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Editorial

RED Special Issue on Human Capital and Inequality, an introduction

Since Becker's seminal 1964 book, *Human Capital*, human capital theory has been used to understand nearly all facets of inequality, including the determinants and evolution of cross-sectional income inequality as well as intergenerational mobility. Individual heterogeneity and market frictions play central roles in this discussion, with many policy analyses motivated by an effort to improve economic efficiency and/or reduce inequality. Economists have also recognized that human capital development begins upon conception and continues throughout the life course, taking place in families, schools, and the workplace.

The papers in this special issue, presented at the Human Capital and Economic Opportunity (HCEO) Conference in Chicago, represent work at the frontier of analyses of human capital and inequality, taking on a range of issues that have come to dominate recent discussions in economics. Most of the papers in this issue focus on higher education decisions and post-school lifecycle skill accumulation, considering the implications of important frictions in credit and/or labor markets, but others focus more on earlier investment choices, intergenerational mobility, and the evolution of cross-sectional inequality.

The first three papers study higher education decisions explicitly in lifecycle frameworks with idiosyncratic productivity shocks, heterogeneous abilities, imperfect credit markets, and labor supply decisions. **Hai and Heckman** incorporate different dimensions of ability and the acquisition of human capital through labor market experience. They estimate their model allowing for the fact that individuals can borrow from the private lending market and from government student loan programs, where the private market credit limit is explicitly derived taking into account endogenous labor supply and many other individual characteristics. They find evidence of substantial life cycle credit constraints that affect human capital accumulation and inequality but that tuition costs have a weak effect on inequality. They also find that equalizing cognitive and noncognitive ability has dramatic effects on inequality, while equalizing parental backgrounds has much weaker effects. The authors find that subsidizing tuition costs would have only a modest impact on inequality.

Heijdra, Kindermann, and Reijnders embed their lifecycle schooling framework in an overlapping generations general equilibrium model and calibrate it based on the current government education financing (i.e. loans and grants) system. They also account for human capital accumulation through formal education as well as learning on the job. Since labor income is stochastic and markets are incomplete, the type of educational financing system in place will influence the kind of financial distress that someone with a bad run of labor market shocks will experience. The authors consider the welfare implications of moving from a system where students finance tuition expenses through student loans repaid in fixed installments to three possible reforms that finance expenditures through taxes on different groups (all workers, all graduates, or degree based). These reforms would help improve risk sharing and incentivize education; however, the welfare gains are distributed unequally across generations.

Navarro and Zhou estimate a similar lifecycle schooling model; however, their primary contribution lies in estimation of the extent to which post-school wage differences reflect *ex ante* known individual heterogeneity or unanticipated labor market shocks. Their findings suggest that much of what looks like post-school labor productivity risk to the econometrician is actually known by individuals at the time they are making their schooling decisions. To better understand the implications of this for policy, the authors study the effects of offering a minimum wage insurance contract to high school graduates. Importantly, they show that failing to recognize asymmetric information between the insuring institution and students can lead to an exposure to important financial losses for the insurer, highlighting the importance of accounting for difficult-to-measure individual heterogeneity.

Giustinelli and Pavoni also study the roles of information and beliefs in schooling decisions, taking on the common assumption in economics that all decision makers have rational expectations and that there is no ambiguity over those expectations. Specifically, they collect and examine new data from middle school students in Italy on their knowledge of high school tracks and their expected success in completing them. Their analysis provides novel evidence on awareness and ambiguity perceptions and on how students' perceptions evolve during the process of high school track choice. The

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middle schoolers in their study display partial awareness about the set of available tracks and report substantial belief ambiguity about their likelihood of succeeding in the various regular high school tracks, especially for lower-ranked tracks. Children from less advantaged families display lower initial perceived knowledge and acquire information at a slower pace, particularly about college-preparatory schools.

Krebs, Moritz, and Wright develop an equilibrium model with endogenous incomplete financial markets where individuals transition through stages of life (ending in death) for random periods of time and are subject to idiosyncratic shocks to their human capital. With a linear human capital technology function (allowing for negative gross human capital investment), the authors obtain tractable distribution of wealth shares over a finite set of agent types rather than an infinite dimensional wealth distribution. After calibrating the model, they show that young households are severely under-insured against human capital (labor income) risk and the welfare losses due to the lack of insurance are substantial. In a set of counterfactuals, the authors show that government policies which improve the provision of private insurance (by extending the length of exclusion from financial markets or increasing income garnishment following an off-the-equilibrium path default (i.e. when the enforcement constraint binds)) can lead to substantial gains in economic growth.

