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The University of Chicago Booth School of Business

STEVEN JOSEPH DAVIS
William H. Abbott Professor of International Business and Economics
http://faculty.chicagobooth.edu/steven.davis/

Ph.D., Economics, Brown University
M.A., Economics, Brown University
B.A., Economics, Portland State University
Steve.Davis@ChicagoBooth.edu
Phone: (773) 702-7312

13 November 2015

To the Recruiting Committee:

I write to recommend **Sara Moreira** to all leading economics departments, business schools and research organizations – including the best. Sara is a macroeconomist with strong interests in business dynamics, entrepreneurship and productivity. She has the smarts, skills, and drive to produce research that advances the frontier. Her job market paper (JMP) on "Firm Dynamics, Persistent Effects of Entry Conditions, and Business Cycles" is well down the path to doing just that. In my judgment, a suitably revised version of the paper is likely to find a home in a top general interest journal.

In her JMP, Sara first studies how demand conditions at entry affect the average size and quality of new businesses and how the effects of initial conditions persist as an entry cohort ages. She develops important evidence in these respects, as I discuss below. She also develops suggestive evidence about the mechanisms that underlie the highly persistent effects of entry conditions. Armed with her new evidence and evidence from other studies, Sara builds an industry equilibrium model of business dynamics that features common and idiosyncratic shocks, imperfect competition, selection on the business entry and exit margins, and an endogenously determined customer base for each business. She combines her empirical results and theoretical model to quantify the roles of business entry and early lifecycle dynamics in propagating shocks forward in time at the cohort and industry levels. This part of her work nicely blends empirical insights and quantitative equilibrium methods to draw out the aggregate implications of business-level heterogeneity and dynamics.

The empirical part of her JMP exploits micro data from the Longitudinal Business Database (LBD) and the Census Business Register, which contain annual employment back to 1976 for all nonfarm business establishments in the United States and annual revenue back to 1994 for most. These databases are very well suited for Sara's objectives and, given her objectives, the best available U.S. data sources. Using these data, Sara shows the following:

1. Initial establishment size is larger and quality is lower, on average, for cohorts that enter when economic conditions are stronger. Her preferred estimate for the elasticity of initial size (number of paid employees) with respect to the cyclical

component of real GDP at entry is about 1.2, conditional on industry, location and other controls.

2. The corresponding elasticity for initial establishment quality (real value added per worker) is about -0.3. As Sara discusses, this result points to strong selection effects on the entry margin, whereby marginal establishments are more likely to enter when contemporaneous market demand is strong.
3. The impact of entry conditions on cohort-level mean log size and quality is remarkably persistent. For example, it shows little or no tendency to fade in the first decade of the establishment lifecycle for the size measure.
4. The highly persistent effect of entry conditions on cohort-level mean outcomes reflects a combination of positive selection on the exit margin – weeding out smaller and lower quality establishments as a cohort ages – and slow adjustment of surviving establishments to contemporaneous conditions.

Looking across industries, Sara also finds that the persistence of initial condition effects on cohort-level mean outcomes rises with product differentiation and advertising intensity. In contrast, she finds little evidence that the persistence of initial condition effects depends on physical capital intensity, as one might expect if capital adjustment costs were the main source of persistence. She interprets these results as evidence that reputation and brand awareness in product markets is the main source of persistence in the effects of initial conditions. Accordingly, she focuses on demand-side sources of slow business-level adjustments in her theoretical model. This part of Sara's empirical study is intriguing but needs further development, which I am sure will be forthcoming.

Her theoretical model builds on Hopenhayn's classic paper (Journal of Political Economy, 1992) and Luttmer (Quarterly Journal of Economics, 2007). On the demand side, she posits that the current sales of a particular business depend on common and idiosyncratic shocks, its current relative price, and its customer base. In turn, its customer base depends on own past sales and, hence, on its past pricing decisions. This formulation captures the idea that a business "builds" its demand over time and is an important source of persistence and shock propagation in the model. To calibrate this aspect of her model, Sara draws on recent work by Foster, Haltiwanger and Syverson (2015). Her calibrated model generates pro-cyclical business size at entry, counter-cyclical business quality at entry, and powerful selection effects on the exit margin. It also performs respectably in reproducing the early lifecycle dynamics of cohort-level employment and survival.

Sara uses her calibrated model to study how common shocks get amplified and propagated forward in time. For example, industry output responds two for one to contemporaneous common productivity shocks. The calibrated model also delivers considerable propagation of common shocks forward in time through the combined effects of selection and customer base building. These amplification and propagation results are interesting, given the limited ability of many leading equilibrium models to deliver sizable shock amplification and significant endogenous sources of persistence. I should note that Sara's quantitative analysis of her theoretical model is less polished and developed at this point than her empirical work, but the main elements are clearly in place and the results thus far are promising. Given Sara's proficiency and drive, I am confident that this part of her paper will improve rapidly in the next few weeks.

Sara has several other papers and works in progress. Her sole-authored papers on "Self Employment and the Business Cycle" and "The Role of Sectoral Composition in the Evolution of the Skill Wage Premium" are solid efforts that, with some additional work, are good candidates for publication in field journals. In work underway with Ippei Shibata, Sara and I revisit the role of skill mismatch in labor market outcomes from a new angle. The topic of labor market mismatch has attracted renewed interest in recent years, as illustrated by the work of Şahin, Song, Topa and Violante (American Economic Review, 2014). Şahin et al. and other previous research on mismatch rely heavily on job vacancy data. We pursue a different approach that reduces or sidesteps the need for vacancy data. Specifically, we combine information about past patterns of inter-industry mobility with information about the individual and the industry distribution of job opportunities in the individual's local economy to characterize re-employment prospects as a function of location, individual characteristics, industry of last employment, and time. Aggregating over persons, we can characterize the evolution of average re-employment opportunities at national and regional levels and for various demographic groups. We are using our new approach to estimate the effects of re-employment opportunities on the job-finding rates of unemployed persons, their exit rates from the labor force, and their wages upon re-employment. We will also use our approach to construct new measures of labor market mismatch over time by region and demographic groups.

In closing, let me restate my top line: I recommend Sara to all leading institutions, including the very best, that are seeking an applied macroeconomist. Sara has an excellent job market paper, and I fully expect her to have a successful research career. I also expect her to be a conscientious colleague and successful teacher, which is consistent with the very strong TA evaluations she has received from public policy students at the University of Chicago.

Please let me know if I can be of further assistance.

Sincerely,

Steven J. Davis