**Stubborn Beliefs in Search Equilibrium**  
**Authors:** Guido Menzio  
**Discussants:** Ilse Lindenlaub, Richard Rogerson

Guido Menzio started the discussion by explaining his motivation for writing the paper in response to the discussants who had expressed skepticism of the strength of the evidence for the belief formation he had assumed as well as the realism of the bargaining process. He argued that there are several papers using surveys of worker beliefs that have documented that worker expectations are not full information rational expectations and that he wanted to work out the implications for wage bargaining as it is a strategic interaction where beliefs play an important role. Having found it implied wage stickiness, he said he decided to allow for coexistence of strategic and non-strategic agents as the strategic implications were clear as strategic agents can always mimic the non-strategic agents leading to asymmetries. He then argued that the results would qualitatively generalize to similar settings without the exact bargaining structure as the potential for strategic agents to sometimes mimic non-strategic workers would still be there.

Robert Hall raised the concern that the macro-labor literature contains many proposed solutions to the Shimer puzzle and that the evidence from Mueller et al. is not strong enough to support the assumptions made in the paper. So while he thought that the analysis was interesting and could be learned from, he said he was skeptical in its usefulness as a solution to the Shimer puzzle. He also mentioned evidence from his joint work with Marianna Kudlyak which suggests that consumer perceptions of the state of the labor market track the actual state quite well over the business cycle (Hall and Kudlyak, 2022, Section 5.3).

Jonathan Parker found the core ideas interesting, that some agents are less sophisticated or informed and that other agents may seek to gain by mimicking the less sophisticated agents. And that this can generate asymmetries between increases and decreases if the degree of mimicking varies over the cycle. He also argued that this result might be more robust than Richard Rogerson had suggested in his discussion. He hypothesized that the qualitative results might still hold if the behavior of less sophisticated agents were closer to rational, and if the more sophisticated agents followed simpler (and so less-perfectly designed) mimicking strategies such as lower bounds on accepted wages.

Guido Menzio then responded to some technical points made by the discussants. He agreed with Richard Rogerson that in dynamic asymmetric information games such as the bargaining game in the paper a lot is possible. He said this was due to one part of the game being a signaling game where the party with private information takes an action which is interpreted by the other party which could be anything off equilibrium. However, the solution concept of perfect sequential equilibrium suggested by Grossman and Perry specifies a theory for off equilibrium beliefs which delivers a unique equilibrium in the paper. The second related to existence of equilibria as raised in Ilse Lindenlaub’s discussion. Guido Menzio said the technical conditions under which the equilibrium exists are not a no-screening condition but really conditions under which a pure strategy equilibrium exists. If the condition is violated, the logic of the Coase conjecture that the informed agent will extract all the rents still holds however it will be a mixed strategy equilibrium where one type will randomize their actions along the equilibrium path. This would require solving for the evolution of the mixing and the posterior distribution of beliefs of the firm and so he focused on the simpler cases in which a pure strategy equilibrium exists. He then explained the reason for not requiring a no-screening condition: if a firm screens, then workers with correct beliefs...
will get paid lower in bad states than workers with stubborn beliefs and as the time interval between offers shrinks then the gap must shrink as the worker with correct beliefs can get the stubborn workers wage when the next offer arrives. Guido Menzio then expressed surprise at the results Ilse Lindenlaub had shown during her discussion of beliefs over the business cycle as in the Mueller et al. paper they find only a small correlation between beliefs and the business cycle and he asked if this was due to composition. Ilse Lindenlaub responded by saying the difference is that she included both unemployed and employed workers. The beliefs of employed workers move much more over the business cycle. Richard Rogerson added to this by saying that the regressions of beliefs on the business cycle in the Mueller et al. paper have both big point estimates and big standard errors and so they cannot be interpreted as no variation. Guido Menzio agreed with that comment and said that his paper was more of an intellectual exercise in understanding the impact of small or no movement in beliefs.

Harald Uhlig suggested that a potential empirical strategy would be to compare the behavior of wages in industries with more or less individual-level bargaining. He suggested industries with high levels of unionization as ones in which there is little to no individual level bargaining.