0$), then there are no spill-ins associated with public goods provided by other countries.

A *Nash equilibrium* results when each member country *i* chooses a mix of public and private goods that satisfies, $p = \alpha MRS_{xy}^{i} + \beta MRS_{zy}^{i}$. The first right-hand term represents the marginal value (in terms of the numeraire good, y) of the 'exclusive' public good and the second is the marginal value of the 'shared' public good. The sum represents the country's marginal valuation of financial-stability benefits received; country i allocates resources to produce these benefits up to the point where the marginal costs and benefits are equalized.

Consistent with the results for the pure public good model, achieving the Pareto optimal allocation of resources in this decision making process would require that the *sum of the group of countries* MRSs are equal to the relative cost of a unit of the public good, p. The Nash equilibrium is socially sub-optimal as it was for the pure public good model above.

Figure1. Nash, Pareto-Efficient, and Coase Equilibria
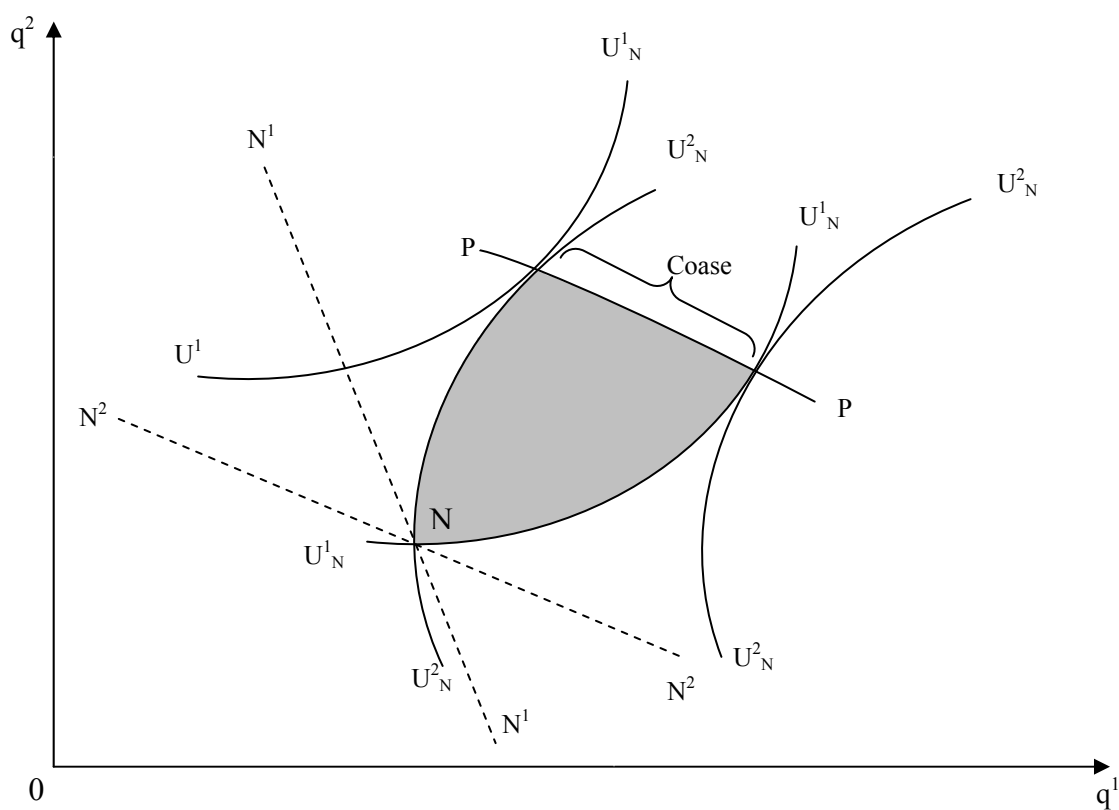
Figure 2 Joint-Product Model: Equilibria With Complementarities Between Pure and Exclusive Public Goods
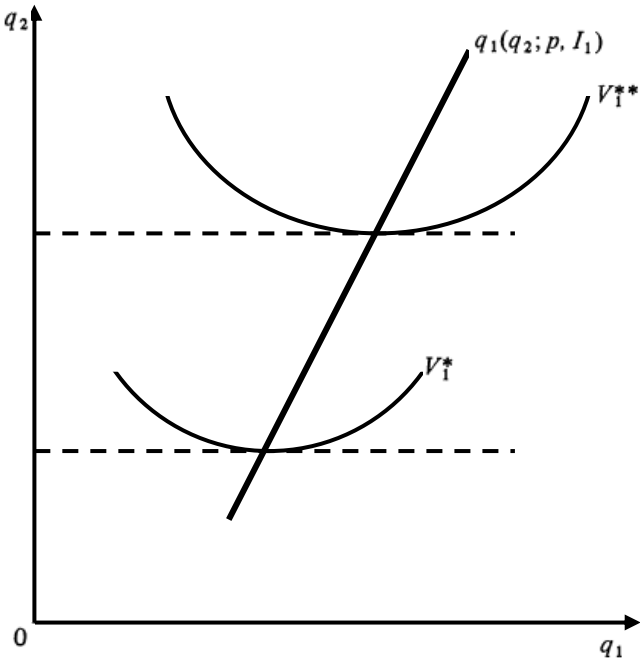
Figure 3. Joint-Product Model: Multiple Equilibria
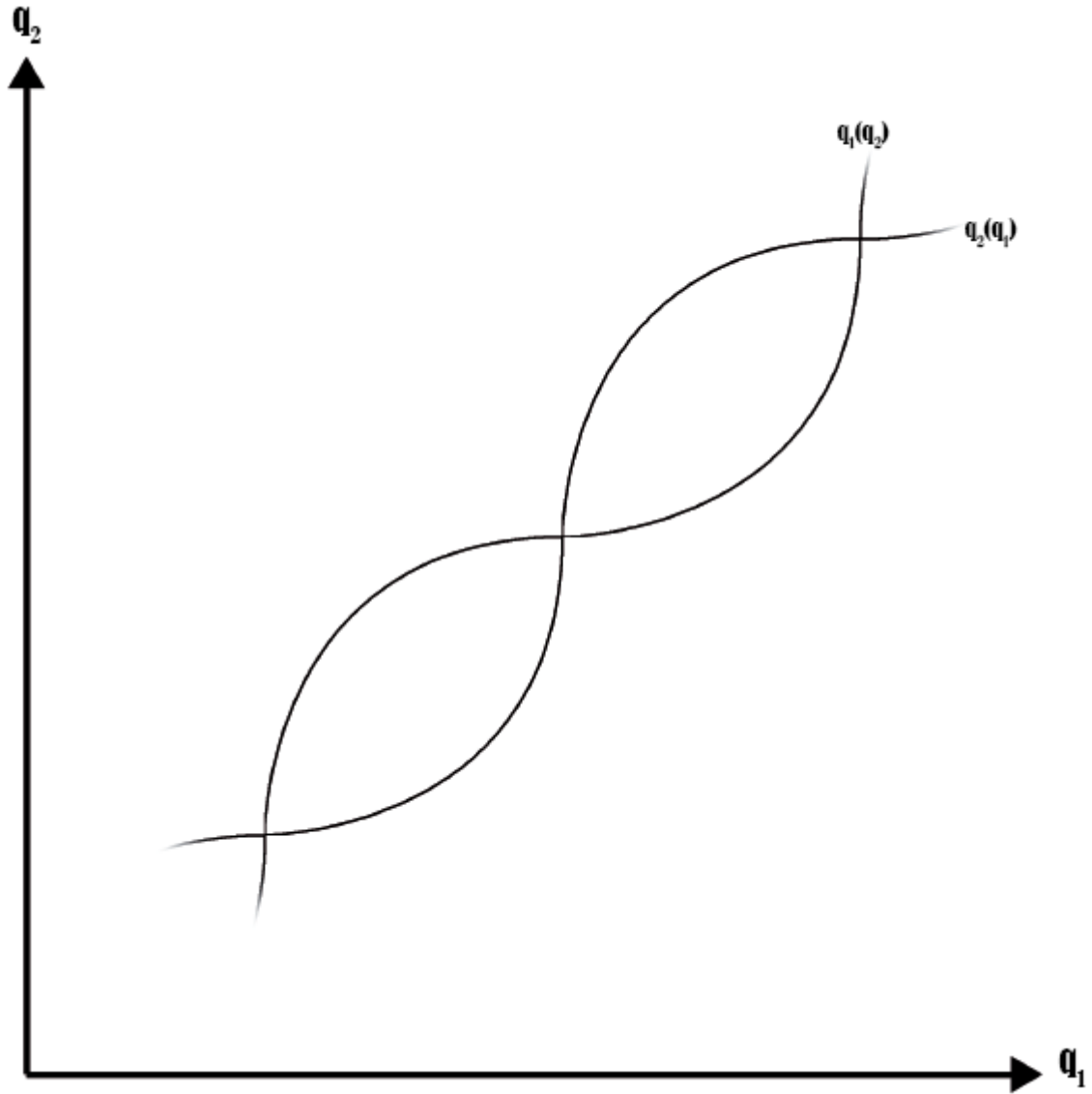
Table 1: Public Interventions in the banking sector

