NOT TOO BIG TO FAIL
Systemic Risk, Regulation, and the Economics of Commodity Trading Firms

SECTION III
SOURCES OF SYSTEMIC RISK

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Systemic financial risk triggers significant adverse effects on the real economy. According to the G-10 and the Financial Stability Board (FSB), the imposition of externalities onto other firms are a necessary condition for a potential source of systematic risk.

A firm’s level of debt and the structure of its debt are important sources of systemic risk. Highly leveraged firms play a role in most financial crises. Fragile capital structures exist because financial intermediaries perform maturity and liquidity transformations. This creates susceptibility to bank runs and bank-run-like behavior.

Multiple financial institutions must be affected simultaneously for a truly systemic event to occur. They may be susceptible to the same economic shock; or a single institution may impact another set of entities via

- **Direct interconnections** – through counterparty credit channels and derivatives
- **Indirect interconnections** – through “contagious runs” and “fire sales.”

When intermediaries’ financial condition is sensitive to macroeconomic conditions, they can accentuate the effect of the initial downturn.
Now that I have reviewed the economics of commodity trading firms, I turn attention to the issue of systemic risk: together these analyses will provide the basis for an evaluation of the systemic risk of commodity traders and the appropriate regulatory regime for these firms. Regulatory changes adopted since the great financial crisis of 2007-2008, and the great recession that followed, are intended to reduce systemic risk, and CTFs may be subjected to some of these regulations.

There are a variety of definitions of systemic risk. The most commonly cited definition was produced by the G-10 in 2001:

• Systemic financial risk is the risk that an event will trigger a loss of economic value or confidence in, and attendant increases in uncertainly about, a substantial portion of the financial system that is serious enough to quite probably have significant adverse effects on the real economy. Systemic risk events can be sudden and unexpected, or the likelihood of their occurrence can build up through time in the absence of appropriate policy responses. The adverse real economic effects from systemic problems are generally seen as arising from disruptions to the payment system, to credit flows, and from the destruction of asset values.

• Two related assumptions underlie this definition. First, economic shocks may become systemic because of the existence of negative externalities associated with severe disruptions in the financial system. If there were no spillover effects, or negative externalities, there would be, arguably, no role for public policy. In all but the most highly concentrated financial systems, systemic risk is normally associated with a contagious loss of value or confidence that spreads to parts of the financial system well beyond the original location of the precipitating shock. In a very highly concentrated financial system, on the other hand, the collapse of a single firm or market may be sufficient to qualify as a systemic event.

• Second, systemic financial events must be very likely to induce undesirable real effects, such as substantial reductions in output and employment, in the absence of appropriate policy responses. In this definition, a financial disruption that does not have a high probability of causing a significant disruption of real economic activity is not a systemic risk event.

The Financial Stability Board advances a similar definition:

• The risk of disruption to the flow of financial services that is (i) caused by the impairment of all or parts of the financial system; and (ii) has the potential to have serious negative consequences for the real economy.

• Fundamental to this definition is the notion that systemic risk is associated with negative externalities and/or market failure and that a financial institution’s failure or malfunction may impair the operation of the financial system or the real economy.

Other definitions include that of Federal Reserve Chairman Ben Bernanke in a letter to Senator Bob Corker in 2009: “Systemic risks are developments that threaten the stability of the financial system as a whole and consequently the broader economy, not just that of one or two institutions.” Stanford Professor John Taylor offers a three-part test to determine whether systemic risk exists, and the analysis that follows adheres to this test. Taylor says for a risk to be systemic, (i) there must be a risk of a large triggering shock (such as a natural disaster or the failure of a firm or firms), (ii) there must be a risk of the shock propagating through the financial system via contagion or chain reaction, and (iii) the financial disruption must affect the broader macro-economy.

According to these definitions, a firm can be systemically important if its financial distress imposes externalities (“spillovers”) onto other firms, and these spillovers reduce output in the real economy. The G-10 and the FSB both explicitly recognize that such externalities are a necessary condition for a firm or group of firms to be a potential source of systemic risk, and that externalities are also a necessary condition to justify the imposition of regulations on this firm or firms.
Like Tolstoy’s unhappy families, all financial crises are unhappy affairs in their own way: the source(s) of externalities, and the ways that a crisis develops, differ from episode to episode. Nonetheless, there are factors that are common to most crises, and to the entities at the center of them. These factors are therefore relevant in determining whether a particular entity, or group of entities, pose a systemic risk.

