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Intrinsic Moral Hazard

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Abstract

The paper argues that financial deregulation incentivized financial firms to take excessive risks and over-expand because it turned social insurance against systemic risk into a *common pool* (or *open*) *resource*. The increased size and complexity of deregulated financial markets in turn raised the social cost of imposing discipline in financial markets to prohibitive levels. Because this undermined the credibility of the regulators' threats of sanction, their deterrence strategy was from then on *subgame imperfect*. This suggests that moral hazard can be explained by the market expectation that regulators would act like a rational maximizer rather than by the things they *irrationally* did or not do.

Keywords: systemic risk, moral hazard, financial deregulation, coordination failure, excessive risk taking and financial crisis
JEL Classification: D72, C70, G20, G18,

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Slack supervision by regulators is often blamed for excessive risk taking that was endemic in financial markets before the 2008 Financial Crisis (Friedman 2011). Likewise, the literature on the political economy of the financial crisis emphasizes the society's agency costs with its regulators (Acemoglu 2011). However, regulatory failure might have been the unintended consequence of financial deregulation itself. The paper argues that this was because (i) financial deregulation caused deregulated markets to over-expand by turning social insurance against systemic risk into a *common pool* (or *open*) *resource*, which in turn by raising the social cost of imposing discipline (ii) undermined the credibility of regulators' threat of sanction, turning moral hazard into an *intrinsic* feature in financial markets.

The effect of deregulation was not only to replace *explicit* government guarantees with those *implicit*, but also to seriously underprice them (Acharya et al. 2009, Acharya et al. 2013). Social insurance against systemic risk was thereby turned into a *non-exclusionary good*, and since it is also *rivalrous* - given that society's resources are finite in the short-run - it became a *common pool* resource (both *rivalrous* and *non-exclusionary*). This gave rise to the classic open resource problem of "over-extraction" which in this instance took the form of excessive risk taking, fueling the excessive growth of deregulated markets. Regulators' ability to prevent excessive risk taking suffered because the increased size and complexity of deregulated financial markets raised the cost of imposing market discipline, undermining the credibility of their threats of sanction. Moral hazard in financial markets was then on *intrinsic* because it could emanate not from anything regulators *irrationally* did or not do but simply from the market players' expectation that they would act like a rational maximizer.

The paper's value added is two-fold. One, it gives a simple and general explanation of why financial deregulation induced market players to take excessive risks and over-expand. Two, it shows how regulatory failure can also be explained independently of agency costs by the subgame imperfection of regulators' threats of sanction, which was an unintended consequence of deregulation. The discussion is organized as follows. Section I argues that a *coordination* failure ensues when social insurance against systemic risk turns into a *common resource*, which incentivizes excessive risk taking and over-expansion. Section II lays out the argument that moral hazard in financial market becomes *intrinsic* when the regulator's deterrence strategy is subgame equilibrium imperfect. The paper ends with a brief conclusion.

1. *Financial Deregulation and Coordination Failure*

New information technologies coupled with financial deregulation spurred a slew of financial innovations during the period before the financial crisis. These innovations helped low-income households access finance at a time of stagnant wages and rising income inequality, while also satisfying investors' demand for better yielding safe securities at a time of low interest rates and shrinking public deficit during the Clinton Administration which shrank the supply of US Treasurys. Prior to the financial crisis it was generally held that financial innovations improved allocative efficiency by helping agents overcome market imperfections (Tufano 2003). However, a more critical view has since emerged (Lerner & Tufano 2011, Beck et al 2016). As the real economy benefits of financialization came under closer scrutiny (Philippon 2013, 2015), a growing new literature focused on the "supply side", arguing that many financial innovations were motivated by capital arbitrage as financial firms were incentivized to engineer products to externalize their *tail-risks* to society (Gennaioli, Shleifer & Vishny 2012, Acharya et al. 2013, Acharya et al. 2009, Awery 2013, Martin & Parigi 2013).

