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Wendy Edelberg
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Monday, June 14, 2010

Via E-mail and FedEx

Professor Markus Brunnermeier
Princeton University
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Re: Follow-up to the Financial Crisis Inquiry Commission Forum

Dear Dr. Brunnermeier:

The Financial Crisis Inquiry Commission thanks you once again for your participation in the "Forum to Explore the Causes of the Financial Crisis" on February 26 and 27, 2010.

Enclosed are follow-up questions which were posed by the Commissioners during the forum, as well as additional questions which have arisen over the course of our investigation which we would like your assistance in answering.

Please respond to the questions by Friday, July 2, 2010. If you have any questions, or would like more information, please contact Scott Ganz at sganz@fcic.gov.

1. Can you help us understand whether and how CDOs, synthetic CDOs, and CDSs led to an expansion of subprime mortgage lending?

2. You described the role of network effects in amplifying the mortgage crisis into a severe financial crisis. Please describe how the over-the-counter derivatives market was a cause of such network effects.

3. Did the over-the-counter derivatives market create interconnections among participants in the market? Did counterparty credit risk and the possibility of its spread in the market play a role in the network effects? Did the lack of transparency tend to create uncertainty and confusion among market participants, regulators, investors?

4. In your view, was AIG too interconnected to fail because of its positions as an over-the-counter derivatives dealer?

5. In your view, were over-the-counter derivatives contracts used to hide loans to Greece in 2002?

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6. Did over-the-counter derivatives play any role in runs on financial institutions during the financial crisis?

Sincerely,

A handwritten signature in black ink, appearing to read 'Wendy Edelberg', with a long, sweeping flourish extending to the right.

Wendy Edelberg

1. Can you help to understand whether and how CDOs, synthetic CDOs, and CDSs led to an expansion of subprime mortgage lending?

Securitization allowed banks to pass on a substantial part of the risk to other financial institutions, so they had little incentive to take particular care in approving loan applications and monitoring loans. The rise in popularity of securitized products ultimately led to a flood of cheap credit, and lending standards fell. Empirical evidence shows that increased securitization led to a decline in credit quality: loans that were more likely to be securitized defaulted by 10-25% more than a similar risk profile loan with a lower probability of securitization.¹ This suggests that if loans can be securitized, then the lending standards are lowered and loans are granted more easily. Also, geographical areas with the most securitization experienced the largest growth and then subsequent collapse in housing prices.² These findings strongly support the view that securitization drove house prices up and planted the seeds of the crisis. It is important to note that one of the reasons the housing bust affected financial institutions was that the credit risk transfer, e.g. through structured investment vehicles, only removed the risk from banks' balance sheets for accounting purposes. However, when house prices fell these risks returned to banks' balance sheets. By holding on primarily to AAA rated products, banks exposed themselves to tail risk.³

2. You described the role of network effects in amplifying the mortgage crisis into a severe financial crisis. Please describe how the over-the-counter derivatives market was a cause of such network effects.

Indirect price effects that fed through the markets eroding asset values and raising margins were the primary effect of the financial crisis. On top of these

¹ Benjamin Keys, Tanmoy Mukherjee, Amir Seru and Vikrant Vig: [Did Securitization Lead to Lax Screening? Evidence From Subprime Loans](#), Quarterly Journal of Economics, 125(1), 2010.

² Amir Sufi and Atif Mian: [The Consequences of Mortgage Credit Expansion: Evidence from the U.S. Mortgage Default Crisis](#), Quarterly Journal of Economics, November 2009, 124(4), 1449-1496

³ Viral Acharya, Philipp Schnabl and Gustavo Suarez : [Securitization Without Risk Transfer](#), New York University working paper, April 2010

indirect effects, direct contractual spillover and network effects also played an important role. The failure of any large OTC dealer raises the fear of direct domino effects to its creditors and OTC counterparties, which not only lose the net value of their position (direct credit risk) but also face large replacement costs, so called gap risk. Gap risk arises since once a major dealer defaults, it takes time for the counterparties to replace their positions: given the market disruption, prices might move substantially against counterparties of the dealer. Furthermore, in case of complicated hard to value OTC derivatives, counterparties might not be able to replace the contracts and could end up holding the risk on their own balance sheet leading to potential capital shortage. In early 2008, Barclays analysts estimated these to be 36-47 billion for a single dealer's default, concentrated in a few counterparties.⁴ Although there is no data on how much counterparties lost on replacing OTC contracts with Lehman, media accounts suggest that some had large losses.⁵ Theoretically, such losses can lead to a run on all banks linked together in the system, not only the counterparties of the failing institution.⁶ Thus it is plausible that price effects and network effects interacted in making the crisis worse. Second, in a network, the unwillingness of an institution to accept offsetting the same the contract with other counterparties might lead to serious problems for counterparties. Supposedly such a situation arose when Goldman hesitated in accepting offsetting contracts involving Bear Stearns.⁷

3. a) Did the over-the-counter derivatives market create interconnections among participants in the market? b) Did counterparty credit risk and the possibility of its spread in the market play a role in the network effects? c) Did the lack of transparency

⁴ Arup Ghosh et al.: [Counterparty risk in credit markets](#), Barclays Capital Research, Quantitative Credit Strategy, February 2008

⁵ [Citadel Files Lehman Claim to Recover \\$470.5 Million](#), The Wall Street Journal, August 25, 2009

⁶ Adam Zawadowki: [Entangled Financial Systems](#), Princeton University working paper, April 2010

⁷ Markus Brunnermeier: [Deciphering the Liquidity and Credit Crunch 2007-08](#), Journal of Economic Perspectives, 2009, 23(1), 77-100

tend to create uncertainty and confusion among market participants, regulators, investors?

