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Towards an EU Framework for Safeguarding Financial Stability

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Towards an EU Framework for Safeguarding Financial Stability

Maria J. Nieto and
Garry J. Schinasi*

Introduction

The EU policy discussion on establishing an institutional architecture for safeguarding EU financial stability is taking place along both political and technical tracks. The former is occurring at EU, euro-zone, regional, and national levels and the latter at policy-making and expert-working levels in and across the relevant monetary, supervisory and regulatory authorities. Despite progress in achieving some pan-European agreements (for example, memoranda of understanding), there has been limited progress in envisioning, no less designing, a European architecture for safeguarding stability in the EU financial system.

At the same time, there is a dearth of rigorous economic analysis asking broader yet no less relevant questions: What is the optimal decision-making framework for establishing a financial stability framework for safeguarding pan-European financial stability? or What is the least-cost way of organizing an EU architecture for safeguarding stability?

This article tries to fill part of this "analytical" gap by introducing and discussing, in a non-technical way, one analytical approach that could be useful for examining these broader questions and their implications for European financial-stability arrangements.[1] The approach is that of the "economics of alliances" developed by Olson (1965) to analyze the nature of decision making by a group of nations (NATO) desiring to create a deterrence against a common outside threat. As in the case of an international alliance, in the EU, there are a large number of member countries and the need for providing multiple public goods (e.g., financial stability, investor protection, market regulations and other public goods).

The overall objectives of this article are threefold: (1) to summarize briefly the ongoing debate on the establishment of EU financial stability arrangements; (2) to characterize EU financial stability as a transnational public good; and (3) to provide model-based benchmarks for assessing the ability of Europe's existing institutional architecture and decision-making processes to safeguard the stability of EU financial system against systemic threats – such as the insolvency of a cross-border European bank.

Importance of cross-border banking in the EU

The development of a single financial market has been a long-term objective of the European Union (EU).[2] The fulfillment of this objective received a significant further impetus with the introduction of the euro, which has acted in many ways as a catalyst for change in monetary and financial affairs. The importance of this impetus has arisen both as a part of the goal of developing a single EU financial market and as an effective mechanism to facilitate the implementation of a common monetary policy throughout the euro area.

So far, the extent of market integration has varied considerably across the various financial-market segments of the European landscape and has depended to a large extent on the degree of integration of the respective market infrastructures (ECB 2007). For example, euro-zone country money markets are the most highly integrated in part because the euro as a

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[1] This article draws heavily on the content of Nieto and Schinasi (2007).

[2] The 1957 Treaty of Rome Establishing the European Economic Community refers to the objective of progressively abolishing all restrictions on the movement of capital between countries.

currency is supported by a high degree of integration of the national large-value payment systems through the introduction of the TARGET payment system. Likewise, but less so, a considerable degree of integration has been achieved in markets in which both government corporate bonds are traded and the equity markets are making considerable progress.[3] By contrast, while the integration of the banking markets is increasing in the retail segment, it is still more fragmented than the wholesale market. For example, cross-border exposures of EU banks in EU countries rose by some 160 percent from 2000 to 2006 (Tieman and Čihák 2007).[4] In the euro area, the cross-border component in banks' capital market-related holdings and interbank holdings has clearly increased in recent years.

The Single Euro Payments Area (SEPA), once fully implemented, will enhance the integration of the European retail payment infrastructure and is expected to foster further integration in that banking segment. A key channel for the development of cross-border banking activities is that of cross-border M&A operations. Although pan-European banks could have developed long ago, cross-border banking remained rather limited until the launching of the euro. An indicator of the increased role of cross-border banking is the growing market share of major cross-border banking groups both in terms of number of institutions and volume of activity.[5]

Although legally permitted under the Societas Europeae, there are no banks with EU charters.[6] This reflects the fact that the EU institutional architecture for financial stability is decentralized, with the performance of these functions based, in large part, on the exercise of national responsibilities and accountability. This contrasts with, for example, part of the US architecture where repeated banking crisis encouraged authorities to federalize lender of last resort, deposit insurance and bank resolution responsibilities long before banks crossed state lines in large numbers (Garcia 2008).[7]

More recently, there has been a growing recognition by EU policy makers and politicians that, along with substantial benefits, the emergence of a European financial system will most likely be accompanied by a greater propensity for market turbulence, cross-border contagion, and regional and European systemic risk. So far, opinions on how to proceed are lining up along national and regional political lines with some encouraging, cautious attention being paid to safeguarding European financial stability.