Interest in macroprudential regulation addressing adverse network effects in financial markets increased sharply after the financial crisis, spawning a large literature that variously focused on liquidity, asset price bubbles and contagion as the various sources of systemic risk (Persaud 2009, Kashyap & Stein 2011, Moschella & Tsingou 2013, Allen & Carletti 2012, Galati & Moessner 2013, Freixas, Laeven & Peydro 2015). For instance, in Gersbach & Rochet (2012) banks make privately optimal decisions that are socially sub-optimal because they do not internalize the impact of their decisions on asset prices, while in Celine et al. (2010) negative network externalities are caused by contagion. Closer to this paper, Acharya *et al* (2015) emphasize rent seeking through risk shifting by banks as 'implicit government guarantees' creates an incentive for "failing" to internalize cost (Acharya *et al* 2009, Acharya *et al* 2013). The discussion in this section gives a simpler (and more general) account based on coordination failure that results when social insurance against systemic risk is turned into a common resource in financial markets.

In a financial economy return increases with leverage, provided the systemic risk increased levels of debt creates is socially well-insured. When this insurance cost is factored in the social return to leverage begins to diminish past a certain threshold of debt. Thus, a system of regulation that internalizes the cost of social insurance against systemic risk is an essential feature of a robust financial system. It ensures that private and social costs are aligned, making it sure that private maximizing decisions produce a socially optimal outcome. However, social and private costs begin to diverge when deregulation turns social insurance into an *open* resource.

Excessive risk-taking from a system-wide perspective and that from the vantage point of an individual investor diverge. The same high-risk unit (strategy) which can be a Pareto improving addition into the mix of a population of low risk takers can have the opposite effect when high risk takers predominate. Thus, from the point of view of the market as a whole, "excessive" risk taking implies that too many market players are high risk takers, i.e., a *coordination failure*. Consider the following simple dyadic coordination problem (technically, a chicken game) where two players, X and Y, decide between a high or low risk investment strategy. In this example, excessive risk taking occurs only when both players are high risk investors. If only one player were a high-risk investor the social outcome would be optimal.

		Y	
		Low Risk	High Risk
X	Low Risk	1,1	1,2
	High Risk	2,1	-1,-1

Consider next the following n person extension of this game, assuming (initially) that market prices fully reflect the social costs that arise from higher debt.

$$H(n+1) = \alpha - mn$$
$$L(n) = \varphi$$

where α, φ and m are some (exogenously given) positive constants, and n is the number of units that take the high-risk strategy in a population of N investors that are identical except for how they invest. $H(n+1)$ is the expected payoff of the $n+1^{st}$ high risk investor, while $L(n)$ is that of the n^{th} low-risk investor. The first high-risk investor's return is higher than that of the low risk strategy by the margin (α - φ), which diminishes with each additional investor taking the high-risk strategy at a constant rate m. Assuming for simplicity that the expected payoff of low-risk strategy is constant in the number of high-risk investors, a stable Nash equilibrium exists at the point n^* where $H(n+1)$ intersects $L(n)$ in Figure 1. The expected return on high risk investment is higher than that of the low-risk strategy to its left and lower to its right, and as investors switch their strategy on the margin the two returns are equalized. In equilibrium, the number of high-risk investors is given by:

$$n^* = \frac{\alpha - \varphi}{m}$$

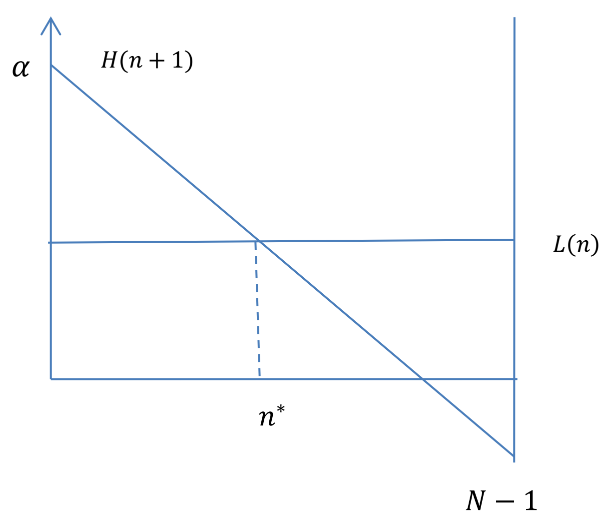

Figure 1

The diagram is helpful in conceptualizing what regulation needs to accomplish. Regulation's first objective is to ensure that the cost of social insurance is reflected accurately in the market environment within which private investors make their decisions. This involves enforcing rules that disallow socially harmful rent seeking, which ensures that the $H(n+1)$ schedule faced by private investors is not much different than the one society faces when adjusted for scale. The second objective of regulation involves imposing a tax on leverage to prevent socially sub-optimal levels of debt. The optimal leverage tax maximizes the social payoff (Z) given by:

$$Z(n) = n(\alpha - mn) + (N - n)\varphi$$

Setting $\frac{\partial Z}{\partial n} = 0$, the number of high risk investors that maximize the social payoff is found equal to:

$$n_o = \frac{\alpha - \varphi}{2m}$$

which is half the number of high risk investors in equilibrium:

$$n_o = \frac{n^*}{2}$$

A tax on high risk strategy can ensure that debt does not exceed its socially optimal level. As shown in Figure 2, the after tax return, $H^t(n+1)$, intersects $L(n)$ at $n = n_o$ where the social payoff is maximized.

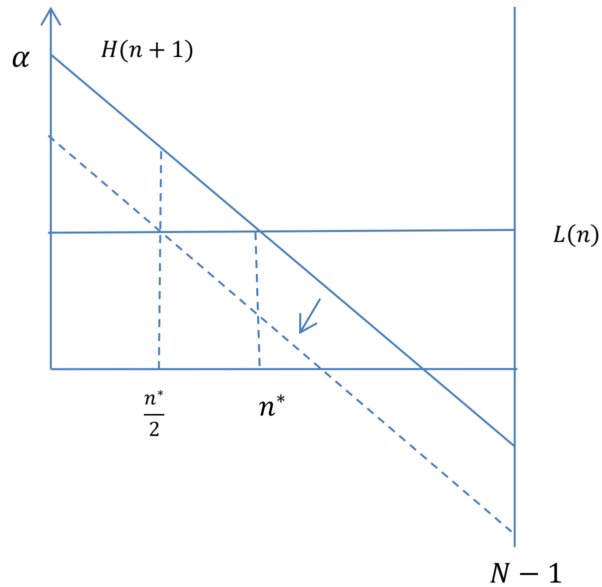

Figure 2

The discussion highlights two different ways in which regulation can fail.[1] One problem arises when the tax on leverage is either too low or too high, causing respectively the dissipation or the under-realization of the potential return from leverage. Any improvements in diversification technology, among other things, can raise the socially optimal levels of debt and risk taking, requiring a recalibration of taxation. A second (and arguably more serious) problem occurs when market prices do not reflect the increasing cost of systemic risk. In this case, the failure results from the inability to deter private units from engaging in socially harmful rent seeking. A wedge is then drawn between private and social marginal return, causing a misalignment of the high-risk strategy payoff respectively for private actors and society. For future reference, I will call the first the Type-I Error, and the second, Type-II.

Figure 3 gives a stylized picture of the Type II Error where the private return the representative market player faces is juxtaposed against the social returns of high-risk strategy,

[1] For a broader discussion of financial regulation, see Goodhart (2008) and Brunnermeier et al. (2009).

assuming it is adjusted for scale. Socially harmful rent seeking implies that the private return on high risk strategy is not only higher but also decreases more slowly than that of its social counterpart. Equilibrium can now occur at a point such as E, where the social marginal cost of leverage might be negative even though it remains positive for the $n + 1^{st}$ high-risk investor. Private gain from higher leverage comes at a collective cost.