- a) OTC contracts linked together financial institutions on a global scale, connecting for example insurance companies like AIG, investment banks and German banks which would not have been connected to the same degree otherwise. It also created large exposures between some financial institutions, such as AIG and Societe General. Since Goldman was connected to AIG, its counterparties were also connected to AIG.⁸
- b) CDS spreads on major financial institutions reached unprecedented levels after the Lehman bankruptcy. The most likely explanation is that market participants became worried about their counterparties' solvency and thus tried to hedge their exposure by buying a CDS on their counterparty.
Counterparty risk is directly related to network effects if market participants are not fully hedged against the default of their counterparties, since in this case a counterparty default can create large losses that lead to knock on effects. For example, according to the released documents,⁹ Goldman was not fully insured against the failure of AIG and would have been adversely affected by its default.
- c) The lack of transparency created two problems. First, it allowed for hidden and uncontrollable build-up of large positions, such as that of AIG, unknown even to their counterparties.¹⁰ Secondly, during the crisis, it led to confusion about what the reasonably possible outcomes were: no one really knew who was going to bear the losses and how big these losses could be. This coupled with fear of the worst possible outcome, might have led to liquidity hoarding and runs on

⁸ Hearing of the US Senate Committee on Finance: [Grassley submits questions for committee record about taxpayer dollars for AIG, Goldman Sachs counterparties](#), for data please see [Attachment 1](#) and [Attachment 2](#)

⁹ Hearing of the US Senate Committee on Finance: [Grassley submits questions for committee record about taxpayer dollars for AIG, Goldman Sachs counterparties](#), for data please see [Attachment 1](#) and [Attachment 2](#)

¹⁰ For a theoretical analysis of this issue, see Viral Acharya and Alberto Bisin: [Counterparty risk externality: Centralized versus over-the-counter markets](#)", New York University working paper, June 2010

otherwise solvent institutions.¹¹

4. In your view, was AIG too interconnected to fail because of its positions as an over-the-counter derivatives dealer?

The main issue with AIG was not the number of institutions it was connected to but the concentration. Based on collateral payments, the top 3 counterparties accounted for about half of the positions: between September 16, 2008 and December 31, 2008 Societe General received 11 billion dollars from AIG due to its OTC derivative positions, while Goldman Sachs 8.1 billion, Deutsche Bank 5.4 billion.¹² The counterparties received additional collateral and termination payments from AIG prior to September 16, 2008 and in early 2009. While the major counterparties could have survived the loss of collateral payments and replacement costs of this scale in normal times, in the already strained times of September 2008, it is reasonable to assume that exposing them to such losses and uncertainties would have triggered a run on at least some of these systemically important institutions.

5. In your view, were over-the-counter derivatives contracts used to hide loans to Greece in 2002?

Based on media accounts it seems that Goldman indeed structured derivative contracts (swaps) which in effect disguised loans to Greece of at least €2.8 billion.¹³ Under EU accounting rules in effect before 2008, this particular deal helped Greece decrease its budget deficit by €2.8 billion. This corresponds to about 1% of Greece's GDP. Greece's total budget deficit in 2009 was close to 13% of GDP. Further investigation of the specific contracts is needed to assess the exact size and aim of these contracts.

6. Did over-the-counter derivatives play any role in runs on financial institutions during the financial crisis?

¹¹ Ricardo J. Caballero and Arvind Krisnamurthy: [Collective Risk Management in a Flight to Quality Episode](#), Journal of Finance, Vol. 63, Issue 5, October 2008

¹² Calculated based on AIG disclosure, [Schedule A](#), March 2009

¹³ [Greece's Currency Swap Draws New Scrutiny](#), The Wall Street Journal, February 18, 2010

Yes, in two ways. First, the exclusion of margin accounts from automatic stay means that it was worthwhile for OTC counterparties to ask for punitive margins even if they knew that this might eventually push the counterparty into bankruptcy. This may have played a role when AIG's counterparties asked for collateral.¹⁴ This resembles a traditional bank run in which each depositor wants to withdraw its deposit before others do and thus forces the bank into bankruptcy. These margin runs potentially accelerated the demise of Bear-Stearns, Lehman Brothers and AIG. Second, the fear of losses through OTC contracts were one of the factors that led to the loss of confidence in some financial institutions (see my answer to question 3).

¹⁴ [AIG-Goldman Sachs Collateral Call Timeline](#), Financial Crisis Inquiry Commission