SHAREHOLDER OPPORTUNISM
IN A WORLD OF RISKY DEBT

Richard Squire

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Richard Squire[*]

Modern finance is increasingly dominated by derivatives and similar contracts that create contingent debts, which become payable only upon the occurrence of an uncertain future event. This Article identifies a pervasive opportunism hazard created by contingent debt that lawmakers and scholars have overlooked. If liability on a firm's contingent debt is especially likely to be triggered when the firm is insolvent, the contract that creates the debt transfers wealth from the firm's creditors to its shareholders. A firm therefore has incentive to engage in correlation-seeking — that is, to incur contingent debts that correlate, or that through asset purchases can be made to correlate, with the firm's insolvency risk. The consequence is an overuse of contingent debt that destroys social wealth through overinvestment, higher borrowing costs, financial distress, and potential systemic risk. Correlation-seeking is especially pernicious because, unlike other forms of shareholder opportunism such as asset substitution, it can reduce risk to shareholders even as it increases shareholder returns. Conduct that is consistent with correlation-seeking played a central role in the 2008 financial crisis, causing the deep losses suffered by the three firms to receive the biggest bailouts: AIG, Fannie Mae, and Freddie Mac. Yet current and proposed legal rules for derivatives and other contingent debt contracts ignore matters of correlation, increasing the risk of another financial crash in the future.

INTRODUCTION

In 2005, near the peak of the recent housing bubble, derivatives traders at AIG were making money hand-over-fist by selling credit default swaps linked to subprime mortgages. This in itself is not surprising: AIG is an insurance company, and a credit default swap in essence is an insurance policy on a bond or other debt obligation. What *is* startling is that AIG at the same time was buying up mortgage-backed securities for its own investment portfolio. This meant that the risks borne by the company were correlated: its assets were likely to plunge in value just as deep liability on its swaps was triggered. When the housing market collapsed, the combined damage to both sides of AIG's balance sheet was more than enough to sink the company.

This Article explains why seemingly reckless conduct of this type can in fact be fully rational from the perspective of shareholders. Such

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conduct reflects an opportunism hazard presented by contingent debt, a hazard that is here termed *correlation-seeking*. If a firm's contingent debts are especially likely to be triggered when the firm is insolvent, the debt contracts transfer value from the firm's unsecured creditors to its shareholders. This transfer creates an incentive for a firm's managers to sell contingent claims against their firm that correlate — or that through asset purchases can be made to correlate — with the firm's insolvency risk. The result is an overuse of contingent debt that produces a variety of social costs such as overinvestment, higher borrowing costs, and possible systemic risk. The potential loss of social wealth is vast given the widespread modern use of contingent debt contracts, which include derivatives such as credit default swaps and options, as well as more traditional arrangements such as loan guarantees.

Correlation-seeking is especially pernicious because, unlike other types of shareholder opportunism, it does not force shareholders to bear more risk in order to capture higher returns. To the contrary, equity volatility typically *falls* when the correlation between the firm's contingent debt risk and insolvency risk rises. Correlation-seeking reduces the volatility of a firm's equity value because it makes it less likely that the firm's contingent debt will be triggered when the equity *has* any value. This inverse relationship between risk and return marks a stark contrast with asset substitution, a form of shareholder opportunism in which a firm borrows against safe assets but then exchanges them for riskier assets before the debt comes due. Asset substitution makes equity returns more variable, meaning that shareholders must bear more risk to capture higher returns. And the same is true when a firm transfers value from its creditors to its shareholders by increasing its ratio of debt to equity, or its "leverage." Correlation-seeking thus avoids a risk-return tradeoff that tends to make other forms of shareholder opportunism self-limiting.

Conduct that is consistent with correlation-seeking played a key role in the 2008 financial crisis. Such conduct is evident not only in the pre-crisis years at AIG, but also at the government-sponsored mortgage companies Fannie Mae and Freddie Mac. Both Fannie and Freddie incurred deep contingent debts, in the form of guarantees on mortgage assets, that were highly likely to be triggered en masse under conditions when their shareholders would already be wiped out. Conventional accounts attribute risk-taking in these three firms to mere recklessness, or to schemes by managers to expropriate wealth from shareholders. But the fact that the companies incurred correlated asset and contingent debt risks suggests that their managers instead were trying to enrich shareholders at the expense of creditors — or, as it turned out, taxpayers. Although the correlated risks ultimately materialized, driving the firms insolvent, it does not follow that the managers' decisions were contrary to shareholder interests at the time they

were made. But those decisions did ensure that insolvency, if it came, would be severe, which is why AIG, Fannie Mae, and Freddie Mac were the three firms that received by far the biggest bailouts.

Despite the potential scope of the correlation-seeking hazard, neither lawmakers nor commentators have recognized the central role of correlation in the economics of contingent debt. Legal doctrines meant to protect creditors rely instead on principles designed for "fixed" debt — a term used here to mean debt that is certain to come due on a specified future date. Accordingly, a contingent debt is treated as less of an opportunism hazard because it is (by definition) less likely than a fixed debt to come due. On this view, a contingent debt is like a fixed debt, only less so.

There are at least two basic problems with this standard view of contingent debt. The first is that, counterintuitively, a contingent debt contract can capture significantly *more* wealth from a firm's unsecured creditors than would a fixed debt contract with the same face value. This is because a firm that incurs a $100 fixed debt (such as by taking out a simple loan) typically receives close to $100 in new assets (the loan proceeds) in exchange. And those new assets mostly neutralize the debt's dilutive effect on the firm's unsecured creditors. But when a firm incurs a $100 debt that has, for example, only a 10% chance of coming due, the firm receives in exchange new assets worth no more than $10. And if this contingent debt is especially likely to be triggered when the firm is insolvent, the disparity between the new assets and the debt's $100 face value greatly reduces expected creditor recoveries.

A second problem with legal doctrines that fail to distinguish between fixed and contingent debt is that the opportunism mechanisms are different for each. What matters most with fixed debt is its total face value relative to the firm's equity value: the higher this ratio, the greater the degree to which losses are borne by the firm's creditors rather than its shareholders. By contrast, a contract that creates a contingent debt with even a relatively large face value (or, in the language of derivatives, "notional" amount) can either benefit or harm a firm's unsecured creditors, depending on whether the correlation between the contingency risk and the firm's insolvency risk is negative or positive. For this reason, legal measures that consider only a debt's face value, and ignore correlations, often produce results that are wholly unrelated to the actual opportunism hazard.

A failure to recognize the pivotal role of correlation in the economics of contingent debt is a major shortcoming of the Obama Administration's proposed regulations for derivative contracts. Those proposals rely on standard measures for regulating fixed debt, such as higher capital and collateral requirements. If implemented, the proposals would raise costs for all derivative users, but would not block the spe-

cific type of opportunism that creates the risk of another AIG, Fannie Mae, or Freddie Mac–style collapse in the future.

The correlation-seeking hazard also calls into question the administration's philosophy on executive compensation. In the wake of the financial crisis, the Treasury Department has required senior managers at bailout recipients to take more of their pay in the form of company stock rather than cash. And the Federal Reserve has issued guidelines suggesting that it is considering similar executive pay rules for banks. This emphasis on equity compensation implies that the administration is concerned primarily with conflicts of interest between managers and long-term shareholders. But at least at the biggest bailout recipients, the evidence suggests that the more serious problem was conflict between the interests of creditors on the one hand, and the interests of shareholders, as advanced by managers, on the other. And the administration's pay approach, by further aligning manager and shareholder interests, only exacerbates this conflict.

These observations indicate that legal rules for contingent debt should be fundamentally rethought. For example, Congress should consider repealing special Bankruptcy Code exemptions that give derivative counterparties priority over other unsecured creditors. Those exemptions undermine the counterparties' incentive to monitor in order to prevent forms of shareholder opportunism such as correlation-seeking, even though the counterparties' sophistication would make them better monitors than most other creditors. In addition, pay rules at systemically important firms should be set to protect creditors as well as shareholders. Finally, fraudulent transfer law should be reformed to permit courts to subordinate a contingent debt if a high correlation between the contingency risk and the debtor's insolvency risk was apparent at the time of contracting. Such a rule would nullify the wealth transfer away from the debtor's unsecured creditors, thereby reducing the incentive for shareholders to use such debts to expropriate wealth rather than create wealth.

This Article proceeds in three parts. Part I describes the economics of correlation-seeking. Part II shows how correlation-seeking explains risk-taking conduct at AIG, Fannie Mae, and Freddie Mac in the years leading up to the 2008 financial crisis. And Part III considers how lawmakers could redesign key legal doctrines to target the distinct opportunism hazard that contingent debt presents.

I. THE ECONOMICS OF CORRELATION-SEEKING

This Part analyzes the economics of contingent debt opportunism. Section A explains why a positive correlation between the risk that a firm will fall insolvent and the risk that its contingent liabilities will be triggered enriches the firm's shareholders at the expense of its unsecured creditors. Section B uses a simple numerical model to demon-

strate why lawmakers' emphasis on fixed debt may be misplaced, and in particular why a contingent debt is a bigger opportunism hazard than a fixed debt of comparable size. Section C explains that correlation-seeking is especially pernicious because, unlike the forms of shareholder opportunism previously studied by scholars, it often reduces the level of risk borne by shareholders even as it increases shareholder returns. And section D explains why correlation-seeking generates various costs that destroy social wealth.

A. How Correlation Determines the Impact of a Contingent Debt

A debt is *contingent* if it becomes payable only upon the occurrence of an uncertain future event, known as the *triggering event*. A wide variety of financial contracts create contingent debts, including guarantees, options, and credit default swaps. In each case, the debtor (the firm liable if the contingency occurs) receives one or more up-front payments, known collectively as the *premium*. In exchange, the debtor agrees to pay the claimant (the other party to the contract) a specified amount — known as the contract's *face value* — if the triggering event comes to pass. For example, if the arrangement is a guarantee on a loan, the triggering event is the failure of a third party to repay a debt to the claimant. If the contract is a put option, the triggering event is the decline of a stock price below the option's strike price. And for a credit default swap, the triggering event is the nonperformance of a debt-like instrument such as a corporate bond or mortgage-backed security.

Contingent debts can serve socially valuable purposes. Many contingent debt contracts act as insurance policies on investments, and in that role they can be value-creating if the debtor is better positioned than the claimant to bear the downside risk on the investment. This may be true if, for example, the debtor can diversify risk more cheaply than the claimant can.

Contingent debt contracts can, however, serve a less benign function: to enrich the shareholders of the debtor at the expense of the debtor's unsecured creditors. To see how this could occur, imagine a hypothetical contingent debt contract which provides that the debtor will be obligated to make a payment to the claimant if and only if the debtor falls insolvent. Under such an arrangement, the debtor's shareholders enjoy the benefits but bear none of the risk. If the debtor remains solvent, the contract expires without the debt's being triggered, and the shareholders' equity stake is enhanced by the amount of the premium. And if the debtor falls insolvent, the triggering of the contingent debt makes no difference to the shareholders, whose equity stake is wiped out anyway. Rather, the triggered liability is borne

by the debtor's unsecured creditors, because it dilutes their recoveries from the debtor's bankrupt estate.[1]   In other words, such a contract constructs a perfect "heads we win, tails you lose" relationship between the debtor's shareholders and unsecured creditors.

Would it make sense for someone to buy a contingent claim that could be asserted only against an insolvent debtor?   The answer, of course, is yes — if the price is right.   The fact that a debtor is insolvent does not mean that its debts are worthless.   Rather, each creditor — including each contingent debt claimant — will be entitled to a portion of the bankrupt debtor's assets, with each portion determined by variables such as the size of the creditor's claim and whether the claim is secured.   Therefore, as long as the premium on the contingent debt contract is adjusted to reflect the debtor's insolvency risk, a mutually profitable deal can be struck.   And in the hypothetical contract just described — in which the debt is triggered by the debtor's insolvency — there would be a wide range of premiums acceptable to both debtor and claimant.   That contract in effect is a sale of a piece of the debtor's future bankrupt estate, a piece that would otherwise go to the debtor's general creditors.   The claimant would be willing to pay any amount up to her expected recovery if the triggering event occurs, discounted by the triggering event's probability.   And the debtor's shareholders would be willing to accept any premium greater than zero, because they bear no downside risk on the contract at all.

In reality, a court would likely refuse to enforce a contract that explicitly required a firm to make a payment only if the firm fell insolvent.[2]   However, the argument in this Article is that firms can — and often do — achieve an economically equivalent result by engaging in *correlation-seeking*.   That is, firms can incur contingent debt that correlates, or that through asset purchases can be made to correlate, with

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[1] For a firm's unsecured creditors to bear the full brunt of a contingent debt that is triggered when the firm is insolvent, the firm's equity investors must enjoy limited liability, which is why those investors are referred to here as "shareholders," implying a corporation.   But limited liability is a feature of most of the other widely used modern business entities, including the limited liability company, limited liability partnership, and Delaware statutory trust.   *See* Henry Hansmann, Reinier Kraakman & Richard Squire, *Law and the Rise of the Firm*, 119 HARV. L. REV. 1333, 1397 (2006).   Only the common law partnership continues to hold equity investors fully liable for firm debts.

[2] One possibility is that a court would deem this hypothetical contract an improper "ipso facto" arrangement.   Provisions of the Bankruptcy Code deny enforcement of ipso facto clauses in specific contexts.   *See* 11 U.S.C. § 365(e)(1)(A) (2006) (executory contracts); *id.* § 541(c)(1)(B) (debtor interests in property).   And several courts have drawn from these provisions and from legislative history a principle that ipso facto clauses generally are against public policy.   *See* Michael J. Di Gennaro & Harley J. Goldstein, *Can Ipso Facto Clauses Resolve the Discharge Debate?: An Economic Approach to Novated Fraud Debt in Bankruptcy*, 1 DEPAUL BUS. & COM. L.J. 417, 443 (2003) (collecting cases).   Alternatively, a court might deem the contract a deliberate fraudulent transfer.   *See* 11 U.S.C. § 548(a)(1)(A) (empowering bankruptcy trustees to invalidate obligations incurred "with actual intent to hinder, delay, or defraud" creditors).

their insolvency risk. And except in the extreme case of a contract that expressly defines the triggering event as the debtor's insolvency, there is little that prohibits correlation-seeking under current law.

Correlation-seeking can take two general forms. The first, which might be called the "forward" type, occurs when a firm's managers sell a contingent claim against the firm that would be triggered only in circumstances when the firm would likely be insolvent. An example would be when a parent corporation issues a guarantee on a loan taken out by its subsidiary. If the parent's largest asset is its equity stake in the subsidiary, the insolvency of the subsidiary would probably cause the parent to fail as well. Therefore, the guarantee on the subsidiary's loan creates a contingent liability that the parent's shareholders, as contrasted with its unsecured creditors, will almost never have to bear. And the second, or "reverse," type of correlation-seeking occurs when a firm incurs contingent debt and then purchases assets that are especially likely to lose value at the same time the debt is triggered. A dramatic recent example is provided by AIG, which incurred large contingent liabilities by selling credit default swaps on subprime mortgage–backed securities, and then bought up subprime securities for its own investment portfolio. These asset purchases made it likely that AIG would be insolvent if liability on its credit default swaps was ever triggered.

Regardless of whether correlation-seeking is of the forward or reverse type, the result is the same: a value transfer from the debtor's unsecured creditors to its shareholders. The transfer occurs when the contingent debt is incurred, or — in the case of reverse correlation-seeking — when the firm purchases the correlated assets. And it consists of a decrease in the creditors' expected recoveries and a corresponding increase in the value of shareholder equity. Though rational from the perspective of shareholders, correlation-seeking will often be wealth-destroying from a social perspective. This is because the opportunity for shareholders to expropriate wealth from creditors distorts a firm's borrowing and investment decisions, leading to overinvestment, higher borrowing costs, financial distress, and potential systemic risk.

Why have lawmakers overlooked the distinct opportunism hazard raised by contingent debt? The answer, it seems, is they have assumed that creditors are protected by the fact that the debtor typically receives a premium when it voluntarily incurs a contingent debt obligation. This assumption is implicit in fraudulent transfer doctrine, which (except in the case of intentional fraud) empowers a court to deny payment on a contingent debt only if the debtor did not receive a

premium that approximates the debt's expected value to the claimant.[3] Because the premium becomes part of the debtor's pool of assets, it augments creditor recoveries if the debtor falls insolvent. Thus, the theory seems to go, the premium protects the unsecured creditors by offsetting the dilutive effect of the contingent debt on their recoveries.

The problem with this theory is that it ignores the pivotal role of the correlation between the risk that the debt will be triggered and the risk that the debtor will fall insolvent. As shorthand, this will be called the contingent debt's "internal" correlation. To understand the importance of the internal correlation, it is necessary to observe that the premium paid for a contingent debt will be smaller — usually, many times smaller — than the debt's face value. For example, if the debt's face value is $100, and its probability of coming due is 10%, a rational claimant will pay a premium no greater than $10.[4] It follows that such a contract will impose a large expected loss on the debtor's unsecured creditors unless they are far more likely to recover the premium than to bear the impact of the debt. As was noted previously, the creditors will pocket the premium when the debtor falls insolvent, because then the premium will augment their recoveries from the debtor's estate. The question therefore becomes, when the debtor does fall insolvent, what is the likelihood that the contingent debt will also be triggered? The internal correlation answers this question. If, to use the same numerical example, the internal correlation is zero, then by definition the contingent debt will be triggered in only 10% of the instances when the debtor falls insolvent. Therefore, at an internal correlation of zero the unsecured creditors are ten times more likely to recover the premium than to bear the impact of the liability. And this ratio mostly neutralizes, in terms of the creditors' expected recoveries, the fact that the debt's face value is at least ten times larger than the premium. However, as the internal correlation increases, the tables turn against the unsecured creditors. And at a perfect correlation — meaning that the contingent debt is triggered if and only if the debtor falls insolvent — the creditors pocket the premium only when they also bear the full brunt of the liability. In that case, the disparity between the premium and the face value imposes a large expected loss on them.

The relationship between the internal correlation and the fortunes of the unsecured creditors is depicted in the following figure, which conceptualizes a contingent debt contract as having four possible outcomes.

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[3] *See* 11 U.S.C. § 548(a)(1)(B)(i). The application of fraudulent transfer doctrine to contingent debt is discussed in section III.B.

[4] The claimant will actually pay something less than $10 due to the time value of money and her expectation that she will not to be paid in full if her claim is triggered.

FIGURE 1. THE IMPACT OF A CONTINGENT DEBT CONTRACT
ON CREDITORS AND SHAREHOLDERS

DEBTOR	CONTINGENT DEBT	
	Not Triggered	Triggered
Solvent	Unsecured Creditors Indifferent: *full repayment* Shareholders Benefited: *premium augments equity*	Unsecured Creditors Indifferent: *full repayment* Shareholders Harmed: *contingent debt reduces equity*
Insolvent	Unsecured Creditors Benefited: *premium augments recoveries* Shareholders Indifferent: *equity stake wiped out*	Unsecured Creditors Harmed: *contingent debt dilutes recoveries* Shareholders Indifferent: *equity stake wiped out*

Note: Shading indicates outcomes that are more likely with a positive correlation between the contingency risk and the insolvency risk. No shading indicates outcomes that are more likely with a negative correlation.

Figure 1 shows why a positive internal correlation harms the debtor's unsecured creditors. Consider each of the four outcomes from their perspective. They are indifferent to the contingent debt contract in the two outcomes where the debtor remains solvent, because in those outcomes the debtor by definition can pay their claims in full regardless of whether the debt is triggered. The contract benefits them in the outcome (insolvent, not triggered), because the premium increases the pool of available assets, and the creditors do not have to share those assets with the claimant. By definition, this outcome is more likely when the internal correlation is negative. Finally, the net effect of the contract is to harm the unsecured creditors in the outcome (insolvent, triggered). This is because of the face-value/premium disparity described earlier: the fact that, when the contingent debt is triggered, the claimant asserts a claim significantly larger than the amount she previously contributed to the debtor's assets. And this outcome is more likely when the internal correlation is positive.

