

crisis response

PUBLIC POLICY FOR THE PRIVATE SECTOR

Financial Paradigms

What Do They Suggest about Regulatory Reform?

What market and regulatory issues led to the subprime crisis? How should prudential regulation be fixed? The answers depend on the interpretative lenses—or “paradigms”—through which one sees finance. The agency paradigm, which has dominated recent regulatory policy, seems to be influencing much of the emerging reform agenda. But collective welfare failures—particularly externalities—and collective cognition failures—particularly mood swings—were at least as important in driving the crisis. All three paradigms should therefore be integrated into a more balanced policy agenda. But doing so will be difficult because they often have inconsistent policy implications.

Like the other two large financial crises in modern U.S. history—the Great Depression and the savings and loan crisis—the subprime crisis was triggered by the inability of financial intermediaries to withstand substantial macroeconomic price volatility. The culprit varied from crisis to crisis (stock prices in the Great Depression, deposit rates in the savings and loan crisis, housing prices in the subprime crisis). But all three crises resulted from a wedge between the underlying value of financial intermediaries’ assets and that of their liabilities, which prevented institutions from honoring the implicit insurance commitments to their clients. High leverage and liquidity on demand, which limited the size of the buffers available against shocks, made the wedges lethal.

Three paradigms

Why do the managers of financial institutions continue making such commitments while repeatedly failing at honoring them? There are two possible explanations: either they understand the risks and go ahead because it suits them, or they go ahead because they do not understand the risks.

The first option leads to two distinct paradigms, the *agency paradigm* and the *collective welfare paradigm*. In the agency paradigm, managers intentionally take advantage of the less informed or farther removed. In particular, they expect to capture the upside while leaving the downside to others (moral hazard). In the collective welfare paradigm, managers have no ill intent but focus only on their private costs and benefits, which

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currently under debate,
and providing insights
for emerging-market policy
makers.



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do not coincide with society’s costs and benefits. This wedge can lead to socially suboptimal outcomes and reflects uninternalized externalities (the failure of individuals to take into account the consequences of their actions for society), free riding (the use by individuals, at no cost, of something that the system offers), and coordination failures (the failure of individuals to act in the group’s and their own best interest because doing the right thing would be optimal only if everybody else in the group did it too).

The second option leads to the *collective cognition paradigm*. This paradigm arises from difficulties in understanding the dynamics and internal workings of the system as a whole. A constantly evolving, uncertain world of rapid financial innovation leads to mood swings driven by rational but poorly informed decision making, bounded rationality, or emotional decision making. This paradigm is naturally associated with bouts of euphoric enthusiasm followed by episodes of sudden alarm, panic, and deep retrenchment.

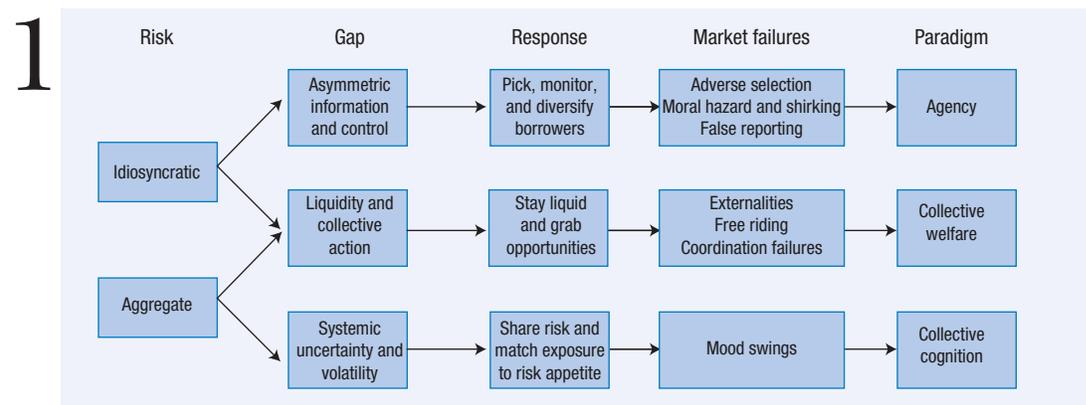
These paradigms mirror the three basic gaps that finance seeks to bridge (figure 1). The *information and control gap*, associated with the agency paradigm, reflects fund suppliers’ exposure to the idiosyncratic risks and information costs involved in properly screening and monitoring fund users and enforcing contracts with them. The *uncertainty and volatility gap*, associated with the collective cognition paradigm, reflects fund suppliers’ aversion to becoming exposed to aggregate risks over which they have no control and that they may not understand. The *liquidity and collective action gap*, associated with the collective welfare paradigm,

