

EXTERNAL REVIEW FOR CERGE-EI PH.D. DISSERTATION BY DANIIL KASHKAROV

Vladimir Smirnyagin

Assistant Professor of Economics, University of Virginia

Summary

Daniil Kashkarov's dissertation is titled "*Essays on Human Capital, Inequality, and Technological Change*" and is comprised of three chapters. The first and the third one are solo-authored, and the second one is co-authored with Valentin Artemov. While the first two chapters study the impact of routine-biased technological change on labor market outcomes, the third chapter brings insights from biology and ecology literature to shed light on how current and potential labor market disruptions may affect workers of various occupations and skill sets. In a sense, this is a generalization of a state-of-the-art labor market framework suitable for comprehensively studying the impact of climate change, AI, and other pressing issues.

Chapter 1

The first chapter, "*RBTC and Human Capital: Accounting for Individual-Level Responses*," empirically and quantitatively studies the impact of routine-biased technological change (RBTC) on the accumulation of human capital and earnings inequality. From an empirical perspective, the paper leverages NLSY79 data to document several important facts about the link between ability, occupation choice (routine vs. abstract), and transition patterns between these occupations. The partial equilibrium occupational choice model developed in the quantitative part of the paper features two exogenous driving forces: time-varying prices for human capital in routine and abstract occupations. The counterfactual experiments show that even though RBTC contributed little to income inequality, it had a profound impact on the abstract wage premium. Importantly, the version of the model with no response of workers to changing human capital prices leads to a much larger wage premium.

Comments

1. The chapter is written very clearly. It is self-contained, and the results of the analysis are well described. It is a nice quantitative contribution to the literature on RBTC. Therefore, in my opinion, it is ready for a PhD thesis defense as it is.
2. Even though the chapter is perfectly suitable for a PhD dissertation, an additional task for future revisions of the paper is to consider the welfare implications. Specifically, how much in consumption equivalent units would agents additionally need, with time-varying human capital prices, to be indifferent to a scenario where those prices are fixed? Who are the winners and who are the losers?

3. It would be interesting to include a discussion of why having two driving forces is necessary to fit the data, instead of normalizing the price of routine human capital to one and varying the relative price of abstract human capital. Also, for future iterations of the paper, I think it may be a good idea to present the model results alongside the data on the same graphs. This way, it will be easier to see which model components are essential for accounting for the data.

Chapter 2

The second chapter, “*Disappearing Stepping Stones: Technological Change and Career Paths*” (co-authored with Valentin Artemov), studies the bottleneck effect of RBTC. Specifically, the authors use novel data on job postings and document that a sizable share of workers who end up taking non-routine cognitive (NRC) jobs follow a so-called stepping stone career path: workers first accumulate human capital early in their careers by taking routine occupations and subsequently transition to NRC jobs. RBTC reduced the number of routine cognitive jobs, making it harder for young workers to eventually transition to an NRC occupation. A quantitative occupational choice model, disciplined by U.S. data, shows that this bottleneck effect accounts for a loss of over 1 million NRC workers who got stuck in lower-skilled occupations. The authors also look into wage losses in the cross-section of workers, finding that the losses are largest in the middle of the wage distribution.

Comments

1. The chapter is written in a very clear way. The exposition is tight and insightful. Therefore, in my opinion, it is a perfect contribution to a PhD thesis as it is.
2. I kept wondering if there is any room for government policy. Specifically, is there anything the government can do to mitigate the effect of RBTC on affected workers? Answering this question requires a general equilibrium framework, possibly with explicit modeling of the production sector, which is beyond the scope of this paper. However, it is something the authors could discuss in future iterations of the paper upon submission to a journal.
3. Another suggestion I have for future work is to emphasize the macroeconomic implications of the bottleneck effect. The authors did a good job convincing the reader that this effect had a pronounced impact on labor composition, wage distribution, and economic losses for specific groups of workers. I would encourage the authors to summarize the magnitude of this effect in aggregate terms to demonstrate that the effect does not wash out in the aggregate.

Chapter 3

This paper brings insights from a well-established biology and ecology literature to study the impact of changing labor market environments on workers’ outcomes. The author takes a

state-of-the-art model of employment dynamics from labor economics literature and subsequently extends it to account for the characteristics of the environment considered to be key in adaptation theory. The model, disciplined by NLSY79 and O*NET data, is used to deliver several important results. The author finds distinct adaptive response modes for cognitive skills due to high costs of mismatch, while manual skills exhibit continuous adaptation. By treating occupational categories as distinct labor market environments and mapping them into distinct adaptive response mode regions, the author studies the impact of automation, AI, and climate change on workers' adaptive capacity.

Comments

1. This chapter is written very clearly, even though it undertakes an ambitious task of bringing insights from a different field with drastically different jargon. I learned a lot from reading this paper. Content-wise, this is a valuable contribution to the literature on labor economics. Thus, I believe it is ready for a PhD thesis defense as it is.
2. One comment I have for future work is about non-convex adjustment costs. When I was reading predictions from biology literature (especially, prediction 2), I was thinking that the model environment should feature some sort of non-convexity. That is, it is costly to develop new adaptive responses, and, thus, a large investment may be needed over a short period of time, given that changes in the environment can be rapid and unanticipated. Few agents will be able to make this investment; this creates lumpiness in the cross-section. In my view, this type of effect is best captured by non-convex costs.

Recommendation

Overall, I find that this dissertation studies fascinating questions. All three chapters are well-executed, and results are clearly described and interpreted. Overall, the dissertation is well-written. The thesis satisfies formal and content requirements for a PhD thesis in economics, and I recommend this dissertation for a defense.