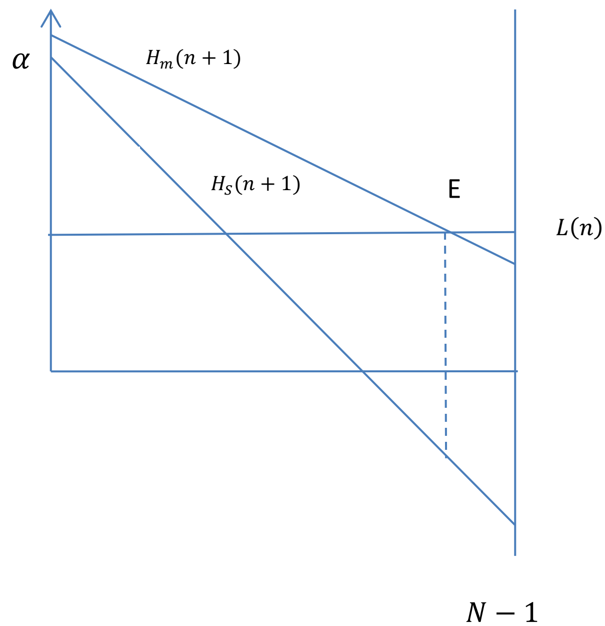

Figure 3

This is akin to the “tragedy of the commons” where market players do not refrain from seeking ‘private gain at collective cost’ since they cannot assume others will do likewise if they did. As regulatory failure takes a cooperative solution out of reach, individual market players are incentivized to “over-extract” (i.e., take excessive risks), expecting others will do the same. It is also possible that both types of error, too low a tax on leverage (or underpricing of protection) and failing to prevent harmful rent seeking, become interlinked. The next section gives a stylized account of financial deregulation, discussing how the former type of error (Type I) can dynamically give rise to the latter type (Type II) independently of regulator agency costs.

2. *Intrinsic Moral Hazard*

It is not unusual to divide financial deregulation in the US into two phases. A major driver of deregulation in the 1980s was the rising competition commercial banks faced from shadow banks. However, as the playing began to level between banks and shadow banks in the 1990s, the main driver of deregulation gradually shifted to the strategic interaction between regulators and financial institutions as a more unified group. As well known, the roots of financial deregulation go back to the rise of Money Market Mutual Funds (MMMF), which were not subject to the same regulatory restraints that prevented commercial banks from investing in the more lucrative but riskier instruments they could. A part of the price of the explicit guarantees the banks enjoyed was the regulatory restrictions they faced. Not subject to the same restrictions, MMMF could offer investors a return higher than they could get from commercial banks. The fact that commercial banks' and thrifts' deposit holders enjoyed explicit government guarantees that were unavailable to the owners' of MMMF shares was thought to balance out the return differential. However, over time, market players increasingly came to believe the latter enjoyed (implicit) guarantees as well. These perceptions gained strength as market players watched Fed successively intervene when the repo and commercial paper markets, both crucial for MMMF solvency, ran into trouble in the 1970s and 1980s.[2] In these instances the Fed intervened to ensure Money Market Mutual Fund (MMMF) "deposits" maintained their face value, i.e., would not "break the buck", deeming that given their size and

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[2] The Federal Reserve provided emergency loans when the commercial paper market shut down after the Penn Central Transportation Company filed for bankruptcy in 1970, and again, in 1982, to stabilize the Repo market after the securities firms Drysdale and Lombard-Wall defaulted on their repo obligations (FCIC, p. 30-1). Neither intervention strictly speaking fit the mold of "too big to fail". As it might be remembered, the term was popularized later in a 1984 Congressional hearing on the rescue of Continental Illinois by a comment made by Connecticut Representative Stewart McKinney responding to Todd Conover, Comptroller of the Currency, who remarked that federal authorities would not allow large banks fail. The Comptroller's remarks might have created an incomplete picture about federal authorities' objectives, at least insofar as it ignored the integrity of Money Market Mutual Funds among them.

systemic importance the cost of not helping them could be prohibitive.[3] But, this also created both a short run and a long run problem.

The short run problem was that commercial banks had to shoulder the cost of social insurance against systemic risk while shadow banks, as Paul Volcker put it, could free ride.[4] The implicit guarantees that replaced those explicit were underpriced, creating a competitive disadvantage for the commercial banks. Throughout the 1980s, banks lobbied Congress to level the playing field, and the legislative response shaped much of the trajectory of early deregulation. Congress first repealed Regulation Q enabling banks to pay higher rates on deposits, and when that led to a profit squeeze it passed new legislation that allowed them to make more lucrative but riskier investments. By the mid-1990s the regulatory differences between commercial and shadow banks ceased to be the main driving force of deregulation (Boot & Thakor 2014). At the end, many of the competitive disadvantages of commercial banks were eventually removed not by raising the price of implicit protection for shadow banks but by lowering the price of explicit protection they enjoyed. The banks and the thrifts were allowed to make increasingly more risky loans to bolster their earnings, among which were the adjustable rate mortgages that shifted interest rate risk onto borrowers, which contributed to the S&L crisis (Cole, McKenzie, & White 1995).[5]