Indeed, at the time of writing this article, the global and European financial systems were being tested by the global financial turbulence triggered by the US sub-prime mortgage crisis. Some European countries have experienced banking problems as a result of this turbulence – notably involving Northern Rock in the UK and IKB and SachsenLB in Germany. In addition, although one very large cross-border European financial institution (UBS) has experienced significant losses and writedowns, it has been able to raise additional capital privately. Thus, so far, Europe has not faced a serious challenge in managing an important cross-border banking problem. In addition, liquidity interventions by the ECB and other central banks have been prompt and well coordinated. For example, several central banks, including the Bank of Canada, the ECB, the US Federal Reserve, and the Swiss National Bank (SNB) announced extraordinary joint operational measures to deal with 2007 year-end liquidity demands (ECB 2008).

Does the policy debate on the EU safety net recognize the lack of incentive to co-operate in safeguarding financial stability?

In 2004, for the first time, national authorities in the EU explicitly recognized the limitations of the existing institutional framework for bank crisis management in Europe. This recognition occurred at the highest European policy level by the Council of Economic and Financial Affairs (ECOFIN), comprised of the ministers responsible for economic affairs and finance in the EU.[8] It came after a long,

[3] The industry Code of Conduct for Clearing and Settlement is aimed at fostering further improvements in securities markets integration.
[4] Data refer to EU-15 countries.
[5] Another indicator of cross-border exposures of EU banks is the share of operating revenues obtained within the EU and outside the home country. For example, in 2004, BNP Paribas obtained 43.7%; Fortis, 57.9%; HVB, 59.3%; Santander, 26.8% and West LB, 21.2% (Tieman and Čihák 2007).
[6] The Council Regulation 2157/2001/EC came into force on 8 October 2004.
[7] The Federal Reserve was formed in 1913 and the Federal Deposit Insurance Corporation in 1934. Bank subsidiaries crossed state lines in the 1980s and interstate branching permitted in the mid-1990s (Garcia 2006).

[8] "[The ECOFIN] stresses the need for Supervisors, Central Banks and Finance Ministers to work together to ensure that appropriate plans and mechanisms are in place to respond to any developing financial crisis which threatens the stability of the financial system. It also […] stresses the importance of promoting financial stability and market integrity, through both legislative and practical initiatives […]", Draft Council conclusions on the Financial Services Committee's report on financial integration, Council of the European Union 9799/04, ECOFIN 186 EF 25, 26 May 2004.

mostly academic debate that had been highlighting for many years that the existing nationally-oriented financial safety nets within the EU provided few incentives for minimizing losses to taxpayers and encouraged delayed solutions likely to substantially increase taxpayer losses (see among others Prati and Schinasi 1999; Goodhart 2000; Holthausen and Ronde 2005; Nieto and Wall 2006; Schinasi and Teixeira 2006; Eisenbeis and Kaufman 2006; and Mayes, Nieto and Wall 2008).

In the particular case of banks, the incentives are such that the interdependence of prudential supervision of banks operating across borders creates a principal-agent relationship between the taxpayers of one country as principal and the various supervisors of the rest of the banking group as agents.[9] In addition, the principal/agent problems in this case are made substantially worse because some of the principals may not have direct authority over the agent, as when a supervisory authority in one country may expose the taxpayers in another country to losses. The problem is that the agent's incentives are to achieve the objectives of the principal that has some direct authority over the agent. That is, when conflicts arise among the principals, the supervisor (agent) is likely to follow the perceived interests of their own country's government and voters (principal). This is likely to increase tax payers' fiscal costs, which, in turn, would further complicate the sharing of resolution-costs among countries.

Since 2004, several initiatives by the European Commission, EU Parliament, the European Central Bank and the Council – as well as by the technical committees under their aegis – have been adopted in order to improve the explicit co-operation among safety net regulators in the EU.[10] The existing co-operation structures range from legal provisions (e.g., Capital Requirement Directive[11]) to legally non-binding guidelines of common forums (e.g., EFC, CEBS, CESR, CEIOPS) and memoranda of understanding (MoU).[12]

From the perspective of the benchmark models discussed below, this ongoing process of co-operative and co-ordinated decision and policy-making can be characterized as an iterative process in which EU countries gradually and selectively internalize some of the negative externalities associated with cross-border financial problems and instability. This ongoing process can thus be seen as one way of moving towards a more desirable European approach to safeguarding EU financial stability.

