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To Whom It May Concern:

Richard (Cong) Xie is a graduate student that I supervise, doing excellent work at the intersection of macro, IO and econometrics. His paper considers R&D and the diffusion of knowledge and is connected to recent work by Lucas and coauthors and earlier work by Jan Eeckhout and Jovanovic. The first part of the paper develops a model where the distribution of agents' knowledge in the economy changes over time from two sources: R&D made by agents to advance their knowledge and learning from others.

Richard characterizes a balanced growth path where as a result of these two forces the distribution of knowledge in the economy advances at a constant rate that is also the rate of growth of the economy. Recent work by Lucas and coauthors derive a balanced growth in a similar environment but in the absence of investment in R&D, which is obviously an important source of growth. Ultimately, Richard's paper will provide estimates of the contribution of both sources of growth and the interaction between the two.

The second and most original part of Richard's paper considers non-parametric identification. In order to do so, he uses data on patent citation to infer properties of the learning process. There is a natural connection as it has been noted that patent citations typically follow an inverted U shape, increasing to a point and then decaying. Citations are linked to knowledge diffusion/learning in his model by a fairly natural assumption on the joint citation and learning process. This assumption delivers the inverted U citation curve in a very natural and elegant way. The data on citations allows him to identify non-parametrically the distribution of knowledge and from the latter and the structure of a balanced growth path he is able to back out non-parametrically the decision rules of agents, namely the policy function for R&D investment. As a final step, he estimates non-parametrically the parameters of the return function that give rise to this decision rule.

The work is still in progress so I cannot quote final results on the decomposition of growth mentioned above. But as a package, this paper provides a very important contribution to this research program.

In addition to his job market paper, Cong has another line of research analyzing the role of mergers and acquisitions in the transfer of patent rights. Richard first documents what I think is a new fact: patent transfers through firm acquisitions are as considerably more important than direct patent sales, representing up to 80% of total transfers. Moreover, while smaller firms are involved in patenting, acquirers are usually large. In addition, he shows that the R&D teams that are acquired as part of the merger stay in the firm for a long time. Richard continues refining his empirical work and is building an equilibrium model that includes both channels of knowledge transfer. His research is innovative in particular drawing new attention to M&A as a source of knowledge transfer.

It is hard to find a comparison group to rank Cong with respect to other graduate students, as he is working in the intersection of several fields. But of all my students, Cong is probably the one currently doing the most interesting work. He is very original and independent, as shown in his job market paper and also from my experience as advisor. This implies that he is probably the student with most promise, but also more variance as he strives for original and non-standard research ideas. Cong is tooled up both in econometrics, empirical analysis and in the modeling, is extremely enthusiastic and hard working. I strongly recommend you for the position you are offering.

Sincerely,

A handwritten signature in black ink, appearing to read 'H. Hopenhayn', written over a horizontal line.

Hugo A. Hopenhayn
Professor of Economics
UCLA