Public interventions in the banking sector

% of GDP	Capital injections		Guarantees on bank liabilities		Relief of impaired assets		Liquidity and bank funding support		Total	
	Approved	Effective	Approved	Granted	Approved	Effective	Approved	Effective	Approved	Effective
Ireland	5.1	2.1	225.2	225.2	-	-	-	-	230.3	227.3
Belgium	4.2	5.7	70.8	16.3	5.7	5.0	NA	NR	74.6	35.3
United Kingdom	3.5	2.6	21.7	9.5	-	-	25.1	18.7	50.3	30.8
Netherlands	7.9	7.9	34.3	5.7	-	4.9	-	5.8	42.2	24.3
Luxembourg	6.9	7.9	12.4	NR	-	-	-	-	19.3	18.5
Sweden	1.6	0.2	48.5	8.8	-	-	0.1	-	50.2	9.0
Latvia	1.4	-	10.9	2.8	-	-	10.9	6.1	23.2	8.9
Austria	5.0	1.7	27.3	5.1	0.4	0.4	27.3	1.5	60.0	8.7
Germany	4.2	1.6	18.6	7.3	3.6	0.4	-	NR	26.4	6.3
Spain	-	-	9.3	2.8	-	-	2.8	1.8	12.1	4.6
France	1.2	0.8	16.6	3.1	2.3	0.3	-	-	20.1	4.2
Portugal	2.4	-	12.5	3.0	-	-	-	-	14.9	3.0
Greece	2.0	-	6.1	0.4	-	-	3.3	1.7	11.4	2.1
Denmark	6.1	0.3	253.0	NR	-	-	NA	NR	243.8	0.5
Hungary	1.1	0.1	5.9	-	-	-	-	-	7.0	0.1
Slovenia	-	-	32.8	-	-	-	-	-	32.8	-
Slovakia	-	-	-	-	-	-	-	-	-	-
Romania	-	-	-	-	-	-	-	-	-	-
Poland	-	-	-	-	-	-	-	-	-	-
Malta	-	-	-	-	-	-	-	-	-	-
Lithuania	-	-	-	-	-	-	-	-	-	-
Italy	1.3	-	NA	-	-	-	-	-	1.3	-
Finland	-	-	27.7	-	-	-	-	-	27.7	-
Estonia	-	-	-	-	-	-	-	-	-	-
Czech Republic	-	-	-	-	-	-	-	-	-	-
Cyprus	-	-	-	-	-	-	-	-	-	-
Bulgaria	-	-	-	-	-	-	-	-	-	-
European Union	2.6	0.5	24.7	7.8	12.0	0.5	4.3	3.0	43.6	11.8
Euro area	2.6	1.4	20.6	8.3	12.0	0.7	1.3	0.7	36.5	11.1

Note: Countries ranked by total effective support, NR = not reported by the Member State, NA = not available. *Source:* European Commission.

Source: Table III.2.1, page 63 of DG-ECFIN's *Economic Crisis in Europe: Causes, Consequences and Responses,* European Economy, 7, 2009.

Table 2: Measures taken by the Commission concerning state aid to combat the crisis (reverse chronological order)

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

Table 3: State aid cases to the financial sector (Decisions taken by the Commission in 2008/2009 – Situation as of 9 September 2009)

	Member State	Type of measure / Beneficiary	Type of Decision	Date of adoption
1	Austria	Aid scheme for the Austrian financial sector (guarantees, recapitalisation & other)	Decision not to raise objections	09 December 2008
			IP/08/1933	
		Prolongation		
			MEX/09/0630	30 June 2009
2	Austria	Recapitalisation of Hypo Tirol	Decision not to raise objections	17 June 2009
			IP/09/928	
3	Belgium/France/ Luxembourg	Guarantee on liabilities of Dexia	Decision not to raise objections	19 November 2008
			IP/08/1745	
4	Belgium/France/ Luxembourg	Guarantee in favour of Dexia on certain assets in FSA	Decision not to raise objections	13 March 2009
			IP/09/399	
5	Belgium/Luxembourg/Netherlands	Measures in favour of Fortis	Decision not to raise objections	19 November 2008