As an example, the internalization of potential negative externalities in the European payment system is almost complete in the case of large value payments (TARGET2). By contrast, the process of internalization is far from complete in the case of safety nets for European cross-border banks and, so, there remain potentially large negative cross-border externalities that may not be captured by the agglomeration of existing nationally oriented safety nets for banks. For example, the enhanced role of the consolidating supervisor will result in a significant "loss of control" over domestic bank assets by host country supervisors in countries such as Luxembourg, Finland, Czech Republic, Hungary and Poland without giving up parallel responsibilities, for example, in deposit insurance, bank reorganization and winding up. In turn, the responsibilities of some prudential supervisors for banks' safety and soundness (Belgium and Spain) will increase considerably without a corresponding increase in the responsibilities of other safety net regulators. Co-operation among safety net regulators has occurred mainly between bank supervisors, central banks and national treasuries; it has been lagging among bank deposit insurers, bank

[9] For simplicity, it is assumed that supervisors act as perfect agents on behalf of their national tax payers. This view is challenged by E. Kane and others.

[10] Note that the implicit co-operation among national regulators had traditionally taken place via minimum harmonization through the EU Directives. The above-mentioned committees have been launched under the aegis of the ECOFIN (Financial Services Committee, Financial Stability Table and the Economic and Finance Committee Ad hoc Working Group) the Lamfalussy architecture (Level 2 and Level 3 Banking Committees) and the European Central Bank (Banking Supervisory Committee and the relevant Working Groups).

[11] The CRD comprises Directive (2006/48/EC) of 14 June 2006 relating to the taking up and pursuit of the business of credit institutions, OJ L 177/1, 30 June 2006 and Directive (2006/49/EC) of 14 June 2006 on the capital adequacy of investment firms and credit institutions, OJ L 177/201, 30 June 2006.

[12] There are three MoUs currently in place on financial crisis management of cross-border banks in the EU, one between central banks and supervisors and two other additionally involving treasuries. Press releases available, respectively, at http://www.ecb.int/press/pr/date/2003/html/pr030310_3.en.html http://www.eu2005.lu/en/actualites/documents_travail/2005/05/14ecofin_mou/index.html and http://www.ecb.int/pub/pdf/other/mou-financialstability2008en.pdf. There are also (generally bilateral) MoUs among prudential supervisors. The MoUs consist of sets of principles and procedures that deal specifically with the identification of the authorities responsible for crisis management (central banks, prudential supervisors and ministries of finance) and the required flows of information between all authorities and the practical conditions for sharing information at the cross-border level. The 2008 MoU also includes supervisors of insurance and securities sectors as well as market infrastructures. In addition to these MoU, EU banking supervisors and central banks also adopted in 2001 a MoU about co-operation between payment systems overseers and banking supervisors, which sets out arrangements for co-operation and information in relation to large-value payment systems. Press release available at http://www.ecb.int/press/pr/date/2001/html/pr010402.en.html.

reorganization and winding up authorities, insurance company supervisors and securities markets regulators.

It can be argued that a significant step toward architectural design occurred in October 2007 when Ministers of Finance in the ECOFIN agreed on a comprehensive approach that, for the first time, considered the simultaneous reform of the entire EU safety net. The Council's report acknowledges the potential need for the establishment of co-operation mechanisms to promote and to foster close co-operation and information sharing, both on an ongoing basis and within the context of any crisis situation that might arise.

Below, we identify key areas touched on by the ECOFIN and developed by other policy forums and EU legislative bodies. These areas deal with the explicit recognition of sharing (at least partially) the cost of supervision; the reduction of information asymmetries among safety net regulators and a broad definition of "systemic importance". We argue that the door is now open for explicitly internalizing some of the existing negative externalities:[13]