reflects fund suppliers’ “opportunistic” desire to stay “ahead of the crowd” by maintaining access to their funds and keeping a quick exit option open at all times. In the face of bargaining costs that hinder a socially preferable collective response, this is an optimal way for each supplier of funds to address both idiosyncratic risks (a quick exit disciplines fund users) and aggregate risks (liquid portfolios and flights to cash mitigate exposure to tail risk¹ and genuine uncertainty).

Financial markets and intermediaries help investors bridge these gaps along a continuum. At one extreme are commercial banks, the prototypical financial intermediaries. Banks help depositors bridge the information and control gap through soft private information (relationship lending), debt contracts (a disciplining device), and capital (“skin in the game”). They bridge the uncertainty and liquidity gaps by offering investors deposits (debt contracts) redeemable at par and on demand and by absorbing the ensuing risks through capital and liquidity buffers. But by interposing their balance sheet between borrowers (through assets that are illiquid and whose underlying value is uncertain and fluctuates with economic conditions) and investors (through liabilities that are liquid and whose value is fixed by contract), intermediaries can become exposed and add to systemic risk, making financial intermediation inherently fragile.

Banks face all types of agency problems, the most important being moral hazard. If all depositors were well informed, banks could eliminate moral hazard by holding enough capital. But the mix of small, uninformed depositors and larger,

Figure 1 The gaps finance seeks to bridge and the pitfalls it encounters



better-informed investors can lead to inefficient outcomes in which banks and wholesale investors benefit at the expense of retail depositors or their insurance coverage (Huang and Ratnovski 2008). Governance issues between bank managers, shareholders, and investors compound the problem by superimposing additional layers of moral hazard.

Banks are also exposed to externalities and free-rider incentives, most notably those associated with liquidity, which has the features of a public good (Holmstrom and Tirole 1998). Thus, during the buildup to a crisis, their failure to internalize the systemic implications of short-term borrowing increases overall fragility. In turn, the flight to liquidity as the market collapses exacerbates the violence of the downturn. Collective welfare frictions can also induce bubble-type deviations of asset prices from their fundamentals or result in underproduction of information and monitoring as well as overextension of credit during upswings and overcontraction during downswings.

Like investors, banks are also vulnerable to making irrational or poorly informed decisions in the face of uncertainty. During financial expansions the decline in macro-financial volatility, predictable pricing, and deep market liquidity feeds risk appetites and exuberance (“this time around things are different and the good times are here to stay”). But a significant dissonance can initiate a brutal downward mood swing driven by risk aversion and fear of the unknown.²

The subprime crisis: new bottle, same wine?

During the buildup to the subprime crisis, highly leveraged intermediation developed outside the confines of traditional banking, in what has now become known as “shadow banking.” By radically expanding the interface between markets and intermediaries, the explosive growth of shadow banking brought new problems and issues. But the same underlying pitfalls of agency problems, liquidity runs, and mood-driven cycles were at work, reappearing with a vengeance.

Each paradigm can provide a very different interpretation of the crisis that is nonetheless largely consistent with the observed facts. In the agency paradigm the multiplication of intermediaries and

actors involved in the “originate to distribute” model increased the scope for agency frictions between the different parties (Ashcraft and Schuermann 2008). Agency problems were also exacerbated within institutions as incentive misalignments (including those stemming from compensation schemes and mark-to-market practices) widened between managers who were focused on short-run returns and shareholders who largely preferred to vote with their feet rather than exercise governance through the board of directors.

In the collective welfare paradigm everyone counted on everyone else for support but no one adequately internalized the systemic risks of such cross-support. In the process a great fallacy of composition developed, leading market players (and supervisors) to believe that risk protections at the individual level would add up to systemic risk protection. Instead, by unloading (selling) risk—for example, through credit default swaps—to other financial institutions, intermediaries further intensified negative systemic externalities.

