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Recommendation of William Du for
Federal Reserve Board Dissertation Fellowship

This recommendation letter is for William Du, a 5th-year student in the PhD program at Johns Hopkins University.

From the Fed's point of view, Will should be a perfect fit as a dissertation intern for this coming summer (for reasons I will articulate below). From Will's point of view, the Fed dissertation internship is lexicographically preferred to any other option for what to do with the summer.

Will spent last summer and fall in an internship at the Bank of England, which cleverly makes internship offers that explode shortly before the Fed begins making dissertation internship offers. (Probably, you already know about this, but if not you might want to figure out some way to respond). The BoE internship was quite productive and I heard great feedback from his supervisor there about his work on a project that integrated housing decisions into a HANK model (described below).

Will's job market paper evaluates the macroeconomic consequences of the fact that unemployment spells have long-lasting negative effects on labor earnings. To do so, he builds a heterogeneous agent New Keynesian (HANK) model with search and matching frictions augmented to include human capital dynamics (the assumed channel for the long-lasting effects of unemployment). His model matches the persistent earnings loss following job displacement that is present in the data, the path of IMPCs documented in Norwegian data, and generates distribution of liquid wealth consistent with data from the *Survey of Consumer Finances*. With the model in hand, he shows that precautionary saving in response to heightened unemployment risk is much larger than in existing models. Over the business cycle, he shows that in his model vs existing HANK models, unemployment is a much stronger amplifier of fluctuations and that the automatic-stabilizer effects of UI spring largely from the precautionary channel as opposed to their stimulative effect on income. For longer policy horizons, he finds that extending UI is considerably more stimulative than increasing the UI replacement rate, because UI extension more effectively mitigates the precautionary saving that arises against the possibility of long term unemployment.

Will's work is closely related to the work of a number of economists at the Fed, in particular Bence Bardoczy, Sebastian Graves, and Christopher Huckfeldt. **?** investigates whether spousal

insurance would serve as a powerful automatic stabilizer against the effects of countercyclical unemployment risk, while **?** evaluates whether unemployment risk amplifies business cycles. In Will's JMP, he shows that UI extensions are a powerful macro stabilization tool due its expectational transmission and demonstrates that the unemployment risk channel is 2-3 times larger when households are subject persistent earnings losses. In **?** finds that unemployment scarring is concentrated on workers who switch occupations and justifies how this scarring can arise in a structural model. While **?** studies the causes of unemployment scarring, Will's work studies the consequences of unemployment scarring instead.

Further, Will has both strong interest and experience in solving HANK models with housing as discrete choice. As a PhD intern at the Bank of England, he solved a HANK model which decomposed the components of the housing wealth channel (Slides). I know from Fed contacts that a number of different sections/groups there are interested in housing models; Will would make a strong fit in any group looking to build such a model as he would be immediately ready to contribute.

Finally, Will is well versed in the sequence space Jacobian (SSJ) approach to solving HANK models (**?**). Both the HANK model in his JMP as well as the housing model at the Bank of England were solved using the SSJ toolkit. Moreover, Will has integrated the SSJ methods into the HARK toolkit by programming methods to produce heterogeneous agent Jacobians with the 'Fake News' Algorithm (**?**). Since Bence Bardoczy is one of the creators of the sequence space method and toolkit, Will would be keen to seek out Bence and connect with him on these topics.

In sum, I strongly recommend William Du for the Federal Reserve Board Dissertation Fellowship for this coming summer. He would be a great fit because his research is closely related to that of a number of economists at the Federal Reserve Board and he has the experience and skills to be quickly contribute to divisions looking to build and solve HANK models and models in which housing responds to monetary policy.

Sincerely,

Chris Carroll