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## *Discussion*

The paper sparked two main strands of comments. First, given the vast number of cases examined by the author and the resulting plethora of possible conclusions, many wondered if there were any robust implications of credit market imperfections. Whereas the author highlighted the diversity of potential outcomes, the audience asked for general principles. Indeed, it was suggested that Matsuyama might use empirical evidence to focus on models that seemed more in accordance with reality. In this way, he would be able to limit the scope of his work and so have a more directed approach to understanding financial frictions. Second, a few comments were directed at his modeling assumptions, noting that this model could be nested within a larger, more general framework. In doing so, the author could shift away from the overlapping generations-specific results, while also obtaining more testable results.

Daron Acemoglu first noted the seeming absence of general results in Matsuyama's credit market imperfections model. Rather than focusing on the possible results, Acemoglu said that it would be most useful to understand the "robust predictions" of the model. General equilibrium would certainly complicate the stark conclusions of the partial equilibrium models within the microeconomic literature. However, Matsuyama's model could help academics to understand the impact of credit market imperfections by determining which partial equilibrium effects dominate given a set of parameters.

Anil Kashyap furthered this argument and offered a means of restricting the possible parameter space. From the empirical literature on credit market imperfections, Kashyap suggested that Matsuyama should determine the main consequences of this kind of friction. Next, the author should find the set of parameters in his model that yields the same implications. In doing so, Matsuyama would be able to form a nar-

rower and empirically more relevant parameter space. This reduction would more easily lead to general theoretical results, which, in turn, would help inform the next generation of empirical studies. Mark Gertler agreed that the author should focus his model on obtaining empirically relevant results. This, he said, would help policymakers understand the benefits of technological improvements in financial markets.

Matsuyama countered by saying that the beauty of the model stems from the fact that there exist such diverse implications in such a simple model. By varying the combination of parameter values, the model could predict, for example, both changes in persistence or volatility. In fact, by understanding the full range of possible conclusions, economists can better understand the implications of credit market imperfections.

Reiterating the comments of the discussants, Acemoglu suggested that Matsuyama use a more general model than overlapping generations (OLG). The OLG model often results in outcomes like endogenous cycles, which would not be the usual finding in a model with infinitely lived agents. Acemoglu said that he was skeptical about the relevance and applicability of equilibrium cycles. Additionally, the OLG framework hides much of the action within the parameter space. Instead of understanding the implications of economically intuitive variations (for example, reducing the required pledge size per loaned dollar), this simplified model examined the effects of changes in parameters. The author, Acemoglu suggested, should transform the model so that it is more about economics than parameter values.

Michael Woodford supported this notion of studying the more general model. Woodford argued that the range of equilibrium dynamics would not be lost in a model with infinitely lived agents. With an appropriate choice of endowment processes, the more general model would also exhibit the kind of exotic solutions found in the OLG model. However, Woodford continued, imposing the artificial constraints on the timing of endowments or strategy space of the kind required to make the model literally mimic an OLG model would be restrictive and would not capture the dynamics of the equilibrium with more general stochastic processes. Matsuyama responded that he chose the OLG model for its transparency. The complex and varied findings could be understood more easily because of the model's simplicity.

Philippe Aghion and Jim Kahn focused on different elements of Matsuyama's work. Aghion wondered whether the credit market imperfec-

tions model can be recast as one primarily about pecuniary externalities. By changing the interpretation of the model, many of the more interesting features of the equilibrium (for example, volatility initially increases with financial development, while later falling as development passes some threshold level) would become more intuitive. These pecuniary externalities (on prices and interest rates) would then interact in interesting ways with the credit market constraints, leading to heterogeneous effects on workers. Matsuyama agreed that much of the model hinged upon the pecuniary externalities.

Kahn questioned Matsuyama about the model's exogenous structure. He argued that Matsuyama's exercises of changing parameter values while leaving the economy unadjusted was unrealistic. For example, financial development, institutions, and contracts are endogenous and should depend upon the rates of return to internal and external finance. Thus, the structure of the economy would change for economic and—because the paper implies political economy motives—political reasons. In response, Matsuyama asserted that by varying the parameter that governed the stringency of credit market imperfections, he was in essence allowing for the economic structure to interact with the model's parameters.