Labour market returns to Master's degree

Abstract

A university degree as a signal of individual productivity has been associated with a significant wage premium in both developed and developing countries. However, the rapid massification of higher education at the end of the 20th and the beginning of the 21st century has inevitably turned the most common Bachelor's degree into a weak labour market signal, no longer serving as a guarantee of successful employment. Along with the massification of undergraduate education and technological change, leading to gradual job polarization, the role of more advanced degrees has also grown. The Master's degree, which can be seen as a certificate of specialised training, providing field-specific professional and instrumental skills, has become a way of distinguishing oneself from other jobseekers and adapting to innovations.

Despite its recent rise in popularity, post-baccalaureate education has received relatively little attention from researchers, especially when compared to the extensive literature on returns to undergraduate degrees. There are two main reasons for this. First, there is limited data that would contain information on Master's degree holders. Much of the existing research is focused on graduates from the early 1990s (Song, Orazem, & Wohlgemuth, 2008; Stevenson, 2016; Titus, 2007), which offers valuable insights from a research perspective but may not fully represent the current economic landscape. More recent and comprehensive data would make it easier to identify relevant trends in returns to human capital in general and advanced degrees in particular. Second, choosing an appropriate empirical strategy to address the endogeneity issue is challenging. On the one hand, endogeneity arises from the failure to consider a graduate's previous educational path prior to entering graduate school. The assumption that only the highest level of education matters for the outcomes significantly biases the estimates (Altonji, 1993), resulting in an overestimation of the returns to master's in fields that already attract high paying undergraduate majors (e.g., computer science) and an underestimation of the returns to lower-paying majors (e.g., humanities, social work). On the other hand, as in most studies of the returns to education, endogeneity may result from non-random selection of students by ability or from reverse causality, whereby higher wages lead to a greater probability of enrolling in Master's programmes. This is particularly the case in countries where further education is preceded by work experience. Only a few recent studies based on US labour market data provide rare exceptions with evidence of causality (Altonji & Zhong, 2021, Altonji, Humphries, & Zhong, 2023, Minaya, Scott-Clayton, & Zhou, 2024). Availability of rich high-quality micro data is essential for conducting a similar study, accounting for previous educational attainment and endogeneity issue.

This study estimates the early career wage returns, associated with obtaining a Master's degree, using all-country administrative data for Russia with a wide set of educational and job characteristics for recent graduates. We focus on a cohort of 2018 Bachelor's degree graduates and examine their transition to Master's programmes after graduation. We first estimate a simple OLS wage model with comprehensive controls on observables, including bachelor's and master's degree characteristics (field of study, level of university selectivity, honours degree), high school honors, gender, age, age squared, and job characteristics. The main limitation of such an approach is endogeneity due to unobserved characteristics and motivations of graduates, as well as non-random selection into postgraduate education, which selection on observables cannot fully account for. To address these issues, we apply entropy balancing, which is a reweighting method used in causal inference to create balanced samples based on covariates. The main goal is to construct a counterfactual control group by matching graduates who obtained a Master's degree with graduates who are as similar as possible on a set of pre-treatment characteristics, but who did not enter a Master's programme (Hainmueller & Xu, 2013). The method adjusts the weights of units in the sample so that the reweighted distribution of covariates in the treatment group resembles the distribution in the control group. We include school and undergraduate degree characteristics that precede enrolment in a Master's programme as a basis for entropy balancing.

Our results suggest that the average premium for a Master's degree with gender and age only is 12 per cent, while in the full specification it is 10 per cent. Women receive on average 17-21 per cent for their degree, while men receive only 5-6 per cent. A Master's degree from a university with low selectivity is associated with a wage premium of 6 per cent compared to no degree at all, although it is only statistically significant for women (15 per cent premium). There is also a 6 per cent premium for universities with below-average selectivity (14 per cent for women, 3 per cent for men) and 13 per cent for universities with above-average

selectivity (18 per cent for women, 8 per cent for men). The largest premium is 15 per cent (20 per cent for women, 10 per cent for men) for a Master's degree from a university with high selectivity. Ranked from the highest to the lowest, the estimated returns to a Master's degree are approximately 24 per cent in Economics and Management, 10 per cent in Mathematics and Computer Science and Natural Sciences, 9 per cent in Engineering, 7 per cent in Law and other Social Sciences, and 5 per cent in Education. Master's degrees in Agriculture, Humanities, and Arts, on average, do not bring any statistically significant returns. A substantial disparity in returns is also evident in this context, with women demonstrating favourable returns that are statistically significant across all disciplines, with the exception of Law and Arts. Conversely, men only experience positive returns from holding a Master's degree in the fields of Engineering (5 per cent) and Economics and Management (15 per cent). Notably, pursuing a degree in Education for men is associated with a 8 per cent wage penalty.

Our contribution to the literature is twofold. First, we add to the growing body of research estimating the returns to advanced degrees, which so far comes mostly from the US and a limited list of European countries. Second, we complement existing research by focusing on recent Master's graduates who entered postgraduate education directly from first-cycle programmes. Unlike in the US, where most Master's students enter postgraduate programmes with at least several years of work experience, in Russia most Master's students have recently completed their undergraduate studies and only begin their careers. Early career is a core period of professional formation when all the inequalities that will affect socio-economic outcomes are formed, meaning that it should receive more research and policy attention.

References

1. Altonji, J. G. (1993). The demand for and return to education when education outcomes are uncertain. Journal of Labor Economics, 11 (1, Part 1), 48-83.
2. Altonji, J. G., & Zhong, L. (2021). The labor market returns to advanced degrees. Journal of Labor Economics, 39 (2), 303-360.
3. Altonji, J. G., Humphries, J. E., & Zhong, L. (2023). The effects of advanced degrees on the wage rates, hours, earnings, and job satisfaction of women and men. Research in Labor Economics, 50 , 25-81.
4. Hainmueller, J., & Xu, Y. (2013). Ebalance: A stata package for entropy balancing. Journal of Statistical Software, 54 (7).
5. Minaya, V., Scott-Clayton, J., & Zhou, R. Y. (2024). Heterogeneity in labor market returns to master's degrees: Evidence from ohio. Research in Higher Education, 65, 775-793.
6. Song, M., Orazem, P. F., & Wohlgemuth, D. (2008). The role of mathematical and verbal skills on the returns to graduate and professional education. Economics of Education Review, 27 (6), 664-675
7. Stevenson, A. (2016). The returns to quality in graduate education. Education Economics, 24 (5), 445-464.
8. Titus, M. A. (2007). Detecting selection bias, using propensity score matching, and estimating treatment effects: An application to the private returns to a master's degree. Research in Higher Education, 48 , 487-521.