Matters are almost exactly reversed from the perspective of the debtor's shareholders, as Figure 1 also indicates. Thus, the shareholders are indifferent to the contingent debt contract if a decline in the value of the debtor's assets causes the debtor to fall insolvent, because

then by definition the shareholders' equity stake is wiped out regardless of whether the debt is triggered.[5] If the debtor remains solvent, the shareholders naturally prefer that the debt not be triggered, because then their equity stake is augmented by the premium and not reduced by the amount of the debt. This outcome is more likely when the internal correlation is positive. Finally, the contract harms the shareholders in the outcome (solvent, triggered), again because of the face-value/premium disparity. And this outcome is more likely when the internal correlation is negative. In short, the contingent debt contract tends to enrich the shareholders when the internal correlation is positive and to harm them when negative, the mirror image of its impact on the unsecured creditors. To the extent that the debtor's managers are loyal to the shareholders, we can expect them to select the debtor's contingent debts accordingly.

Besides forcing them to shoulder more risk, a positive internal correlation can harm the unsecured creditors in a second way: it can shrink the premium. By definition, the claimant collects on the contingent debt only in the two outcomes in which the debt is triggered. Between these, she prefers the outcome in which the debtor is solvent and hence can pay her claim in full. This outcome is more likely when the internal correlation is negative. If instead the claim is triggered when the debtor is insolvent, the claimant recovers only a portion of her claim if she is unsecured, and she also recovers only a portion if she is secured but the secured assets have depreciated to less than her claim's face value. And this outcome is more likely when the internal correlation is positive. It follows that an increase in the "perceived" internal correlation — meaning the internal correlation that is evident to the claimant at the time of contracting — reduces the claimant's willingness to pay. And a reduction in the premium harms the unsecured creditors by shrinking the pool of assets available to them in the debtor's bankruptcy proceeding. A positive internal correlation thus can land a one-two punch on the unsecured creditors: it increases the likelihood that, if the debtor falls insolvent, they will have to share the debtor's assets with the claimant; and it can decrease the value of those assets by causing the claimant to pay a smaller premium.

As this last observation suggests, firms often receive the smallest premiums in exchange for precisely those contingent debts that are most likely to be borne by the firms' unsecured creditors rather than shareholders. Does this mean that the incentive for firms to engage in forward correlation-seeking is somehow self-correcting? The answer,

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[5] The implicit assumption here is that the contingent debt is not large enough itself to cause the debtor's insolvency, which therefore must arise from an independent source, such as a business downturn that diminishes the value of the debtor's assets. The alternative possibility — a contingent debt big enough to cause insolvency by itself — is addressed in section I.B.2.

alas, is no. To see why, consider that the premium paid for a contingent debt can be divided into two pieces: one representing the claimant's expected recovery if the debtor stays solvent, and the other representing her expected recovery if the debtor falls insolvent. Only the second piece induces opportunism, because only it pays shareholders for risk borne by others. As the perceived correlation increases, the first piece shrinks, but the second piece grows. To be sure, the *net* effect of a higher correlation is a smaller premium, because the claimant expects to collect more from a solvent debtor than an insolvent one. But the opportunism hazard nonetheless rises with the correlation level because the premium increasingly overcompensates the shareholders relative to the risk they bear.

Why would a firm's unsecured creditors permit its managers to engage in correlation-seeking? While opportunism of this type is not illegal as a matter of positive law, creditors (other than involuntary tort victims) in theory could negotiate loan covenants that prohibit it. As a practical matter, however, this approach will often not be cost-effective. Loan covenants will deter opportunism only if the creditors monitor the debtor for violations, as opportunism will otherwise be evident only after the debtor has fallen insolvent, at which point an enforcement action will be ineffective because the debtor will be judgment-proof. And for many creditors, especially those with relatively small claims, the necessary monitoring costs will exceed the expected losses that the monitoring would prevent.[6] Along these lines, Professors Marcel Kahan and Edward Rock have observed that bond covenants designed to deter debtor opportunism are regularly underenforced because monitoring costs for individual bondholders are high and bondholders face collective action problems.[7] The fact that lawmakers have developed a variety of noncontractual measures to protect creditors — such as fraudulent transfer law, voidable preference rules, and the bankruptcy system itself — attests to contract law's limitations in deterring debtor opportunism. Thus, rather than monitor, many creditors will simply impute opportunism risk into the interest rate they demand up front from all debtors, a response that does not deter opportunism because the debtor pays the same interest rate re-

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[6] *See* Lucian Arye Bebchuk & Jesse M. Fried, *The Uneasy Case for the Priority of Secured Claims in Bankruptcy*, 105 YALE L.J. 857, 864 (1996) (describing why many creditors do not protect themselves from the risk that their debtor will use a secured loan to subordinate their claims); Elizabeth Warren & Jay Lawrence Westbrook, *Contracting Out of Bankruptcy: An Empirical Intervention*, 118 HARV. L. REV. 1197, 1226 (2005) (arguing that many creditors are unlikely to find it cost-effective to enforce protective loan covenants).

[7] *See* Marcel Kahan & Edward Rock, *Hedge Fund Activism in the Enforcement of Bondholder Rights*, 103 NW. U. L. REV. 281, 296–301 (2009). The authors argue that activist hedge funds can overcome the underenforcement problem, *id.* at 301–02, but they note that incentive-based obstacles remain, *id.* at 309.

gardless of how it treats its creditors after it borrows.[8] An across-the-board increase in interest rates will, however, decrease social wealth by acting like a tax on credit, a point that will be revisited in the discussion of the social costs of correlation-seeking in section I.D.

Finally, creditors will not bother to monitor if they believe that the government will bail them out if their debtor fails. Bailouts shift the loss produced by correlation-seeking from the debtor's unsecured creditors to another group of "creditors": taxpayers. And the correlation-seeking hazard will be at its zenith when creditors lack incentive to monitor, an observation of obvious importance as lawmakers continue to craft a response to the 2008 financial crisis.

B. The Scale of the Hazard: Contingent Versus Fixed Debt

The discussion to this point explains why correlation-seeking is an opportunism hazard. But is it a hazard big enough to worry about? Legal rules designed to prevent misuse of debt imply that the answer is no. Those rules ignore correlations, and apply to contingent debts the same principles they use to prevent abuse of fixed debts such as loans and bond obligations.[9]

Is this lack of nuance justified? The answer might be yes if contingent debts produced smaller opportunistic wealth transfers than fixed debts of comparable size, and thus did not merit special attention. On an intuitive level this notion has some appeal: a claim that is 100% likely to come due — which is another way to describe a fixed debt — seems a much bigger dilution threat to the debtor's unsecured creditors than a claim for the same face value that is only (say) 10% likely to come due. Some version of this notion seems to underlie standard accounting rules, which require a firm to accrue a loss if a liability is certain or "probable,"[10] but permit liabilities that are only a "reasonable possibility" to be consigned to footnotes.[11] And "remote" contingencies often need not be disclosed at all.[12]

The law's general failure to distinguish between contingent and fixed debt might also be justified if the same factors determined

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[8] *See* Richard Squire, *The Case for Symmetry in Creditors' Rights*, 118 YALE L.J. 806, 840–41 (2009) (making the same point with respect to the secured loan).

[9] Two sets of such rules are discussed in Part III.

[10] ACCOUNTING FOR CONTINGENCIES, Statement of Fin. Accounting Standards No. 5, para. 8 (Fin. Accounting Standards Bd. 1975).

[11] *Id.* para. 10.

[12] An exception applies to guarantees, which the Financial Accounting Standards Board has decided should be disclosed even if the contingency risk is remote. *Id.* para. 12; *see also* GUARANTOR'S ACCOUNTING AND DISCLOSURE REQUIREMENTS FOR GUARANTEES, IN-CLUDING INDIRECT GUARANTEES OF INDEBTEDNESS OF OTHERS, Interpretation No. 45 (Fin. Accounting Standards Bd. 2002) (elaborating on accrual and disclosure requirements for guarantees).

whether a debt of either type was an opportunism hazard, permitting a one-size-fits-all legal approach. With a fixed debt, we know that the hazard is driven by the face value: the larger this amount, the greater the increase in the debtor's ratio of debt to equity, or leverage. And higher leverage increases the degree to which creditors rather than shareholders suffer losses caused by a drop in the value of the firm's assets.[13] Unless the creditors can force the firm to compensate them for these greater expected losses by charging higher interest rates, they suffer a wealth transfer to the benefit of shareholders.[14] Current legal doctrine might make sense if misuse of contingent debt worked by the same mechanism, with the hazard driven primarily by the contingent debt's face value (or, in the language of derivatives, "notional" amount).

In fact, neither of these potential justifications for current legal doctrine is valid. This section uses a simple model of a contingent debt contract to show why. The model demonstrates that a contingent debt can in fact transfer *more* wealth than a fixed debt for the same face amount, even if the contingent debt is far less likely to be triggered. And the model also shows that the opportunism hazard is determined not only by the contingent debt's face value, but also by its internal correlation. Indeed, even a relatively large contingent debt can be pernicious or benign, depending on whether the internal correlation is positive or negative. For this reason, rules for contingent debt that ignore correlations and consider only face values will often produce results that bear no relationship to the actual opportunism hazard.

The model employed in this section also yields another important result: it shows that the internal correlation does not have to be unusually high for a contingent debt to harm the debtor's unsecured creditors. To the contrary, any nonnegative correlation will typically be sufficient to reduce their expected recoveries. For this reason, the correlation-seeking hazard cannot be disregarded on grounds that some firms might find it difficult to arrange for contingent debts with unusually high internal correlations.

The model will address two general cases. In the first, the contingent debt is not large enough in itself to render the debtor insolvent. Under that assumption, the debtor falls insolvent only if it suffers a business downturn that causes its assets to depreciate below the amount of its fixed liabilities. The second case addresses the alternative possibility, in which the contingent debt is big enough to break the

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[13] *See* Marcel Kahan & Michael Klausner, *Antitakeover Provisions in Bonds: Bondholder Protection or Management Entrenchment?*, 40 UCLA L. REV. 931, 940–41 (1993); Yedidia Z. Stern, *A General Model for Corporate Acquisition Law*, 26 J. CORP. L. 675, 706–08 (2001).

[14] Squire, *supra* note 8, at 819–20.

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debtor even if the debtor's assets do not also decline in value. In other words, in the second case the contingent debt is itself a source of internal correlation. As one might expect, the opportunism hazard is greater in the second case than the first. But in either case the contingent debt has the capacity, even at relatively low correlations, to transfer more wealth than a fixed debt of equal size.

1. Contingent Debt Not Larger than the Debtor's Equity Value. — Suppose that Debtor is a business corporation owned and controlled by Shareholders. Debtor initially has $125 in assets and one liability, a $100 fixed debt to Unsecured Creditor.[15] The model plays out over two periods. In period one, Debtor enters into a contract with Claimant that creates a contingent debt. Under the contract, Claimant pays Debtor a premium in period one, and Debtor agrees to pay Claimant $25 if a specified triggering event occurs in period two. Because Debtor's managers are skilled negotiators, Claimant pays a premium equal to her expected recovery on the contract, which is the largest premium a risk-neutral party in Claimant's position rationally would pay.[16] In period two, Debtor experiences two types of risk. The first is that the triggering event will occur. We will assume that the probability of this event is 10%. The second is that Debtor will suffer a business downturn that causes its assets — including the premium, which has become part of Debtor's property — to lose 40% of their value. We will assume that the probability of a downturn is also 10%.[17] At the end of period two, the debt to Unsecured Creditor comes due and the payouts for the parties are determined.

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[15] These figures make for a leverage ratio of 4:1, a conservative level that permits analysis of a contingent debt that is relatively large but not big enough in itself to cause insolvency. Higher leverage increases the likelihood that the contingent debt will be sufficient to cause insolvency, a possibility addressed in section I.B.2.

[16] In theory, a contingent debt contract might generate efficiencies that benefit the claimant, and the debtor might be able to capture the value of those efficiencies in the premium. The most obvious efficiency — assuming the claimant is risk-averse — would be to smooth out returns on the claimant's investment portfolio. However, the model already imputes such a benefit by assuming that Claimant does not apply a risk-based discount when valuating her uncertain recovery on the contract. A second possibility would be that the contract induces the debtor to try to prevent the triggering event, such as by monitoring the "reference" entity. This potential benefit is perhaps most likely with certain types of guarantee.

[17] In the world of corporate debt this would make Debtor a high credit risk; the discussion later considers the implications if Debtor were safer. Also, setting the downturn risk equal to the contingency risk permits analysis of the full range of positive internal correlations. For example, if Debtor's downturn risk were 10% but the contingency risk were only 5%, then the highest possible internal correlation would be 0.69. *See infra* note 20.

Note that this model has four possible outcomes, corresponding to the four outcomes depicted in Figure 1.[18] Note too that a downturn will render Debtor insolvent but the triggering of the contingent debt by itself will not, because the debt's face value ($25) is not larger than Debtor's starting equity value (also $25).

Based on these assumptions, it is possible to calculate Unsecured Creditor's "baseline loss," by which is meant the difference between the $100 face value of Unsecured Creditor's claim and the amount Unsecured Creditor would expect to recover if there were no contract between Debtor and Claimant.[19] In the analysis that follows, Unsecured Creditor's baseline loss is used to place the impact of opportunism in the context of the other main risk a creditor faces: the risk of a downturn that renders the debtor insolvent.

Figure 2 shows the relationship between the internal correlation on the contingent debt and the impact of the debt contract on Unsecured Creditor.

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[18] This simple model can be formalized with the following terms, which will be used for all formulae in this Article:

A: initial value of Debtor's assets

U: amount Debtor owes Unsecured Creditor

C: face value of debt to Claimant

V: Debtor's total liabilities after contract is signed, or $U + C$

d: discount factor (between 0 and 1) used to determine value of Debtor's assets in downturn

$p(R)$:probability that contingent debt is triggered

$p(D)$:probability that Debtor suffers an asset downturn.

[19] The baseline loss equals the difference between the face amount of Unsecured Creditor's claim and his expected recovery if there is no contract with Claimant, and hence the only risk he faces is the downturn risk. In general terms, it can be expressed as:

$B = U - [p(not\ D)*U + p(D)*dA]$.

Because $p(not\ D)$ equals $1 - p(D)$, this formula simplifies to:

(1) $B = p(D)*[U - dA]$.

Under the numerical assumptions specified above, the baseline loss is $2.50.

FIGURE 2. CONTINGENT VERSUS FIXED DEBT
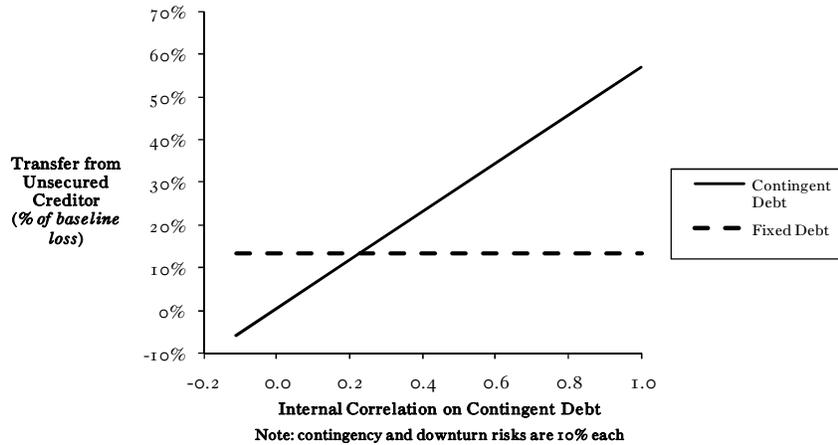WEALTH TRANSFERS: FACE VALUE NOT GREATER
THAN DEBTOR'S EQUITY

Note: contingency and downturn risks are 10% each

Figure 2's *x*-axis represents the internal correlation on the contingent debt, which is determined by the relative probabilities of the model's four outcomes.[20] As the correlation increases, so does the probability of the outcome in which the asset downturn and triggering event both occur, as well as the probability of the outcome in which neither occurs. By necessity, this means that an increase in the correlation corresponds to a decrease in the probabilities of the two outcomes where one of these risks materializes but the other does not.[21] The *y*-axis

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[20] The *x*-axis represents the correlation coefficient for the relationship between the risk of the triggering event and the risk that Debtor will fall insolvent for each possible distribution of probabilities across the model's four outcomes, as represented in Figure 1. Its formula is:

(2) $\rho_{X,Y} = E((X - \mu_X)(Y - \mu_Y))/\sigma_X\sigma_Y$.

E is expected value, μ is mean value, σ is standard deviation, and *X* and *Y* are a pair of dummy variables. *X* is 0 when the triggering event does not occur and 1 when it does. *Y* is 0 when insolvency does not occur and 1 when it does. Due to the assumption that each risk has a 10% probability, μ_X and μ_Y are both 0.1, and σ_X and σ_Y are both 0.3. Note that μ_X by definition equals *p(R)*, and μ_Y equals *p(D)* if we assume (as we do in Figure 2) that Debtor is insolvent only if a downturn occurs. A discrete expected value for the product of the differences between each dummy variable and its mean — that is, a discrete covariance for *X* and *Y* — can be obtained for each possible distribution of probabilities across the model's four outcomes, producing a one-to-one correspondence between each possible probability distribution and each correlation coefficient represented along Figure 2's *x*-axis.

[21] In terms of Figure 1, a higher internal correlation means higher probabilities of the outcomes (insolvent, triggered) and (solvent, not triggered), and lower probabilities of the outcomes (insolvent, not triggered) and (solvent, triggered).

represents the value transfer away from Unsecured Creditor.[22]   The transfer is defined as the decrease in Unsecured Creditor's expected recovery caused by the contract between Debtor and Claimant, and is expressed in the figure as a percentage of Unsecured Creditor's baseline loss.   The diagonal line shows the transfer produced by the contingent debt contract at each possible internal correlation level.[23]

As predicted, the internal correlation drives the contingent debt contract's expected impact.   When the internal correlation is -0.1 (its lowest possible value given the assumptions used for Figure 2[24]), the contract confers a windfall on Unsecured Creditor, reducing his expected losses by 6%.[25]   When the contingency and insolvency risks are uncorrelated, the contract has essentially no expected impact on Unsecured Creditor, increasing his expected losses by a trivial 0.3%.   Finally, when the internal correlation is perfect (1.0), the contract imposes a large burden on Unsecured Creditor, taking enough value from him to increase his expected losses by 57%.[26]   This range of results shows that a contingent debt's face value is not the only factor that drives the opportunism hazard.   Rather, it is the internal correlation that determines whether the debt contract tends to enrich a debtor's unsecured credi-

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[22]   The transfer is computed in two steps.   First, the premium is calculated, which by assumption equals Claimant's expected recovery on her contract with Debtor.   Assuming that $A \geq V$ and that Claimant is unsecured, the formula for the premium is:

$P = p(not\ D|R)*C + p(D|R)*[C/V]*d[A + P]$.

Solved for P, this equation becomes:

(3) $P = [p(not\ D|R)*CV + p(D|R)*dA*C] / [V - p(D|R)*dC]$.

The wealth transfer away from Unsecured Creditor is defined as Unsecured Creditor's expected recovery without the contract between Debtor and Claimant minus his expected recovery when the contract is in place.   It can be expressed as:

$T = p(D)*dA - p(D|not\ R)*d[A + P] - p(D|R)*d[A + P]*[U/V]$.

Because Unsecured Creditor's recovery is not affected by the contract when Debtor does not fall insolvent, those outcomes are excluded from the equation.   Because $p(D)$ equals $p(D|not\ R)$ plus $p(D|R)$, the equation simplifies to:

(4) $T = p(D|R)*d[A - (A + P)*(U/V)] - p(D|not\ R)*dP$.