	Member State	Type of measure / Beneficiary	Type of Decision	Date of adoption
			IP/08/1746	
6	Belgium/Luxembourg/Netherlands	Restructuring aid to Fortis Bank and Fortis Bank Luxembourg	Decision not to raise objections	03 December 2008
			IP/08/1884	
7	Belgium/Luxembourg	Additional aid measures in favour of Fortis Bank and Fortis Bank Luxembourg	Decision not to raise objections	12 May 2009
			IP/09/743	
8	Belgium	Recapitalisation measure in favour of KBC	Decision not to raise objections	18 December 2008
			IP/08/2033	
9	Belgium	Capital Injection for Ethias Group	Decision not to raise objections	12 February 2009
			IP/09/254	
10	Belgium	Recapitalisation and asset relief for KBC Group	Decision not to raise objections	30 June 2009
			IP/09/1063	

Table 3: State aid cases to the financial sector (continued)

	Member State	Type of measure / Beneficiary	Type of Decision	Date of adoption
11	Denmark	Rescue aid to Roskilde Bank	Decision not to raise objections (IP/08/1222)	31 July 2008
12	Denmark	Liquidation aid Roskilde bank	Decision not to raise objections IP/08/1633	5 November 2008
13	Denmark	Guarantee scheme for banks in Denmark	Decision not to raise objections IP/08/1483	10 October 2008
14	Denmark	Recapitalisation scheme and amendment of the guarantee scheme Prolongation	Decision not to raise objectives IP/09/206 MEX/09/0817	3 February 2009 17 August 2009
15	Denmark	Rescue aid for Fionia Bank	Decision not to raise objections IP/09/819	20 May 2009
16	Finland	Finnish guarantee scheme	Decision not to raise objections IP/08/1705	14 November 2008

Table 3: State aid cases to the financial sector (continued)

	Member State	Type of measure / Beneficiary	Type of Decision	Date of adoption
		Prolongation and modification	Decision not to raise objections IP/09/681	30 April 2009
17	Finland	Guarantee for Kaupthing Bank Finland	Decision not to raise objections IP/09/82	21 January 2009
18	France	Financial support measures to the banking industry in France	Decision not to raise objections IP/08/1609	30 October 2008
		(Refinancing)	Decision not to raise objections IP/09/750	
		Extension of the scheme		12 May 2009
19	France	Financial support measures to the banking industry in France	Decision not to raise objections	08 December 2008
		(Recapitalisation)	IP/08/1900	
		Amendment to the Decision	IP/09/158	28 January 2009

	Member State	Type of measure / Beneficiary	Type of Decision	Date of adoption
		Amendment to the Decision	IP/09/461	
20	France	Capital injection for Caisse d'Epargne and Banque Populaire	Decision not to raise objections	23 March 2009 8 May 2009
21	Germany	Restructuring aid to Sachsen LB	IP/09/722 Conditional decision (after formal investigation procedure IP/08/849	4 June 2008
22	Germany	Restructuring aid to IKB	Conditional decision (after formal investigation procedure) IP/08/1557	21 October 2008
23	Germany	Rescue aid to Hypo Real Estate Holding	Decision not to raise objections IP/08/1453	2 October 2008
24	Germany	Aid scheme for financial institutions in Germany (guarantees, recapitalisations & other) Prolongation	Decision not to raise objections IP/08/1589 MEX/09/0622	27 October 2008

Table 3: State aid cases to the financial sector (continued)

	Member State	Type of measure / Beneficiary	Type of Decision	Date of adoption
25	Germany	Guarantee and recapitalisation for Bayern LB	Decision not to raise objections	22 June 2009 18 December 2008
26	Germany	Guarantee for NordLB	IP/08/2034 Decision not to raise objections	22 December 2008
27	Germany	Guarantee for IKB	IP/08/2056 Decision not to raise objections	22 December 2008
28	Germany	Guarantee for SdB – Sicherungseinrichtungsgesellschaft deutscher Banken mbH	IP/08/2055 Decision not to raise objections	22 January 2009
29	Germany	Commerzbank capital injection	IP/09/114 Decision not to raise objections	7 May 2009
30	Germany	Aid for the restructuring of West LB	IP/09/711 Conditional decision (after formal investigation procedure) IP/09/741	12 May 2009
31	Germany	Recapitalisation of HSH Nordbank	Decision not to raise	29 May 2009