- The ECOFIN explicitly recognized an EU dimension in the mandate of national prudential supervisors, which encompasses the use of the resources of the EU budget to finance specific EU wide projects of the supervisory committees. Although not legally enforceable as yet, this recognition is a relevant political agreement aimed at internalizing potential negative externalities of the activity of national supervisors.
- Safety net regulators need to understand and, hence, to have accurate and timely information on the overall financial condition of a banking group and financial infrastructures if they are to effectively anticipate problems and take appropriate corrective measures. This has been recognized in the CRD (Art. 132) by requiring supervisors to provide one another with any information which is essential or relevant for the exercise of the other authorities' supervisory tasks. This legal provision has been further specified with the need to reach agreements on the disclosure requirements for "significant" subsidiaries, on reporting for the calculation of minimum regulatory requirements, on the treatment of intra-group exposures for large exposures and on own funds requirements in excess of the minimum level (European Commission 2008).[14] The recognition of the importance to share information encompasses also systemically important financial infrastructures operating across borders (e.g., TARGET, trading and post-trading systems) (MoU 2008). The provisions of the MoUs are not legally binding; however, the fact that the 2008 MoU is public makes the explicit pre-commitments more likely. An ex ante commitment can affect the outcome by raising the cost of reneging the commitment. Pre-commitment arguably raises this cost by making any decision to renege transparent to all.[15]
- Once information asymmetries have been minimized, the process of making decisions needs to encompass all the parties involved. In the particular case of cross-border banks, the decision process takes place in "colleges of supervisors", which in light of the Commission proposal (2008) also encompass the host prudential supervisors of systemically important branches (implicitly recognizing the potential negative externalities that their business activity may cause in the host country).[16] Another welcome proposal by the European Commission refers to the requirement that prudential supervisors of the host and home countries decide jointly on the designation of branches and subsidiaries of systemic importance in the host country.
- The 2008 MoU not only expands the safety net regulators involved in crisis management but also is applicable to crisis situations regardless of its origin, affecting the stability of the financial system in at least one country with impact in other countries.

Although all of the above are steps in the right direction, they fall short of fully internalizing the potential negative externalities that result from the existing national orientations and biases of financial safety nets and financial-sector policies. The next two sections provide the analytical underpinnings for achieving greater internalization of the negative

[13] Council of the European Union, Economic and Financial Affairs, 9 October 2007. http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/ecofin/96351.pdf. These proposals were further developed in the Report to the Informal ECOFIN meeting on actions to develop EU financial stability arrangements (Brussels, 3 April 2008) ECOFIN/CEFCPE(2008)REP/51731.

[14] CRD potential changes proposed by the EU Commission (DG Internal Markets and Services, Brussels, 16 April 2008).

[15] Similar reasoning can be used for the "comply or explain" principle to be applied to the decisions taken by the Level 3 Committees of supervisors, which strengthens the ex ante commitment of EU supervisors to abide by their decisions.

[16] In case of disagreement, referrals correspond to CEBS in order to preclude the possibility of regulatory arbitrage between colleges.

externalities associated with European cross-border financial problems and instability – as part of a greater effort in establishing a European architecture for safeguarding EU financial stability.

Properly framing Europe's financial-stability challenge as providing transnational (or pan-European) public goods

As the ongoing European debate makes clear, European financial stability is being viewed in some cases as a transnational public good.[17] The operational significance of this in the European context is that achieving and safeguarding financial stability requires both collective decision-making and action, at times involving private stakeholders, at times public stakeholders (including politicians and policy makers), and at times combinations of both.

Safeguarding financial stability is challenging within one legal jurisdiction, because it requires significant resources and collective action. The challenges are greater within a multi-country and decentralized decision-making framework such as the EU's. The added difficulty is that the public-good benefits of EU financial stability arise through the efforts and resources (expenditures) of individual countries whose primary objective is national financial stability and not European.

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 13 in the euro area) independently decide to devote 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. Each country does so 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. 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.[18] Individual country decisions are made with the knowledge, or at least the presumption, that they may be both conveying benefits to non-citizens and receiving benefits from the actions of other European countries. Because each nation knows this, there may be 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 nationally.

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

Evaluating EU financial stability arrangements from the perspective of the "economics of alliances"

This section examines the implications of two simple models that provide objective benchmarks for evaluating aspects of the ongoing debate in the EU, such as the implications of decentralized versus centralized decision making and the benefits versus costs of ex ante burden sharing agreements for resolving threats to financial stability (or what amounts to the same thing in the models, to producing the optimal amount of financial-stability benefits). The first subsection examines the implications of a decentralized decision making in allocating resources to the production of a "pure" public good that conveys benefits to all countries and citizens within a group of countries. The second subsection then goes on to examine the production of a public good that conveys some exclusive public-good benefits to the country that provides it and some pure public-good benefits to all other countries as well. This joint-pub-

[17] Chapter 5 in Schinasi (2006) defines financial stability and reasons for seeing it as a public good. Financial stability can be considered a pure public good in the same way the provision of national defense is considered one, because it provides non-excludable and non-rival benefits. Benefits are non-excludable if the provider/producer of the good cannot exclude others from the benefits without incurring significant costs. The benefits are non-rival if consumption by one agent does not reduce benefits to others. The provision of EU financial stability would have these characteristics for all member countries and their citizens.