A longer term problem was also created by the “soft” reputation the Fed acquired for itself by bailing out shadow banks during the early period, the effects of which were perhaps more consequential. As discussed above, the first objective of regulation is the alignment of social and private cost. Regulators fulfil this objective by imposing rules that they enforce by threatening sanctions against banks who violate them. While regulators calibrate regulation intensity, deciding whether it is *lax* or *strict*, banks decide whether to *comply* with or *defy* the rules imposed on them through innovations if not outright “cheating”, risking sanctions. The

[3] Bernanke’s (2015) detailed account of Federal Reserve policy during the crisis highlights the importance it attached to protecting Money Market Mutual Funds after the failure of Lehman Brothers. See also Kaeperczyk & Schnabl (2010) and Levin (2009).
[4] FCIC, p. 33.
[5] Rising competition from the MMMF raised agency costs, incentivizing banks to take excessive risks by reducing their franchise value. See, among others, Keeley (1990) and Demsetz et al (1996).

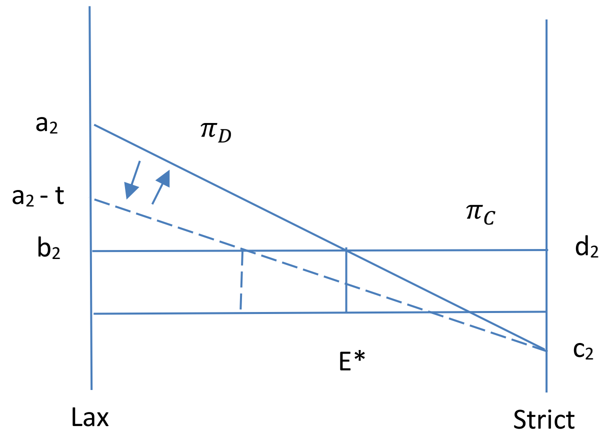
socially optimal outcome is for banks to *comply* and the regulators to be *lax* since both sides are worse off when banks are non-compliant and the regulators are too *strict*. In the dyadic payoff matrix below, financial institutions are assumed to be a composite actor (Column) and the regulator is Row. It greatly simplifies both the notation and the exposition to assume that all payoffs are common knowledge.

		Financial Firms	
		Comply	*Defy*
Regulator	*Lax*	b_1,b_2	d_1,a_2
	Strict	a_1,d_2	c_1,c_2

The N person extension of the dyadic game is given in Figure 4, which depicts banks' expected payoff from a strategy of defection (π_D) and from compliance (π_C) as a function of the expected enforcement intensity (or probability of punishment) by the regulator. The expected payoff of defection is at its highest (a_2) when expected enforcement is *very lax* (i.e., expected probability of punishment is low) and at its lowest (c_2) when it is *very strict*.[6] In other words, the regulator imposes a tax (t) on banks' expected defection payoff, which it enforces with probability Υ. For a given level of t, the compliance payoff is below that of defection for low levels of Υ, i.e., $a_2 – \Upsilon t > b_2$, and higher when Υ is high. At the critical value of enforcement, E*, banks' expected payoff of defection and compliance are equal, and, for any point to its left (right) the expected defection payoff is higher (lower) than that of compliance. The effect of changes in the tax level is to lower the critical threshold of enforcement intensity E*, i.e., lowering the minimum enforcement intensity needed to make banks' expected compliance payoff exceed that of defection. This is shown by the dotted line in Figure 4, where an increase in t tilts downward the banks' π_D schedule and *vice versa*. By reducing t, the effect of

[6] To keep things simple, I assume the expected payoff of compliance remains constant at all levels of enforcement intensity, $b_2 = d_2$.

deregulation was to steepen the slope of π_D, raising the minimum enforcement intensity threshold beyond which compliance payoff remains higher than that of defection.[7]



The probability of punishment (ϒ)

Figure 4

It follows that whether deregulation ends up incentivizing excessive risk taking or not plays out on two margins: (i) the extent of the reduction in t (i.e., how much the *de facto* price of social insurance falls as restraints on banks are lifted), and, (ii), whether enforcement intensity exogenously changes. Just as the former lowers its critical value E*, any independent concomitant reduction in enforcement intensity due to worsening agency costs raises the probability with which the banks' compliance payoff falls below that of defection.

