Daniel K Tarullo: Industrial organization and systemic risk – an agenda for further research

Speech by Mr Daniel K Tarullo, Member of the Board of Governors of the Federal Reserve System, at the Conference on the Regulation of Systemic Risk, Federal Reserve Board, Washington DC, 15 September 2011.

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In previous speeches I have called on researchers to devote more attention to investigating economies of scale and scope in financial services. This conference provides the ideal occasion and audience for me to elaborate on that request and, indeed, to expand it by suggesting a broader range of topics on which the questions and perspectives of Industrial Organization (IO) may be relevant to financial economists probing the nature of systemic risk and the causes of financial crises. Before addressing this subject directly, let me take a few minutes to place it in the context of the changes in regulatory focus motivated by the financial crisis.

The familiar, "microprudential" approach to regulation focuses on risk within individual firms. The ability to borrow at a risk-free rate conferred by deposit insurance, combined with the limited liability that is standard in corporate structures, presents banks with incentives to take on socially inefficient risks. This well-known moral hazard problem traditionally has been addressed through regulation and supervision directed specifically at protection of the deposit insurance fund. Thus, for example, traditional bank holding company regulation was actually fairly narrowly defined: It sought to protect insured depository institutions from the risks of their uninsured affiliates and to limit use of insured deposits to fund activities in other parts of the holding company. The potential effects of an individual bank's behavior on the financial system as a whole – much less that of a bank holding company or unregulated financial firm – were generally not addressed in prudential regulatory laws and only unevenly considered in supervisory practice.

Of course, the picture was not quite so monolithic as I have just portrayed it. The moral hazard associated with too-big-to-fail institutions, which worried some researchers and a handful of supervisors, was a concern that touched upon the stability of the financial system more generally. And a few prescient observers had for many years called for a complementary, "macroprudential" approach to financial regulation that considers the effects of the financial condition of, and actions taken by, individual actors on the financial system as a whole.[1] But these were far from being dominant features of pre-crisis regulation.

Since the crisis, both academic work and regulatory reform have given a much more prominent place to macroprudential regulation. The Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act) introduced a variety of new policy levers, including capital surcharges, resolution plan requirements, consideration of systemic risk effects in reviewing and ruling on applications for mergers among financial firms, and even the ability to require the reduction in size or scope of large financial conglomerates.

At a conceptual level, effective implementation of these policy tools requires that we incorporate systemic risk into the normative framework of what constitutes a socially efficient outcome. The goal of macroprudential regulation is to require firms to internalize the

[1] In 1979, the Bank of England published a report in which it defined macroprudential regulation as an approach concerned with "problems that bear upon the market as a whole as distinct from an individual bank, and which may not be obvious at the micro-prudential level." See "The Use of Prudential Measures in the International Banking Markets," October 24, 1979, pp. 1–2, in BISA 7.18(15) – *Papers Lamfalussy*, LAM25/F67. See also *BIS Quarterly Review*, March 2010, pp. 59–67 for more on the early use of the term "macroprudential."

externalities they impose on the stability of the financial system as a whole. Thus, we need a way to incorporate systemic externalities into the models of firm and investor behavior that inform regulatory and supervisory policies. At the same time, we have to evaluate the costs associated with systemic events, which by their nature are relatively rare, in light of the basic goals of promoting productive efficiency, access to credit, and financial innovation.

Here – in filling out this analytic framework – is where the perspectives, questions, and conclusions of IO literature may usefully be applied. Many financial markets are far from perfectly competitive. Instead, they are characterized by large firms with significant market shares and sustained positive economic profits, a fact not always reflected in financial analysis and regulation. Yet IO economists, who have studied a variety of topics arising from concentrated market structures, have themselves generally focused on areas other than financial markets, with the important but limited exception of competition issues in commercial banking. I would venture to guess that the very peculiarities of financial markets that motivated the evolution of an entire subdiscipline in economics complicate application of conventional IO learning to these markets. This is why I believe that some interchange between IO and finance researchers is important.

While much of the interchange I have in mind will simply add nuance to existing work, we must recognize that some earlier findings about optimal market structure or regulatory policy may not hold once researchers incorporate systemic risk considerations into normative standards about what constitutes an efficient outcome. As specific regulatory proposals or acquisitions are considered, we may well identify tensions between the traditional IO approach to antitrust and regulation, on the one hand, and the goal of maintaining the stability of the financial system, on the other.

In the remainder of this talk, I will discuss three topics from the IO literature that seem promising for systemic risk research: first, the need for a deeper understanding of scale and scope economies in the production of financial services; second, the ways in which patterns of competition and cooperation among large financial firms can affect systemic risk; and third, how market structure can affect firm incentives and thereby impose externalities on the financial system.