Mestieri, Schauer, and Townsend study the interaction between human capital acquisition and entrepreneurship. More specifically, they develop and estimate an incomplete markets overlapping generations model with dynastic families where human capital and entrepreneurial investment are both endogenously determined and interact in general equilibrium. This interaction is important. If entrepreneurs suffer from financial frictions, the number of operating firms and their size can be distorted downward relative to an environment with perfect credit markets. These distortions affect firms' labor demand and put downward pressure on equilibrium wages, which reduces incentives for education. On the other investment margin, borrowing constraints can limit investments in human capital, which reduces the productivity of both workers and entrepreneurs managing firms. It can also reduce the effective supply of labor, distorting equilibrium wages upward. Together, these forces can translate into reductions in the number of firms and their size. After calibrating their model to household level data from Mexico, they show that endogenous human capital acquisition is a key driver of inequality and intergenerational persistence.

The next two papers aim to understand factors leading to geographic differences in intergenerational mobility. **Kotera and Seshadri** focus on the importance of state-level school financing policies in explaining the dramatic differences in intergenerational mobility documented in Chetty et al. (2014). They develop a dynamic model in which school districts vote over per pupil spending and states determine the finance system. Both schooling expenditures and private parental investments are productive inputs into child human capital, which can also be augmented later in life through on-the-job investment. The inability of parents to borrow against their children's future earnings leads to distortions in investment behavior and intergenerational mobility. Calibrating their model to measures of expenditures per pupil and intergenerational income relationships, they show that differences in school finance policies and local expenditures are important factors in explaining intergenerational mobility. The authors demonstrate that moving to a full state funding system, with no variation across districts, would substantially improve intergenerational mobility in some states, while leaving other states largely unaffected.

Abbott and Gallipoli study the geographical variation in the intergenerational elasticity of earnings (IGE) and its relationship with the complementarity of worker's human capital in the production function. To do so, they develop and estimate an equilibrium model that extends the Becker–Tomes framework by introducing a production sector in which workers' human capital inputs are complements. In this setting, the return to parental human capital investments is lower where skill complementarity is more intense and this generates less intergenerational persistence. They show that education subsidies may thus be more desirable where skill complementarities are stronger, which endogenously leads to a negative correlation between progressive public policy and IGE. Using microdata they construct location-specific measures of skill complementarity and find that the geographic differences in skill complementarity directly account for at least one fifth of cross-country variation in IGE

Attanasio, Meghir, Nix, and Salvati, study the production of human capital and its determinants at younger ages in two developing countries: Ethiopia and Peru. They estimate the production functions for two components of human capital, health and cognition, from ages 1 to 15, characterizing the nature of their persistence and dynamic complementarities. They find that more-able and higher-income parents invest more, particularly at younger ages, when investments have the greatest impact, and that these differences in investments by parental income lead to large gaps in inequality by age 8 that persist through age 15. These large differences in parental investment may thus be an important source of social inequality and points to interventions boosting investments in children from poor backgrounds at a very early stage.

Flinn, Gemici, and Laufer focus on the interactions between search frictions and human capital accumulation. They develop and estimate a labor search model with on-the-job training that endogenizes both general and match specific productivity of the worker. In decomposing the sources of lifecycle wage growth, they focus on the earnings process associated with labor market experience and tenure on the current job. The model generates positive dependencies between experience and job tenure since both are positively related to the values of general and match-specific human capital. Their model produces relationships between wages, schooling, general experience, and job tenure broadly consistent with what is found when estimating an augmented Mincerian wage function. The authors study the implications of raising minimum wages when there is post-entry investment. Unlike earlier papers, they show that post-entry investment tends to offset the deleterious effects of the policy.

Two papers focus their analysis on the determinants and evolution of cross-sectional inequality. **Caines, Hoffmann, and Kambourov** establish the important role of complex skills and tasks in modern labor markets, arguing that the computerization of many simple routine tasks has depressed the wages of all workers with low levels of analytical and abstract skills, whether they work in routine or non-routine occupations. Conditioning on task complexity, they find that routine-intensity of an occupation is not a significant predictor of wage growth or levels over the 1980-2005 period. By contrast, wages and wage growth are higher for complex occupations, routine or non-routine. At the same time, labor has reallocated toward more complex occupations.

Kitao, Ljungqvist, and Sargent aim at understanding trans-Atlantic employment experiences since World War II: before the 1970s, unemployment rates were significantly lower in Europe than in the U.S., but the roles were reversed after the 1970s. To explain these facts, they build an overlapping generations model with two types of workers, high school and college graduates, whose career decisions are affected by different skill acquisition technologies, and whose short-run employment outcomes are affected by search frictions. They find that higher minimum wages in Europe explain why youth unemployment has risen more in Europe than in the U.S., while turbulence, in the form of higher risks of human capital depreciation after involuntary job destructions, causes long-term unemployment in Europe, mostly among older workers. The latter leaves U.S. unemployment unaffected.

Finally, **Gilleskie, Han, and Norton** study the role of both health and human capital on wage inequality over the lifecycle. In particular, they jointly estimate the evolution of schooling, body mass index (BMI), employment, family structure, and wages over time for American women. Focusing primarily on the role of BMI, both directly and indirectly through its influence on other choices, they estimate both the contemporaneous and dynamic effects of BMI on wage distributions by age and race, allowing them to disentangle the many ways in which obesity might affect wage inequality.

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