In the collective cognition paradigm the shift from traditional to shadow banking can be interpreted as the natural evolution of a rapidly deepening financial system in which markets and intermediaries increasingly complemented each other. But the creation of new instruments and forms of intermediation outpaced the ability of market participants and supervisors to fully comprehend their implications and handle the associated risks and uncertainty. Compounding this problem was a failure to fully understand the dynamic links between financial sector and asset prices and the feedback loop between rising asset prices and expanding credit.

Why did regulation fail?

In this multi-paradigm world the failure of regulation in the subprime crisis can be explained by a piecemeal approach that looked at one paradigm at a time and, in trying to address the central problem in one paradigm, made problems in the others worse; and by a regulatory framework that was designed to help intermediaries overcome the first two gaps of finance but not the third.

The current regulatory regime rests on three key pillars: prudential norms that seek to align principal and agent incentives *ex ante*; an *ex*

post safety net (deposit insurance and lender of last resort) aimed at enticing small depositors to join the banking system and forestalling contagious runs on otherwise solvent institutions; and a “line in the sand” separating the world of the prudentially regulated (mainly commercial banking) from that of the unregulated.

In turn, the line-in-the-sand pillar rests on at least three key arguments. First, regulation is costly and can produce unintended distortions. It can limit intermediation, financial innovation, and competition, and it needs to be accompanied by good—and thus inherently costly—supervision. Second, oversight on the cheap can exacerbate moral hazard by giving poorly regulated intermediaries an undeserved “quality” label and an easy scapegoat (blame the regulator if there is a problem). Third, investors outside the realm of the small depositor should adequately monitor the unregulated financial intermediaries, making sure their capital is sufficient to eliminate moral hazard and other agency frictions.

Consistent with this line-in-the-sand rationale, only deposit-taking intermediaries are prudentially fully regulated and supervised under the current regulatory architecture. In exchange, and reflecting their systemic importance, they benefit from a safety net. Other financial intermediaries (and all other capital market players) neither enjoy the safety net nor are burdened by full-blown prudential norms. Instead, they are subject mostly (if not only) to market discipline, enhanced by securities market regulations focused on transparency, governance, investor protection, market integrity, and the like.

The early history of regulatory intervention, which was marked by the introduction of the safety net in response to repeated bank runs, was

more closely linked to externalities and coordination failures than to agency problems. But the creation of the Federal Reserve System in 1913 and the introduction of deposit insurance after the Great Depression exacerbated the agency-moral hazard problem. In turn, the strengthening of prudential norms after the savings and loan crisis, meant to address the acute manifestations of moral hazard observed during that crisis, exacerbated collective welfare failures. The side-by-side existence of a regulated sector—where systemic concerns were partially factored in—and an unregulated sector—where externalities were not at all internalized—created a wedge in returns between the two worlds. Investors left the regulated world in droves to join the world of the less regulated, highly leveraged and short-funded intermediaries, rapidly increasing their relative size and boosting systemic risk in the process.

Moreover, while focusing on collective welfare failures and moral hazard, regulation failed all along to address the issues arising from uncertainty and mood swings. Thus the regulatory architecture that is in place today became seriously unbalanced.

What is the role of supervisors?

Regulatory reform is complicated by the fact that the internal logic of each paradigm leads to different and often mutually inconsistent implications. Consider first the relative roles of markets and supervisors (table 1).³

In the agency and collective welfare paradigms the aims differ (reducing principal-agent frictions in the first, and internalizing social costs and facilitating coordination in the second), but the need to align incentives is clear in both. In the collective cognition paradigm, by contrast,

Table What is the role of supervisors?

Issue	Agency paradigm	Collective welfare paradigm	Collective cognition paradigm
<i>What is the market failure?</i>	Betting with someone else’s money	Engaging in opportunistic behavior that conflicts with the social good	Acting on weak information or biased perceptions
<i>What are the objectives of prudential regulation?</i>	Align incentives through skin in the game	Align incentives by internalizing externalities	Temper moods and tame creativity
<i>Can risk be priced?</i>	Yes	Probably not fully (hundred-year floods)	Probably not (unless supervisor is Moses-like)
<i>What is the role of supervisors?</i>	Enhancer of market discipline, crime police	Crowd manager, firefighter	Scout, moderator, firefighter

the aim is to temper moods and keep innovation under control. While there are no obvious inconsistencies, the two sets of objectives call for different styles of supervision. Similarly, the scope for risk pricing, which depends in part on whether systemic price bubbles and crises can be avoided, varies correspondingly across the paradigms, also leading to different roles for supervisors.

