



November 2, 2015

Recommendation for Ruben Gaetani

Dear Recruiting Chair:

I am writing to recommend Ruben Gaetani for a position in your department. Ruben is a top student and one of the best candidates I have seen in during my time at Northwestern. He deserves strong consideration by any department.

Ruben is an applied macroeconomist who is interested in the theory and micro-empirics of economic growth. Typical of his work is using micro-level data on patents to inform original theories of endogenous growth and innovation, using a novel blend of reduced form analysis and theoretical modeling.

Ruben's job market paper, coauthored with another student, brings new evidence to bear on a classic question in economic growth and urban economics: how important is population density (cities) as a driver of innovation? Most theories of endogenous growth and knowledge diffusion predict a positive relationship between density and innovation: the more opportunities people have to interact, the more rapidly will both new ideas be created and knowledge spread throughout space and time.

The first contribution of Ruben's paper is to create a new micro dataset to test the relationship between population density and innovation. In particular, he collects and geocodes the entire universe of patents issued by the US Patent office over the period between 2002 and 2014. Using this data, he finds a striking fact: a substantial fraction of innovation (as measured by patents and citations) is conducted outside of cities. At first, this would seem to be a strong rejection of these theories. However, Ruben shows when one restricts attention to only unconventional innovations- those innovations based on unusual combinations of existing knowledge- that there is a strong, positive relationship between density and innovation. Ruben then argues that this is exactly the relationship one would expect to find if informal interactions that are concentrated in cities are essential to transmitting knowledge across unrelated fields (imagine an economics and

physics professor talking together at a local water hole) but are less relevant for flows across similar fields.

The second contribution of Ruben's job market paper is to build a spatial equilibrium, endogenous growth model consistent with these empirical facts. A nice feature of this model is that it endogenously generates the pattern observed in the data: clusters of similar workers emerge in cheap, low-density areas and produce conventional innovation, whereas high-density cities specialize in diversity and become hubs for the development of unconventional ideas. In other words, the model endogenously generates cities of different sizes and types despite the fact that agents are ex-ante homogenous. Finally, he uses the model as a laboratory to better understand how cities can become hubs of innovation, a question of significant current policy interest. He finds that implementing a system of place-based subsidies is possible and can have sizeable welfare effects by changing both the intensity and composition of innovation activity.

Overall, Ruben's paper is quite impressive. It showcases a wide range of techniques, from novel data work, general equilibrium modeling to applied microeconometrics. These techniques are mobilized to isolate a theoretical mechanism and assess its empirical plausibility. The paper is also very creative. I give Ruben a lot of credit for choosing and writing a very good paper on a topic that is not the specialty of anyone at Northwestern.

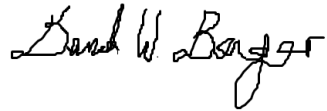
Ruben also has another very interesting paper on the economic effect of scientific breakthroughs that is coauthored with a former student. In this paper, they link patents with data on publicly traded companies from Compustat to measure firm-level exposure to scientific advances. This allows them to step inside the black box of TFP and better understand how firms respond to expected and unexpected changes in scientific knowledge.

Their first result is that firms do respond to unexpected breakthroughs in a natural way: if there is a breakthrough advance in a field in which the firm is familiar with then after some initial hesitation the firm responds by investing more in physical capital and expanding their labor force. This result suggests that scientific shocks are an important driver of firm dynamics and can help explain why some firms flourish and become technological leaders in their markets and other firms fail. Second, they provide evidence that systematic uncertainty permeates the early stages of new technological waves, with skepticism and over-enthusiasm emerging in turn as natural consequences. Finally, they build a model of endogenous growth that includes sector-specific discovery shocks that can rationalize these facts.

Ruben has other papers in his portfolio, which I will not discuss in this letter. He is smart, ambitious, and creative. He is very knowledgeable about endogenous growth models, the innovation literature and applied microeconomic techniques. This is a rare combination of skills, which I believe will deliver great results in the years to come. He is also extremely hard working. I anticipate that Ruben will be a leading researcher in the fields of economic growth and innovation in the years to come.

Finally, on a personal level Ruben is very easy to get along with. He will be an excellent scholar, colleague and teacher. In sum, I think that Ruben is amazing and that all economics departments and business schools should take a close look at him.

Sincerely,

A handwritten signature in black ink that reads "David W. Berger". The signature is written in a cursive style with a large, stylized 'D' and 'B'.

David Berger
Assistant Professor of Economics