Such agency costs play a prominent role in the new political economy literature.[8] The focus is either on *plutocracy* or the political pressures to appease low-income voters, but in

[7] The effect of acquiring a "soft" reputation as the Fed did over the years is similar. As discussed below it also raised the critical enforcement threshold E* by causing an upward shift in banks expected defection payoff schedule.

[8] As Acemoglu (2011) puts it, two different strands exist in this literature. One view focuses on politicians' motivation to make home ownership more affordable for low income groups (Rajan 2011, Kane 2009, Calomiris & Haber 2014), while the other on rent seeking by big banks (Johnson & Kawak 2011, Gilens 2014, Stiglitz 2010, Mian *et al* 2010, Bartels 2010).

either case slack regulation results from the society's agency costs *vis a vis* its regulators.[9] In the *plutocracy* argument, financial interests collude to *hack* democracy and thereby raise public's coordination costs, which in turn lowers elected officials' and by extension regulators' expected probability of being sanctioned when they *defect*, i.e., serve their own interest at the social expense. In the political pressure argument, the public's coordination costs rise again but this time it is because political calculus compels the elected masters of regulators to ignore the imperatives of good economic governance. The electorate's short-sightedness in part incentivizes politicians/regulators to design the time profile of the social payoff in such way that *costs* are deferred while *benefits* are immediate.

Yet, the policy decision to lower the effective price of implicit protection can also *itself* give rise to slack regulation. Even when society's agency costs with its regulators are nil, it is possible that the rising cost of imposing discipline in overgrown deregulated markets can render defection the preferred strategy for financial firms. As the social cost of imposing discipline rises the regulator's threat of punishment loses its credibility since the market players can perceive that the regulator is better off being *lax* than *strict*. Put differently, the regulator's *sucker's* payoff (d_1) falls below its *punishment* payoff (c_1) when imposing discipline is costlier than appeasement. The regulator is then caught in a One-Sided Chicken Game, turning the off-diagonal *lax/defy* combination into a Nash equilibrium.[10] Whenever any threat of retaliation or punishment by a rational maximizer is too costly to carry out, the threat might not be credible. For at the subgame stage when her threat is ignored the threat maker is better off not carrying out its threatened punishment.

Figure 5 shows the set of possible payoff combinations in sequential play when Row (X) threatens to do B if Column (Y) does A. If Y does not do A, then X does not have to carry out the threatened punishment B, in which case their respective payoffs are (b_1,b_2). If Y does A then X decides if it wants to retaliate. If it chooses not to, it receives the *sucker's* payoff (d_1) while Y gets away with the *temptation* payoff (a_2). If it instead retaliates both players receive their

[9] On the agency problem of the society *vis a vis* the regulators, see Barth, Caprio & Levine 2012, Boot, A. & A. Thakor (1993) and Kane 1990.
[10] This is the same problem of subgame imperfection Schelling' (1967) argued exists in the *mutually assured destruction* doctrine in nuclear deterrence.

respective *punishment reward* payoff (c_1,c_2). But, when $d_1 > c_1$, retaliation makes X is worse off than not retaliating, and when Y is aware of this she can safely ignore X's threat as "cheap talk" - provided she believes that X is a rational maximizer. This suggests that X's strategy of deterrence is not sub-game perfect.