	Member State	Type of measure / Beneficiary	Type of Decision	Date of adoption
			objections	
32	Germany	Recapitalisation and asset relief for LBBW (Landesbank Baden Württemberg)	IP/09/854 Decision not to raise objections	30 June 2009
33	Germany	German asset relief scheme	IP/09/1058 Decision not to raise objections	31 July 2009

Table 3: State aid cases to the financial sector (continued)

	Member State	Type of measure / Beneficiary	Type of Decision	Date of adoption
34	Germany	Additional aid (guarantees) for IKB	IP/09/1216 Decision not to raise objections	17 August 2009
			IP/09/1235	
35	Greece	Aid scheme to the banking industry in Greece (guarantees, recapitalisation & other)	Decision not to raise objections	19 November 2008
36	Hungary	Financial support measures to Hungarian financial industry in form of recapitalisation and guarantee scheme	IP/081742 Decision not to raise objections	12 February 2009
			IP/09/253	
		Prolongation and modification		
			Decision not to raise	

	Member State	Type of measure / Beneficiary	Type of Decision	Date of adoption
			objections	3 September 2009
			MEX/09/0903	
37	Hungary	Hungarian Mortgage Support Scheme	Decision not to raise objections	13 July 2009
			IP/09/1123	
38	Ireland	Guarantee scheme for banks in Ireland	Decision not to raise objections IP/08/1497	13 October 2008
39	Ireland	Recapitalisation of Anglo Irish Bank	Decision not to raise objections	14 January 2009
			IP/09/50	
40	Ireland	Recapitalisation of Anglo Irish Bank	Decision not to raise objections	26 June 2009
			IP/09/1045	
41	Ireland	Change of ownership of Anglo Irish Bank	Decision not to raise objections	17 February 2009
			IP/09/271	
42	Ireland	Recapitalisation of Bank of Ireland	Decision not to raise objections	26 March 2009
			IP/09/483	

Table 3: State aid cases to the financial sector (continued)

	Member State	Type of measure / Beneficiary	Type of Decision	Date of adoption
43	Ireland	Recapitalisation of Allied Irish Bank	Decision not to raise objections	12 May 2009
			IP/09/744	
44	Italy	Guarantee scheme for Italian banks	Decision not to raise objections IP/08/1706	14 November 2008
			IP/09/929	
		Prolongation		16 June 2009
45	Italy	Recapitalisation scheme	Decision not to raise objections	23 December 2008
			IP/08/2059	
46	Latvia	Public support measures to Parex Banka	Decision not to raise objections	24 November 2008
			IP/08/1766	
		Amendment to the Decision	IP/09/732	
				11 May 2009
47	Latvia	Guarantee scheme for banks	Decision not to raise	22 December 2008

	Member State	Type of measure / Beneficiary	Type of Decision	Date of adoption
			objections	
			IP/08/2054	
48	Luxembourg	Prolongation Restructuring aid for Kaupthing Bank Luxembourg	MEX/09/0630 Decision not to raise objections	30 June 2009 9 July 2009
49	Netherlands	Guarantee scheme for Dutch financial institutions	IP/09/1107 Decision not to raise objections IP/08/1610	30 October 2008
			MEX/09/0707	

Table 3: State aid cases to the financial sector (continued)

	Member State	Type of measure / Beneficiary	Type of Decision	Date of adoption
		Prolongation		7 July 2009
50	Netherlands	Measure in favour of ING	Decision not to raise objections IP/08/1699	13 November 2008
51	Netherlands	Measure in favour of Aegon	Decision not to raise objections	27 November 2008
			IP/08/1822	

	Member State	Type of measure / Beneficiary	Type of Decision	Date of adoption
52	Netherlands	SNS Reaal/New capital injection by Dutch authorities	Decision not to raise objections	10 December 2008
			IP/08/1951	
53	Netherlands	ING Illiquid asset facility	Decision not to raise objections	31 March 2009
			IP/09/514	
54	Portugal	Guarantee scheme for credit institutions in Portugal	Decision not to raise objections IP/08/1601	29 October 2008
55	Portugal	State guarantee for Banco Privado Português	Decision not to raise objections	13 March 2009
			IP/09/400	
56	Portugal	Bank recapitalisation scheme	Decision not to raise objections	20 May 2009
			IP/09/818	
57	Slovenia	Guarantee scheme for credit institutions in Slovenia	Decision not to raise objections	12 December 2008
			IP/08/1964	
		Prolongation	MEX/09/0622	

