Essays on Education-Occupation (Mis-)Match in Labour Market

A THESIS
SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
FELLOW PROGRAMME IN MANAGEMENT
INDIAN INSTITUTE OF MANAGEMENT
INDORE

By

Shweta Grover

Economics

March 2020

Thesis Advisory Committee

Prof. Ajay Sharma [Chair]

|……..|

Prof. Deepak Sethia [Member]

|……..|

Prof. Karthikeya Naraparaju [Member]

|……..|

ABSTRACT

Education is considered as a key determinant of earnings and in turn economic growth (Dickson & Harmon, 2011). However, this relationship may be undermined in the presence of incongruity between attained education of a worker and the required education by her occupation, popularly called education-occupation mismatch (EOM) (Hartog, 2000; Leuven & Oosterbeek, 2011). Understanding EOM provides a new mechanism to understand the wage determination in the labour markets of developing countries where educational outcomes are on the rise but jobs are not growing at the same pace. Using data from the latest nationally representative survey on employment and unemployment conditions collected by India's National Sample Survey Office (NSSO) in 2011-12, this dissertation attempts to understand the relevance of EOM for two crucial aspects of the labour market – dispersion in returns to education and informality.

The first essay examines the relationship between EOM and within-education group dispersion in returns and attempts to contribute to the long-standing debate on why workers with similar education are paid different wages. Borrowing from the assignment model of wage determination (Sattinger, 1993), this study hypothesizes that it is not only the human capital and job characteristics which are central in explaining within-education group dispersion in returns, but the interaction of the supply- and demand-side factors as indicated by EOM is also crucial. This argument is based on the literature which finds overeducated workers enduring significant wage penalties and undereducated workers receiving considerable wage rewards as compared to their matched counterparts with the same level of education (Hartog, 2000; Leuven & Oosterbeek, 2011). The finding signals that match status (adequately educated, overeducated, or undereducated) of workers in the labour market, by affecting returns to education, could explain a part of within-education group dispersion in returns (Martins &

Pereira, 2004). Hence, this study explores how matching of workers to jobs alters the structure of within-education group dispersion in returns in the labour market. Applying a double sample selection bias correction and quantile wage regression estimation, the analysis reveals interesting findings. First, on average, overeducated workers suffer a wage penalty of seven percent and undereducated workers do not receive a wage reward as compared to their adequately educated counterparts. Second, the inclusion of match status reduces within-education group dispersion in returns. The finding highlights that ignoring EOM and thus, adopting a restrictive view of similarity across workers may lead to overestimation of the within-education group dispersion in returns. This study argues for focusing on EOM to increase both pecuniary and social benefits of education in terms of productivity gains and wages as well as to reduce wage dispersion.

The second essay contributes to the literature on wage determination by examining the intertwining relationship between informality and EOM and the consequent impact on the workers' wages. Considering informality from the dimensions of both, sector of work (nature of firm) and type of employment, the study discusses three issues. First, the relative importance of informality and EOM in determining the wages of workers. Second, the relevance of EOM for formal and informal workers. Third, the significance of formal-informal wage gap for matched and mismatched workers. The main results of the analysis are as follows. First, considering the individual impact of informality on wages, the results are consistent with the existing literature. Both the informal sector and informally employed workers earn lower wages than their formal counterparts. Second, segregating the data first by formal and informal sector and then by formal and informal employment reveals that EOM is crucial for formal sector and formally employed workers. However, for informal sector and informally employed workers, undereducation does not result in wage rewards. Moroever, informally employed workers tend to lose the most. They do not get rewarded for being undereducated but suffer a higher penalty

for being overeducated as compared to their formal counterparts. Lastly, the wage gap between formal and informal workers varies across all the match groups. The study highlights the need for considering the bifurcation of formal-informal workers to understand the complete dynamics of EOM especially for developing countries where informality is predominant.

Keywords: Education-occupation mismatch, Dispersion in returns to education, Informality, India.

Table of Contents

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

EOM – Education-Occupation Mismatch

EUS – Employment and Unemployment Survey

FAO – Food and Agriculture Organization

HCT – Human Capital Theory

ILO – International Labour Office

INR – Indian Rupees

JA – Job Analysis

JCM – Job Competition Model

NCEUS – National Commission for Enterprises in the Unorganized Sector

NCO – National Classification of Occupation

NSSO – National Sample Survey Office

OLS – Ordinary Least Squares

PMRPY – Pradhan Mantri Rojgar Protsahan Yojana

QR – Quantile Regression

RM – Realized Matches

Rs. – Rupees

SNP – Semi-Non-Parametric

WA – Workers' Self-Assessment

References

Agrawal, T. (2012). Returns to education in India: Some recent evidence. *Journal of Quantitative Economics*, 10, 131–151.