[23]   The figure's diagonal line is created by plugging the outcome probabilities corresponding to each correlation level into equations (3) and (4) in note 22, *supra*, and then dividing T by B as calculated by equation (1) in note 19, *supra*.   As described in note 20, *supra*, each value for the correlation coefficient in Figure 2 corresponds to a discrete distribution of probabilities across the model's four possible outcomes.

[24]   A correlation coefficient of 1.0 means that only the outcomes (solvent, not triggered) and (insolvent, triggered) can occur, with the probability of outcome (solvent, not triggered) being 90% and of outcome (insolvent, triggered) being 10%.   The opposite extreme, meaning a correlation coefficient of -1.0, would require that only the outcomes (solvent, triggered) and (insolvent, not triggered) could occur, which is impossible given the assumptions that the triggering event and the asset downturn are each only 10% likely.   Rather, the lowest possible correlation occurs when the outcome (solvent, triggered) is 10% probable, the outcome (insolvent, not triggered) is 10% probable, and the outcome (solvent, not triggered) is 80% probable, which yields a correlation coefficient of -0.1.

[25]   The nominal value of the transfer at this correlation level is $0.15.

[26]   In nominal terms, T is $1.43 when the internal correlation is perfect.

tors, harm them, or — when the internal correlation is close to zero — have little effect in either direction.[27]

There is a flip side to the contract's impact on Unsecured Creditor as shown in Figure 2, and that is its impact on Debtor's Shareholders. Indeed, Shareholders' expected gains are almost exactly equal to Unsecured Creditor's expected losses at each positive correlation level. This parity of outcomes is a result of the assumption that Claimant pays a premium equal to her expected recovery on the contract, which includes the full amount she expects to recover at Unsecured Creditor's expense.[28] For this reason, Figure 2's diagonal line can be interpreted to represent the amount of value that the contingent debt contract transfers from Unsecured Creditor to Shareholders at each correlation level. If we were to assume instead that Claimant paid a premium smaller than the contract's full expected value to her, Shareholders would not capture the entire transfer away from Unsecured Creditor, but rather they and Claimant would split it between them.

Figure 2 also has a dashed horizontal line, which shows the expected loss to Unsecured Creditor under the alternative assumption that Debtor's $25 obligation to Claimant is fixed rather than contingent — meaning that the "risk" of its being triggered is 100%. Strictly speaking, the internal correlation on a claim that is 100% likely to come due is indeterminate; the figure nonetheless depicts the result as a horizontal line to permit comparison with the impact of an equally sized contingent claim at each correlation level. As the figure indicates, a $25 fixed debt contract increases Unsecured Creditor's ex-

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[27] The fact that an uncorrelated contingent debt produces only a trivial wealth transfer is robust to a broad range of numerical assumptions consistent with the model's four-outcome structure. By the four-outcome structure, what is meant are the parameters that Debtor starts out solvent, an asset downturn renders Debtor insolvent, Claimant pays a premium equal to her expected recovery on the contract, and — in this first case — the face value of the contingent debt is not greater than Debtor's starting equity value. Thus, if we hold constant the assumption that the amount owed Claimant is $25 and that the downturn and contingency risks are 10% each, but toggle all other variables, no combination of alternative assumptions that is consistent with these parameters causes an uncorrelated contingent debt to transfer more than $0.06.

[28] Given the assumptions used in Figure 2, the formula for the increase in Debtor's expected equity value attributable to the contract is:

$$G = p(not\ D|not\ R)*(A + P - U) + p(not\ D|R)*(A + P - V) - p(not\ D)*(A - U);$$

with P calculated using equation (3) in note 22, *supra*. Because by definition $p(not\ D)$ equals $p(not\ D|not\ R)$ plus $p(not\ D|R)$, the formula simplifies to:

$$(5) \quad G = p(not\ D|not\ R)*P + p(not\ D|R)*(P - C).$$

For example, at a correlation of 1.0, G equals $1.37, as contrasted with a T (per equation (4) in note 22, *supra*) of $1.43. The $0.06 difference between the gain to Shareholders and the loss to Unsecured Creditor is attributable to the decline in value of the premium assets held by Debtor when Debtor suffers a downturn.

pected losses by 13%.[29] This is the well-known effect of higher leverage, which increases the degree to which creditors rather than shareholders bear losses caused by a decline in the debtor's asset value.[30]

Comparing the two lines in Figure 2 reveals that the contingent debt contract has the capacity to transfer several times more value away from Unsecured Creditor than the fixed debt contract, even though the contingent debt is ten times less likely to come due. Indeed, when the internal correlation is perfect, the transfer caused by the contingent debt contract is more than four times as large. To be sure, this particular ratio depends on the numerical assumptions used in the model.[31] Nonetheless, across the full range of assumptions that are consistent with the model's general, four-outcome structure,[32] a perfectly correlated contingent debt always harms Unsecured Creditor more than a fixed debt with the same face value. And in almost all situations it harms him by at least twice as much.[33]

The fact that a contingent debt can transfer significantly more wealth than a fixed debt of equal size is counterintuitive, which may help explain why lawmakers and scholars have paid little attention to the distinct opportunism hazard that contingent debt presents. It seems a matter of common sense that a $25 claim that will come due with 100% certainty is a much bigger dilution threat to the debtor's unsecured creditors than a $25 claim that will come due only 10% of the time. And yet, as Figure 2 shows, the contingent debt will transfer

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[29] This result is calculated by using equations (3) and (4) in note 22, *supra*, and assuming that *p(not D|R)* is 90% and *p(D|R)* is 10%, making the probability of the triggering event 100%. The nominal amount of the transfer is $0.33.

[30] *See* sources cited *supra* notes 13–14.

[31] For example, the ratio between the wealth transfer amounts would fall from 4.3 to 3.7 if we assumed that Debtor's assets lost 90% of their value in a downturn rather than 40%. This is because a deeper devaluation destroys more Debtor wealth when the premium is larger, and a fixed claim fetches a larger premium than a contingent claim. Thus, increasing the devaluation percentage raises the relative dilutive effect of the fixed debt. The ratio would further drop to 2.5 if we also assumed that Debtor's assets started out worth $150 rather than $125. This occurs because a fixed debt harms unsecured creditors primarily by increasing the debtor's debt-to-equity ratio, and the impact would be relatively larger when the initial ratio is smaller. This ratio, however, is completely insensitive to the debt's face value. If we were to use the other assumptions in Figure 2 but cut the face values of Claimant's fixed and contingent claims to $10 each, or double them both to $50, the ratio would remain 4.3.

[32] For an explanation of the model's general, four-outcome structure, see *supra* note 27.

[33] The only way to get the wealth transfer ratio below 2.0 given the model's general structure is to assume a much smaller initial value for the amount owed Unsecured Creditor, and thus an unusually low leverage ratio. And this assumption, in turn, requires a further assumption that Debtor's assets suffer a deeper devaluation in a downturn, for otherwise Debtor is not insolvent when a downturn occurs. For example, if we assume that Unsecured Creditor is owed $50 rather than $100, and a downturn causes Debtor's assets to depreciate 70% rather than 40%, the wealth transfer produced by a $25 contingent debt with a perfect internal correlation is only 1.6 times greater than the transfer produced by a $25 fixed debt.

more value — typically, several times more — as long as its internal correlation is high enough.

The reason for this counterintuitive result is the face-value/premium disparity described earlier. A rational party will be willing to pay a relatively large up-front amount for a claim that is 100% likely to come due. For example, Claimant pays $24.29 for the $25 fixed claim in Figure 2. This infusion of new assets into Debtor largely (though, as the figure shows, not fully) neutralizes the fixed liability's dilutive impact on Unsecured Creditor. But no rational party would similarly pay almost $25 for a $25 claim that only has a 10% chance of becoming collectible. Rather, the premium Claimant pays for the $25 contingent debt in Figure 2 ranges from $1.52 to $2.50, with the premium shrinking as the correlation increases. When the contingency and insolvency risks are uncorrelated, Unsecured Creditor is ten times more likely to pocket this premium than to bear the burden of the contingent liability, a ratio that mostly offsets, in terms of his expected recovery, the fact that the face value is at least ten times larger than the premium. But when the correlation is perfect, he benefits from the premium only when he also bears the full brunt of the liability, and therefore the disparity between the premium and the face value imposes a large expected loss on him.

As this discussion implies, a contingent debt contract's relative capacity to harm unsecured creditors *increases* as the triggering event becomes *less* likely, as long as the internal correlation remains high. The reason is that a decrease in the probability of the triggering event widens the disparity between the face value and the premium. For example, if we were to assume in Figure 2 that the probabilities of the asset downturn and the triggering event were each 1% rather than 10%, and hence that Debtor were a better credit risk, the absolute amounts of the wealth transfers would fall. But the ratio between the loss caused by the perfectly correlated contingent debt and the loss caused by the fixed debt would increase.[34] Conversely, the ratio would shrink if the probabilities were 25% each,[35] the predictable consequence of the fact that a contingent debt looks more like a fixed debt as the contingency becomes more likely.

Another important implication of Figure 2 is that the internal correlation does not have to be unusually high for a contingent debt contract to produce a larger value transfer than a fixed debt contract with the same face value. The contingent debt in Figure 2 surpasses the fixed debt as an opportunism hazard at a correlation level slightly

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[34] In particular, it would increase from 4.3 to 4.9.

[35] It would fall to 3.4.

above 0.2.[36] By way of comparison, the average correlation between returns on random pairings of publicly traded stocks is approximately 0.3.[37] The implication is that whenever a debtor incurs a contingent debt that is tied to the performance risk of another firm — such as by writing a put option on that firm's stock — the debt contract already captures as much value from the debtor's unsecured creditors as would a fixed debt contract of comparable size.[38] If the debtor and "reference" firm are in the same industry, the internal correlation will be even larger,[39] and so will the transfer. And the correlation and transfer amounts will be greater still if the two entities are part of the same firm, such as when one member of a corporate group guarantees the debt of another.

   2. *Contingent Debt Big Enough To Cause Bankruptcy.* — What happens if the contingent debt is itself a source of internal correlation, because it is large enough to bankrupt the debtor without an asset downturn?[40]

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   [36] This result is robust to a wide range of available numerical assumptions. For example, the point at which the contingent debt line crosses the fixed debt line in Figure 2 remains between 0.2 and 0.4 if we assume that Debtor's assets depreciate 90% rather than 40% in a downturn, that the initial value of those assets is $150 rather than $125, or that Unsecured Creditor is owed $80 rather than $100. An important exception occurs with a change in the face value. As is seen in Figure 3, doubling the face value causes the contingent debt to transfer more wealth than the fixed debt at all available correlation levels.

   [37] Louis K.C. Chan et al., *On Portfolio Optimization: Forecasting Covariances and Choosing the Risk Model*, 12 REV. FIN. STUD. 937, 942 (1999). The result was obtained by randomly selecting 500 stocks from the New York and American stock exchanges for each year from 1968 through 1998, and calculating an average pairwise correlation for all sets. *See id.*

   [38] To be sure, the correlation between two companies' stock returns is not the same as the correlation between one's stock performance and the other's insolvency risk, even though the two measures of correlated risk are likely to be similar. The cited figure nonetheless suggests that the internal correlations on most contingent debts found in the economy probably are significantly greater than zero.

   [39] *See* Chan et al., *supra* note 37, at 943–44.

   [40] Many contingent debt contracts do not specify a face value, but rather expose the debtor to a range of possible liability amounts based on the performance of the underlying "reference" asset. For example, the liability generated by a put option depends on how far the price of the reference stock drops below the strike price. If the liability range on a contingent claim straddles the value of the debtor's equity, then the probability-weighted mean value of the liability determines whether a graph of the wealth transfer relative to the correlation level looks like Figure 2 or Figure 3.

FIGURE 3. CONTINGENT VERSUS FIXED DEBT WEALTH
TRANSFERS: FACE VALUE GREATER THAN DEBTOR'S EQUITY

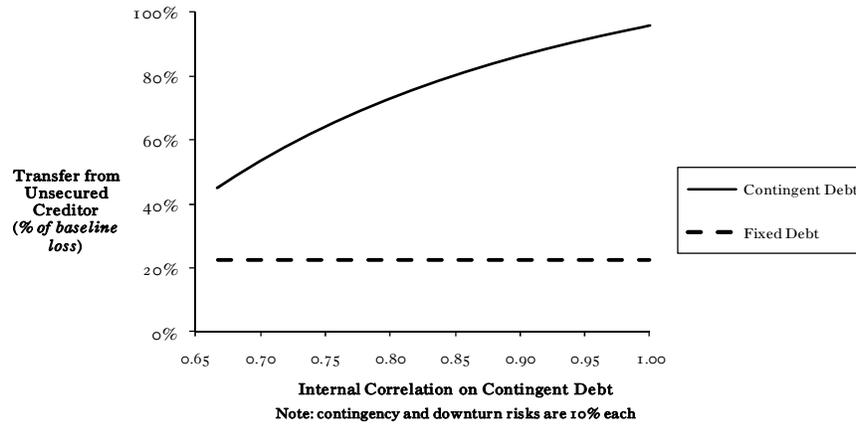Note: contingency and downturn risks are 10% each

Figure 3 reflects the same assumptions that were used for Figure 2, except that the face value of Debtor's liability to Claimant (whether contingent or fixed) is now assumed to be $50 rather than $25, and thus greater than Debtor's starting equity value.[41] One consequence of this change is that the lower end of the internal correlation range along the *x*-axis is now truncated, reflecting the fact that Debtor is always insolvent when the contingent debt is triggered, making it impossible for the internal correlation to drop below a certain level. However, the independent risk of an asset downturn means that Debtor can fall insolvent even if the debt is not triggered, which is why the internal correlation can still be less than 1.0.[42]

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[41] The formula for the premium that Claimant pays when $V > A$ is:

$P' = p(not\ D|R)*[C/V]*[A + P] + p(D|R)*[C/V]*d[A + P]$;

which solved for P' gives:

(6) $P' = AC*[p(not\ D|T) + p(D|T)*d] / [V - p(not\ D|T)*C - p(D|T)*dC]$.

The formula for the wealth transfer when $V > A$, defined again as the difference between Unsecured Creditor's expected recovery without a contract with Claimant and his recovery when there is one, is:

$T' = p(D)*dA + p(not\ D)*U - p(D|not\ R)*d[A + P'] - p(D|R)*d[A+P']*[U/V] - p(not\ D|not\ R)*U - p(not\ D|R)*[A + P']*[U/V]$;

which can be simplified as:

(7) $T' = p(D|R)*d[A - (A + P')*(U/V)] + p(not\ D|R)*[U - (A + P')*(U/V)] - p(D|not\ R)*dP$.

The value on the *y*-axis line in Figure 3 is calculated by dividing T' by B as computed in equation (1) in note 19, *supra*.

[42] The correlation coefficient in Figure 3 is calculated using equation (2) in note 20, *supra*, except that Y (the variable corresponding to the insolvency risk) is now set at 1 (representing insol-

The most notable aspect of Figure 3 is that the contingent debt line is everywhere higher than the fixed debt line. This result is unsurprising in the sense that the contingent debt is now a source of internal correlation. But it further lays to rest any notion that contingent debt presents the smaller opportunism hazard. When a contingent debt's face value is greater than the debtor's equity value, the internal correlation is always high, and therefore the contingent debt always captures more expected value from the debtor's unsecured creditors than would a fixed debt of comparable size. But *changes* in the correlation level still matter: as the internal correlation increases from its minimum to its maximum possible level in Figure 3, the wealth transfer away from Unsecured Creditor more than doubles.[43]

In evaluating the opportunism hazard suggested by Figure 3, it should be recognized that the wealth transfers depicted there would result not only from a single contingent debt with a large face value, but also from a combination of smaller debts that are themselves positively correlated. For example, a firm might sell numerous put options or credit default swaps on the same underlying risk. If the liabilities from the individual contracts are themselves small, and their triggers do not correlate with changes in the debtor's asset values, they might initially pose no opportunism hazard. But if the firm continues to enter into such contracts, a tipping point is reached at which the cumulative effect of the liabilities (which are themselves positively correlated) is sufficient to bankrupt the firm. And at that point a moral hazard arises, because the firm can enrich its shareholders by selling additional positively correlated claims whose downside risk is borne entirely by the firm's unsecured creditors. The fact that correlated contingent debts can have this cumulative impact is a further indictment of legal rules that ignore correlations when determining whether a particular debt is an opportunism threat.

A final point worth emphasizing about both Figures 2 and 3 is that they reflect an assumption that Claimant is unsecured. This assumption is realistic for many traditional types of contingent debt contracts, such as loan guarantees. But it is possible to secure a contingent claim, and special provisions of the Bankruptcy Code automatically give many derivative counterparties the functional equivalent of a secured claim.[44] And when a contingent claim is secured the opportunism risk is even greater. Securing a claim increases the claimant's relative recovery in a bankruptcy proceeding, producing a larger transfer

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vency) rather than 0 (representing solvency, as in Figure 2) in the outcome where a downturn does not occur but the contingent debt is triggered.

[43] This ratio falls if we further increase the contingent debt's face value.

[44] *See infra* pp. 1187–88.

away from the debtor's unsecured creditors.[45] For example, if we secure the contingent claim in Figure 2 — meaning we assume that Claimant enjoys a prior claim on Debtor's assets rather than a pro rata claim — the wealth transfer when the internal correlation is perfect increases by 64%.[46] To be sure, securing the *fixed* claim in that figure also causes it to produce a larger transfer, but the amount of the increase is 27% smaller.[47] Scholars have known for some time that a secured claim poses a wealth transfer hazard to a debtor's unsecured creditors.[48] But they have not recognized that the relative hazard is even greater when the secured claim is contingent rather than fixed.

C. *Shareholder Opportunism and the Risk-Return Tradeoff*

The previous section shows that correlation-seeking makes shareholders richer. Surprisingly, it usually also makes them *safer*. In this way, correlation-seeking stands in stark contrast to other forms of shareholder opportunism that scholars have studied. For example, higher leverage can enrich shareholders by increasing the degree to which creditors bear losses caused by declining asset values. (This is different from correlation-seeking's wealth-transfer mechanism, which instead increases the probability that creditors will bear losses caused by the triggering of contingent debts.) But while higher leverage increases expected shareholder returns, it also raises the volatility of those returns,[49] an unpleasant side effect for risk-averse shareholders. Some of this increase in volatility can be neutralized if the shareholders hold a diversified investment portfolio. But diversification may be infeasible for shareholders who wish to hold a controlling share

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[45] To be sure, this larger expected recovery translates into a larger premium. But as was true for an unsecured claim, at positive correlation levels the larger premium is insufficient to counteract the claim's dilutive effect on the unsecured creditors.

[46] For a secured claim with full priority over all of Debtor's assets, assuming $C \leq dA$, the formula for the premium is:

(8) $P'' = p(R)*C$.

Assuming that $A > V$, the formula for the transfer is:

(9) $T'' = -p(D|R)*[dP'' - C] - p(D|not\ R)*dP''$.

Plugging the other assumptions used in Figure 2 into these formulae gives a transfer for a perfectly correlated contingent claim of $2.35, as contrasted with a transfer of $1.43 when the claim was unsecured.

[47] Based on equations (8) and (9) in note 46, *supra*, the nominal transfer produced by the secured fixed debt is $1.00, as compared with a transfer of $0.33 when the debt was unsecured. This change represents a marginal increase of $0.67, as compared with the marginal increase of $0.92 for the perfectly correlated contingent debt.

[48] For a review of this literature, see Squire, *supra* note 8, at 863–65.

[49] *See* WILLIAM A. KLEIN & JOHN C. COFFEE, JR., BUSINESS ORGANIZATION AND FINANCE 345–46 (10th ed. 2007) (noting that higher leverage increases the volatility of equity returns); Yakov Amihud, Kenneth Garbade & Marcel Kahan, *A New Governance Structure for Corporate Bonds*, 51 STAN. L. REV. 447, 464 (1999) (noting that an increase in equity return volatility tends to enrich shareholders at the expense of creditors).

block, and it is an option denied to managers paid in shares that the managers are not permitted to touch for several years. Therefore, higher leverage imposes a tradeoff between risk and return that in many firms will tend to make it self-limiting.