In the agency paradigm anyone with enough “skin” invested in the game has incentives to keep risk taking within socially acceptable bounds. Once principal-agent problems are under control, systemic crises should not occur and prices provide a sound basis for day-to-day micro-prudential risk management. Accordingly, the main role of the supervisor is to put into place the necessary apparatus for markets to perform well. Once this is done, the supervisor’s only remaining role is checking compliance and policing crime.

By contrast, in the collective welfare paradigm, where the key dimension of risk is systemic, the scope for market assistance is much more limited. Markets can provide insurance only if they are able to calibrate the risks and costs of systemic breakdowns and to withstand their strains, both of which seem questionable.⁴ The role of the supervisor grows in inverse proportion. The supervisor should induce intermediaries to internalize externalities and enhance the stability of the system through prudential buffers. But because putting into place fully crisis-proof buffers is likely to be socially too expensive, risks of occasional systemic crises (“hundred-year floods”) will persist.

In the collective cognition paradigm the scope for market assistance is even more limited, because uncertainty now dominates risk. Risk pricing becomes inherently difficult, not only because statistical history provides few clues on what might be popping up ahead but also because markets shaped by alternating bouts of euphoria and despair are unlikely to provide efficient pricing signals. It does not follow, however, that in this paradigm “anything goes.” Instead, price bubbles and financial market dynamics have an internal logic that makes them broadly predictable. Moreover, well-trained observers should be able to grasp how the system is wired, connect the dots, and recognize the possible cracks ahead. Still, separating bubbles from fundamentals, identifying potential vulnerabilities,

and steering the financial boat away from icebergs are not easy tasks. Systemic risk analysis is therefore unlikely to arise spontaneously as a profitable market activity and should probably be viewed instead mostly as a public good, to be supplied by supervisors.

What about regulatory reform?

Much progress has been made in designing the agenda for regulatory reform, with detailed (though not always specific) proposals having already emerged.⁵ As could be expected, these proposals have a strong agency emphasis, including measures to enhance transparency and consumer protection, limit conflicts of interest, improve governance, alter management compensation schemes, and increase skin-in-the-game requirements. All these are clearly essential.⁶ Consistent with the emphasis in this brief on the need for a better balance across paradigms, however, the focus here is on the reform proposals for the other two paradigms.

Dealing with externalities

Let’s start with the collective welfare paradigm. There is widespread agreement on the need to tackle systemic risk. In particular, there seems to be an emerging consensus that some measure of “systemic importance” should be the criterion used when deciding which financial institutions to bring into the sphere of prudential regulation. This proposal is problematic, however, because it is based on a purely static definition of systemic importance that is likely to exacerbate regulatory arbitrage over time, with financial transactions moving in waves outside the regulated sphere, as in the buildup to the subprime crisis. Moreover, applying this proposal could well be an operational nightmare. If the systemic distinction is based on size, unregulated intermediaries just below that size could multiply in number and engage in “systemic herding.” And distinctions based on interconnectedness are likely to be extremely complex and subject to many competing interpretations of what is truly systemic. In the end they might have unpredictable effects over time and may provide a false sense of security. In addition, moving institutions on and off the systemically important list would have adverse signaling implications.

Simplicity would better serve the goal of avoiding regulatory arbitrage. Thus one proposal would be to have a single set of prudential regulations for all intermediaries that take deposits or borrow in the market, yet allow for the existence of unregulated (but licensed) intermediaries that may borrow only from the regulated. Because the unregulated intermediaries could fund themselves only from the regulated, a dollar lent to a final borrower through an unregulated intermediary would end up paying the same Pigovian tax (that is, the tax that would internalize all the externalities inflicted on the system by each individual institution, including those associated with systemic liquidity, as discussed below) as a dollar lent through a regulated intermediary. Thus systemic risk would be evenly internalized across all possible paths of financial intermediation. At the same time, because the unregulated intermediaries would not need to meet entry requirements, this scheme would favor innovation and competition. It would also limit the cost of oversight, because the activities of the unregulated would be monitored through their contractual relationships with the regulated intermediaries that lend to them.