Member State	Type of measure / Beneficiary	Type of Decision	Date of adoption
			22 June 2006
58	Slovenia	Liquidity scheme for financial sector	Decision not to raise objections	20 March 2009

Table 3: State aid cases to the financial sector (continued)

Member State	Type of measure / Beneficiary	Type of Decision	Date of adoption
		IP/09/452	
59	Spain	Fund for the Acquisition of Financial Assets in Spain	Decision not to raise objections IP/08/1630	4 November 2008
		Prolongation	Decision not to raise objections
		MEX/09/0807	7 August 2009
60	Spain	Spanish guarantee scheme for credit institutions	Decision not to raise objections	22 December 2008
		IP/08/2049	
		Prolongation	Decision not to raise

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	Member State	Type of measure / Beneficiary	Type of Decision	Date of adoption
			objections	25 June 2009
			MEX/09/0625	
61	Sweden	Support measures for the banking industry in Sweden	Decision not to raise objections IP/08/1600	29 October 2008
			IP/09/186	
		Amendment to the decision		
			IP/09/652	28 January 2009
		Amendment and prolongation		
				28 April 2009
62	Sweden	Emergency rescue measures regarding Carnegie Investment Bank	Decision not to raise objections	15 December 2008
			IP/08/1977	
63	Sweden	Recapitalisation scheme	Decision not to raise objections	11 February 2009
			IP/09/241	

Table 3: State aid cases to the financial sector (continued)

	Member State	Type of measure / Beneficiary	Type of Decision	Date of adoption
		Prolongation	Decision not to raise objections	5 August 2009
			MEX/09/0805	
64	United Kingdom	Rescue aid to Bradford and Bingley	Decision not to raise objections IP/08/1437	1st October 2008
65	United Kingdom	Aid scheme to the banking industry in the UK (guarantees, recapitalisation & other)	Decision not to raise objections IP/08/1496	13 October 2008
		Prolongation	Decision not to raise objections	
			IP/09/586	15 April 2009
66	United Kingdom	Working capital guarantee scheme	Decision not to raise objections	24 March 2009
			IP/09/471	

Source: Commission's 'Overview of state aid national measures adopted as a response to the financial/economic crisis', MEMO-09-380
http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/09/380&format=HTML&aged=0&language=EN&guiLanguage=en

Table 4: Case currently under formal investigation by the Commission

	Country	Type of measure / Beneficiary	Date of decision regarding the opening of formal investigation	
1	Belgium/France/Luxembourg	Restructuring of Dexia	13 March 2009 (IP/09/399)	*Case under assessment*
2	Belgium	Asset relief measure in favour of KBC Group	30 June 2009 IP/09/1063	*Case under assessment*
3	Germany	Aid package for Hypo Real Estate	7 May 2009 IP/09/712	*Case under assessment*
4	Germany, Austria	Aid package for Bayern LB and its Austrian subsidiary Hypo Group Alpe Adria	12 May 2009 IP/09/742	*Case under assessment*
5	Germany	Asset relief measure in favour of Landesbank Baden-Württemberg (LBBW)	30 June 2009 IP/09/1058	*Case under assessment*
6	Latvia	Aid package for JSC Parex Banka	29 July 2009 IP/09/1203	*Case under assessment*
7	United Kingdom	Restructuring aid for Northern Rock	2 April 2008 (IP/08/489)	*Case under assessment*

		Extension of the ongoing in-depth investigation	7 May 2009	
			IP/09/713	
8	Netherlands	ING Illiquid asset facility	31 March 2009	*Case under assessment*
			IP/09/514	
9	Netherlands	State measures in favour of Fortis Bank Nederland (FBN) and the activities of ABN Amro	8 April 2009	*Case under assessment*
			IP/09/565	

Source: Commission's 'Overview of state aid national measures adopted as a response to the financial/economic crisis', MEMO-09-380
http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/09/380&format=HTML&aged=0&language=EN&guiLanguage=en

Table 5: State aid to non financial sectors under the Temporary Framework (Decisions by the Commission during 2008-2009; situation as of 9 September 2009)