A similar dynamic is seen with asset substitution, a stratagem in which a firm borrows against low-risk (that is, low-variance) assets but then exchanges them for high-risk (high-variance) assets before the debt comes due.[50] Asset substitution is not the same thing as reverse correlation-seeking, which occurs when a firm acquires assets not because their value is highly variable, but because their variability, whether high or low, is expected to coincide with changes in the firm's liability levels. The thing that asset substitution and reverse correlation-seeking have in common is that both increase the volatility of a firm's net worth — meaning the simple arithmetic difference between the firm's assets and liabilities.

What matters to shareholders, however, is not their firm's net worth, but rather the value of their equity claims, which unlike net worth is prevented from dropping below zero by the rule of limited shareholder liability. And in terms of equity volatility, asset substitution and correlation-seeking usually are opposites. Thus, asset substitution is like leverage in that it boosts the volatility of equity returns.[51] For this reason, it often will be a hazard only when a firm has fallen insolvent, at which point shareholders no longer have any value at risk.

Correlation-seeking, by contrast, can escape the tradeoff between risk and return. To be sure, whenever a firm takes on a new debt — whether fixed or contingent — the resulting increase in leverage tends to boost equity volatility.[52] But with a contingent debt, the amount by which equity volatility increases depends on the internal correlation. And in most cases, the increase in volatility gets smaller as the internal correlation gets higher, and disappears altogether when the correlation

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[50] *See* Alan Schwartz, *Security Interests and Bankruptcy Priorities: A Review of Current Theories*, 10 J. LEGAL STUD. 1, 11 (1981).

[51] Asset substitution is conceptualized here as a situation in which an indebted firm faces two possible future states, one in which it does not suffer an asset downturn, and the other in which it does. The firm owns one asset, *A*, and exchanges it for asset *B*, where *B* relative to *A* has both a higher variance of future values and a lower expected value. It can be shown that the exchange of *A* for *B*, if it increases the firm's expected equity value, also increases the variance of that value. *See* Jeffrey N. Gordon, *Deutsche Telekom, German Corporate Governance, and the Transition Costs of Capitalism*, 1998 COLUM. BUS. L. REV. 185, 195–96 (noting that asset substitution increases the volatility of equity returns).

[52] New fixed debt (unless matched by a proportionate infusion of new equity capital) always boosts equity volatility. New contingent debt typically does so as well, but an exception can occur when the contingency and insolvency risks are both high and the internal correlation is deeply negative. *See infra* note 60.

is perfect.[53]   Correlation-seeking therefore can confer a double benefit on shareholders: higher returns plus lower risk.   This means that, when a firm is choosing among contingent debts of equal size, the one that delivers the biggest increase in equity value usually will also impose the smallest boost in equity volatility.   And when a firm instead engages in reverse correlation-seeking, the assets that deliver the largest wealth transfer will also provide the greatest reduction in volatility.[54]   Correlation-seeking therefore is more pernicious than both leverage and asset substitution, because only correlation-seeking typically holds no downside for risk-averse shareholders.

Why does correlation-seeking defy the standard relationship between risk and return?   The short answer is that a contingent debt can affect equity volatility only to the extent of the probability that it will be triggered when the debtor is otherwise solvent.   If the debt comes due when the debtor is insolvent, equity value cannot decrease any further because it is already zero.   Thus, correlation-seeking typically reduces the volatility of a firm's equity value because it decreases the chances that the firm's contingent debt will be triggered when the equity *has* any value.

As an illustration, consider the contingent debt from Figure 2, with a face value equal to Debtor's starting equity value.   As its internal correlation rises from its lowest to its highest level, the expected value of Shareholders' equity increases 7%.[55]   This is the effect of correlation-seeking already discussed: as the internal correlation grows, so does the wealth transfer.   However, over the same correlation range the volatility of Shareholders' equity *decreases* by 24%, as measured by the equity value's standard deviation.[56]   In other words, risk falls

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[53] The net effect of the *contract* that creates the perfectly correlated contingent debt will be a slight increase in equity volatility, because the premium will augment the debtor's equity value and thus give shareholders more to lose in a downturn. But this volatility increase is not caused by the triggering of the debt itself, the effects of which are borne entirely by the debtor's unsecured creditors.

[54] This is an "all other things being equal" statement, meaning that it holds constant the probability that the assets will depreciate and permits variation only in the correlation between this probability and the contingency risk.

[55] The expected (or "mean") value of Shareholders' equity stake in Debtor is the sum of the probability-weighted equity values in each of the model's four outcomes. For the assumptions used for Figure 2, the equity value in the two outcomes in which Debtor suffers a downturn is always zero. The formula for the expected equity value, taking into account the remaining two outcomes, is:

(10) $S = p(not\ D|not\ R)*(A + P - C) + p(not\ D|R)*(A + P - V)$;

with P calculated using equation (3) in note 22, *supra*. When the correlation is at its lowest possible level (-0.1), S is \$22.25. At the highest possible correlation (1.0), S is \$23.87.

[56] Equity volatility is conventionally defined as the standard deviation of returns on equity. Because Debtor's initial equity value is the same (\$25) regardless of the internal correlation on the contingent debt, a reduction in the standard deviation of the final equity value necessarily translates into a lower standard deviation of equity returns. The standard deviation is calculated using

even as returns rise. The reason for this result in this particular example is that there is a wide divergence between the mean value of Debtor's equity and its value in the specific outcome (solvent, triggered). And this outcome by definition becomes less likely as the internal correlation increases. It follows that, as the internal correlation increases, equity volatility falls. To be sure, the increase in the internal correlation boosts the volatility of Debtor's *net worth*, but these wider value swings are suffered by Unsecured Creditor, not Shareholders.

The same dynamic is seen with the contingent debt from Figure 3, with a face value greater than Debtor's initial equity value. As that debt's internal correlation rises from its lowest to its highest level, the expected value of equity increases 6%, but the standard deviation drops 30%.[57] Thus, once again, higher returns bring lower risk. And lower volatility accompanies higher returns even if we consider a third case that is not addressed in the previous section — one in which the debtor falls insolvent only if its assets depreciate *and* its contingent debt comes due. This would be true if, for example, we returned to the arrangement from Figure 2 but assumed that Debtor's assets lost 15% of their value in a downturn rather than 40%. This case is interesting because, unlike in the previous two, an increase in the internal correlation makes it more likely that Debtor will fall insolvent.[58] Yet correlation-seeking still delivers its double benefit: the expected equity value rises with the correlation level (by 6%) while the standard deviation falls (by 9%).[59]

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the expected value of equity as provided by equation (10) in note 55, *supra*, and the equity value in each of the model's four possible outcomes. The equity value is $A + P - U$ in outcome (solvent, not triggered), $A + P - V$ in outcome (solvent, triggered), and zero in the two insolvency outcomes.

[57] The expected value of Shareholders' equity stake given the assumptions used for Figure 3 is:

(11) $S' = p(not\ D|not\ R)*(A + P' - C)$;

with P' given by equation (6) in note 41, *supra*. The standard deviation is calculated using S' and the equity value in each of the model's four possible outcomes. The equity value is $A + P - U$ in outcome (solvent, not triggered), and zero in the other three outcomes.

[58] When the downturn risk and contingency risk have their lowest possible negative correlation in this example, Debtor's risk of insolvency is 0%; when they are perfectly correlated, it is 10%. By contrast, Debtor's risk of insolvency is a constant 10% across all correlation levels in Figure 2, because in that figure Debtor is insolvent if and only if a downturn occurs. In Figure 3, Debtor's insolvency risk actually decreases from 20% to 10% as the internal correlation rises from its lowest to its highest possible level.

[59] The formula for the premium in this example is P as given by equation (3) in note 22, *supra*. The only structural difference between this case and the one from Figure 2 is that Debtor is now solvent when a downturn occurs but the triggering event does not occur, and this change does not affect the premium because the contingent debt has no value to Claimant unless it becomes payable. The formula for the expected value of Shareholders' equity stake in this example is:

(12) $S'' = p(not\ D|not\ R)*(A + P - C) + p(not\ D|R)*(A + P - V) + p(D|not\ R)*(d(A + P)) - U$.

The standard deviation is calculated using S'' and the equity value in each of the example's four possible outcomes. The equity value is $A + P - U$ in the outcome (no downturn, not triggered),

It should be recognized that correlation-seeking's promise of lower risk is not ironclad. Exceptions can occur if the contingent debt is especially small, or especially likely to be triggered. But these exceptions are relatively unimportant because they involve cases in which correlation-seeking is already less attractive as an opportunism device. For example, if we take the contingent debt from Figure 2 but assume that its face value is $4 rather than $25, an increase in the correlation no longer suppresses equity volatility, because the debt itself is too small to drive the direction of equity swings. But reducing the face value by this much also causes a sharp decrease in the size of the wealth transfer, meaning that such a debt is less of an opportunism hazard in any event. Alternatively, equity volatility rises rather than falls as the correlation increases if we take the arrangement from Figure 2 but assume that the contingency and insolvency risks are each 50% rather than 10%.[60] Volatility rises with the correlation level in this example because, when the triggering event is that likely, Debtor's equity value is closer to its mean value when the contingent debt is triggered than when it is not. However, as was noted in the previous section, the wealth transfer caused by a contingent debt contract *relative* to the transfer caused by a fixed debt contract decreases as the triggering event becomes more likely. Therefore, neither this nor the previous example contradicts a general conclusion that there is an inverse relationship between risk and reward in those situations where correlation-seeking captures the most wealth for shareholders relative to other opportunism options.

The fact that correlation-seeking can make shareholders both richer and safer has important policy implications. For example, correlation-seeking may be especially likely in firms whose shareholders are not diversified, the opposite of the case with higher leverage and asset substitution. In addition, fraudulent transfer law generally assumes that a debtor is unlikely to engage in opportunism toward creditors unless the debtor is already insolvent. While this assumption makes sense for opportunism devices that increase equity volatility, it is inapt for correlation-seeking, which will be attractive even in firms that are fully solvent. Lawmakers should adjust fraudulent transfer rules for contingent debt accordingly, as will be discussed in section III.B.

$A + P - V$ in the outcome (no downturn, triggered), $d(A + P) - U$ in the outcome (downturn, not triggered), and zero in the outcome (downturn, triggered).

[60] This example is exceptional for a second reason: a contract for a contingent debt with such a high probability can cause the absolute level of the debtor's equity volatility to be lower than it would be without the contract. This effect occurs because such a contingent debt can have a negative correlation that approaches -1.0, in which case the contract can neutralize much of the equity volatility that would otherwise result from fluctuations in the debtor's asset values. Such a contract is unlikely to be found in the real world, however, because a negative internal correlation on a contract with such a large face value transfers wealth away from shareholders.

D. The Social Costs of Correlation-Seeking

The discussion so far has depicted correlation-seeking as a zero-sum game between shareholders and creditors. But correlation-seeking's impact on the *distribution* of wealth is not its only, or even most important, social consequence. Correlation-seeking matters mainly because it is wasteful: firms that seek to transfer wealth end up destroying wealth.

Like any other legal arrangement, a contract that creates a contingent debt generates both costs and benefits. Ideally, the parties to the contract fully internalize the contract's economic consequences and therefore enter into it only when doing so is expected to create social wealth. But a value transfer at the expense of unsecured creditors acts like a thumb on the scale, increasing the benefits to the parties for a reason that has nothing to do with actual value creation. For this reason, contingent debt contracts that expropriate value from creditors will be overused, producing a net loss of social wealth.

Perhaps the most important social cost of contingent debt overuse is overinvestment. Many contingent debt contracts — including credit default swaps, put options, and guarantees — serve as insurance policies on loans and other investments. In an efficient market, an individual makes an investment only if the expected social returns exceed those from investing the same capital elsewhere. An insurance policy that insulates the investor from downside risk does not change this calculus as long as the risk is borne by the insurer, because then the insurer demands a premium at least as large as the expected loss the policy protects against. But if the expected loss is borne instead by the insurer's unsecured creditors, the insurer will be willing to sell the policy at a discount, effectively splitting the opportunistic value transfer with the investor.[61] The result is a misallocation of capital, because investors purchase those assets for which underpriced insurance is available rather than the assets that generate the highest returns when the impact on all parties is taken into account.[62] Pointedly, the recent overinvestment in housing almost certainly was exacerbated by the availability of insurance on subprime mortgage–backed securities (in the form of credit default swaps) from AIG, and on prime mortgage–

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[61] This observation implies that the calculations in section I.B understate value transfers by assuming a premium equal to Claimant's expected recovery on her claim rather than the expected burden of the claim on Shareholders, which is lower whenever the internal correlation is positive, and indeed is zero when the correlation is perfect. The extreme case — in which Claimant pays no premium at all — is addressed in Figure 4 in section III.B.

[62] Overinvestment is also a social cost of other types of shareholder opportunism, including asset substitution and misuse of the secured loan. *See* Bebchuk & Fried, *supra* note 6, at 899 (secured borrowing); Clifford W. Smith, Jr. & Jerold B. Warner, *On Financial Contracting: An Analysis of Bond Covenants*, 7 J. FIN. ECON. 117, 118–19 (1979) (asset substitution).

backed securities (in the form of guarantees) from Fannie Mae and Freddie Mac. Each of these firms was itself heavily invested in the same types of assets on which it was selling insurance, and therefore was highly unlikely to be solvent if those insurance claims ever came due.

A second social cost of contingent debt overuse is an increase in the risk that debtors will become financially distressed. Distress becomes more likely because the contingent liabilities may themselves be large enough to render the debtor insolvent,[63] and because an inverse relationship between asset and liability levels makes it more likely that an otherwise shallow asset downturn will be sufficient to drive the debtor into bankruptcy.[64] Financial distress is wealth-destroying because it disrupts productive activity, causing managers to scramble for immediate sources of cash rather than focus on long-term value creation.[65] Similarly, when a debtor stumbles, its creditors try to liquidate their positions ahead of a bankruptcy filing, disrupting the normal operations of debtor and creditor alike.[66] Finally, firms *in extremis* are more likely to engage in wealth-destroying asset substitution, which unlike correlation-seeking increases the volatility of equity returns, and thus is a hazard primarily when shareholders have little left to lose.[67]

If the firms that engage in correlation-seeking are financial intermediaries, then their greater chance of distress may present a systemic risk to the broader economy. The notion that the collapse of a bank or other financial institution can impose system-wide costs is a central premise of the Obama Administration's broad new proposals for regu-

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[63] Although correlation-seeking will usually increase the debtor's insolvency risk, this consequence is not inevitable. For example, insolvency risk increases whenever a firm incurs a contingent liability that is itself large enough to cause insolvency. However, if we hold the face value of this liability constant, reverse correlation-seeking actually reduces insolvency risk by decreasing the chances of a downturn-induced insolvency as an independent event. Thus, Debtor's insolvency risk in Figure 3 actually decreases from 20% to 10% as the internal correlation moves from its lowest to its highest level.

[64] This possibility corresponds to the third case described in section I.C. *See supra* p. 1179.

[65] *See* Gregor Andrade & Steven N. Kaplan, *How Costly Is Financial (Not Economic) Distress? Evidence from Highly Leveraged Transactions that Became Distressed*, 53 J. FIN. 1443, 1471 (1998) (noting that financial distress destroys wealth by causing firms to liquidate assets rather than make capital expenditures); Mark J. Roe, *Bankruptcy and Debt: A New Model for Corporate Reorganization*, 83 COLUM. L. REV. 527, 538 (1983) (noting that distraction of managers is one of the "heavy costs of financial distress").

[66] These costs are illustrated by the impact of collateral calls on AIG in September 2008, described in the next Part. *Cf.* Ronald J. Gilson & Charles K. Whitehead, Essay, *Deconstructing Equity: Public Ownership, Agency Costs, and Complete Capital Markets*, 108 COLUM. L. REV. 231, 250 (2008) (identifying the reluctance of various creditor groups to deal with an insolvent firm as a social cost of financial distress).

[67] *See* Robert K. Rasmussen, *The Ex Ante Effects of Bankruptcy Reform on Investment Incentives*, 72 WASH. U. L.Q. 1159, 1185 (1994) (noting that asset substitution is more likely when a firm is insolvent); Squire, *supra* note 8, at 820–21 (same).

lating the financial sector.[68] If this view is correct, correlation-seeking is particularly costly in the derivatives market, where most sellers are financial intermediaries. And in settings in which regulators are unwilling to let firms fail, correlation-seeking makes government bailouts more likely.

A final set of social costs will result from the defensive efforts that creditors take to protect themselves against opportunism. In order to deter correlation-seeking, creditors must negotiate and enforce loan covenants that tailor the terms of lending to the risks created by the debtor's ongoing dealings with third parties. And covenants are ineffective unless creditors monitor the debtor, because monetary damages for covenant violations will be inadequate if the violations are discovered only after the debtor has fallen insolvent and hence is judgment-proof.[69] But monitoring is costly, and creditors who plan to monitor will demand higher interest rates up front as compensation.[70] Or, rather than monitor, creditors will simply demand a higher interest rate from all debtors to offset expected losses from opportunism. In either case, the increase in borrowing costs will act like a tax on credit, producing a deadweight loss by making it harder for firms to fund new projects.[71] Importantly, debtors will have to pay higher interest rates even if they do not act opportunistically after they borrow, meaning that their mere option to engage in correlation-seeking will cause a loss of social wealth.

II. CORRELATION-SEEKING AND THE CRISIS OF 2008

This Part considers the role of correlation-seeking in the financial crisis of 2008. That crisis saw the collapse of storied Wall Street firms and government bailouts of private companies on an unprecedented scale. A key aspect of the crisis that has been ignored by standard ac-

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[68] *See* U.S. DEP'T OF THE TREASURY, FINANCIAL REGULATORY REFORM, A NEW FOUNDATION: REBUILDING FINANCIAL SUPERVISION AND REGULATION *passim* (2009) [hereinafter TREASURY REPORT], *available at* http://www.financialstability.gov/docs/regs/Final Report_web.pdf. A potential illustration of systemic risk is the fact that the September 2008 bankruptcy of Lehman Brothers precipitated a run on money market funds because one fund — the Reserve Primary Money Fund — owned large amounts of Lehman Brothers commercial paper. Daisy Maxey, *Expense Tally for Reserve Primary Since "Breaking Buck": $16.6 Million*, WALL ST. J., June 13, 2009, at B6. This run caused money market funds to stop buying commercial paper, thereby denying firms a key source of short-term financing.

[69] The inadequacy of monetary damages in this context is the reason that the standard contractual remedy for a covenant violation is to accelerate the debtor's repayment obligation. Kahan & Rock, *supra* note 7, at 302.

[70] *See* F.H. Buckley, *The Bankruptcy Priority Puzzle*, 72 VA. L. REV. 1393, 1440–41 (1986). As an alternative, creditors might try to protect themselves by demanding a secured claim, but that arrangement creates its own set of costs, mostly by producing an opportunistic wealth transfer to the secured creditor's advantage. *See* Bebchuk & Fried, *supra* note 6, at 870–71.

[71] Squire, *supra* note 8, at 820–21.

counts is how conduct consistent with correlation-seeking brought down the three firms that received the biggest bailouts: AIG, Fannie Mae, and Freddie Mac.[72] In all three cases, the concept of correlation-seeking explains how managerial decisions that caused the firms to suffer deep losses may in fact have been consistent with the managers' duty to maximize shareholder value. Without a proper understanding of the conduct that preceded each firm's collapse, lawmakers will be unable to correct the incentives that increase the risk of another financial crisis in the future.

