Galina Vereshchagina

Organizing by skill: the role of skill heterogeneity and moral hazard in formation of entrepreneurial teams.

Entrepreneurial teams are an important contributor to entrepreneurial activity: they account for more than half of entrepreneurial employment, investment, and output (e.g. Basaluzzo 2006). At the same time, there is limited amount of work aimed at understanding how entrepreneurial teams are formed. In particular, since entrepreneurs vastly differ in their skills, one may wonder whether highly skilled entrepreneurs team up with other highly skilled – or with the low skilled – partners (or, formally, do entrepreneurs sort *positively* or *negatively* with respect to their skills when forming the teams), and what are driving forces behind this choice. This goal of this project is to emphasize a novel channel that may affect how entrepreneurs of different skills organize in teams, analyze the importance of this channel for understanding the properties of the underlying production technology, and use the Kauffman Firm Survey data to document the observed skill composition of entrepreneurial teams and evaluate the magnitude of the channel described in this project.

Existing studies have often implied that the realized sorting is indicative of the properties of the underlying production technology: observing teams of like agents indicates that their skills are complementary, while observing teams of heterogeneous abilities points towards the presence of sub-modularities, such as within-the-team knowledge transfer. At the same time, understanding the properties of production technology – and correctly estimating the extent of super- / sub-modularities built into it is, undoubtebly, important for many applied questions. This project will argue that the structure of entrepreneurial teams may be crucially affected by the presence of moral hazard, one of the most notable frictions of joint production. In particular, it will demonstrate that inability to observe individual efforts creates incentives for more able entrepreneurs to seek for less able partners in order to minimize the moral hazard cost, and that accounting for this force is important for estimating the production technology.

The key intuition motivating this work is as follows: Upon forming a team, the partners agree on a compensation structure that would split the revenue among them. If the individual efforts are not observable, the compensation cannot be contingent on exerted efforts and the moral hazard problem arises. It is well known that, if the team members cannot commit to

discard some of the realized revenue (i.e., they rely on budget balanced contracts – which is a natural feature of teams owned by their participants), unobservability of individual efforts results in too little effort exerted by the team members. The surplus loss due to this inefficiency, however, can be mitigated by the contract the team members agree on. It is known that the optimal compensation scheme can be replicated by a simple linear contract which specifies the equity sharing rule and the system of output-independent transfers between the partners; the sharing rule is chosen to maximize the joint surplus achieved by the team and the transfers serve to share this surplus among the team members. When the team members are homogeneous, the loss of surplus due to moral hazard is minimized under the equal equity split. In contrast, in heterogeneous teams, the optimal contract assigns higher equity share to the more skilled partner, so his incentives for effort provision are distorted less. Thus, organizing in heterogeneous teams allows entrepreneurs to mitigate the cost of moral hazard by providing more incentives for effort provision to the entrepreneurs whose effort is particularly valuable.

To formalize this intuition, I will incorporate Holmstrom (1982) team moral hazard problem into a classical equilibrium assignment model (e.g., Becker 1973) of the formation of teams among entrepreneurs with heterogeneous skills. I will analyze how the presence of moral hazard impacts equilibrium sorting pattern, and study the magnitude of this effect. The above intuition suggests that, even if the underlying production technology exhibits complementarities with respect to skills, moral hazard may result in the formation of heterogenous teams. An important quantitative question then is how strong this impact of moral hazard is; or, put differently, what degrees of technological skill complementarity are consistent with the appearance of heterogeneous teams due to inability to observe individual effort.

In the second part of the project, I will use the data from the Panel Study of Entrepreneurial Dynamics (PSED, publicly available) and the Kauffman Firm Survey (KFS) to document the observed skill composition of entrepreneurial teams. I am pretty familiar with both datasets, as I worked with both of them in my other project aiming at understanding the role of individual financial contributions in the formation of entrepreneurial teams. Both datasets provide extensive characteristics of nascent entrepreneurs that can proxy their skills, as well as a number of other characteristics that are likely to affect the formation of teams and should be factored out while focusing on the role of individual skills.

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FIELDS OF INTERESTS:

Macroeconomics, Applied Theory, Industrial Organization

EMPLOYMENT:

2014 – present: Associate Professor, Arizona State University
2007 – 2014: Assistant Professor, Arizona State University
2004 – 2007: Assistant Professor, University of Iowa
2001 – 2004: Junior Researcher, CERGE-EI, Prague

OTHER PROFESSIONAL ACTIVITIES:

2014 – present: *Review of Economic Dynamics*, Associate Editor

EDUCATION:

Ph.D. in Economics (2004)
Center for Economic Research and Graduate Education and Economic Institute (CERGE-EI), Prague
M. A. in Economics (2001) CERGE-EI, Prague
M.Sc. in Mathematics, *diploma cum laude* (1998), National Taras Shevchenko University of Kiev, Ukraine (specialization: Theory of Probability and Mathematical Statistics)

Doctoral exchange programs:
University of Rochester, Rochester, NY, Visiting student (Spring 2002 and Spring 2003)
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PUBLICATIONS:

"Risk Taking by Entrepreneurs" (with Hugo Hopenhayn), *American Economic Review*, Vol. 99(5), December 2009, pp. 1808-1830.

