

Experimenting with Contingent Capital Triggers

By Edward Simpson Prescott and David A. Price

Contingent capital is debt that converts to equity when some triggering event occurs. It can automatically recapitalize a bank in distress, thus avoiding potentially costly failure. Unfortunately, little is known empirically about contingent capital regimes because there have been only a few issuances of contingent capital. Results from laboratory experiments suggest that contingent capital with price triggers would increase volatility of prices and the chance of mistakes in conversion decisions.

Capital regulations are among the most important tools in bank regulation. High capital provides a large cushion against losses and motivates shareholders to reduce bank risk, two effects that help preserve the stability of the financial system. In the aftermath of the 2007–08 financial crisis, one of the many significant financial regulatory changes was to increase the stringency of these requirements. Stricter capital requirements are part of the international Basel III accord of December 2010, which U.S. bank regulators have indicated that they intend to adopt in large measure, and are also part of the 2010 Dodd-Frank Act.¹

An approach that is complementary to raising capital requirements is mandating the issuance of contingent capital—debt that converts to equity when some triggering event occurs to signal that the bank is in distress or at risk of becoming distressed. The conversion immediately recapitalizes the bank without the need for it to go to capital markets in distressed condition. Moreover, contingent capital creates desirable discipline; shareholders and management have strong reason to avoid excessively risky practices that might lead to the triggering of the conversion because shareholders do not

want to be diluted, and management does not want to face the wrath of diluted shareholders.

Advocates of contingent capital argue that it has a number of advantages over traditional capital requirements.² Most notably, contingent capital may avoid the procyclical effects of minimum capital requirements. Minimum capital requirements are most likely to come into play for a bank during a downturn, the period when the bank's assets are also most likely to deteriorate. Because new capital is harder to raise during a downturn, banks may forgo good lending opportunities or even shrink their lending, which may create an additional drag on the economy. Contingent capital would be expected to reduce this effect by serving as an automatic source of new capital when the conversion is triggered. As such, it would complement the approach of the Basel III accord, which seeks to reduce the procyclical effects of capital requirements by mandating capital conservation buffers that institutions can draw upon in times of distress.³

In addition, by automatically recapitalizing a distressed institution, contingent capital reduces the pressure on policymakers to step in with costly or disruptive interventions, such as placing the insti-

tution in receivership of the Federal Deposit Insurance Corporation or providing an ad hoc bailout. In effect, contingent capital operates a bit like a prepackaged bankruptcy procedure that reduces the chance that a receivership or liquidation will be needed.⁴

But what should the triggering event be? The two main alternatives are book accounting measures and market measures. There is some evidence that book accounting measures might not work. The Prompt Corrective Action (PCA) provisions in the Federal Deposit Insurance Corporation Improvement Act of 1991 require regulators to impose restrictions on banks, including shutting them down, when regulatory capital levels drop below certain thresholds. In theory, such a system should shut down a bank before it could impose much cost on the deposit insurance fund. In practice, PCA does not seem to do this. Losses to the deposit insurance fund during the recent crisis were high, about 25 percent of assets, despite the use of PCA.⁵ We are unaware of studies of why these losses were so high, but we suspect that it was because the book accounting measurements tended to significantly lag behind the institutions' actual conditions.

In contrast, a market-based trigger has the advantage of being forward-looking because prices depend on expectations. Unfortunately, there is little evidence on how such a trigger might work in practice. There have been only a few known issuances of contingent capital bonds by financial institutions, and these have all taken place since the financial crisis.⁶ Furthermore, theoretical models that base significant regulatory actions directly on market prices find that the mutual feedback between prices and actions creates multiple equilibria or non-existence of any equilibrium; that is, such triggers create an interdependence between the anticipated conversion and the price that reduces the informational content of the prices. These two properties of the models suggest problems for basing regulatory actions on market prices.⁷

An alternative source of information is laboratory experiments, which were pioneered in economics by Charles Plott and Vernon Smith. In laboratory

experiments, participants (usually undergraduate students) interact with each other by playing games for real but small stakes, typically on computers, in a controlled setting. The experiments are designed to assess economic phenomena. For example, they have been used to evaluate auction design, emission trading schemes, and other market arrangements.

Recent work by economists Douglas Davis and Oleg Korenok of Virginia Commonwealth University (VCU) and one of the authors of this article (Prescott) uses market experiments to evaluate the effectiveness of market-based contingent capital triggering mechanisms.⁸ The experiments examined two arrangements: one where conversion is triggered by asset prices crossing a predetermined threshold and one where a monitor (regulator) makes conversion decisions using the asset prices as his only source of information.⁹

The experiments took place in 2010 and 2011 at VCU's Experimental Laboratory for Economics and Business Research with a total of 424 undergraduate volunteers. The participants were upper-level students in math, science, business, or engineering. In each session, 10 participants acted as traders and participated in 20 rounds.

In each experiment, the 10 traders each started out with some laboratory cash and two units of the asset. The asset had a fundamental value—a payoff to holding the asset—in the range of \$2 to \$8. In some experiments, the value was in the low part of the range, in others it was in the middle, and in some it was at the high end.¹⁰ The fundamental value to the traders differed. Some valued it slightly more (60 cents) than the rest. If there was conversion, the fundamental value of the asset for all of the traders would, depending on the experiment, increase or decrease by \$2. The former experiments corresponded to a contingent capital conversion that increases value for incumbent equity holders and the latter to a conversion that decreased value for incumbent equity holders.