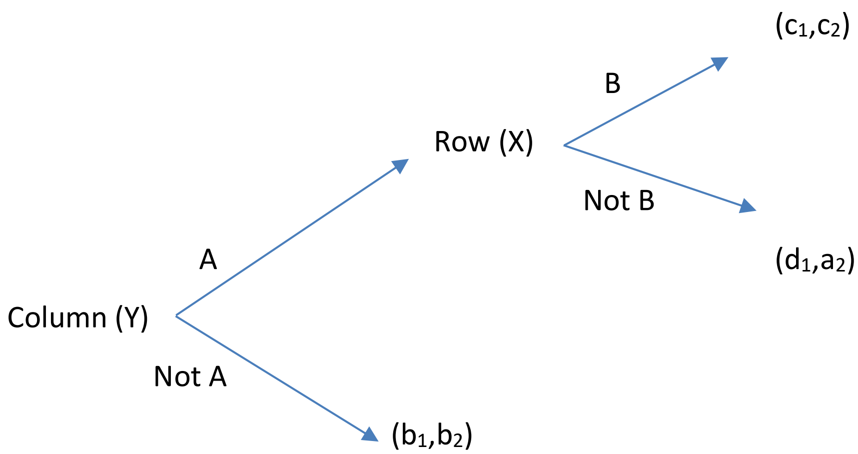


Figure 5

However, if the game is expected to be repeated in the future, X might still want to carry out the costly punishment when Y ignores her threat if her reputation is at stake.[11] In this case, Y now has to assign a probability δ for whether X retaliates or not, which suggests that her expected possible payoffs in the event she ignores X's threat is δc_2 or $(1 - \delta)a_2$ depending on whether X retaliates or not. All else being the same, Y might assign a high value for δ if X has a "though" reputation to protect. She might then choose not to ignore X's threat if $(1 - \delta)a_2 < b_2$. But, the opposite can also hold. If X has a past reputation for being soft, Y can then reasonably assign a low value for δ. It analogously follows that the threat coming from a regulator with a past reputation for being lax is likely to be much less credible, causing financial firms (Y) to assign a low value for δ with the result: $(1 - \delta)a_2 > b_2$. The effect of a lax reputation on the part

[11] Selten's (1978) "chain store paradox" is an example where this is the case.

of the regulator is then to shift up banks' expected defection payoff schedule in Figure 4 above, which reduces the desirability of being strict for the regulator as well. To see why, consider the interaction depicted in Figure 4 above from the regulator's vantage point.

The regulator's payoff from either strategy, being *lax* or *strict*, varies as to how pervasive it expects defection or compliance will be among banks. Normally, when all banks are compliant the regulator is better off being *lax* than *strict*, i.e., $b_1 > a_1$, and, when all banks are defecting it is better off being *strict* than being *lax,* provided $c_1 > d_1$. The regulator's expected payoff from either respective strategy is equal at the critical ratio (probability) of bank defection D* as shown in Figure 5. At any higher (lower) probability the regulator is better (worse) off being *strict* than *lax*. But, two things raise the critical threshold value of *defection* (push D* to the right), making it less likely that the regulator will be strict. One is the soft reputation it might have acquired in the past which shifts down the schedule depicting the expected payoff being strict, and the other is the rising social cost of imposing discipline as deregulated markets' size and complexity increases. Figure 6 below depicts the second of these effects. The rising cost of imposing discipline (being *strict*: c_1) in relation to that of appeasement (being *lax*: d_1) steepens the slope of the schedule depicting the expected payoff of being strict π_S, making it less likely that the regulator will want to be *strict* unless a much higher ratio of banks defect.[12] Note that when eventually the regulator's *punishment reward* (c_1) falls below its *sucker's payoff* (d_1) the regulator is always better off with a *lax* strategy at all levels of bank defection. This is shown by the dotted line, which indicates a downward tilt in regulator's expected payoff schedule from being *strict* (π_S), which now always lies below that of π_L.

[12] If the regulator's expected return of being lax and strict are equal at the same D* for which banks' expected payoff from compliance and defiance are equal, the Nash equilibrium is stable.