	Member State	Type of measure / Beneficiary	Type of decision	Date of adoption
1	Austria	N 47/a/2009- Temporary scheme (aid up to € 500 000)	Decision not to raise objections	20 March 2009
			IP/09/454	
		N 317/2009 - Amendment	IP/09/972	
2	Austria	N 47/d/2009- Temporary scheme (risk capital)	Decision not to raise objections	18 June 2009 25 March 2009
			IP/09/484	
3	Belgium	N 117/2009- Temporary scheme (subsidised guarantees)	Decision not to raise objections	20 March 2009
			IP/09/447	
4	Czech Republic	N 237/2009 - Temporary scheme (subsidised interest rates)	Decision not to raise objections	6 May 2009
			IP/09/699	
5	Czech Republic	N 236/2009 - Temporary scheme (aid up to € 500 000)	Decision not to raise objections	7 May 2009
			IP/09/719	
6	Denmark	N 198/2009 - Temporary scheme (export-credit insurance)	Decision not to raise objections	6 May 2009
			IP/09/706	
7	Estonia	N 387/2009 - Temporary scheme (aid up to € 500	Decision not to raise	13 July 2009

	Member State	Type of measure / Beneficiary	Type of decision	Date of adoption
		000)	objections	
8	Finland	N 224/2009 - Temporary scheme (aid up to € 500 000)	IP/09/1121 Decision not to raise objections	3 June 2009
			IP/09/869	

Table 5: State aid to non financial sectors (continued)

	Member State	Type of measure / Beneficiary	Type of decision	Date of adoption
9	Finland	N 82b/2009 - Temporary scheme (guarantees)	Decision not to raise objections	9 June 2009
			IP/09/919	
10	Finland	N 258/2009 – Temporary scheme (export-credit insurance)	Decision not to raise objections	22 June 2009
			IP/09/979	
11	France	N 7/2009 – Temporary scheme (aid up to € 500 000)	Decision not to raise objections	19 January 2009
			IP/09/72	
12	France	N 15/2009 - Temporary scheme (reduced interest rates)	Decision not to raise objections	4 February 2009
			IP/09/216	

	Member State	Type of measure / Beneficiary	Type of decision	Date of adoption
13	France	N 11/2009 - Temporary scheme (reduced interest rates – to producers of green products)	Decision not to raise objections	3 February 2009
			IP/09/205	
14	France	N 23/2009 - Temporary scheme (subsidised guarantees)	Decision not to raise objections	27 February 2009
			IP/09/332	
15	France	N 119/2009 - modification of French risk capital scheme	Decision not to raise objections	16 March 2009
			IP/09/406	
16	France	N 36/2009 - Temporary scheme (risk capital)	Decision not to raise objections	30 June 2009
			IP/09/1094	
17	Germany	N 661/2008 – KfW run special program 2009 (interest subsidies)	Decision not to raise objections	30 December 2008
			(IP/08/2063)	
18	Germany	N 668/2008 – Temporary scheme (limited amount of compatible aid)	Decision not to raise objections	30 December 2008
			IP/08/2063	
		N 299/2009 - Amendment		

	Member State	Type of measure / Beneficiary	Type of decision	Date of adoption
			IP/09/877	
		N 411/2009 - Amendment		4 June 2009
			IP/09/1163	
20	Germany	N 27/2009 - Temporary scheme (guarantees)	Decision not to raise objectionsIP/09/331	17 July 2009 27 February 2009
21	Germany	N 38/2009 - Temporary scheme (reduced interest rates)	Decision not to raise objections	19 February 2009
22	Germany	N 426/2009 – Temporary Scheme (green products)	IP/09/296 Decision not to raise objections	4 August 2009
23	Germany	N 384/2009 – Temporary Scheme (export credit insurance)	IP/09/1223 Decision not to raise objections	5 August 2009
24	Greece	N308/2009 - Temporary scheme (guarantees)	IP/09/1222 Decision not to raise objections	3 June 2009
25	Greece	N309/2009 - Temporary scheme (subsidised interest rates)	IP/09/867 Decision not to raise	3 June 2009

	Member State	Type of measure / Beneficiary	Type of decision	Date of adoption
			objections	
			IP/09/868	
26	Greece	N 304/2009 - Temporary scheme (aid up to € 500 000)	Decision not to raise objections	15 July 2009
			IP/09/1143	
27	Hungary	N 114/2009- Temporary scheme (guarantees)	Decision not to raise objections	10 March 2009
			IP/09/387	
28	Hungary	N 77/2009 – Temporary scheme (aid up to € 500 000)	Decision not to raise objections	24 February 2009
			IP/09/325	
29	Hungary	N 78/2009 – Temporary scheme (subsidised interest rates)	Decision not to raise objections	24 February 2009
			IP/09/325	
30	Hungary	N 203/2009 - Temporary scheme (guarantees)	Decision not to raise objections	24 April 2009
			IP/09/647	
31	Ireland	N 186/2009 – Temporary scheme (aid up to € 500 000)	Decision not to raise	15 April 2009