In each experiment, after learning their own value of the asset, the traders would trade the asset using

a standard, open-book double auction (similar to the rules used on the New York Stock Exchange). At the end of trading, the median price of the trades was calculated, and if conversion was triggered, it occurred. Finally, as a baseline, in each session several experiments were run in which there was no possibility of conversion. In these experiments, prices were close to informationally efficient (prices were close to the final value of the asset) and final holdings of the asset were close to allocationally efficient (assets ended up in possession of the high-value traders).

In the fixed-price regime, which corresponds to contingent capital with an equity-price trigger, the trigger was set at \$5. If the median price was less than this amount, the asset was converted. The problem for the traders was to buy and sell the asset to make money while trying to determine if conversion would occur, which would affect the final value of the asset.

The experimenters found that in the fixed-price trigger regime, there were substantial informational and allocational efficiency losses in the laboratory markets. Furthermore, conversion did not always occur when it was desired; that is, sometimes conversion occurred when the fundamental value was above \$5, and sometimes it did not when it was below \$5. With asset values in the range of \$3 to \$5, the average rate of conversion errors for value-increasing conversions was 38 percent. With asset values in the range of \$5 to \$7, the average rate of conversion errors for value-decreasing conversions was nearly as high at 33 percent, though most of the errors occurred near the \$5 threshold.

In the monitor regime, three additional students were chosen to be monitors and were rewarded if they made a conversion when the fundamental value of the asset had fallen below \$5 and if they did not make a conversion when it was above \$5. These participants did not know the fundamental value; they had to infer it from the reported price.¹¹

The monitor regime, which corresponds to regulators who are trying to use prices to decide when to order a conversion, also resulted in substantial informational and allocational efficiency losses. Indeed,

in some scenarios, typically closer to the \$5 trigger point, the rate of conversion errors in the monitor regime was approximately 50 percent. In other words, the monitors, or regulators, did no better than chance.

The extent to which policy implications can be drawn from the experimental results remains an open question. The stakes in the laboratory were far smaller than in real-life trading, and the subjects were students rather than experienced traders. Nevertheless, the experiments make clear the difficulties of relying on a price trigger. Both the traders and the monitors had trouble determining what the price should be, particularly near the price cutoff level. In the experiments, this was reflected in a wide range of prices and sometimes substantial conversion errors. In general, this experimental evidence implies that contingent capital based on a market-price trigger may have negative effects that defeat the very purpose of the conversion. ■

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Endnotes

¹ Huberto M. Ennis and David A. Price, "Basel III and the Continuing Evolution of Bank Capital Regulation," Federal Reserve Bank of Richmond *Economic Brief*, no. 11-06, June 2011; David A. Price and John R. Walter, "Identifying Systemically Important Financial Institutions," Federal Reserve Bank of Richmond *Economic Brief*, no. 11-04, April 2011.

² Charles W. Calomiris and Richard J. Herring, "Why and How to Design a Contingent Convertible Debt Requirement," Financial Institutions Center Working Paper No. 11-41, University of Pennsylvania Wharton School, November 2011; Mark J. Flannery, "Stabilizing Large Financial Institutions with Contingent Capital Certificates," Centre for Applied Research in Finance Working Paper, Università Bocconi, April 2010; Edward Simpson Prescott, "Contingent Capital: The Trigger Problem," Federal Reserve Bank of Richmond Working Paper No. 11-07, November 2011; Squam Lake Group, *The Squam Lake Report: Fixing the Financial System*, Princeton: Princeton University Press, 2010; Mark J. Flannery, "No Pain, No Gain? Effecting

Market Discipline via 'Reverse Convertible Debentures,'" in *Capital Adequacy Beyond Basel: Banking, Securities, and Insurance*, Oxford: Oxford University Press, 2005.

³ Compared with equity, contingent capital has a debt-like cash flow in normal times that would appeal to some investors. If contingent capital were given the same tax treatment as debt in general, that would further increase its appeal to investors.

⁴ A third advantage is that it can force regulators to act.

⁵ Prescott, "Contingent Capital: The Trigger Problem."

⁶ Suresh Sundaresan and Zhenyu Wang, "On the Design of Contingent Capital with Market Trigger," Federal Reserve Bank of New York Staff Report No. 448, Revised November 2011.

⁷ Urs W. Birchler and Matteo Facchinetti, "Self-Destroying Prophecies? The Endogeneity Pitfall in Using Market Signals as Triggers for Prompt Corrective Action," March 2, 2007; Philip Bond, Itay Goldstein, and Edward Simpson Prescott, "Market-Based Corrective Actions," *Review of Financial Studies*, February 2010, vol. 23, no. 2, pp. 781-820; Sundaresan and Wang, "On the Design of Contingent Capital with Market Trigger."

⁸ Douglas Davis, Oleg Korenok, and Edward Simpson Prescott, "An Experimental Analysis of Contingent Capital Triggering Mechanisms," Federal Reserve Bank of Richmond Working Paper No. 11-01R, Revised October 2011.

⁹ They also considered a regime where the regulator also observed the results of prediction market, but we do not discuss those results here.

¹⁰ These numbers are in terms of laboratory dollars. At the end of each session, laboratory dollars were converted to U.S. dollars at a rate of 12 to 1. Participant payouts varied between \$14 and \$32.25 and averaged \$23.25, which included a \$6 appearance fee.

¹¹ One of the three monitors' decisions was chosen randomly to determine whether conversion actually occurred.

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