Besides being the biggest bailout recipients, AIG, Fannie, and Freddie are interesting because they illustrate two different forms that correlation-seeking can take. AIG's conduct during the run-up to 2008 is primarily consistent with reverse correlation-seeking, whereby a firm reallocates its investment portfolio into assets that increase the internal correlations on the firm's contingent debts. Fannie and Freddie, by contrast, illustrate the type of correlation-seeking that occurs when a firm has passed the "tipping point" where its contingent debts are large enough in themselves to cause insolvency, and the firm piles on additional correlated debts that pose no downside risk to shareholders. In both cases, the broader point remains that conduct consistent with correlation-seeking helps to explain why the firms suffered such calamitous losses, at taxpayer expense, when their correlated risks materialized.

A. Raising Correlation Through Asset Purchases: AIG

Perhaps the most notorious financial crisis bailout was that of the multinational insurer AIG, whose trades in financial derivatives are widely blamed for the company's spectacular unraveling in September 2008.[73] To many observers, AIG's implosion was the fulfillment of Warren Buffet's prophecy that derivative contracts would prove to be "financial weapons of mass destruction."[74] The company merits special attention here not only because of the amount of bailout money it received, but also because the Obama Administration has cited AIG as exhibit one in its case for more aggressive federal regulation of derivatives.

The standard account of what happened at AIG — and the account that the administration has adopted — is founded upon a key misperception. According to this view, a small band of derivatives

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[72] For a summary of the various bailout programs and amounts paid on behalf of the largest recipients, see *Adding Up the Government's Total Bailout Tab*, N.Y. TIMES, Feb. 4, 2009, http://www.nytimes.com/interactive/2009/02/04/business/20090205-bailout-totals-graphic.html.

[73] *See, e.g.*, Brady Dennis & Robert O'Harrow, Jr., *A Crack in the System*, WASH. POST, Dec. 30, 2008, at A1.

[74] BERKSHIRE HATHAWAY INC., 2002 ANNUAL LETTER TO SHAREHOLDERS 15 (2003).

traders, operating at the periphery of AIG's mainline insurance businesses, was able to bring an otherwise sound corporate giant to its knees.[75] But in fact the liabilities on AIG's derivative contracts were not big enough in themselves to break the company. Rather, the conduct that undid AIG was a company-wide affair, in which derivatives traders at an AIG subsidiary sold contingent debts linked to subprime mortgages, and then fund managers at the AIG parent company cranked up the internal correlations on those debts by purchasing risky mortgage-backed securities for the company's general investment portfolio. When the housing market collapsed, it was the combined damage to *both* sides of AIG's balance sheet that brought the company to the brink of bankruptcy.

The derivatives that bear the popular blame for AIG's failure are credit default swaps sold by Financial Products, a distinct legal entity in the AIG corporate group. A credit default swap is a natural product for an insurer to sell, as such a contract insures the performance of a debt-like instrument such as a bond. The buyer of the swap makes one or more premium payments to the swap's issuer — also known as the "protection seller" — who in return agrees to pay the buyer the difference between the debt instrument's face value and its market value if the instrument defaults. And Financial Products had a strong competitive edge in the swap business because the AIG parent, which enjoyed a perfect AAA credit rating, had unconditionally guaranteed all of its obligations.[76] Counterparties were therefore willing to enter into swap contracts with Financial Products without requiring that the division "post" (set aside) cash or low-risk securities to serve as collateral.

Initially, Financial Products sold swaps only on corporate bonds.[77] However, as the housing market expanded during the early years of the past decade, the division also began selling swaps on mortgage-backed securities, which are bonds that represent claims on cash flows produced by pools of mortgages.[78] Many such securities were issued by government-sponsored entities such as Fannie Mae and Freddie Mac, which assembled the underlying mortgage pools and guaranteed the securities that were paid from those pools.[79] However, Financial Products also sold swaps on securities backed by "subprime" mortgag-

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[75] *See, e.g.*, Dennis & O'Harrow, *supra* note 73 (blaming the fall of AIG entirely on its derivatives sales).

[76] Am. Int'l Group, Inc., Annual Report (Form 10-K), at 179 n.12(d) (Feb. 28, 2008) [hereinafter AIG 2007 10-K Report].

[77] Dennis & O'Harrow, *supra* note 73.

[78] Robert O'Harrow, Jr. & Brady Dennis, *Downgrades and Downfall*, WASH. POST, Dec. 31, 2008, at A1.

[79] *See* Christopher L. Peterson, *Fannie Mae, Freddie Mac, and the Home Mortgage Foreclosure Crisis*, 10 LOY. J. PUB. INT. L. 149, 149 (2009).

es that were too risky to qualify for Fannie or Freddie guarantees, and that instead were pooled by wholly private firms.[80]

Financial Products' lucrative swap sales came to an end in 2005, after a government investigation into AIG's reported earnings[81] led the rating agencies to downgrade the company to AA.[82] This change deprived Financial Products of its competitive advantage in the swap business because it meant that the division now had to post collateral on its derivative positions.[83] Unsurprisingly, not long thereafter the division's managers decided to stop selling credit default swaps — although, portentously, they did not unwind the contracts the division had already sold.[84]

By the time it stopped selling swaps, AIG was deeply exposed to the housing market, with a total notional value on its subprime-linked swaps of approximately $60 billion.[85] Moreover, the company derived little diversification benefit from the large number of swaps it had sold, because the contingent liabilities from the individual contracts were highly correlated with each other. This was because Financial Products had sold swaps almost exclusively on securities that represented the senior tiers of the underlying mortgage pools.[86] Those pools were structured to pay senior tiers first if the mortgages underperformed, which meant that junior tiers would absorb essentially all idiosyncratic (that is, borrower-specific) and regional risk associated with the mortgages.[87] Accordingly, the senior tiers were considered the least risky, and indeed regularly received AAA scores from the rating agencies.[88] However, as the rating agencies themselves under-

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[80] *See id.* at 161–62.

[81] *See* Dennis & O'Harrow, *supra* note 73.

[82] A credit rating reflects a debt obligation's perceived default risk and hence suggests the minimum yield that investors will require in order to be willing to buy the obligation. This particular rating is from Standard & Poor's Financial Ratings; Fitch Ratings and Moody's Investors Service also downgraded AIG's long-term debt rating during the same period. Am. Int'l Group, Inc., Annual Report (Form 10-K), at 14 (Mar. 16, 2006) [hereinafter AIG 2005 10-K Report].

[83] *Id.* at 15.

[84] AIG insiders have told reporters that Financial Products stopped selling credit default swaps in 2005 because executives were concerned at that point about the company's concentrated exposure to the subprime housing market. *See, e.g.*, Michael Lewis, *The Man Who Crashed the World*, VANITY FAIR, Aug. 2009, at 98, 137–38. This explanation is contradicted by the fact that executives permitted the AIG parent to make heavy purchases of subprime mortgages in 2006 and 2007. *See* AIG 2007 10-K Report, *supra* note 76, at 105.

[85] This figure is from 2007. AIG 2007 10-K Report, *supra* note 76, at 122 n.(b). AIG did not disclose its notional swap exposure for 2005. However, the figure is unlikely to have changed significantly in the interim given that the company stopped selling swaps in 2005 but did not unwind the positions it had already incurred.

[86] *Id.* at 122.

[87] *See* Joshua D. Coval et. al., *The Economics of Structured Finance* 6 (Harvard Bus. Sch., Working Paper No. 09-060, 2008), *available at* http://www.hbs.edu/research/pdf/09-060.pdf.

[88] *Id.* at 3–4.

stood,[89] there was one event that could trigger deep losses on the senior tiers: a sustained drop in housing prices that spanned multiple regions.[90] For this reason, the only event that could trigger a large claim on any particular subprime-linked swap contract — that is, a general drop in housing prices — would also cause large claims on the other contracts to be triggered at the same time.

Despite its concentrated nature, AIG's exposure on its subprime-linked swaps would not have been sufficient in itself to bankrupt the company. Liability for the full $60 billion notional amount was always extremely unlikely, since this would require that the underlying houses prove to be completely worthless rather than just badly overpriced. And AIG's overall equity value at the end of 2005 (when it ended swap sales) was $86 billion.[91] In other words, AIG was in the position depicted by Figure 2 rather than Figure 3, and it could have contained the downside risk on its swap contracts by investing in assets that were unlikely to depreciate at the same time the swaps were triggered.

Rather than hedge itself on the asset side of the ledger, however, AIG doubled down. Just as Financial Products was shutting down swap sales in 2005, fund managers at the AIG parent started buying up subprime mortgage–backed securities for the company's general investment portfolio. This buying spree accelerated in 2006 and did not end until 2007, at which point the portfolio held $45 billion in subprime mortgage–backed securities — more than a tenfold increase from the amount held just three years earlier.[92] And Financial Products had itself acquired another $16 billion in subprime securities, bringing the company-wide total at the end of 2007 to $61 billion.[93] More than 90% of these securities represented the senior tiers of the underlying mortgage pools,[94] and thus matched exactly the risk from the company's swap positions. Finally, the company owned another

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[89] *See id*. at 23 (noting that ratings analysts relied on models that the analysts knew would "break down" if housing prices stopped rising (internal quotation mark omitted)).

[90] *See id*. at 20 (noting that exposure on diversified swaps was driven entirely by systematic risk, an example of which is housing price changes that cannot be diversified away by investing across multiple regions).

[91] AIG 2005 10-K Report, *supra* note 82, at 24.

[92] In 2007, AIG (other than Financial Products) held $3.7 billion in subprime mortgages of pre-2005 vintage. AIG 2007 10-K Report, *supra* note 76, at 105 (including securities classified by the company as both "Alt-A" and "subprime," both categories being subprime in the sense that neither was guaranteed by government-sponsored entities such as Fannie Mae and Freddie Mac). Adding in the 2005 to 2007 vintage holdings produces a total of $44.9 billion. Assuming that all of the pre-2005 vintage holdings were purchased before 2005, this marks a twelvefold increase. If some of these earlier vintages instead were purchased during the reference period, the ratio is even higher.

[93] *Id.* at 104.

[94] *Id.* at 105 (consisting of the sum of $22.5 billion in AAA Alt-A securities and $18.5 billion in AAA subprime securities, divided by the sum of $23.7 billion in total Alt-A securities and $21.2 billion in total subprime securities, which results in 91%).

$48 billion in mortgage-backed securities that, while not classified as "subprime," nevertheless were not guaranteed by Fannie Mae or Freddie Mac, and hence were highly vulnerable to a real estate downturn.[95] Therefore, the company's total exposure to the at-risk portion of the mortgage market at the end of 2007, including both the company's swap exposure and its holdings of nonguaranteed mortgage-backed securities, was $169 billion, as compared with a company equity value of $96 billion.[96] When the market for mortgage-backed securities collapsed in September 2008, this exposure was more than enough to render the company insolvent.[97]

The series of decisions by which AIG tied its fate to the mortgage market contradicts the standard model of the insurance business, in which insurers hedge the risks on the policies they sell by investing the premiums in safe assets. But AIG's choices make sense if the goal was to maximize shareholder returns. Thus, the company first used its AAA rating to earn high premiums from sales of swaps linked to subprime mortgages. Then, after a ratings downgrade brought swap sales to an end, the company cranked up the internal correlations on the contingent debts from those swaps by buying up mortgage-backed securities for its investment portfolio. Those securities were highly unlikely to lose value except in circumstances when deep liability on the swaps would be triggered at the same time. Therefore, by reallocating such a large portion of its investment portfolio into mortgage-backed assets, AIG shifted more of the potential gains from that portfolio to shareholders, and it shifted more of the downside risk from its swap positions onto the company's general creditors.

Who exactly were the creditors that stood to lose from the high internal correlations on AIG's swap liabilities? Importantly, the answer is not — or at least not mainly — the swap counterparties themselves. Those claimants were protected by special Bankruptcy Code provisions that exempt derivative counterparties from the Code's automatic stay and from its prohibitions on fraudulent transfers, preferences, and

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[95] These securities consisted of $21 billion in "prime" but nonetheless nonguaranteed residential mortgage–backed securities, $4 billion in "other housing-related" securities, and $23 billion in commercial mortgage–backed securities (CMBS). *Id.* at 104. Along with AIG's subprime investments, these assets lost value in 2007. *Id.* And this trend accelerated in 2008. Am. Int'l Group, Inc., Annual Report (Form 10-K), at 161 (Mar. 2, 2009) [hereinafter AIG 2008 10-K Report].

[96] AIG 2007 10-K Report, *supra* note 76, at 97.

[97] AIG reported losses in 2008 of $99 billion. AIG 2008 10-K Report, *supra* note 95, at 36. As noted above, AIG's equity value at the end of 2007 was $96 billion. In addition, another $5 billion in losses were recorded for the first quarter of 2009. Am. Int'l Group, Inc., Quarterly Report (Form 10-Q), at 5 (May 7, 2009). These reported losses for 2008 and early 2009 almost certainly understate the actual damage to the company's intrinsic value as a result of the housing market collapse because they fail to exclude benefits that AIG received from its bailout.

ipso facto clauses.[98]   Because of those exemptions, the counterparties could have foreclosed on collateral after AIG filed for bankruptcy, even if AIG had posted the collateral while insolvent. In other words, AIG's swap buyers were secured to the extent of their collateral, as there was no risk that they would have to share that collateral with AIG's general creditors.[99]

Thus, most of the expected burden from AIG's contingent debts was borne not by the swap buyers, but rather by two other groups of AIG creditors. The group most directly imperiled was the general (that is, nonderivative) creditors of Financial Products and of the AIG parent, which had guaranteed all of Financial Products' obligations.[100] And a second, even larger group that was placed at risk was the multitude of policyholders who had bought AIG's garden-variety insurance and annuity products.[101]   These policyholders were supposed to be protected by state insurance regulations that limit insurer investments in risky assets and give policyholders priority of claim if the insurer fails.[102] But AIG skirted the intent of these laws through its "securities lending program," whereby it lent regulated assets such as blue chip stocks to third parties in exchange for cash collateral, and then used that cash to buy mortgage-backed securities.[103] When the market for these securities collapsed in September 2008, AIG ended up owing

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[98] 11 U.S.C. §§ 362(b)(6)–(7), 362(b)(17), 546(e)–(g), 555, 556, 559, 560 (2006); *see also* Edward R. Morrison & Joerg Riegel, *Financial Contracts and the New Bankruptcy Code: Insulating Markets from Bankrupt Debtors and Bankruptcy Judges*, 13 AM. BANKR. INST. L. REV. 641, 651 (2005) (noting that amendments in 2005 to the Code's definition of "swap agreement" widened the exemptions to cover essentially all derivatives). To be precise, counterparties are exempt from provisions relating to "constructive" fraudulent transfers, but not from those directed at intentional fraud. 11 U.S.C. § 546 (e)–(g) (cross-referencing 11 U.S.C. § 548(a)(1)(A)).

[99] Although AIG eventually ran out of collateral when its credit rating was again downgraded in September 2008, the amount of collateral it was able to post before it received its first bailout loan covered most of the losses on its counterparties' underlying securities. By August 31, 2008, AIG had posted $22 billion to its swap counterparties, almost all of which went to those that had purchased default protection on subprime securities. AIG 2008 10-K Report, *supra* note 95, at 3, 146. Continuing deterioration in the value of AIG's own mortgage-backed assets led the rating agencies to downgrade AIG again on September 15, 2008, which in turn led to further collateral calls of approximately $11 billion. *Id.* at 4, 146. AIG was unable to meet these collateral calls in full until it received a loan from the New York Federal Reserve on September 22, 2008. *Id.* at 5.

[100] These unsecured creditors were owed $108 billion at the end of 2007. AIG 2007 10-K Report, *supra* note 76, at 89.

[101] AIG owed these policyholders more than $420 billion in 2007. *Id.* at 131.

[102] *See id.* at 13–14, 16 (describing state-law restrictions on the investment activity of AIG's insurance subsidiaries); Patrick Collins, Note, *HMO Eligibility for Bankruptcy: The Case for Federal Definitions of 109(b)(2) Entities*, 2 AM. BANKR. INST. L. REV. 425, 431 (1994) (noting that state insolvency proceedings generally give policyholders priority of claim).

[103] AIG 2008 10-K Report, *supra* note 95, at 166. At the end of 2007, AIG's outstanding obligations under this program were $76 billion, two-thirds of the proceeds from which were invested in subprime assets. AIG 2007 10-K Report, *supra* note 76, at 108.

these third parties more than $40 billion,[104] a deficit the AIG parent could not cover because of the simultaneous triggering of collateral calls on the swap contracts.[105]

Of course, AIG's various unsecured creditors did not ultimately bear the impact of the company's decision to go "double long" on the housing market. In a series of bailout measures that began in September 2008 and continued through 2009, the federal government spent more than $120 billion keeping AIG out of bankruptcy.[106] Therefore, the wealth transfer produced by the high internal correlations on AIG's swap positions has been suffered not by AIG's own creditors, but rather by another large group of unsecured "creditors": U.S. taxpayers. To the extent that such a bailout was foreseeable, it only would have exacerbated the opportunism hazard by undermining the incentive for AIG's creditors to monitor in order to protect themselves.

The account of AIG's conduct offered here might seem to contradict media reports suggesting that AIG's managers thought that fears of a housing bubble were overblown and consequently that the risk of deep liability on the company's swaps was remote.[107] But it must be remembered that the relevant question for correlation-seeking purposes is not whether the debtor's managers think that a contingent liability is particularly likely to come due. Rather, the question is whether the managers believe that, if the triggering event (however unlikely) does occur, the debtor will probably be insolvent, due to asset devaluation or otherwise. And there can be little doubt that informed AIG managers would have understood that the risk from the firm's mortgage-linked swaps was highly correlated with the risk that the company's own mortgage-backed securities would lose value. Indeed, the fact that AIG had matched the specific risk type across its balance sheet — on both sides, exposing itself only to the senior tiers of the underlying mortgage pools — made the correlation all the more evident.

More broadly, there is evidence that a well-understood process of correlation-seeking was at the heart of AIG's swap business even before AIG's managers bet the firm on the housing market. When Financial Products first began selling swaps on corporate bonds in the late 1990s, the division's computer models predicted that liability would be triggered only in the event of a "full-blown depression."[108]

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[104] Press Release, Am. Int'l Group, Inc., AIG Discloses Counterparties to CDS, GIA and Securities Lending Transactions (Mar. 15, 2009), *available at* http://www.businesswire.com/news/home/20090315005036/en.

[105] *See id.*

[106] *See* Serena Ng et al., *In Battle with U.S. over Pay, AIG Chief Meets His Match*, WALL ST. J., Dec. 24, 2009, at A1.

[107] *See, e.g.*, O'Harrow & Dennis, *supra* note 78.

[108] Dennis & O'Harrow, *supra* note 73.

From this prediction, the division's managers concluded that the premiums on these early swap sales were "almost free money."[109] The basis for this conclusion would not have been the one later offered in newspaper reports — namely that, in case of a general depression, "the holders of swaps would almost certainly be wiped out, so how could they even collect?"[110] A bankrupt firm can still sue to collect on its contracts, a fact that these sophisticated managers would have understood. Rather, the more accurate statement is that, in case of a severe depression, *AIG* would probably be wiped out, because the company's investment portfolio was tied to the performance of the general economy. Those swaps on corporate bonds therefore were contingent debts that the company's shareholders — as opposed to its general creditors — would almost certainly never be called upon to pay.

As it turned out, the company's mortgage-linked swaps — in contrast with its earlier, corporate bond–linked swaps — were in fact triggered during a severe economic downturn that some have compared to a depression.[111] This does not mean, however, that AIG's concentrated bets on the housing market make sense only if its managers foresaw a tight link between the housing market and the performance of the broader economy. To the contrary, the heavy purchases of mortgage-backed securities from 2005 to 2007 are more consistent with a belief that the downside risk on the mortgage-linked swaps was sector-specific, as contrasted with the downside risk from the earlier, bond-linked swaps. Nonetheless, both examples suggest that the opportunism hazard may be highest when contingent debts constitute what might be called "end of the world insurance" — that is, insurance against the risk of an especially broad and deep economic downturn. This is because an economy-wide collapse is likely to impair asset values enough to leave the insurance sellers insolvent regardless of whether their contingent debts are triggered.