Table 5: State aid to non financial sectors (continued)

	Member State	Type of measure / Beneficiary	Type of decision	Date of adoption
			objections	
32	Italy	N 279/2009 - Temporary scheme (risk capital)	IP/09/585 Decision not to raise objections	20 May 2009
33	Italy	N 266/2009 - Temporary scheme (guarantees)	IP/09/825 Decision not to raise objections	28 May 2009
34	Italy	N 248/2009 – Temporary scheme (aid up to € 500 000)	IP/09/852 Decision not to raise objections	28 May 2009
35	Italy	N 268/2009 – Temporary scheme (subsidised interest rates)	IP/09/852 Decision not to raise objections	29 May 2009
36	Latvia	N 124/2009 – Temporary scheme (aid up to € 500 000)	IP/09/857 Decision not to raise objections	19 March 2009
37	Latvia	N 139/2009 - Temporary scheme (guarantees)	IP/09/442 Decision not to raise objections	22 April 2009
38	Lithuania	N 272/2009 – Temporary scheme (aid up to € 500 000)	IP/09/626 Decision not to raise objections	8 June 2006
			IP/09/890	

	Member State	Type of measure / Beneficiary	Type of decision	Date of adoption
39	Luxembourg	N 99/2009 – Temporary scheme (aid up to € 500 000)	Decision not to raise objections	26 February 2009

Table 5: State aid to non financial sectors (continued)

	Member State	Type of measure / Beneficiary	Type of decision	Date of adoption
			IP/09/334	
40	Luxembourg	N 128/2009 – Temporary scheme (guarantees)	Decision not to raise objections	11 March 2009
			IP/09/392	
41	Luxembourg	N 50/2009 – Temporary scheme (export-credit insurance)	Decision not to raise objections	20 April 2009
			IP/09/603	
42	Malta	N 118/2009 - Temporary scheme (aid up to € 500 000)	Decision not to raise objections	18 May 2009
			IP/09/820	
43	Netherlands	N 156/2009 – Temporary scheme (aid up to € 500 000)	Decision not to raise objections	1 April 2009
			IP/09/527	
44	Portugal	N 13/2009 – Temporary scheme (aid up to € 500 000)	Decision not to raise objections	19 January 2009

	Member State	Type of measure / Beneficiary	Type of decision	Date of adoption
			IP/09/71	
45	Romania	N 286/2009 – Temporary scheme (guarantees)	Decision not to raise objections	5 June 2009
46	Slovak Republic	N 222/2009 – Temporary scheme (aid up to € 500 000)	IP/09/882 Decision not to raise objections	30 April 2009
47	Slovenia	NN 34/2009 - Temporary scheme (guarantees)	IP/09/680 Decision not to raise objections	12 June 2009
48	Slovenia	N 228/2009 - Temporary scheme (aid up to € 500 000)	IP/09/917 Decision not to raise objections	12 June 2009
49	Spain	N 140/2009 – Temporary scheme (aid for green cars)	IP/09/918 Decision not to raise objections	29 March 2009
50	Spain	N 307/2009 – Temporary scheme (aid up to € 500 000)	IP/09/499 Decision not to raise objections	8 June 2009
51	Sweden	N 80/2009 - State guarantees in favour of Volvo cars	IP/09/889 Decision not to raise objections	5 June 2009
52	United Kingdom	N 43/2009 – Temporary scheme (aid up to € 500	IP/09/879 Decision not to raise	4 February 2009

	Member State	Type of measure / Beneficiary	Type of decision	Date of adoption
		000)	objections	
53	United Kingdom	N 71/2009 – Temporary scheme (guarantees)	IP/09/215 Decision not to raise objections	27 February 2009
54	United Kingdom	N 72/2009 – Temporary scheme (to businesses producing green products)	IP/09/333 Decision not to raise objections	27 February 2009
55	United Kingdom	N 257/2009 – Temporary scheme (subsidised interest rates)	IP/09/333 Decision not to raise objections	15 May 2009
			IP/09/793	

Source: Commission's 'Overview of state aid national measures adopted as a response to the financial/economic crisis', MEMO-09-380
http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/09/380&format=HTML&aged=0&language=EN&guiLanguage=en

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