Scale and scope economies in financial services

Well before the financial crisis and my arrival at the Federal Reserve, I had found that the relative dearth of empirical work on the nature of economies of scale and scope in large financial firms hindered the development and execution of optimal regulatory and supervisory policies. Some regulatory features added by the Dodd-Frank Act only increase the importance of more such work to fill out our understanding of the social utility of the largest, most complex financial firms. Ultimately, we want to understand what these scale or scope economies imply for the degree to which large size or functional reach across many types of financial activities is essential for the efficient allocation of capital and liquidity and for the international competitiveness of domestic firms.

Significant economies of scale in terms of production costs have been demonstrated for services related to payment networks. Generally, though, even where intuition suggests economies in some other areas – such as the breadth of securities distribution networks and the ability to provide all forms of financing in significant amounts – evidence for the existence of such economies is limited and mixed. Moreover, even where significant scale is necessary to achieve certain economies, an important question will be what the minimum efficient scale – or, perhaps more realistically, the minimum feasible scale – actually is. It is possible that a firm would need to be quite large and diversified to achieve these economies, but still not as large and diversified as some of today's firms have become.

There are some promising lines of inquiry begun by academics, including funding-cost advantages enjoyed by large firms; possible diseconomies of scope resulting from firm

complexity; and the effect of market concentration and firm size on intra- and inter-firm diversification. As I noted earlier, there has also been a considerable amount of work on scale economies in commercial banking.[2] However, more needs to be done on these and other subjects. Indeed, from a policy perspective, the value of some of the scholarship done to date may be limited. For example, if funding-cost advantages in fact derive from market perceptions that a very large firm was too-big-to-fail, the phenomenon is really one of competitive advantage grounded in moral hazard, not one of true efficiencies. Similarly, the use of profitability of large firms as a surrogate for efficiency – as found in some studies – would be more helpful for policymaking if researchers find a way to control for the possibility that higher revenues are associated with market power or branding.

Let me illustrate with two examples how these issues of scale and scope economies relate to the increased regulatory emphasis on systemic risk.

First is the Federal Reserve's review of proposed mergers and acquisitions under the Bank Holding Company Act. Of course, economies of scale and scope have always played a part in the analysis of the competitive effects of proposed mergers. But the Dodd-Frank Act now requires that we also consider whether a proposed merger would lead to greater or more concentrated risks to financial stability. Consider, for instance, how we would evaluate the financial stability effects of a proposed merger of two medium-sized institutions. Among other things, we would need to assess the expansion of the acquiring institution's systemic footprint. Then, we would have to balance the potential increased costs across the system were the institution to fail against the potential benefits from either a lesser likelihood of failure or, with respect to essential financial functions, a greater capacity to step in and fill the gap if one of the firms' large competitors were to fail. In performing these kinds of analyses, we will draw on the extensive work on systemic risk we have already done in connection with our development of capital requirements, the designation of systemically important firms by the Financial Stability Oversight Council, and other matters.

It is important to note that, while Congress instructed us to consider the extent to which a proposed acquisition would pose a greater risk to financial stability, it clearly did not instruct us to reject an acquisition simply because there would be *any* increase in such risks. Instead, it appears we have been instructed to add any increased systemic risk to the list of adverse effects that could result from the merger and then determine whether the benefits to the public of the acquisition outweigh these adverse effects. If, for example, there are few indications that scale or scope efficiencies would be gained, then anticipated adverse effects on systemic stability could be expected to have a greater impact on our ultimate decision. If, on the other hand, there are genuine scale or scope efficiencies to be realized, then a more complicated set of trade-offs may be needed. The more developed our knowledge about economies of scale and scope in large financial conglomerates becomes, the more nuanced an analysis of these effects we will be able to make.

The new authority for orderly liquidation of systemically important institutions is a second example of a systemic regulation in which an understanding of scale and scope is important. At least some advocates of orderly liquidation regimes seem to favor resolution plans that silo activities as much as possible. However, in the presence of significant economies of scope, this approach might result in loss of efficient forms of organization. In these circumstances, resolution plans that seek to preserve the scope economies even as a firm is dismembered might result in better liquidation outcomes. In addition, siloing activities in the context of a resolution plan could affect day-to-day operations during normal times and might

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[2] For a review of recent literature on these topics, see Financial Stability Oversight Council (2011), *Study of the Effects of Size and Complexity of Financial Institutions on Capital Market Efficiency and Economic Growth* (Washington: Financial Stability Oversight Council, January). Also see, Loretta Mester (2010), "Scale Economies in Banking and Financial Regulatory Reform," Federal Reserve Bank of Minneapolis, *The Region*, vol. 24 (September), pp. 10–13.

reduce efficiency by preventing firms from realizing economies of scope, resulting in increased costs of financial services for households and businesses.