While AIG's credit default swap sales are especially notorious, it is unlikely that the insurer is the only firm that has used derivatives to create contingent debts with high internal correlations.[112] A provocative observation in this regard is that approximately 80% of credit default swaps have been purchased by parties that — unlike most of AIG's counterparties — did not own the underlying "reference" as-

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[109] *Id.* (internal quotation mark omitted).

[110] *Id.*

[111] *See, e.g.*, RICHARD A. POSNER, A FAILURE OF CAPITALISM: THE CRISIS OF '08 AND THE DESCENT INTO DEPRESSION (2009).

[112] Indeed, the company's sales of credit default swaps accounted for only about 1% of the market. Houman B. Shadab, *Guilty by Association? Regulating Credit Default Swaps*, 4 ENTREPRENEURIAL BUS. L.J. 407, 417 (2010).

set.[113] Such buyers are not seeking protection against downside risk, and instead may be acting on a belief that the swaps are underpriced relative to the expected value of future payouts. And correlation-seeking is a reason that sustained underpricing can occur, because it causes sales to be subsidized by expected wealth transfers from the sellers' unsecured creditors. In other words, correlation-seeking makes it rational for both buyer and seller to agree to a premium that is smaller than the contract's expected payout. This observation suggests that the correlation-seeking hazard presented by derivatives extends well beyond AIG's swaps on mortgage-backed securities, even if those swaps offer the most conspicuous example.

B. Beyond the Tipping Point: Fannie Mae and Freddie Mac

The only firms to elicit even more bailout spending than AIG are the government-sponsored mortgage giants Fannie Mae and Freddie Mac, which have suffered combined losses of nearly $190 billion since the middle of 2007.[114] Viewed by government officials as too important to let fail, the firms have been kept afloat by a staggering $1.4 *trillion* in bailout spending.[115] As with AIG, the standard story on why these firms failed so dramatically is at best misleading. Media reports have suggested that the firms collapsed because they took on too much fixed debt, or because they overinvested in subprime assets. Both of these stories are contradicted by the fact that Fannie Mae has lost almost twice as much money as Freddie Mac has, even though Fannie had a lower leverage ratio and invested only half as much in subprime assets. Only when one observes that the firms incurred massive contingent debts during the housing bubble, debts that were likely to be triggered simultaneously in circumstances when the firms' assets would also plummet in value, does the scale of their losses begin to make sense. In other words, the main reason that Fannie and Freddie have cost taxpayers so much is that they took on correlated contingent debts that posed essentially no downside risk to their shareholders.

Congress created the Federal National Mortgage Association — better known as Fannie Mae — in 1938 for the purpose of providing

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[113] Dawn Kopecki & Shannon D. Harrington, *Banning "Naked" Default Swaps May Raise Corporate Funding Costs*, BLOOMBERG, July 24, 2009, http://www.bloomberg.com/apps/news?pid=20601208&sid=a0W1VTiv9q2A.

[114] During the nine quarters ending in the third quarter of 2009, Fannie Mae lost a total of $120.5 billion, and Freddie Mac lost $67.9 billion. Rebecca Christie & Jody Shenn, *U.S. Treasury Ends Cap on Fannie, Freddie Lifeline for 3 Years*, BLOOMBERG, Dec. 25, 2009, http://www.bloomberg.com/apps/news?pid=20601070&sid=aflZde00JA6I.

[115] Fed. Hous. Fin. Agency, Data as of December 10, 2009 on Treasury and Federal Reserve Purchase Programs for GSE and Mortgage-Related Securities, http://www.fhfa.gov/webfiles/15315/TSYFed121009.pdf (last visited Jan. 31, 2010) [hereinafter Fed. Hous. Fin. Agency 2009 Data].

"liquidity and stability in the secondary mortgage market."[116] Fannie has sought to achieve this purpose by purchasing pools of mortgages from banks and other lenders, placing the pools in trusts, and causing the trusts to issue mortgage-backed securities whose performance Fannie Mae guarantees.[117] These guarantees meant that the firm always operated with large contingent debts. And the debts were correlated with one another because — as was true of AIG's subprime-linked credit default swaps — a nationwide housing slump would cause deep liability on many of the debts to be triggered at the same time. Given these correlated contingent debts, one might have expected Fannie Mae to hedge itself on the asset side, investing in something unrelated to housing. But the firm did the opposite, using the premiums it earned on its guarantees, as well as cash it raised by issuing fixed debt, to buy and hold even more mortgages and mortgage-backed securities.[118] As a result, Fannie was always anti-hedged, with large contingent debts backed by assets whose value was tied to the same underlying risks.

When housing prices began to fall in 2007, those correlated risks materialized, and Fannie took losses.[119] The losses deepened in 2008 and continued into 2009, reaching a total of $121 billion over a nine-quarter period.[120] By comparison, Fannie's equity value at the end of 2006 was only $42 billion.[121] The company thus fell insolvent almost three times over, and only a massive federal bailout could keep it from defaulting on its debts. Federal regulators took control of the company by placing it in conservatorship on September 6, 2008,[122] and the bailout spending started immediately thereafter.[123] That spending continued through the end of 2009, by which point the Treasury had injected $60 billion directly into the company, and along with the Federal Reserve had purchased another $789 billion in Fannie Mae fixed debt and Fannie-guaranteed mortgage-backed securities.[124]

How did Fannie Mae end up so far underwater? The correlated risks across its balance sheet undoubtedly meant that the company

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[116] Fed. Nat'l Mortgage Ass'n, Annual Report (Form 10-K), at 1 (Feb. 26, 2009) [hereinafter Fannie Mae 2008 10-K Report].

[117] *Id.* at 15.

[118] For example, at the end of 2007, mortgage-related assets constituted 82% of Fannie's total assets. *See id.* at 81, 124 (noting total assets in 2007 of $879 billion, and total mortgage assets of $723 billion). This figure is comparable to the 2000 proportion, which was 90%. *See* Fed. Nat'l Mortgage Ass'n, Annual Report (Form 10-K), at 20 (Mar. 31, 2003) (noting total assets in 2000 of $675 billion, and a net mortgage portfolio of $608 billion).

[119] Fannie Mae 2008 10-K Report, *supra* note 116, at 80 (noting net losses in 2007 of $2 billion).

[120] Christie & Shenn, *supra* note 114.

[121] Fannie Mae 2008 10-K Report, *supra* note 116, at 81.

[122] *Id.* at 20–21.

[123] *Id.* at 25.

[124] Fed. Hous. Fin. Agency 2009 Data, *supra* note 115.

was always a risky proposition, unlikely to survive any sustained nationwide drop in housing prices. But the *depth* of the company's failure — and hence the scale of its bailout — has led commentators to surmise that the firm must have engaged in reckless conduct during the bubble years that exacerbated its collapse. For example, commentators have argued that Fannie borrowed too much money, with its borrowing costs reduced by implicit government guarantees on its various debt obligations.[125]

The problem with a simple story of excess borrowing is that Fannie's leverage did not in fact rise during the run-up to the crisis. At the end of 2007, its debt-to-equity ratio was 19.[126] While this was a high figure compared to other financial institutions,[127] it nonetheless marked a sharp decline from 2001, when the ratio was 34.[128] Therefore, a simple focus on leverage — the traditional metric of risk for *fixed* debt — would have given observers no warning that Fannie Mae was piling on risk during the height of the bubble.

Instead of focusing on debt levels, other commentators have blamed Fannie's troubles on its holdings of subprime mortgage–backed securities,[129] which rose from approximately \$15 billion in 2004 to \$74 billion in 2007.[130] However, only a fraction — about 19% — of Fannie's 2008 losses can be attributed to its subprime investments.[131]

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[125] *See, e.g.*, Steve Forbes, *In-credit-able!*, FORBES, Dec. 28, 2009, at 15 (arguing that Fannie and Freddie's "implicit government guarantees" enabled them to "borrow cheaply and leverage up on a scale no private company could").

[126] At the end of 2007, Fannie Mae's total liabilities were \$835 billion, and its shareholder equity was \$44 billion. Fannie Mae 2008 10-K Report, *supra* note 116, at 81. Dividing the first number by the second gives a leverage ratio of 19.

[127] *See* Peter Eavis, *Fannie, Freddie May Have Further To Fall*, WALL ST. J., Feb. 29, 2008, at C2 (noting that Fannie's leverage ratio at the end of 2007 was "at a level far above that of other financial institutions").

[128] At the end of 2001, Fannie's total liabilities were \$791 billion, and its shareholder equity was \$23 billion. Fed. Nat'l Mortgage Ass'n, Annual Report (Form 10-K), at 63 (Dec. 6, 2006) [hereinafter Fannie Mae 2004 10-K Report]. Dividing the first number by the second gives a leverage ratio of 34.

[129] *E.g.*, Jody Shenn, *Fannie, Freddie Subprime Spree May Add to Bailout*, BLOOMBERG, Sept. 22, 2008, http://www.bloomberg.com/apps/news?pid=20601109&sid=ayoKkt47a3s4; *see also* Peter Eavis, *Fannie and Freddie's Home Inequity*, WALL ST. J., Dec. 28, 2009, at C10 (asserting that Fannie and Freddie played "a central role in the housing crash with their huge purchases of dangerous Alt-A mortgages"); Forbes, *supra* note 125, at 15 (characterizing Fannie as "bingeing" on subprime mortgages in the years prior to the 2008 crash).

[130] *See* Fed. Nat'l Mortgage Ass'n, Annual Report (Form 10-K), at 93 (Feb. 27, 2008) (noting that Fannie's total holdings of subprime and Alt-A mortgage-backed securities at the end of 2007 were \$74 billion, of which \$14 billion were of a pre-2005 vintage). As noted in note 92, *supra*, subprime and Alt-A mortgages are lumped together for purposes of the analysis here.

[131] Fannie lost \$59 billion in 2008. Fannie Mae 2008 10-K Report, *supra* note 116, at 80. Of this amount, \$7 billion was attributable to reduced cash flows and defaults on subprime and Alt-A securities in the company's investment portfolio. *Id.* at 103. In addition, the company lost approximately \$4 billion on trades in mortgage-backed securities, most of which involved subprime

And it must be remembered that the prime/subprime distinction is less important to Fannie than to a firm like AIG, because Fannie was itself the guarantor of prime mortgage–backed securities, and thus was exposed to losses on both mortgage types. Therefore, the more relevant metric is the total value of Fannie's mortgage-linked investment holdings — prime plus subprime. And this amount in fact declined from 2004 to 2007.[132]

To understand the depth of Fannie's collapse, one must look not at the firm's fixed debt levels or its subprime investments, but rather at its contingent debts. And here the numbers are telling. Between 2002 and 2007, the value of outstanding mortgage-backed securities guaranteed by Fannie more than *doubled*, from $1.04 trillion to $2.12 trillion.[133] This stunning increase occurred despite the fact that the firm's total asset value actually declined slightly over the same period.[134] In other words, each dollar of assets on Fannie's books was supporting twice as much contingent debt in 2007 as it was in 2002. And while Fannie's equity value did grow somewhat over the same period, that growth was not nearly sufficient to keep pace with the increase in contingent debt. While every dollar of equity supported $33 worth of contingent debt in 2002, this figure rose to $48 by the end of 2007.[135] As a result, Fannie's 2008 losses due to its contingent debts were $30 billion, more than half its total losses for the year.[136] Thus, Fannie's contingent debts, rather than its subprime investments, were the millstone that pulled the company underwater.[137]

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and Alt-A securities. *See id.* at 107. Thus, total losses on subprime and Alt-A securities were $11 billion, or 19% of $59 billion.

[132] Fannie's total mortgage portfolio was $917 billion in 2004, *see* Fannie Mae 2004 10-K Report, *supra* note 128, at 63, and shrank to $728 billion in 2007, *see* Fannie Mae 2008 10-K Report, *supra* note 116, at 81.

[133] This figure is listed on Fannie's balance sheet as "Fannie Mae MBS held by third parties." Fannie Mae 2008 10-K Report, *supra* note 116, at 81; Fannie Mae 2004 10-K Report, *supra* note 128, at 63.

[134] Fannie's total assets were $905 billion in 2002, Fannie Mae 2004 10-K Report, *supra* note 128, at 63, slightly higher than the 2007 total of $879 billion, Fannie Mae 2008 10-K Report, *supra* note 116, at 81.

[135] Fannie's equity value was $32 billion in 2002, Fannie Mae 2004 10-K Report, *supra* note 128, at 63, and $44 billion in 2007, Fannie Mae 2008 10-K Report, *supra* note 116, at 81. Dividing the value of the outstanding Fannie mortgage-backed securities listed in the text by these amounts provides the stated ratios.

[136] *See* Fannie Mae 2008 10-K Report, *supra* note 116, at 109 (noting credit-related expenses of $30 billion, consisting of changes in loss reserves for guarantees on outstanding mortgage-backed securities, losses due to purchases of loans from Fannie Mae trusts that were nonperforming, and foreclosure expenses for these loans); *id.* at 80 (noting losses of $60 billion).

[137] After the mortgage-linked contingent debts, the biggest source of losses for Fannie in 2008 was its derivatives positions, most of which involved interest rate swaps that were meant to hedge against the risk to Fannie's mortgage investments of an increase in interest rates. These positions cost the firm $15 billion. *Id.* at 104–06.

Why did Fannie Mae double its contingent debt levels in just five years, thereby ensuring that it would suffer catastrophic losses if the housing market collapsed? The simplest answer is that this conduct greatly increased the value of the company to its shareholders. As previously noted, Fannie had an inherently rickety structure, with almost nothing in its investment portfolio to prop it up in case of a housing downturn. Moreover, even in 2002 the combined value of the company's mortgage-linked assets and contingent debts was many times greater than its equity value. Therefore, in 2002 — if not well before — the company was unlikely to remain solvent under market conditions that would trigger meaningful liability on its contingent debts. The implication was that the company was at the tipping point described earlier in section I.B.2. It could sell additional contingent claims against itself without placing any further risk on its shareholders, who would be wiped out anyway if deep liability on those claims was ever triggered. Thus, by taking on another $1 billion in mortgage-linked contingent debt, the firm's managers made a massive one-way bet on behalf of shareholders, who stood to pocket the premiums if the debt was not triggered but lose nothing if it was.

Given that the premiums from these additional mortgage-linked guarantees were essentially free money to Fannie's shareholders, one wonders why the company did not ramp up its contingent debt levels even sooner. A plausible answer is that Fannie in fact always took on as much contingent debt as it could, but that it was not until the housing bubble that both the supply of new mortgages and the demand for mortgage-backed securities permitted such rapid growth in the company's contingent debt levels.[138] An aggravating factor may have been that shareholders pressured Fannie's managers to boost earnings after the company's stock price started sliding in 2004,[139] which may have made managers more willing to issue so many new securities so quickly.

Media accounts that focus on fixed debt and subprime investments do only a slightly better job explaining the collapse of Freddie Mac, a firm that Congress created as the Federal Home Loan Mortgage Corporation in 1970.[140] Freddie Mac's official purpose is essentially the same as Fannie Mae's,[141] and it has followed the same business model, issuing mortgage-backed securities whose performance it guarantees

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[138] Of course, Fannie's willingness to expand its issuances of guaranteed mortgage-backed securities may have itself contributed to the housing bubble.

[139] *See* Shenn, *supra* note 129.

[140] *See* Fed. Home Loan Mortgage Corp., Annual Report (Form 10-K), at 1 (Mar. 11, 2009) [hereinafter Freddie Mac 2008 10-K Report].

[141] *See id.* (noting that Freddie's purpose is to provide "liquidity, stability and affordability to the U.S. housing market").

and purchasing mortgage assets for its own investment portfolio.[142] Like Fannie, Freddie entered federal conservatorship in 2008, a year in which it suffered losses of $50 billion, almost twice its equity value at the end of 2007.[143] Losses continued into 2009, bringing the company's total losses to $68 billion since the middle of 2007.[144] And Freddie is like Fannie in that it has received an enormous bailout, which through 2009 has totaled $570 billion in direct capital infusions plus government purchases of its outstanding fixed debt and guaranteed securities.[145]

Even though Fannie and Freddie were essentially equals in 2007 in terms of total asset value,[146] Freddie invested more than twice as much in subprime mortgages.[147] Freddie is thus more deserving of allegations in the media that the mortgage giants were "binging" on subprime assets before the financial crisis.[148] Nevertheless, Freddie's subprime investments were only partly responsible for the firm's collapse, accounting for just one-third of the firm's 2008 losses.[149] And increased borrowing also cannot explain Freddie's demise: while Freddie's 2007 leverage ratio of 29 was high in absolute terms, it had in fact declined from a level of 32 in 2001.[150]

Therefore, to understand Freddie's conduct during the peak housing years, one must look again to contingent debt levels. And there, as with Fannie, we see essentially a doubling in face amounts, with the value of outstanding mortgage-backed securities guaranteed by Fred-

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[142] *Id.* at 1, 5.

[143] *Id.* at 58 (noting a 2008 net loss of $50.1 billion and a 2007 equity value of $26.7 billion).

[144] Christie & Shenn, *supra* note 114.

[145] Fed. Hous. Fin. Agency 2009 Data, *supra* note 115.

[146] Freddie's total assets were $794 billion at the end of 2007. Freddie Mac 2008 10-K Report, *supra* note 140, at 58. Fannie was 11% larger, with $879 billion in assets. Fannie Mae 2008 10-K Report, *supra* note 116, at 81.

[147] At the end of 2007, Freddie held $153 billion in subprime securities, a total that includes securities the company characterized as subprime, Alt-A, and MTA (which stands for Moving Treasury Average, the index that determines the underlying mortgages' adjustable rate). *See* Freddie Mac 2008 10-K Report, *supra* note 140, at 93, 95. By contrast, Fannie held $74 billion in subprime securities at that point, as described in note 130, *supra.*

[148] Peter J. Wallison, *The Price for Fannie and Freddie Keeps Going Up*, WALL ST. J., Dec. 30, 2009, at A17 (stating that Fannie and Freddie were "binging" on subprime and Alt-A mortgages between 2005 and 2007); *see also* Forbes, *supra* note 125, at 15.

[149] As noted in note 143, *supra*, Freddie lost $50.1 billion in 2008. Of this, $16.6 billion was from impairment of the value of the company's subprime portfolio. Freddie Mac 2008 10-K Report, *supra* note 140, at 80.

[150] *See id.* at 58 (noting 2007 total liabilities, defined as total assets minus shareholders' equity, of $768 billion, and shareholders' equity of $27 billion); *see also* FREDDIE MAC, 2005 INFORMATION STATEMENT AND ANNUAL REPORT TO STOCKHOLDERS 19 (2006), *available at* http://www.freddiemac.com/investors/ar/pdf/2005annualrpt.pdf (noting 2001 total liabilities of $621 billion and shareholders' equity of $20 billion).

die climbing from $729 billion in 2002 to $1.38 trillion in 2007.[151] Such growth came about even though Freddie's equity value declined during that period, which meant that each dollar of shareholder equity had to bear more than twice as much contingent debt.[152] As a result, once the housing market collapsed, the losses that Freddie suffered because of its mortgage-linked guarantees were greater than its losses on its subprime investments.[153]

The fact that correlation-seeking sheds more light than conventional accounts on the failures of both Fannie and Freddie becomes especially apparent when one compares the total losses sustained by the two firms. As was noted previously, Freddie invested twice as much in subprime assets as Fannie did. And, even though the two firms had comparable total asset values, Freddie's simple leverage ratio was significantly higher than Fannie's: 29 as opposed to 19. Based on these metrics, one would expect Freddie to be the firm that would suffer deeper losses if the bottom ever fell out of the housing market. But the opposite is the case: so far Fannie has lost almost twice as much as Freddie, and has also soaked up $280 billion more in federal bailout funds.[154] This difference in outcomes makes sense only if we look past subprime investments and fixed debts to observe that the face value of Fannie's mortgage-linked guarantees exceeded Freddie's by more than $700 billion at the end of 2007.[155] Why Freddie did not keep pace with Fannie in this regard is unclear, although simple market constraints may have played a role. But in any event, the correlation-seeking incentives described here suggest why both the firms were willing to run up their contingent debts so steeply when the opportunity presented itself, and why such conduct produced such deep losses when the correlated risks materialized. Indeed, because the firms operated beyond the contingent debt tipping point, they provide an example of correlation-seeking in its purest form, with the downside risk

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[151] *Compare* FREDDIE MAC, 2002 INFORMATION STATEMENT AND ANNUAL REPORT TO STOCKHOLDERS 6 (2004) [hereinafter FREDDIE MAC, 2002 ANNUAL REPORT], *available at* http://www.freddiemac.com/investors/ar/pdf/2002annualrpt.pdf, *with* Freddie Mac 2008 10-K Report, *supra* note 140, at 127.