Admittedly, this proposal does not directly address the too-big-to-fail, too-interconnected-to-fail (TBTF-TITF) problem. But this is not as severe a shortcoming as it may seem, for several reasons. First, it is simply wrong to equate systemic risk with TBTF-TITF. Systemic risk can be present even without TBTF-TITF. Second, systemic risk is not addressed by fueling regulatory arbitrage (which applying stricter prudential regulations to TBTF-TITF institutions would most probably do) but by removing (or at least lessening) the root causes leading to systemic events. A uniformly applied systemic liquidity tax, as discussed below, would be an important step toward this goal. Third, stricter regulation would be of little or no help if a TBTF-TITF institution becomes troubled or unviable. That scenario, the main concern of proponents of tougher regulations for such institutions, calls for different instruments, chiefly a suitable framework for resolution of failed institutions—with powers to undertake such actions as closing, intervening in, and restructuring institutions; unwinding positions; and separating the “good” and “bad” parts of the balance sheet.

The need for regulations to address the systemic vulnerabilities resulting from short-term wholesale funding has also become widely recognized. But the proposals based on controlling the mismatch between the maturity of assets and that of liabilities appear problematic. Matching short liabilities with short assets can protect the liquidity of an individual intermediary but at the expense of exacerbating systemic vulnerability. In systemic events short loans become as illiquid as long loans unless intermediaries press borrowers to repay the loans. But if they do so, they shift the liquidity pressure onto somebody else, the final borrower or another intermediary, thereby increasing default risk across the system and contributing to downward asset spirals.

A better solution would be to turn the conventional maturity mismatch principle—it is okay to borrow short if you also lend short—on its head. A systemic liquidity tax would penalize the short funding from uninsured wholesale investors as well as the short lending by regulated intermediaries, at least to the unregulated financial intermediaries. The tax would be aimed at pricing appropriately the value of the option to “lend short and run” that deposit insurance and the lender of last resort implicitly provide. It could take the form of a capital surcharge; a risk-adjusted premium on deposit insurance; or a risk-adjusted premium on newly created systemic liquidity insurance linked to the lender-of-last-resort facility. Calibrating this tax will not be trivial, however, not least because of the inherent conflict across paradigms (lending short disciplines borrowers under the agency paradigm).

Dealing with mood swings

Now let’s turn to the collective cognition paradigm, where the virtual absence of regulatory reform proposals is remarkable. While some reports do recognize that markets can be caught in mood swings, there are few specific recommendations yet on how to address the associated market inefficiencies. This is an important gap that needs to be filled. In particular, the supervisor’s role will need to be broadened beyond that contemplated in the proposals currently aimed at enhancing systemic supervision, which are based solely on collective welfare frictions (interconnectedness, contagious runs, and the like).

In the rational expectations version of the collective cognition paradigm—where mood swings reflect a rational updating of imperfect information—the only new function of the supervisor is that of scouting. Once warned by the supervisor of the potential icebergs ahead, rational markets should change course on their own. As noted, however, scouting is a difficult function that will require additional public resources. Because it turns on its head the agency paradigm mantra that intermediaries know best, it will constitute a major change in supervisory philosophy and organization.

Scouting also raises a number of delicate questions, including what is the most useful way to look ahead and assess possible systemic vulnerabilities. While many efforts are under way to redesign stress testing within a more systemic context that takes into account tail risk and changes in correlations, the question arises whether the task of finding the cracks in the system is more qualitative than quantitative. Another key question is what will be a proper balance between on-site and off-site work. Many experienced supervisors seem to lean in favor of bringing tomorrow's supervision closer to the ground, through a heavier on-site presence. Such an approach makes perfect sense in the agency paradigm. But in the collective cognition paradigm the emphasis might be more on understanding the systemic vulnerabilities than on verifying the individual risk assessments. From this perspective it is no longer so clear whether the best response is more on-site presence or better off-site supervision.