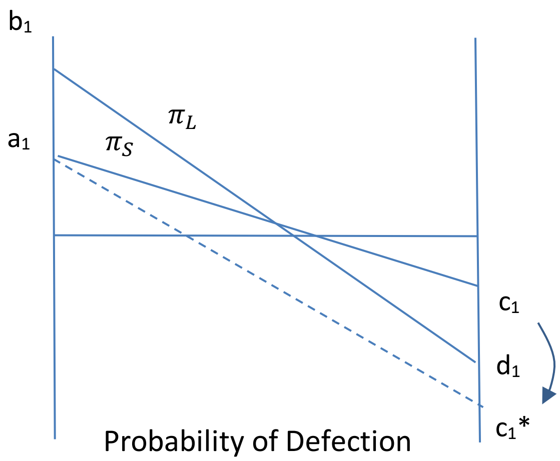


Figure 6

The foregoing supports the view that once the policy decision underprices implicit government guarantees (Type I error), it tends to encourage lax regulation even when regulator agency cost is nil, incentivizing socially costly rent seeking (Type II error). The over-expansion of deregulated financial markets traps the regulator in a no-win situation where punishing the "foolhardy" costs the society more than turning a blind eye. It is doubtful that the MMMFs could have grown as fast as they did in the 1980s had they not benefitted from an implicit insurance against the risk of "breaking the buck" (Type I Error). Likewise, had their rapid growth not acquired them systemic importance the regulators would not have felt compelled to intervene to protect them. An adverse consequence was to incentivize commercial banks and thrifts to take higher risks, which led to the regulatory forbearance towards insolvent "zombie" thrifts.[13] This was arguably the most consequential Type II error of this period. Again, the

[13] "Thrift failures increased during 1987 and into 1988, but the insolvency of the FSLIC meant that rescuing troubled thrifts would cost more than the FSLIC had available in its insurance fund. As a result, the regulators could not intervene in S&Ls that had more liabilities than assets. This meant that several insolvent thrifts remained in business. These "zombies" had

market for structured instruments and OTC derivatives grew exponentially once the policy decision not to check capital arbitrage, viz., *Commodities Futures Modernization Act* of 2000,[14] made it "safer" to ignore improbable risks such as steep, nation-wide slides in housing prices. Again, the policy decision was followed by the further relaxation of regulatory oversight (Johnson & Kwak 2011). Brunnermeier et al (2009) find it is surprising in hindsight that the regulators would accept the legal fiction that banks' off-balance sheet conduits were distinct entities. But, as an example of Type II error this was not perhaps as surprising.[15] The market expectations about central bank provision of backstop liquidity and low interest rate policy had the same modality as well. The cost of reversing an "easy" policy rose steeply as increased leverage made market players more dependent on low interest rates and backstop liquidity provision, tying the hands of regulators and policy makers (Farhi & Tirole 2009). Market players commonly factored into their strategies the dilemma they observed the regulators faced. That the social cost of a stricter policy often boxed them into a lax policy stance found its expression in the markets in the notion of *Greenspan put* - the *Bernanke put* once he became the chair, and nowadays, simply the *Fed put*.

3. *Conclusion*

The paper provides a novel perspective on how moral hazard can rise in financial markets independently of society's agency problems with its regulators. Pointing at the role of implicit government guarantees in incentivizing excessive risk taking by market players, it highlights the strategic complementarity between the regulation intensity and the maximizing decisions of market players with respect to their risk-taking strategies. The crucial insight is that the overall

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incentives to take even more risks in the hope that they could eventually improve their outcomes" Acharya et al. (2009).

[14] Equally important was Basel II provisions on minimum capital requirements. Jones (2000) gives an extensive account of how many of the financing techniques that were commonly used by financial intermediaries were motivated by capital arbitrage considerations, while Acharya et al. (2013) argue that banks used securitization and conduits mainly for the purposes of capital arbitrage.

[15] Regulators reportedly considered increasing the capital requirements on bank conduit guarantees after the failure of Enron but then chose not to follow through (Acharya et al. 2013).

effect of financial deregulation was to turn social protection against systemic risk into an *open* resource. This helps explain why deregulated markets expanded so rapidly, incentivizing innovations that enabled financial firms to take privately lucrative risks that were socially costly. Moral hazard became *intrinsic* in this process because the increasing size and complexity of deregulated markets raised the cost of imposing discipline to prohibitive levels, undermining the credibility of the regulator's threats of sanction. Moral hazard did not have to arise from anything regulators irrationally did (or not do) but simply from the market participants' expectation that they would act like a rational maximizer.

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