[152] Freddie's 2002 shareholder equity value was $31.3 billion. FREDDIE MAC, 2002 ANNUAL REPORT, *supra* note 151, at 27. As noted in note 143, *supra*, its 2007 equity value was $26.7 billion.

[153] Freddie Mac's 2008 losses attributable to its mortgage-linked guarantees included a $16.4 billion increase in its provision for losses and $1.6 billion in losses on loans purchased from the underlying mortgage pools. Freddie Mac 2008 10-K Report, *supra* note 140, at 82–83. As noted in note 149, *supra*, Freddie's losses on its subprime portfolio were $16.6 billion.

[154] As noted previously, Fannie Mae so far has received $849 billion in bailout funds, *see supra* p. 1192, and Freddie Mac has received $570 billion, *see supra* p. 1196.

[155] As noted previously, Fannie had $2.12 trillion in contingent debt at the end of 2007, *see supra* p. 1194, while Freddie had $1.38 trillion, *see supra* p. 1197.

from additional contingent debt sales borne almost entirely by parties other than the firms' shareholders.

III. RECONCEPTUALIZING THE LAW OF CONTINGENT DEBT

Despite the widespread use of contingent debt in the modern economy, lawmakers have ignored the distinct opportunism hazard it presents. Legal rules for contingent debts take no account of correlations, relying instead on principles designed for fixed debts. This is true not only of the Obama Administration's regulatory proposals in response to the 2008 financial crisis, but also of traditional creditor-protection doctrines such as fraudulent transfer law. In both cases, lawmakers need to shift the emphasis from face values to correlations if legal rules are to neutralize the incentives that create the risk of another AIG, Fannie Mae, or Freddie Mac–style collapse.

A. Federal Financial Regulation After the Crash

In the wake of the 2008 crisis, the Obama Administration has proposed broadly expanding federal regulation of the financial sector. New rules would require financial firms to operate with less leverage, disclose more information about business risk, and pay their executives more in equity and less in cash. In addition, the federal government would acquire direct oversight of the market for financial derivatives. Importantly, none of these proposals hits the correlation-seeking hazard head-on. Some proposals — such as the leverage and disclosure rules — address correlation-seeking only obliquely, and may impose high compliance costs. And others — such as collateral requirements for derivatives and new executive pay rules — may in fact make the correlation-seeking hazard worse. As explained below, a better approach might be for lawmakers to remove obstacles that now prevent or discourage market participants from monitoring each other to prevent correlation-seeking directly.

1. Correlation Indistinct: The Administration's Regulatory Vision. — Many of the administration's regulatory proposals for the financial sector were laid out in a June 2009 Treasury Department report.[156] The most important of these proposals appear in a bill — the Wall Street Reform and Consumer Protection Act[157] — that the House of Representatives passed in December 2009. Importantly, neither the Treasury report nor the legislation derived from it takes direct account of the correlated asset and debt risks that drove AIG, Fannie, and

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[156] *See* TREASURY REPORT, *supra* note 68.

[157] Wall Street Reform and Consumer Protection Act, H.R. 4173, 111th Cong. (as passed by House of Representatives, Dec. 11, 2009), *available at* http://financialservices.house.gov/Key_Issues/Financial_Regulatory_Reform/FinancialRegulatoryReform/111_hr_finsrv_4173_full.pdf.

Freddie so deeply insolvent. For example, the report states that "excessive risk taking" at AIG was a leading cause of the financial crisis,[158] and it cites the company's conduct as a primary justification for federal regulation of derivatives.[159] But the report does not recognize that AIG was broadly exposed to the subprime market on both sides of its balance sheet, concluding instead that the company imploded because it was "overwhelmed" by the "sheer volume" of its credit default swap liabilities.[160] Unsurprisingly, the House bill's provisions for derivatives invite officials to regulate contracts based primarily on their notional amounts, as if the contingent debt problem were indistinct from a problem of excess leverage more generally.[161]

Perhaps the most far-reaching of the measures in the House bill are leverage caps that would require financial firms to issue less debt relative to their equity values.[162] Minimum capital requirements of this type have obvious appeal in the aftermath of 2008, as a decrease in a firm's debt-to-equity ratio makes the firm's insolvency less likely. But the bill also enables regulators to raise capital requirements even higher on firms that trade in derivatives.[163] And leverage requirements specific to derivative users seem harder to justify, as they could burden even firms whose derivative-based contingent debts lack positive internal correlations and thus do not increase insolvency risk or otherwise present a meaningful opportunism hazard. In other words, the bill invites regulators to adopt a sledgehammer approach, effectively taxing derivatives across the board rather than targeting those that are most likely to create systemic risk or otherwise reduce social wealth.

The House bill would also require derivative users to disclose more information about their trading positions, with data to be collected through regulated exchanges.[164] As with stricter leverage require-

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[158] TREASURY REPORT, *supra* note 68, at 47.

[159] *Id.*

[160] *Id.* In this way, the section on derivatives is analytically no different from the report's earlier sections that blame the collapse of large bank holding companies on problems of "excess leverage." *See id.* at 29.

[161] No variant on the word "correlation" appears in the section of the bill that addresses derivatives, and two of that section's most important provisions — those involving capital and margin requirements — could be set based entirely on notional amounts, at the discretion of regulators. The closest that the section on derivatives seems to come to addressing risk correlations are its provisions that permit regulators to impose position limits on individual parties. But the bill does not direct regulators to take risk correlations into account when setting limits, and instead seems concerned primarily with positions that might interfere with price discovery. H.R. 4173 §§ 3113, 3203.

[162] *Id.* §§ 1103–04.

[163] *Id.* §§ 3107, 3204; *see also* TREASURY REPORT, *supra* note 68, at 48 (identifying stricter counterparty capital requirements as a regulatory goal).

[164] *See* H.R. 4173 §§ 3103–3106, 3204. Because of exemptions contained in the bill, only about half of all derivative contracts would need to be exchange-traded. *See* Randall Smith & Sarah N. Lynch, *How Overhauling Derivatives Died*, WALL ST. J., Dec. 26–27, 2009, at B1.

ments, this proposal could have nominal benefits. For example, required disclosures may make it cheaper for creditors to monitor debtors and ferret out opportunism. It is not obvious, however, that a lack of relevant information was a primary cause of the financial crisis. For example, AIG's 2007 annual report contained detailed information about the company's swap positions and about the type, face value, vintage, and credit rating of the mortgage-backed securities that the company owned.[165] Yet insurance regulators did nothing to force AIG to mitigate its housing market exposure before the crisis. In other words, the financial crisis seems to have been caused not primarily by a lack of information about risk, but rather by a lack of motivation among those with information to act on it. And disclosure requirements impose direct costs, especially if they become a basis for private lawsuits alleging that disclosures are incomplete or misleading. Therefore, heightened disclosure rules may be another example of a measure that raises costs across the board but fails to reach the root of the problem.

The House bill's third major requirement for derivative contracts is potentially the most problematic. The bill would enable regulators to impose "margin" requirements, meaning that counterparties would have to post more collateral than their contracts would otherwise require.[166] The idea is to insulate each counterparty from the risk that the other will fall insolvent, thereby preventing the type of contagion in a financial crisis that is the essence of systemic risk. In this way, the proposal implies that the financial crisis was primarily a crisis of illiquidity — for example, that AIG could have survived without a government bailout if it had only posted more collateral when it first entered into its swap contracts. But the truth is that AIG was not just illiquid but also insolvent, with losses in 2008 that exceeded the company's 2007 equity value.[167] Therefore, more collateral for AIG's counterparties would simply have meant deeper losses for its other creditors — including other financial firms — in a bankruptcy proceeding. Put more generally, financial intermediaries are thought to create systemic risk because they are interconnected, with multiple debt obligations and other contractual arrangements among them. It therefore seems doubtful that the systemic damage caused by the failure of one such firm could be stemmed by shifting losses from some contract types to others.

Indeed, rather than contain systemic risk, higher margin requirements may in fact exacerbate it. As was noted previously, the special

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[165] AIG 2007 10-K Report, *supra* note 76, at 104–05, 121–23.

[166] *See* H.R. 4173 §§ 3107, 3204.

[167] *See supra* note 97.

Bankruptcy Code exemptions for derivatives make counterparties de facto secured creditors by giving them the first claim to posted collateral.[168] And this priority reduces the need for counterparties to monitor each other because it shifts insolvency risk onto other unsecured creditors. However, to the extent that counterparties start out undersecured, with the expectation that more collateral will have to be posted if risk levels increase, the parties have some reason to keep an eye on each other over the life of the contract. It follows that margin requirements that force parties to post more collateral up front will further reduce their incentive to be vigilant after the contract is signed, thereby making correlation-seeking — and hence financial distress — more likely. And this result would be especially perverse given that the relative sophistication of derivative counterparties, most of which are financial institutions, would make them better monitors than the typical unsecured creditor.

When considered in the context of the financial system as a whole, higher margin requirements can be seen as introducing conflict between two related regulatory goals. The first goal is to prevent individual financial institutions from taking on excessive business risk that might cause them to fail. And the second goal is to quarantine those firms that (despite regulators' best efforts) fail anyway, thereby preventing insolvent firms from infecting otherwise healthy counterparties. Strict margin rules advance the second goal at the expense of the first, because they insulate select creditors from losses caused by correlation-seeking, thus making correlation-seeking more likely. For this reason, margin rules are inferior to reforms such as minimum capital requirements, which reduce the risk both that an "index patient" will succumb and, if one does, that the infirmity will spread.

The other important component of the administration's regulatory vision is found not in proposed legislation, but rather in the executive pay policies adopted by the Treasury Department's "pay czar." Although the pay czar has formal jurisdiction over only a handful of bailout recipients such as AIG and General Motors, the Obama Administration has expressed a hope that other firms will treat his approach as a "best practice" that they too should follow.[169] And several firms have in fact already done so, perhaps to try to stave off more aggressive regulation.[170] The Federal Reserve, in turn, has proposed pay

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[168] *See supra* pp. 1187–88.

[169] *See* Deborah Solomon, *Pay Czar Targets Salary Cuts*, WALL ST. J., Oct. 6, 2009, at A1 (internal quotation marks omitted).

[170] Deborah Solomon, *Firms Back Plan To Change Pay Policies*, WALL ST. J., Sept. 21, 2009, at A3; s*ee also* Aaron Lucchetti, *Morgan Stanley To Overhaul Pay Plan*, WALL ST. J., Dec. 29, 2009, at C1 (noting that Morgan Stanley has adopted a pay policy that increases the degree to which senior executives will be paid in deferred stock).

guidelines that would apply to all banking organizations[171] and that suggest in places an approach to executive compensation potentially similar to that of the pay czar. Importantly, that approach is based on a theory of management misconduct that is in tension with the opportunism story told here.

The administration has sought to regulate executive pay according to two general principles. The first is that senior executives should take more of their compensation in the form of equity rather than cash.[172] And the second is that executives should be forced to hold on to their equity in the company for several years.[173] In combination, these principles suggest that the administration is mainly worried about conflicts of interest between managers and shareholders, and in particular that managers too often pursue short-term gain at the expense of long-term shareholder value.[174] But the evidence from AIG, Fannie Mae, and Freddie Mac tells a different story. In those firms, the apparent problem was not that managers failed to serve shareholders, but rather that they served them too well, seeking to enrich them at the expense of creditors and taxpayers. The fact that these firms' shareholders eventually took huge losses does not mean that the managers' decisions were contrary to shareholder interests given the information available at the time. Moreover, correlation-seeking is not a game in which managers play the short term against the long term. Rather, it is a stratagem in which managers play the interests of shareholders against the interests of creditors over essentially the same time horizon. By forcing executives to take more of their pay in equity and less in cash, the administration's policies align managers even more closely with shareholders against creditors, thereby making correlation-seeking more likely.[175]

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[171] In particular, the Federal Reserve's pay rules would bind U.S. bank holding companies, state member banks, and the U.S. operations of foreign banks, among others. *See* Proposed Guidance on Sound Incentive Compensation Policies, 74 Fed. Reg. 55,227, 55,228 n.1 (Oct. 27, 2009) [hereinafter Proposed Guidance].

[172] *See* Solomon, *supra* note 169 ("Instead of awarding large cash salaries, [the pay czar] is planning to shift a chunk of an employee's annual salary into stock that cannot be touched for several years . . . ."); s*ee also* Proposed Guidance, *supra* note 171, at 55,234 (indicating that banking organizations can comply with guidelines on management risk-taking incentives by paying senior executives "deferred incentive compensation in equity (such as restricted stock of the organization) or equity-based instruments (such as options to acquire the organization's stock)").

[173] *See* sources cited *supra* note 172.

[174] *See, e.g.*, Proposed Guidance, *supra* note 171, at 55,232 (expressing concern with compensation that focuses on short-term revenues or profits because "[a]ctivities that carry higher risk typically yield higher short-term revenue").

[175] Other scholars have also observed that paying bank executives in equity may induce banks to take risks that are excessive from a social perspective. *See* Lucian A. Bebchuk & Holger Spamann, *Regulating Bankers' Pay*, 98 GEO. L.J. 247, 256 (2010).

In fact, the administration's pay policies would cause senior executives to benefit even more from correlation-seeking than many of their shareholders do. This is because many shareholders diversify their investments across public companies, which blunts their personal benefits from correlation-seeking in two ways. First, diversification reduces the net wealth gain to the shareholder from correlation-seeking by making it more likely that the shareholder will own the firms on both sides of the wealth transfer. And second, diversification tempers investment volatility, thereby reducing the need for loyal managers to take equity volatility into account when deciding which assets to buy or contingent debts to incur. But diversification is an option denied to executives who are forced to hold a large, locked-in equity stake in a single firm. And concentrated shareholders of this type benefit most from wealth transfers to their particular firm's advantage, and from firm-specific reductions in equity volatility, both of which are consequences of correlation-seeking. For this reason, the administration's pay policies may introduce a type of conflict between managers and public shareholders that further exacerbates the correlation-seeking hazard.

2. A Better Approach: Helping Creditors Help Themselves. — In light of these drawbacks to the administration's proposed financial sector reforms, a better approach might be for lawmakers to remove legal impediments that now discourage creditors from punishing opportunism directly. The most important of these impediments are the special bankruptcy exemptions for derivative counterparties. The ostensible purpose of these exemptions is to reduce systemic risk by preventing the bankruptcy of one firm from destabilizing counterparties that are financial intermediaries.[176] However, as argued above, it is implausible that systemic risk can be curtailed merely by shifting losses around among contract types. Moreover, the exemptions magnify the opportunism hazard created by derivatives because the wealth transfer produced by a contingent debt increases when the claimant has priority over other creditors.[177] Reinstating bankruptcy's automatic stay and its prohibitions on preferences and ipso facto clauses would shrink wealth transfers by relegating derivative counterparties to the status of ordinary unsecured creditors. This change would also make counterparties more vulnerable to correlation-seeking, thereby encouraging them to monitor in order to prevent it. For example, if AIG's sophisticated swap buyers had been more exposed to the risk that AIG would

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[176] Franklin R. Edwards & Edward R. Morrison, *Derivatives and the Bankruptcy Code: Why the Special Treatment?*, 22 YALE J. ON REG. 91, 97–99 (2005).

[177] *See supra* pp. 1174–75.

fail, they might have tried to prevent the company from reallocating so much of its investment portfolio into risky mortgage-backed assets.

Lawmakers should also encourage creditor monitoring by reforming common law creditor-protection doctrines to reflect the distinct opportunism hazard presented by contingent debt. For example, an effective fraudulent transfer doctrine would penalize contingent claimants when correlation-seeking is apparent, thereby encouraging the claimants themselves to avoid contingent debt contracts with high internal correlations.[178] In addition, regulators might require rating agencies to issue reports that reflect not only the probability that an individual debt instrument will default, but also the instrument's diversification value — that is, the correlation between the instrument's default risk and the risks on other important categories of investment products. Such ratings would permit creditors to write loan covenants that refer to publicly available measures of diversification, creating a cheap mechanism for enforcing contractual limitations on internal correlation levels.

Besides the bankruptcy exemptions for derivatives, another policy that lawmakers should revisit is the administration's executive pay guidelines. By insisting that senior managers hold long-term equity positions, these guidelines only aggravate shareholder-creditor conflict. Lawmakers instead should be more tolerant of executives' natural preference for cash-based compensation, at least in financial intermediaries. Or, if "short-termism" remains a perceived problem (albeit a problem distinct from correlation-seeking), lawmakers might require executives in systemically important firms to take some of their pay in the form of restricted firm debt.

Of course, any effort to make creditors — including, potentially, managers themselves — more watchful will be in vain if the creditors expect the government to bail them out when their debtor defaults. It follows that the correlation-seeking hazard is at its zenith when creditors are confident that they will recover in full, with taxpayers rather than creditors suffering the expected wealth transfers, and the economy as a whole bearing the social costs. It therefore is essential that regulators create an environment in which creditors bear default risk. In this respect, there seems to be little reason for the government to bail out the general, fixed-claim creditors of government-sponsored entities such as Fannie Mae and Freddie Mac, even if the government continues to ensure the performance of the mortgage-backed securities those firms issue.[179]

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[178] *See infra* section III.B, pp. 1205–12.

[179] While the future form of government-sponsored mortgage firms remains unclear, the federal government appears likely to retain at least some role in the underwriting of residential mort-

To the extent, however, that creditors will inevitably regard at least some firms as "too big to fail," regulators may have to target correlation-seeking directly. In the cases of Fannie Mae and Freddie Mac, this presumably would mean much tighter limits on the ratio of outstanding mortgage guarantees to firm equity value. And in systemically important firms generally, regulators might consider bright-line prohibitions on sales of contingent debt contracts that constitute "end of the world" insurance, meaning insurance that is likely to be triggered only in a severe economic downturn that impairs multiple asset classes. Because the downside risk on such contracts cannot easily be hedged, it is unlikely to be borne by shareholders of firms with meaningful debt levels, thereby creating large expected wealth transfers away from unsecured creditors and taxpayers. A prominent example of such insurance is credit default swaps on U.S. Treasury bonds, the market for which has swelled in recent years. These swaps tend to sell at a discount precisely because, as economist Jeffrey Hummel has observed, the U.S. government is likely to default on its debts only under the sort of dire economic conditions that would tend to bankrupt the swap sellers as well.[180] Regulators should consider permitting derivatives of this type to be sold only by entities that lack significant debt, and thus cannot readily use the contracts to expropriate wealth through correlation-seeking.

B. Correlation and Fraudulent Transfer Law

Like current regulatory proposals, traditional creditor-protection doctrines also neglect correlation-seeking. This is a shame, because the most important of these doctrines, fraudulent transfer law, provides a powerful equitable remedy in a setting where contractual remedies often are inadequate to deter opportunism. That remedy is subordination of a claim against a debtor that otherwise would tend to expropriate wealth from the debtor's unsecured creditors. Applied properly, subordination could negate the correlation-seeking incentive by canceling the wealth transfer away from the debtor's unsecured creditors.