**Leverage**
Highly leveraged entities play a central role in most financial crises. Large numbers of banks and investment banks have either failed, or been at risk of failure, during historical crises: indeed, financial crises are often referred to as “banking crises.” Banks and investment banks are typically highly leveraged. Other crises have involved highly leveraged trust companies, structured financial vehicles that fund asset purchases primarily with debt, or highly leveraged hedge funds (e.g., LTCM).

The amounts of gearing of affected institutions are very high, typically at least ten-to-one, but sometimes forty-to-one or more. High leverage means that small declines in asset values can force firms into financial distress. Through a variety of mechanisms, discussed in more detail below, financial distress at certain firms can have systemic consequences, depending on the nature of the firms’ leverage, interconnections between firms, and their ability to supply intermediation services while in distress.

**Fragile Leverage**
Not just the level of debt, but the structure of debt, has been an important source of systemic risks. In particular, the entities involved in most crises have had fragile capital structures that are susceptible to runs, or run-like behavior. Bank deposits—and bank runs—are the canonical example. Bank deposits are payable on demand and subject to a sequential service constraint. When depositors suspect that a bank is insolvent, or will not be able to pay on demand, each has an incentive to withdraw their funds before others do in order to minimize the likelihood of suffering a loss. A bank may have insufficient liquid assets to meet these demands, and fail. A run equilibrium almost always exists, and even a solvent bank can fall victim to a run.

Other entities have fallen victim to run-like phenomena. Money market funds that provide demandable claims are one example. Special Purpose Vehicles funded with short-maturity claims (e.g., asset-backed corporate paper) are another. Continued operation of an intermediary funded by short-term debt requires it to roll over that debt repeatedly. Doubts about its solvency can lead owners of maturing debt to refuse to repurchase the intermediary’s new debt. Refusal to refinance maturing debt is analogous to depositors withdrawing funding from a bank.

Fragile capital structures exist because financial intermediaries perform maturity and liquidity transformations. Maturity transformation involves using short-term debt to fund the purchase of assets with longer maturities. For instance, a bank may use demand deposits to fund mortgage or corporate loans with maturities measured in years. Another example is the use of short-maturity (with maturities as short as a day) repurchase agreements (“repo”) to fund purchases of long-dated bonds. This maturity mismatch means that an entity must constantly refinance the debt that funds its assets, and failure to do so can lead to its failure.

Liquidity transformations occur when banks issue claims (such as demand deposits) that are close substitutes for currency and use the proceeds to purchase illiquid assets (i.e., assets that can only be sold quickly at a substantial discount). Thus, when creditors refuse to renew their funding of a firm, it must dispose of its assets at a low price. Liquidity transformations are frequently related to maturity transformations, as short-term debt is often more liquid than long-term loans/assets.

Runs are an inefficient equilibrium in a coordination game between depositors/purchasers of short-term debt. Consider a bank run. If no other depositors withdraw, an individual depositor has no incentive to withdraw except to pay for consumption.
However, if an individual depositor believes that a large number of other depositors will withdraw their funds, he has an incentive to withdraw even in the absence of a consumption need in order to ensure that he can redeem all his funds: if he waits, and a sufficient number of other depositors withdraw, the bank may not be able to pay his claim in full. Thus, runs can be a self-fulfilling phenomenon, and can occur for reasons unrelated to the solvency of a financial institution. These runs can be inefficient, because they lead to the premature sale or termination of illiquid investments.

Depositors may decide to run based on a signal about the financial condition of an institution. Depositors are more likely to run from weaker institutions than stronger ones, but equilibria can exist wherein depositors run from weak but solvent institutions, leading to inefficient liquidation of their assets.

Coordination failures are most likely to occur when a financial intermediary is funded by a large number of creditors who make decisions independently.