"Incentives and the Structure of Teams" (with April Franco and Matthew Mitchell), *Journal of Economic Theory*, Vol. 146(6), November 2011, pp. 2307-2332.

"Preferences for Risk in Dynamic Models with Adjustment Costs", *Review of Economic Dynamics*, Vol. 17(1), January 2014, pp. 86-106.
(previously circulated as "Preferences for Risk in a Dynamic Model with Consumption Commitments")

"Partnerships versus Corporations: Moral Hazard, Sorting and Ownership structure" (with Ayca Kaya), *American Economic Review*, Vol. 104(1), January 2014, pp. 291-307.

"Moral Hazard and Sorting in a Market for Partnerships" (with Ayca Kaya), *Economic Theory*. Volume 60 (1), September 2015, pp 73-121.

WORKING PAPERS:

"The Role of Individual Financial Contributions in the Formation of Entrepeneurial Teams", August 2015, under review

"Serial Entrepreneurship and the Impact of Credit Constraints on Economic Development", June 2014

"Between-Firm Redistribution of Profit in Competitive Industries: Why Labor Market Policies May Not Work", August 2005

WORK IN PROGRESS:

"Public and Private Equity in a General Equilibrium Model of Occupational Choice"

"On the Convergence of Volatility of Public and Private Firms"

PRESENTATIONS AT CONFERENCES AND WORKSHOPS:

2015: Texas A&M

2014: Society of Economic Dynamics Meeting in Toronto (June)

2013: Society of Economic Dynamics Meeting in Seoul (June), Society of the Advancement of Economic Theory in Paris (July), FRB of Richmond , Drexel University

2012: Midwest Economic Theory Conference (October), Midwest Macroeconomic Meetings (November), Queens University (November)

2010: Southwest Economic Theory Conference (February)

2009: Society of Economic Dynamics Meeting in Istanbul (June), Minneapolis Fed (June)

2008: Midwest Economic Theory Conference (October), PennState (November), UC, Irvine (February), Society of Economic Dynamics Meeting in Boston (June)

2007: NYU Macroeconomics Workshop (September), NBER Summer Institute (July), Society of Economic Dynamics Meeting in Prague (June), SAET Conference on Current Trend in Economics (June), University of Illinois at Urbana Champaign (May), Arisona State University (March)

2006: Society of Economic Dynamics Meeting in Vancouver (June), Penn State University (April)

2004: IIES (February), Universidad Autonoma de Barcelona (February), Universidad Carlos III (February), University of Warwik (February), UCL (February), University of Iowa (January)

2003: European Winter Meeting of the Econometric Society in Madrid (October 24-25), Econometric Society European Meeting in Stockholm (August 20-24), NBER Summer Institute, Capital Markets and the Economy Workshop (July 21-23), 2003 Society for Economic Dynamics Meeting in Paris (June 26-28), the 11th Midwest Macroeconomics Conference, Federal Reserve Bank of Chicago (May 16-17), University of Rochester (February)

GRANTS, AWARDS, AND FELLOWSHIPS:

W. P. Carey School of Business "Dean's Award for Excellence" (2014, 2013, 2012)
Kauffman Foundation sponsored seat at the NORC Data Enclave (12 months starting from April 2013)
Old Gold Fellowship, University of Iowa (2005)
Global Development Network Research Competition Grant III-035, Principal Investigator (2003)
Dissertation Workshop Paper Award, CERGE-EI, Prague (May 2002)
National Taras Shevchenko University of Kiev performance stipend (1993-1998)
Soros Student Grants # GSU 041015 , GSU 071037 and GSU 061095 from International Soros Science Education Program (1994-1998)

TEACHING:

Arizona State University: Instructor for the following courses
- Intermediate Macroeconomics (ECN 313, undergraduate level)
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- Macroeconomics III (ECN 715, graduate level, topics)

University of Iowa: Instructor for the following courses
- Intermediate Macroeconomics (06E:105, undergraduate level)
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- Macroeconomics III (06E:241, advanced graduate course
  - Topic: Incomplete markets and dynamic contracting in macroeconomics)

CERGE-EI, Prague: Teaching Assistant for the following graduate courses:
- Macroeconomics 0, I, II, Advanced Macroeconomics I, II, Economic Growth, Labor Economics

Universidad Torcuato di Tella, Buenos Aires: Teaching Assistant for Macroeconomics (Fall 2002)

National Taras Shevchenko University of Kiev, Ukraine: Teaching Assistant for Statistics (Spring 1998)

REFEREE FOR:

American Economic Review, Journal of Political Economy, Quarterly Journal of Economics, Journal of Economic Theory, International Economic Review, Review of Economic Dynamics, Economic Theory, The B.E. Journal of Theoretical Economics, Journal of International Money and Finance, Economic Inquiry, Journal of Economic Studies, Journal or Economics and Mangement Startegy, Optimization Letters, GDN Grant Competition