Alas, fraudulent transfer doctrine is currently unsuitable for deterring correlation-seeking. Courts analyze fraudulent transfer challenges to contingent debts under the same principles they use for challenges to fixed debts, producing rulings that bear no meaningful relationship to the actual opportunism hazard. Fortunately, fraudulent transfer

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gage–backed securities. *See* Nick Timiraos, *Support Grows for Fan-Fred Plan*, WALL ST. J., Dec. 14, 2009, at A7.

[180] Jeffrey Rogers Hummel, *Why Default on U.S. Treasuries Is Likely*, LIBR. ECON. & LIBER-TY, Aug. 3, 2009, http://www.econlib.org/library/Columns/y2009/Hummeltbills.html.

rules for contingent debt that focus on correlations could be fashioned within the existing statutory framework. This section explains how.

Originally, fraudulent transfer law prohibited only "actual" fraud — meaning debtor conduct that demonstrably was intended to harm creditors.[181] But modern fraudulent transfer statutes also grant relief from certain debtor conduct that is objectively likely to make creditors worse off, known as "constructive" fraud. To establish constructive fraud, a litigant must satisfy two elements. First, the litigant must show that the debtor gave away assets or incurred a debt without receiving "reasonably equivalent value" in exchange.[182] And second, the litigant must show that the challenged transaction occurred under circumstances in which opportunism was especially likely.[183] Litigants have a few statutory options for fulfilling this second element; by far the most popular is to show that the debtor was insolvent when the transaction occurred.[184]

When the alleged fraud involves a simple purchase or sale, the "reasonably equivalent value" question is straightforward: did the debtor give away assets worth about as much as those the debtor got in return? If the answer is no, the transaction reduced the debtor's net worth, making creditors worse off. When the alleged fraud involves a debt contract, however, the analysis is a bit more complicated. What exactly is the "reasonably equivalent value" of a debt? Although courts have differed on this question, the majority approach today employs something akin to a simple expected value calculation.[185] In other words, the court estimates the forward-looking probability that the debt will come due, and multiplies this by the debt's face value. If the product is comparable to the value of the assets the debtor received for incurring the debt, the court holds that reasonably equivalent value was provided.[186]

This expected value approach makes good sense when used to deter misuse of *fixed* debts. To see why, consider again the $25 fixed debt from Figure 2. That figure assumed that Claimant was willing to

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[181] *See* 11 U.S.C. § 548(a)(1)(A) (2006) (incorporating a prohibition on actual fraudulent transfers into federal bankruptcy law); Robert A. Fogelson, *Toward a Rational Treatment of Fraudulent Conveyance Cases Involving Leveraged Buyouts*, 68 N.Y.U. L. REV. 552, 555 (1993) (indicating that the original fraudulent conveyance statute, the Statute of Elizabeth, prohibited only actual fraud).

[182] 11 U.S.C. § 548(a)(1)(B)(i); UNIF. FRAUDULENT TRANSFER ACT §§ 4(a)(2), 5(a), 7A U.L.A. pt. 2, at 58, 129 (2006). Under the older Uniform Fraudulent Conveyance Act, which is still in effect in some states, a "fair consideration" test stands in for the "reasonably equivalent value" requirement. *Id.* § 4 cmt. 2 (internal quotation marks omitted).

[183] *See* 11 U.S.C. § 548(a)(1)(B)(ii).

[184] *See id.* § 548(a)(1)(B)(ii)(I).

[185] The most influential decision in this line of cases was written by Judge Richard Posner. *See In re* Xonics Photochemical, Inc., 841 F.2d 198 (7th Cir. 1988).

[186] *See id.* at 200.

pay Debtor an up-front amount equal to her expected recovery on her claim, which is the maximum amount a rational, risk-neutral party in Claimant's position would pay. Given the other assumptions used for Figure 2, that amount was $24.29. And, as the figure showed, this arrangement increased Unsecured Creditor's expected losses by 13%. How much worse off would Unsecured Creditor be if we assumed instead that Debtor simply gave away the $25 fixed claim for free? In that case, the increase in Unsecured Creditor's expected losses would more than quadruple, to 60%.[187] The implication is that a fraudulent transfer doctrine that requires claimants to pay the expected value of their claims does in fact greatly reduce the opportunism hazard presented by fixed obligations.

Matters change considerably, however, when we apply the same approach to contingent debts, as Figure 4 illustrates.

FIGURE 4. CONTINGENT DEBT WEALTH TRANSFER:
WITH AND WITHOUT PREMIUM
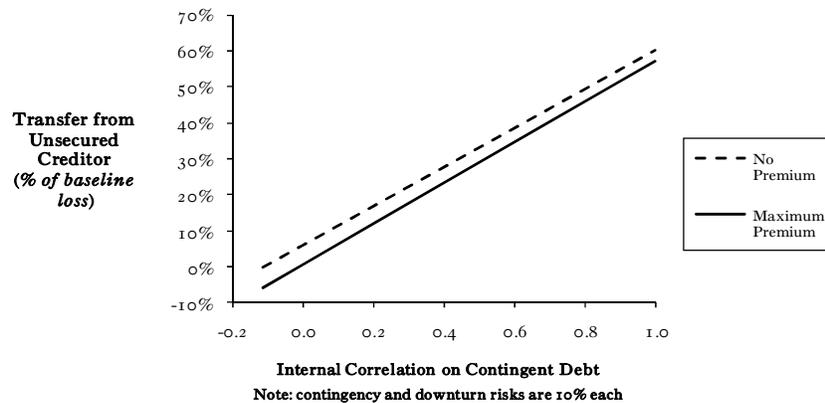
The figure reflects the same assumptions that were used for Figure 2. The line labeled "Maximum Premium" shows the wealth transfer away from Unsecured Creditor when Claimant pays a premium equal to her expected recovery on her claim — which, as noted, is the largest amount she rationally would pay.[188] And the "No Premium" line shows the opposite extreme, where Debtor incurs the contingent debt but receives nothing from Claimant in return.

The figure shows that the "reasonably equivalent value" requirement as courts now interpret it serves essentially no useful function

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[187] This result is calculated by taking equation (3) in note 22, *supra*, and setting *P* equal to $0.
[188] This line is thus identical to the contingent debt line in Figure 2.

when applied to a contingent debt. By forcing claimants to pay the simple expected value of their claims, that requirement in effect tries to reduce unsecured creditors losses by the distance between the "No Premium" line and the "Maximum Premium" line. But this distance is trivial, a mere 3% to 6% in terms of Unsecured Creditor's baseline loss. By contrast, recall that the same approach made a 47 percentage-point difference in terms of Unsecured Creditor's expected losses when the claim was fixed. Thus, relative to the other factors that determine the contingent debt's impact on Unsecured Creditor, we see that the question whether Claimant pays a premium at all — let alone the maximum premium she would pay — is almost entirely irrelevant. What really matters is the internal correlation, which as it swings from zero to perfect in Figure 4 increases Unsecured Creditor's expected losses by more than 50%.[189]

Figure 4 also shows that current doctrine decides cases in a manner that makes big mistakes in both directions. The claim at the upper right endpoint of the Maximum Premium line represents a huge opportunism risk, since it increases Unsecured Creditor's expected losses by 57%. But a court would hold that the claim satisfies the "reasonably equivalent value" test because Claimant paid a premium equal to her full expected recovery on it. Conversely, the claim at the lower left endpoint of the No Premium line has no expected economic impact on Unsecured Creditor at all. And yet a court might very well deem that claim fraudulent because Debtor gave it away for free.

These illogical results stem from current doctrine's failure to define "reasonably equivalent value" from the perspective of the parties that fraudulent transfer law is supposed to protect: unsecured creditors. The simple expected value test that courts now use essentially adopts the viewpoint of the contingent claimant, and asks whether she paid a premium approximating her claim's value to her. For example, Claimant is willing to pay $1.52 for the perfectly correlated $25 contingent claim depicted in Figure 4. And, as noted, a court would probably find that this premium qualifies as reasonably equivalent value, because it reflects the claim's simple expected value. (If alternatively the court adopted the perspective of Shareholders, the premium would seem *more* than reasonable, because the claim imposes no downside risk on them at all.) But $1.52 is grossly inadequate from the perspective of Unsecured Creditor. Due to the liability's high internal correlation, the premium would have to be $31.25 to neutralize the debt's

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[189] The question whether Claimant pays in full becomes even less important as the risk of the triggering event decreases. For example, if we were to assume in Figure 4 that the contingency and downturn risks were each 1% rather than 10%, the correlation level would still make more than a 50% difference in terms of Unsecured Creditor's expected losses. But the difference made by the premium would shrink to less than 1%.

negative impact on Unsecured Creditor[190] — more than *twenty times* the maximum premium that Claimant would pay.

The magnitude of this shortfall suggests that courts should not waste time and litigation costs trying to determine how much a claimant actually paid for a contingent debt. The difference between the maximum and minimum amounts the claimant could have paid is of essentially no consequence to the debtor's unsecured creditors. Instead, courts should look at the factor that actually drives the scale of the wealth transfer: the internal correlation. And, because the purpose of fraudulent transfer law is to deter opportunism, courts should focus specifically on the correlation that would have been evident to an informed claimant when the debt was incurred. When that correlation is low, the court can be confident that the debt contract imposed at most a minor expected loss on the unsecured creditors, even if the debtor gave away the debt for free. Such a contract presents no opportunism hazard and should be enforced in full. But when the internal correlation is high, a court knows that the contract produced a large expected transfer, even if the debtor managed to bargain for the largest possible premium the claimant would have paid. Such a contract therefore should automatically be deemed to fail the "reasonably equivalent value" requirement.

Unfortunately, the second element of most constructive fraudulent transfer challenges to contingent debts performs no better than the first. As noted above, litigants usually try to satisfy the second element by showing that the debtor was insolvent when the debt was incurred.[191] The intuition behind the insolvency requirement is that a firm's managers are most likely to give away the firm's assets — through outright gifts or one-sided "loans" — when the shareholders have no remaining economic stake in the firm.

While the logic behind the insolvency requirement seems plausible when a debt is 100% certain to come due, it breaks down when the obligation to pay is contingent upon a future event that is correlated with the firm's insolvency risk. In that case, the firm does not have to be insolvent now for its managers to anticipate that it will be if the liability ever comes due. Therefore, a fraudulent transfer doctrine that applies an insolvency requirement to contingent debts will be badly underinclusive, missing many instances in which the opportunism hazard arises. This conclusion is borne out by Figures 2 and 3, which show contingent debts that can produce large expected wealth transfers even

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[190] This result is calculated by taking equation (4) in note 22, *supra*, setting T equal to $0, and solving for P.

[191] *See* 11 U.S.C. § 548(a)(1)(B)(ii)(I) (2006); UNIF. FRAUDULENT TRANSFER ACT § 5(a), 7A U.L.A. pt. 2, at 129 (2006).

though both figures assume that Debtor is solvent when the debts are incurred.

Fortunately, there are statutory alternatives to the insolvency requirement. In particular, a litigant can prevail by showing instead that the debtor "intended to incur, or believed that the debtor would incur, debts that would be beyond the debtor's ability to pay as such debts matured."[192] This alternative is rarely used,[193] presumably because litigants believe that it is hard to prove that a debtor intended to default. But a high internal correlation that was conspicuous when a contingent debt was incurred provides exactly such proof. Thus, if a debtor knew, or reasonably should have known,[194] that a contingent debt was highly correlated with the debtor's insolvency risk, then the debtor certainly incurred a debt that it could foresee would be beyond its ability to pay as the debt matured.[195] This alternative to the insolvency requirement means that litigants in theory could use evidence of a high internal correlation to satisfy *both* elements of a constructive fraudulent transfer claim. And it means that courts could have an effective method for policing correlation-seeking that conforms with fraudulent transfer statutes as they are now written.

How would courts estimate the internal correlation that would have been evident to an informed observer when a contingent debt was incurred? Although a complete answer to this question requires further scholarship, a few factors that might serve as reliable indicators of positive internal correlations can be identified here. First, the contingent liability created by a guarantee contract will almost invariably have a high internal correlation if the guarantor and borrower are under common control — meaning that they are part of the same corporate group, or the guarantor is a shareholder who has personally guaranteed the debt of a closely held corporation. In those arrangements, the fortunes of borrower and guarantor tend to be tightly

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[192] 11 U.S.C. § 548(a)(1)(B)(ii)(III); *accord* UNIF. FRAUDULENT TRANSFER ACT § 4(a)(2)(ii), 7A U.L.A. pt. 2, at 58 (employing an essentially identical test).

[193] *See* Asarco LLC v. Ams. Mining Corp., 396 B.R. 278, 399 n.140 (S.D. Tex. 2008) (noting that courts have had little opportunity to interpret the provision).

[194] Although the statutory language suggests a subjective intent requirement, courts have held that the requirement can be satisfied upon a showing that "the debtor could not have reasonably believed that it would be able to pay its debts as they matured." WRT Creditors Liquidation Trust v. WRT Bankr. Litig. Master File (*In re* WRT Energy Corp.), 282 B.R. 343, 415 (Bankr. W.D. La. 2001).

[195] In the typical fact pattern, the challenged transaction is a conveyance of assets rather than the incurrence of an obligation, and the question is whether the conveyance was fraudulent with respect to subsequent creditors. *See, e.g., Asarco*, 396 B.R. at 400. Courts have, however, deemed an obligation to be fraudulent when the obligation itself is the debt that the debtor did not intend to be able to repay. *See, e.g.*, Pajaro Dunes Rental Agency, Inc. v. Spitters (*In re* Pajaro Dunes Rental Agency, Inc.), 174 B.R. 557, 593–94 (Bankr. N.D. Cal. 1994) (applying the corresponding provision in California's fraudulent transfer statute).

linked, either because the two produce the same economic outputs, or because one owns a large equity stake in the other.

More broadly, contingent liabilities tend to have high internal correlations when the debtor is in the same industry as the firm or asset whose performance risk is the subject of the contingency. For example, stock prices for firms in the same industry are more correlated than stock prices generally.[196] Courts therefore might adopt a presumption that a claim on a put option is to be subordinated whenever the writer of the option is in the same industry as the issuer of the reference stock. And the same rule would apply to a credit default swap on a bond when the swap seller is in the same industry as the bond issuer.

Finally, the most reliable indicator of a positive internal correlation is a face value that is greater than the debtor's equity value when the debt was incurred. As Figure 3 illustrated, contingent debts of this type always produce large expected wealth transfers, implying that they should always be subordinated.[197] For the same reason, a debt should be subordinated if its face value combined with the value of other contingent debts already on the debtor's books exceeded the debtor's equity and the triggers on those debts were themselves highly correlated.

A potential objection to the fraudulent transfer doctrine proposed here is that it is subject to hindsight bias. By necessity, fraudulent transfer challenges to contingent debts are brought only when the debt has in fact been triggered against an insolvent debtor, making this eventuality seem much more likely than it would have originally appeared to an informed observer. But hindsight bias is a pitfall of any fraudulent transfer doctrine that tries to analyze conditions when a debt was incurred rather than after it has come due. Moreover, questions of correlation will usually be less speculative than the expected value questions that courts now ask. For example, reasonable minds could have disagreed in 2005 about the probability that liability on AIG's mortgage-linked swaps would be triggered. And yet the answer to that question would be an essential ingredient of an expected value calculation. By contrast, there could have been far less doubt that, if deep liability on AIG's swaps was triggered, then AIG's own subprime mortgage–backed securities would also have plummeted in value. This example suggests that estimating whether two future events are correlated is often easier than estimating each event's independent probability. And, as the previous discussion suggested, a correlation-

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[196] Chan et al., *supra* note 37, at 943.

[197] For claims that create a range of possible liability amounts, courts could treat the expected mean, or perhaps the mean plus a standard deviation, as the relevant point for determining whether to subordinate.

based doctrine could use bright-line rules such as whether assets are employed in the same industry or under common control. Therefore, a correlation-based fraudulent transfer approach to contingent debt would be easier than current doctrine to apply, while at the same time producing results better targeted toward the actual opportunism hazard.

A second potential objection to the approach proposed here is that it would not deter reverse correlation-seeking. The proposed approach looks only at the internal correlation when the contingent debt was incurred, rather than also considering subsequent debtor conduct that might have increased that correlation. But subordinating a contingent debt in response to reverse correlation-seeking would make little sense, because reverse correlation-seeking harms the contingent claimant along with the rest of the debtor's unsecured creditors. Importantly, this limitation of the proposed approach is not a reason to prefer current fraudulent transfer doctrine, which also does nothing to prevent reverse correlation-seeking. The limitation does, however, suggest that an effective legal response to correlation-seeking must include multiple components, combining reform of fraudulent transfer doctrine with, for example, measures that would make it cheaper for creditors to monitor in order to prevent correlation-seeking in each of its forms.

CONCLUSION

The recent financial crisis demonstrated that the law has failed to keep pace with the expanding role of contingent debt in the modern economy. Legal rules meant to prevent abuse of debt were designed for a world of fixed obligations such as simple loans and bonds. These rules naturally focus on a debt's face value, and they assume that opportunism is most likely when a firm is already insolvent and shareholders therefore no longer care that higher leverage means higher volatility. With contingent debt, however, there is a variable that matters just as much as the face value: the correlation between the contingency risk and the debtor's insolvency risk. And conduct that increases this correlation — a form of opportunism that this Article has termed correlation-seeking — often reduces equity volatility as it increases shareholder returns, making it a hazard even in firms that are fully solvent. If rules suitable for contingent debt had been in place before 2008, the financial crisis might not have been as severe. And AIG, Fannie Mae, and Freddie Mac certainly would not have needed so much government money to stay afloat.

This Article has identified several ways for lawmakers to start catching up to the correlation-seeking hazard. In the financial markets, obstacles to creditor monitoring should be cleared, and regulators should reconsider executive pay rules that exacerbate shareholder-creditor conflict by encouraging managers to hold locked-in equity po-

sitions. But these would only be first steps. Lawmakers need empirical research in order to target correlation-seeking aggressively without unduly burdening socially beneficial uses of contingent debt. For example, more data is needed to identify which variables — such as industry, market sector, and ownership structure — best predict high internal correlations. To tailor rules to contract types, separate data is required for correlations between equity values and insolvency risk (which would predict misuse of put options), and between insolvency risk across firms (predicting misuse of credit default swaps). In addition, regulators charged with curbing systemic risk would benefit from information on how prices for contingent debt contracts vary depending on the seller's debt structure. Such information could flag those contracts that are being subsidized by large value transfers away from the seller's unsecured creditors — or, if the seller is a likely bailout recipient, taxpayers. Not only could such data reveal firm-specific correlation-seeking, but it also could identify an increase in systemic risk before it manifests in another crash.

Although this Article's focus has been on relatively "exotic" contingent debt contracts such as credit default swaps, more traditional arrangements may be no less subject to opportunism. Indeed, the most pervasive ongoing source of correlation-seeking in the modern economy may be guarantees on corporate debt where the guarantor and borrower are part of the same corporate group (an "intragroup" guarantee) or the guarantor is the borrower's controlling shareholder. These arrangements are extremely prevalent, and correlation-seeking helps explain why. The fortunes of a guarantor and a borrower will be highly correlated if both entities contribute to the production of the same outputs, or if one entity holds a large equity stake in the other. Therefore, the contingent liabilities created by guarantees in which the guarantor and borrower are under common control will almost invariably have high internal correlations, producing large expected wealth transfers away from the guarantors' unsecured creditors. On the other hand, common control guarantees may generate important economic efficiencies, especially if the guarantor is better positioned than the lender to monitor the borrower. For this reason, and because an extensive literature on these arrangements already exists, common control guarantees deserve a more thorough treatment than could be provided here. Nonetheless, they serve as a useful reminder that the hazard of correlation-seeking goes well beyond financial derivatives, and that a comprehensive legal response must do so as well.