Lasse Pedersen opened by responding to issues raised by the discussants. Responding to Tobias Adrian’s reference to asset-specific leverage constraints, he clarified that the agents face a single capital constraint on investment but that the haircuts are specific to the assets. On the implications of their model for macroprudential policy, Pedersen noted that the model could readily accommodate an additional constraint for regulatory capital, since leverage can be reduced in good times only through a different constraint. He also agreed with Adrian’s comment that haircuts could be included as an explanatory variable in their regression analysis and argued that the Fed should collect more comprehensive data on haircuts as an important variable for study.

Responding to Michael Woodford’s question about whether the Fed should directly purchase assets (such as mortgage-backed securities) or use lending programs to encourage private purchases, Pedersen offered his personal view that the lending facilities were less problematic. He argued that lending facilities exposed the Fed to less risk and could come off the Fed’s balance sheet more easily, since loans were charged a penalty interest rate. Pedersen also argued that Woodford’s market segmentation theory would be a useful extension of their existing model rather than an alternative. In his view, the asset-specific margins are a critical feature and could only be dispensed with given a very high degree of segmentation. Furthermore, Pedersen pointed to a companion paper that showed how differing haircuts could explain violations of the law of one price for assets that were otherwise very similar. Pedersen argued that a value-at-risk constraint, as opposed to asset-specific haircuts, could not explain these deviations from the law of one price.

Daron Acemoglu voiced concern that the asset-specific haircuts were fixed exogenously. He argued that these haircuts should respond endogenously to policy changes, and Pedersen conceded that more can be done to endogenize the haircuts.
Acemoglu also noted that their triple-differencing econometric approach may not capture the partial effect of changes in the haircut on asset prices. He noted that any change in the haircut of any individual security would change the Lagrange multiplier on the agent’s constraint and operate through the other haircuts to change the price of all assets. Adam Ashcraft noted that differences in S&P ratings could control for the indirect effects of changes in haircuts. Acemoglu suggested adding additional terms capturing the interaction of ex post margins and time effects. However, Pedersen responded that their triple-differencing method is effectively doing this, since the type of security (A2 versus A1A) controls for the ex post margin. As Pedersen notes, A2 securities became eligible for TALF while the margins for other securities were unchanged (remaining at 100%), thus capturing the price effect of a change in just the margin for a particular security.

Nobuhiro Kiyotaki observed that asset-specific margin constraints emerge when borrowers’ trading cannot be observed by the lender. He asked whether these margins might change due to concerns about the actions of borrowers. Pedersen responded that collateral should obviate the need of the lender to monitor the actions of the borrower. The size of the haircut depends on the underlying value and liquidity of the asset and should be independent of any borrower action.

Deborah Lucas echoed Kiyotaki’s concerns, arguing that counterparty risk was a key factor in the credit crisis. She argued that the model presented makes the strong assumption of no credit risk, while, in reality, the Fed offered collateralized loans well below the market prices and therefore exposed itself to adverse selection. She also added that there appeared to be large pools of private liquidity on the sidelines that could have purchased assets cheaply. Ashcraft responded that the Fed had several restrictions on program participation and acceptable collateral that prevented any adverse selection. As an example, Ashcraft noted that TALF loans came with a carry cap that required repayment of the loan to the Fed before borrowers received any gains.

Lucas acknowledged that the Fed attempted to limit adverse selection but added that the Fed took on significant risk if the credit crisis worsened. Frederic Mishkin responded that, in performing its role as lender of last resort, the Fed always faces difficulty distinguishing between liquidity and solvency of assets, and Robert Hall described the Fed’s actions as attempting to mitigate an externality.

Pedersen disagreed that the Fed faced substantial credit risk. He noted that their model shows that when the natural buyers are credit constrained, there is a role for a central bank to reduce haircuts and
support investment. Taking commercial mortgage-backed securities as an example, Pedersen noted that the Fed was effectively lending $35 on $100 face value; such assets had never shown low enough recovery rates to expose the Fed to any credit risk. Similarly, he noted that some derivative securities backed by U.S. Treasuries were trading with yields in excess of 10%. In short, the credit risk in these examples appears negligible.

The discussion turned to the mechanics of the repo market when Hall asked what determines the interest rate and margin on repo transactions. Ashcraft and Pedersen responded that the interest rate is set quite close to the money market rates, with a haircut high enough to make the security essentially riskless. Acemoglu added that securities in the money market are not perfect substitutes, and Woodford cited work by John Geanakoplos that described how both the interest rate and leverage can be determined endogenously. Lucas added that collateral can be divided into standard and nonstandard collateral, with haircuts for the latter negotiated on a case-by-case basis, differing markedly among assets and counterparties. Adrian noted that there is no centralized market for repo transactions—reported rates are some average of a set of similar transactions.

Pedersen noted that, in principle, two parties will negotiate the haircut. However, after the failure of Lehman Brothers, several money market funds simply stopped accepting whole classes of collateral, effectively raising haircuts to 100%. For many funds, Treasuries and agency securities became the only acceptable form of collateral. Lucas also noted that their model abstracted from the two-sided risk seen in most repo markets, since collateral values can fall, though Adrian noted that such issues are addressed with triparty repo arrangements.

Julio Rotemberg asked how robust the model’s conclusions are, given that the selling observed seemed to be mostly panicked and irrational. He noted that the model depended on two types of agents with differing levels of risk aversion. Pedersen responded that the margin capital asset pricing model holds in more general circumstances and can explain asset-pricing facts in both the time series and cross section.

Rotemberg noted that agents, in the model presented, have common knowledge of the risks determining asset prices and that an alternative view of the crisis might emphasize a high degree of disagreement about the quality of the underlying assets. If the optimistic agents are wiped out, then the Fed does well ex post in an intervention simply because only pessimistic agents are setting market prices. Lucas added that there seemed to be quite a few arbitrage opportunities, but hedge funds
remained on the sidelines despite having the means to acquire these assets. Pedersen argued that the Rotemberg hypothesis is still consistent with his model, but the optimistic buyers need to be constrained in some way. However, he disagreed with Lucas’s view that hedge funds could take advantage of these arbitrage opportunities. In Pedersen’s view, hedge funds were clearly capital constrained and many went out of business.

Ashcraft wrapped up the discussion by noting that, while the Fed lending facilities appeared effective in this crisis, it remains an open question as to whether these instruments can be used prudently in the future.