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

lic-good model encompasses the pure model, and results of the two models can be compared.

To our knowledge, the "economics of alliances" approach has not been applied to analyze the challenges now facing financial-stability policy makers in the EU. This 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 should be 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. In the context of the models, socially optimal decision making for the EU as a whole would imply the full internalization of potential externalities in the decision-making process (for example, via central data bases of banks' financial condition; full convergence of prudential regulation and supervisory practices; a common budget authority) without necessarily implying a new centralized European institution. 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 co-operative decision making process, as described in the previous paragraph, which could result in Pareto-efficient equilibrium allocations for the group as a whole.

Decentralized decision-making in providing a "pure" public good (such as European-wide financial stability)

The logic of a simple model can be briefly summarized as follows.

Each member of a group of countries (the EU) chooses an allocation of resources to produce a 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. 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-co-operative mathematical game, the solution of which is a Nash equilibrium. The Nash solution is an 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).

This optimization exercise can be shown to have the following interesting and relevant implications for the European discussion.[19] First, as is well known in other contexts, the decentralized (Nash) equilibrium level of provision of the European financial-stability pubic good would be suboptimal relative to the Pareto-optimal level that would be achieved by maximizing EU welfare (rather than each countries' welfare). Even though each country chooses an optimal resource allocation to produce a private/ public good output mix, the resulting European equilibrium will be suboptimal. It is sub-optimal because no country considers the costs and benefits of providing the pure financial-stability public good for other European countries and their citizens. Consequently, the group of countries will jointly provide a sub-optimal level of the public good compared to co-ordinated decisions in which even only some of the positive externalities (benefits) from collective action can be internalized and distributed to all European countries.

Second, because of the decentralized decision making, some (smaller) countries might find it optimal to free-ride. This would be reflected in the country distribution of the supply of the public good. More specifically, the optimal allocation of the burden of safeguarding financial stability (or sharing the costs of resolving a cross-border banking problem) falls disproportionately on larger (higher income) countries – in that they provide a share of the public good that exceeds their GDP share in the group of countries. That is, in Nash equilibrium, a large country's share in providing the group's total public good will exceed its GDP share in the alliance.

Third, in Nash equilibrium, member countries' propensities to provide the pure 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.

Fourth, in the context of the burden-sharing debate, if a matching of benefits received and costs incurred to preserve financial stability is to be achieved, then at least some form of co-ordination of resource allocation decisions, if not full internalization of the externalities, would be required. The recent EU policy initiatives referred to above that consider cross-border implications for EU financial stability can be seen as a move in this direction.

Fifth, 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.

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 Europeans.

A more realistic but more complicated model: providing both "exclusive" (nationally-oriented financial stability) and "pure" public goods (European-wide financial stability) [20]

Countries in Europe provide financial-stability public goods whose benefits are also country-specific

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

[20] Deviations from the "pure" public good model of Olson and Zeckhauser (1966) were first examined in Ypersele de Strihou (1967) and later generalized by Sandler and Cauley (1975), Sandler (1977) and Cornes and Sandler (1984). This section applies the analysis in these papers.

and conveyed 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). 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 non-residents 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 implications. In particular, while the set up of the model is the same as before, the public good conveys two types of 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). A key parameter in this model is the share of "exclusive" benefits to the producing country relative to total benefits to all of Europe.

The implications of this more complicated model can be summarized as follows. First, the simultaneous decisions of countries still results in a 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 the externalities. Achieving the Pareto optimal allocation of resources in this decision-making process would require that all other countries' benefits and costs be considered in each country's optimal decisions – a veritable co-ordinated decision making process.

The literature on the economics of alliances suggests that the existence of joint products could in reality provide greater incentives for 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 co-ordination 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 co-ordination allows countries to take advantage of country-specific benefits as well as excludable public benefits, then the payoff pattern may be more conducive to encouraging all countries to make contributions to the "fully shared" public-good. Thus, the mix of joint products and their publicness can influence how coalitions and alliances are formed.