In the alternative interpretation of the collective cognition paradigm—a world of bounded rationality and sentiment-driven traders—information and analysis will not suffice. Instead, market guidance will require adding deeds to words. In turn, this will require boosting the supervisor's capacity (and skills) to exert judgment-based discretionary interventions aimed at restricting specific instruments and forms of intermediation that may become riskier as they develop. To this end, supervisors will need more powers to regulate and standardize financial innovation.

Supervisors will also need more powers to slow down credit cycles and expand prudential buffers when systemic uncertainty increases. Judgment-based countercyclical prudential norms seem

the obvious instrument to consider in this connection. Mood swings thus militate in favor of an appropriate mix of rules and discretion in dealing with systemic fluctuations in credit and asset prices. Such an approach would combine preset, cyclically adjusted prudential norms that target *expected risks* (dynamic provisioning requirements to offset predictable swings in default risk over the cycle) with countercyclical, discretionally adjusted prudential norms that target *unexpected risks* (capital adjustments reflecting increases in systemic uncertainty that make tail risks grow). The cyclically adjusted prudential norms should remain under the direct responsibility of the supervisory agency. The countercyclical, discretionally adjusted prudential norms should naturally become part of the toolkit of the central bank. Clearly, however, appropriate arrangements will be needed to ensure proper coordination between the supervisory agency and the central bank.

Conclusion

To be successful, regulatory reform will need to integrate the key insights of all three paradigms underpinning the world of finance. But regulatory reform is complicated by the inherent policy inconsistencies across paradigms, which become readily apparent once their internal logic is worked out. Agency issues can be largely solved through the self-correcting forces of well-functioning financial markets, making life easier for regulators and financial economists alike. By contrast, markets cannot on their own address the daunting challenges posed by collective welfare and collective cognition failures. Instead, the thorny issues linked with these paradigms (tail risks, free riding, bounded rationality, genuine uncertainty) put a heavy burden on regulators and sit uncomfortably in the world of mainstream finance.

Moreover, attempts to address the problems identified under one paradigm can often worsen the problems identified under the others. Things are made no easier by the problem of attribution; the behavior of financial markets conflates agency, collective welfare, and collective cognition frictions in such a complex way that their individual effects are virtually impossible to sort out empirically. Thus the path ahead will ultimately require

a judgment call as to whether the benefits of a regulation on account of one paradigm exceed the potential costs on account of another.

With these constraints in mind, this brief has argued in favor of three main proposals to address issues of externalities and mood swings. First, to limit regulatory arbitrage, prudential regulation should be applied uniformly to all intermediaries that take deposits or borrow in the market. However, unregulated intermediaries should be allowed as long as they borrow only from regulated ones. This proposal stands in contrast with the apparently emerging consensus that intermediaries should be subject to different regulatory rigor depending on their systemic importance.

Second, a systemic liquidity tax should be designed that penalizes both short-maturity borrowing and short-maturity lending. This stands in contrast with the more popular view that would penalize maturity mismatches.

Third, in recognition of the importance of uncertainty and the need to temper moods, the central bank should be empowered with a countercyclical prudential norm that could be calibrated discretionally in light of unexpected changes in circumstances. This stands in contrast with the popular view that countercyclical prudential norms should be only rules based.

Notes

This brief is based on a longer paper in the World Bank Policy Research Working Paper series (de la Torre and Ize 2009).

1. The risk of low-probability, extreme events at the upper end of the risk distribution.
2. The argument that mood swings play an important role in financial bubbles and panics finds its roots in Keynes's "animal spirits" and Hyman Minsky's writings on financial crises and was popularized by Kindleberger and Aliber (1996) and Shiller (2006).
3. Similar inconsistencies arise for the justification for a safety net and the manner of prudential oversight. See de la Torre and Ize (2009).
4. The jury is still out on whether partial insurance schemes might help provide useful market signals.

5. See Brunnermeier and others (2009), FSA (2009), Acharya and Richardson (2009), and the April 2009 Declaration of the G-20 Summit, to cite just a few.
6. What makes many of these issues hard nuts to crack is their frequent location at the interface between two or more paradigms. For example, finding ways to induce shareholders or investors to do a better job at monitoring and controlling managers (an agency problem) requires overcoming both free-rider problems and mood swings.

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