Both these examples suggest how regulators might, in certain instances, be required to make trade-offs between systemic risk and efficiency considerations. An additional concern would arise if some countries made the trade-off by limiting the size or configuration of their financial firms for systemic risk reasons at the cost of realizing genuine economies of scope or scale, while other countries did not. In this case, firms from the first group of countries might well be at a competitive disadvantage in the provision of certain cross-border activities. The existence of international agreements such as the Basel Committee on Banking Supervision's capital surcharge on systemically important institutions should allay this concern but, depending on national choices associated with systemic risk mitigation, might not eliminate it.

But I am getting ahead of things here. Returning to my starting point, I reiterate that the importance of this research agenda lies precisely in determining how significant these trade-offs might be. The events of the past few years make brutally clear the potential for societal damage associated with systemic risk. Considerable work has already been done by academics and policymakers to develop systemic risk metrics, and thus to lay the groundwork for sound macroprudential regulatory measures. As we and our counterparts in other countries move forward with the implementation of these measures, a complementary stream of work on scale and scope would substantially enhance these efforts.

I recognize that studying scale and scope economies in large financial conglomerates presents some practical challenges. The small number of very large and diversified financial firms, the difficulties delineating specific activities of interest, and the problems in measuring economic costs all complicate the undertaking. So too, disentangling real economies from the funding advantages associated with moral hazard, or the supra-competitive profits associated with a concentrated industry structure, may not be easy. Perhaps, then, in the short term, the research community and regulators may benefit from case studies that inform the direction of future research.

Cooperation and competition among financial institutions

The second topic I want to address today is the impact on financial stability of simultaneous competition and cooperation among large financial institutions. The IO literature gives us examples in which limited cooperation between otherwise competing firms can increase social welfare. In these models, cooperation can overcome resource constraints, limited information, or externalities, and thereby induce welfare-enhancing investments that would not have been undertaken by firms acting individually.[3] Large financial institutions have come together to provide infrastructure services such as exchanges, clearinghouses, and even information providers such as Markit Partners. Other forms of cooperation among moderate-sized institutions, such as syndicated lending and underwriting partnerships, serve to reduce information costs, overcome resource constraints, and diversify risk. In antitrust terms, the practices I have in mind here would be subject to a rule of reason analysis that assesses both the potential for increased social welfare from limited cooperation and the negative direct or spillover effects on competition.

The industrial organization literature has shown that enduring cooperation is most likely when firms interact repeatedly and can observe each others' behavior. In order to model cooperation among large financial firms, however, an additional factor needs to be incorporated. Unlike the firms depicted in much of the IO literature, financial conglomerates

[3] See, for example, Robert H. Porter (1995), "The Role of Information in U.S. Offshore Oil and Gas Lease Auctions," *Econometrica*, vol. 63 (January), pp. 1–27.

transact with one another on a continual basis and enter into contractual arrangements that impose future obligations. In other words, cooperation is often institutionalized so that the day-to-day operations of a given firm depend crucially on the institutions with which it cooperates. This, of course, is one – though not the only – reason why systemic crises are a recurring feature of the financial system.

Understanding the role of cooperation among financial conglomerates that are interconnected through counterparty relationships and correlated exposures may be challenging, but it could be quite important for effective macroprudential regulation. Cooperation among large firms can, in principle, buffer the impact of systemic events.[4] On the other hand, the expectation of future cooperation from one's competitors can induce riskier behavior on the part of individual firms. And, perhaps more troubling, the sudden breakdown of cooperation during a systemic event can accelerate the transmission of adverse consequences throughout the financial system.

Regulators must consider how new resolution frameworks such as that created by Dodd-Frank will affect market participants' beliefs about what will happen in the case of distress at a large financial institution and, consequently, how cooperative behavior among financial counterparties might change. Orderly liquidation authority can be understood as a "credible threat" on the part of regulators to allow a troubled institution to fail. Resolution plan requirements may allow other firms to better anticipate the consequences of such a failure and, as a result, to reduce the cost of uncertainty for those firms. Both of these features of Dodd-Frank have, in theory, the potential to weaken implicit cooperative arrangements during a crisis. Even so, game theorists would point out that the anticipated breakdown of cooperation in the future would alter the types of arrangements firms would be willing to enter into in the first place, and that this could, in turn, reduce risky behavior and the likelihood that a crisis would occur.

This is obviously a complex issue, with potentially different conclusions depending on the context of a specific regulatory system and industry structure. But pursuit of this line of inquiry might yield notable policy implications. That is, understanding how a systemic resolution mechanism could maintain, reduce, or reverse incentives to engage in what might otherwise be socially desirable cooperation could affect the optimal design of that mechanism and other elements of financial regulation.