Second, the greater the exclusive benefits are to a particular country relative to total benefits, the lower will be the extent to which the cost of providing shared benefits will fall disproportionately on larger countries. This is because as exclusive benefits take a greater share of total benefits (and as national financial stability becomes the exclusive benefit), smaller countries may capture fewer shared benefits and devote more of their resources to produce exclusive public goods. In other words, when there are country specific benefits, small countries have a greater incentive to produce the public good (financial stability).

As the exclusive benefits relative share to total benefits approaches one, market solutions and the formation of "clubs" or "coalitions" are capable of yielding solutions that achieve more efficient equilibrium outcomes (for example, consider the special coalitions between the Nordic and the Benelux countries to safeguard financial stability). This occurs because when there are exclusive country-specific benefits, more of the benefits of a public good are received by the country producing it. Accordingly, equilibrium outcomes are associated with a greater association between a country's benefits received and costs incurred, which is welfare improving for all country members concerned.

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

Fourth, countries with a greater likelihood of threats to stability – and of causing EU-wide threats – would contribute more resources to offsetting the resulting externalities.

Fifth, and consistent with an earlier implication, the recognition of joint products should result in deci-

sion making that produces a greater match between benefits received and cost burdens carried – which is similar to a benefit principle of taxation.

Sixth, the extent of sub-optimality is not related to the size of the group of countries if there is a large share of "exclusive" public-good benefits.

Finally, once "exclusive" public goods – in contrast to the production of pure public goods – are admitted, the relation between a country's resource allocation to produce the public good and that of other countries can be positive. This has the implication that a higher level of spending on the public good in one country might be associated with a greater level of expenditure in other countries as well. This would reduce the tendency toward free riding, and also raise the level of total benefits received by the group of countries. That is, in the joint-product model, there is greater scope for co-operation to move the group to an equilibrium that is welfare improving relative to the Nash equilibrium.

Conclusions

In recent years, there has been a growing recognition of the "efficiency" gaps in providing for EU financial stability identified in the models described in this article. Recognition of this gap has led to some tangible efforts to capture some of the potential efficiency gains through legally binding mechanisms and policy co-ordination via participation in joint forums. As noted in the article, the ongoing iterative process of co-operation and co-ordination through legislative initiatives committees and MoUs can be interpreted as having already internalized some of the EU potential negative externalities and thereby moved the EU away from the relatively inefficient Nash equilibrium toward an improvement in EU stability closer to the Pareto optimum. In this sense, the framework presented in the paper is descriptive of what is going on in the EU; as such, it is potentially useful for considering what might happen in the period ahead as EU countries consider how best to internalize existing externalities.

The public goods considered in this paper can be thought of either generally as safeguarding (including prevention and resolution efforts) the EU financial system from systemic financial threats or specifically as resolving a European systemic financial event, such as the illiquidity/insolvency of a pan-European bank or a pan-European-market-driven systemic threat to stability. If the decentralized decision making process described in the models can be taken as a rough approximation of how European decisions are made, then several implications of the "pure" and "exclusive" public good models are instructive for the ongoing debate in Europe.

First, decentralized decision making in the provision of EU shared financial-stability public goods results in an (Nash) equilibrium that is sub-optimal from a European perspective, even though each country views its decision as optimal and has no incentive to change its decision if other countries maintain theirs. Thus, greater co-ordination and harmonization, if not full internalization of costs and benefits, could lead to welfare enhancing improvements relative to the existing European decentralized architectures and decision-making processes.

Second, decentralized decision making implies that the larger countries in Europe will foot a disproportionately larger share of the overall (and socially sub-optimal) cost of providing EU financial-stability pubic goods (including the financial resources to bail out banks), which implies, in turn, that there may not be a close matching across countries of the benefits received and the costs incurred in contributing to the shared public good. To the extent that the public goods convey some "exclusive" benefits as well, there may be a more equal matching of costs and benefits.

Third, to the extent that each country provides a mix of both "pure" and "exclusive" financial-stability public goods, there will be greater incentives for collective action and coalition forming. That is, the mix of joint public goods and their publicness can influence how the alliances are formed. In the limit, as the share of exclusive benefits to total benefits increases, the gains from collective action through co-operation and alliances naturally decline.

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