Interconnections
For a truly systemic event to occur, multiple financial institutions must be affected simultaneously. This can occur because they are all susceptible to the same economic shock. Alternatively, it can occur because institutions are interconnected, and a shock can propagate from an institution or group of institutions to a larger set of entities. These interconnections can be direct or indirect.

Direct connections are typically in the form of a counterparty credit channel. Institution A borrows from B which borrows from C. A’s financial distress may prevent it from repaying B, which may force it into financial distress, which can in turn imperil C, and then C’s creditors, and on and on.

Derivatives can also connect institutions directly. A’s financial distress can prevent it from paying what it owes on a derivatives contract executed with B, which can jeopardize B’s financial condition, which in turn damages B’s creditors (which can include its derivatives counterparties).

There are two major indirect connections. The first is contagious runs. A run on one entity may lead the creditors (e.g., depositors) of others to infer that these institutions are also at risk of insolvency. Runs may therefore occur on these other intermediaries.

The second channel is asset “fire sales.” A distressed institution experiencing a run or an inability to refinance maturing debt may sell assets in order to raise cash to pay off withdrawing depositors or maturing liabilities. If the sold assets are imperfectly liquid, and the sales are in sufficient quantity, these sales cause their prices to fall. This imposes losses on other institutions holding these assets, or related ones. These losses may induce the affected institutions to sell assets, exacerbating the price declines. They may also cause their creditors to run.

These indirect channels are more likely to be important when institutions hold similar portfolios of assets. When a given institution suffers a loss on a particular class of investment, creditors of other institutions are more likely to draw adverse inferences about them when they hold similar assets. Similarly, a distressed institution’s asset sales have more severe adverse consequences to those holding similar assets, so fire sale problems are most widespread and acute when many institutions hold similar portfolios.

Affected Institutions Cannot Supply Systemically Important Intermediation Services When in Financial Distress
A truly systemic event adversely affects the real economy. Financial distress does not necessarily have this effect: it can merely redistribute wealth from one group of agents to another. Efficient processes for handling insolvency can permit a troubled firm to operate its assets, or facilitate the transfer of these assets to others who can operate them.

However, financial distress impairs the ability of financial intermediaries to supply credit. This occurs because they cannot fund the credit they extend to their customers, or because of “debt overhang” problems: the benefits of positive value investments
accrue to the creditors of distressed institutions rather than the equity holders, which limits their incentive to undertake them. (This is sometimes referred to as the “zombie bank” phenomenon.) Since many industrial and service firms are dependent on credit, and credit from particular intermediaries with whom they have built relationships, impairment of the ability of these intermediaries to supply credit can force their borrowers to curtail output. This reduction in output can have knock-on effects, as declines in the values of suppliers of goods and services can harm their creditors.

This is sometimes referred to as the “bank lending channel”, because historically it has been associated with financial distress at banks, and because banks have been the primary suppliers of credit in most economies. However, the phenomenon is not limited to banks, especially in economies in which non-banks are important suppliers of credit. For instance, repo markets or securitizations funded with corporate paper are subject to run-like phenomena that can restrict the supply of credit through these channels.

**Sensitivity to Macroeconomic Conditions**

The values of the assets of banks or other important providers of credit may decline as the economy weakens. If this asset value decline is sufficiently large to lead to runs or fire sales that weaken the financial condition of credit suppliers, the resulting contraction in credit can exacerbate the initial decline in economic activity. Thus, when intermediaries’ financial condition is sensitive to macroeconomic conditions, they can accentuate the effect of the initial downturn.

The structure of the assets held by intermediaries can affect their susceptibility to macroeconomic shocks. For instance, the structure of AAA senior and supersenior CDOs backed by mortgage loans diversified away exposure to declines in real estate prices in particular geographic markets, but made their values extremely sensitive to broad-based, nationwide declines in prices. Put differently, these securities were exposed to substantial “wrong way risk.”

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11 Section IV presents data on bank leverage during the Great Financial Crisis of 2007-2009.

12 A run equilibrium is a steady state in which it is rational for an individual to attempt to withdraw funds if everyone else does. It is a type of self-fulfilling prophecy. A run equilibrium can be inefficient if it causes the failure of a solvent institution, or if it causes the institution to sell some of its long-maturity, illiquid assets at distress prices in order to meet the demands of the running depositors.