Market structure and externalities

The third topic I want to mention today is how systemic risk may be affected by the interaction of market structure and externalities where firms' incentives are at odds with social efficiency. The IO literature has identified examples in which, depending on the circumstances, concentrated market structures can exacerbate, reduce, or even create new negative externalities. While the finance literature has extensively studied externalities associated with various forms of intermediation, researchers are only beginning to explore how optimal behavior from a firm's perspective might be shaped by its competitive environment and how, in turn, the aggregation of firm decisions in various environments could affect economy-wide risk.

One particularly promising area for inquiry is the relationship among industry structure, firm incentives to diversify risk, and systemic risk. In principle, larger firms are better able to diversify their balance sheets and thereby insulate themselves from idiosyncratic risks. However, some researchers have argued that when the financial system is dominated by a few large firms, the result may be that these few large firms have balance sheets that are

[4] Bruce I. Carlin, Miguel Sousa Lobo, and S. Viswanathan (2007), "Episodic Liquidity Crises: Cooperative and Predatory Trading," *Journal of Finance*, vol. 62 (October), pp. 2235–74.

highly correlated, creating significant common risk exposures.[5] In such instances, a common shock to a class of assets held by the large firms could be expected to have systemic effects through some combination of domino and fire-sale effects.[6] There would be considerable value in further research that explored the potential tradeoffs between industry structures in which relatively smaller, less diversified firms are more prone to idiosyncratic failure versus industry structures in which very large, diversified firms are individually less vulnerable to idiosyncratic failure but collectively more likely to create systemic risk because of their common exposures.

One can imagine other strands of IO literature providing insights when applied to the financial sector. Let me suggest a couple of possibilities. First is the subject of financial innovation. This audience hardly needs reminding that certain forms of financial engineering lay at the heart of the recent financial crisis. Indeed, analysis of these practices has yielded some of the most important finance work of the last few years. The observation that some forms of financial innovation were profit-maximizing for the individual firms that pursued them, while simultaneously increasing systemic risk, has a parallel in IO research. Work in this area shows how the competitive structure of an industry can create incentives for socially suboptimal behavior through, for example, inefficiently low levels of information acquisition or excessive product variety. In thinking about this issue, I was also reminded of the older work on how product differentiation may substitute for price competition in concentrated industries.[7]

We are unlikely to see renewed use of the specific financial products that precipitated or amplified the financial crisis. But financial regulation faces an ongoing challenge in trying to identify and respond to new practices that increase systemic risk, while not suppressing financial innovation that can improve the efficiency of capital allocation. In furtherance of this regulatory objective, it could be useful to complement finance research with an inquiry into whether and how industry structure or other competitive factors act to increase, or possibly dampen, such risks.

My second example where researchers might usefully draw on IO insights is incentive-based compensation practices at financial firms. There is now widespread agreement that the very high-powered, short-run incentives in the compensation structure of finance professionals prior to the crisis may have induced them to take certain kinds of risks that were detrimental to shareholders of their firms, the overall financial system, or both. While firms have already changed compensation practices, both on their own initiative and in response to guidance from the Board, the complexity of some of these issues will require continuing attention.& These efforts might be advanced through adapting lessons from the IO literature on how competitive forces can affect the way that individual firms solve principal-agent problems, and how those decisions affect economy-wide risk when aggregated across firms.

Conclusion

In some respects, my talk today has been a financial regulator's wish list for research at the intersection of IO and finance, intended as a complement to the formidable finance research agenda that has already been generated and is on display at this conference. Some of the items on this list – such as the scale and scope economies issue – are of clear and

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[5] Wolf *Wagner (2010), "Diversification at Financial Institutions and Systemic Crises," Journal* of Financial Intermediation, vol.19 (July), pp. 373–86.

[6] See Daniel K. Tarullo (2011), "Regulating Systemic Risk," remarks delivered at the 2011 Credit Markets Symposium, Charlotte, NC, March 31.

[7] See, for example, Simon P. Anderson, Andre de Palma, and Jacques-Francois Thisse (1992), *Discrete Choice Theory of Product Differentiation* (Cambridge, MA: MIT Press).

immediate significance for systemic risk regulation. Others are perhaps more speculative. And I hope to have provoked you, and readers of this speech, to add some items to the agenda.

As is often true, efforts to tackle new questions and to confront new problems may not lend themselves immediately to well-worn research approaches. Contributions in this area may come in many forms, including case studies and other less conventional approaches to research. I hope that, at least in the early stages of research into these issues, referees and journal editors will be sympathetic to any research that may advance our knowledge in this new area.