Agrawal, T., & Agrawal, A. (2018). Who gains more from education? A comparative analysis of business, farm and wage workers in India. *The Journal of Development Studies*, 1-18.

Alejos, L. A. (2003). Contribution of the determinants of income inequality in Guatemala.

Azam, M. (2012). Changes in wage structure in urban India, 1983–2004: A quantile regression decomposition. *World Development*, 40(6), 1135-1150.

Balasubramanian, I. (2016). Local skill concentrations and district employment growth: a simultaneous equation approach for India. *The Annals of Regional Science*, 56(2), 491-511.

Barrett, A., Callan, T., & Nolan, B. (1999). Rising wage inequality, returns to education and labour market institutions: evidence from Ireland. *British Journal of Industrial Relations*, 37(1), 77-100.

Becker, G. S. (1964). Human capital theory. Columbia, New York, 1964.

Becker, G. S. (2010). The economics of discrimination. University of Chicago press.

Berry, A., & Sabot, R. H. (1978). Labor market performance in developing countries: a survey. World Bank.

Blázquez, M., & Rendon, S. (2014). Over-education in multilingual economies: Evidence from Catalonia. *International Migration*, 52(6), 149-164.

Boeri, T., & Van Ours, J. (2013). The economics of imperfect labor markets. Princeton University Press.

Buchinsky, M. (1998). The dynamics of changes in the female wage distribution in the USA: a quantile regression approach. *Journal of Applied Econometrics*, 1-30.

Buchinsky, M. (2002). Quantile regression with sample selection: Estimating women's return to education in the US. In Economic Applications of Quantile Regression (pp. 87-113). Physica, Heidelberg.

Budría, S., & Moro-Egido, A. I. (2008). Education, educational mismatch, and wage inequality: Evidence for Spain. *Economics of Education Review*, 27(3), 332-341.

Budría, S., & Telhado-Pereira, P. (2011). Educational qualifications and wage inequality: evidence for Europe. *Revista de Economía Aplicada*, 19(56), 5.

Card, D., Cardoso, A. R., & Kline, P. (2015). Bargaining, sorting, and the gender wage gap: Quantifying the impact of firms on the relative pay of women. *The Quarterly Journal of Economics*, *131*(2), 633-686.

Castelló-Climent, A., & Mukhopadhyay, A. (2013). Mass education or a minority well educated elite in the process of growth: the case of India. *Journal of Development Economics*, 105, 303-320.

Catsiapis, G., & Robinson, C. (1982). Sample selection bias with multiple selection rules: An application to student aid grants. *Journal of Econometrics*, 18(3), 351-368.

Chevalier, A. (2003). Measuring over-education. *Economica*, 70(279), 509-531.

De Luca, G. (2008). SNP and SML estimation of univariate and bivariate binary-choice models. *Stata Journal*, 8(2), 190.

Dickson, M., & Harmon, C. (2011). Economic returns to education: What we know, what we don't know, and where we are going—some brief pointers. *Economics of Education Review*, 30(6), 1118-1122.

Dolton, P. J., & Makepeace, G. H. (1990). Self employment among graduates. *Bulletin of Economic Research*, 42(1), 35-54.

Duncan, G. J., & Hoffman, S. D. (1981). The incidence and wage effects of overeducation. *Economics of Education Review*, 1(1), 75-86.

Duraisamy, P. (2002). Changes in returns to education in India, 1983–94: by gender, age-cohort and location. *Economics of Education Review*, 21(6), 609-622.

Dutta, P. V. (2005). Accounting for wage inequality in India. *Indian Journal of Labour Economics*, *48*(2), 273-295.

Eckstein, Z., & Van den Berg, G. J. (2007). Empirical labor search: A survey. *Journal of Econometrics,* 136(2), 531-564.

Feldstein, M., & Poterba, J. (1984). Unemployment insurance and reservation wages. *Journal of Public Economics*, 23(1-2), 141-167.

Fields, G. S. (1990). Labour market modelling and the urban informal sector: theory and evidence.

Fleming, C. M., & Kler, P. (2008). I'm too clever for this job: a bivariate probit analysis on overeducation and job satisfaction in Australia. *Applied Economics*, 40(9), 1123-1138.

Food and Agriculture Organization (FAO) (1998). “The state of food and agriculture 1998”. Food and agriculture organization of the United Nations, Rome, 1998.

Freeman, R. (1976). The overeducated american.

Gastwirth, J. L. (1972). The estimation of the Lorenz curve and Gini index. *The Review of Economics and Statistics*, 306-316.

Gindling, T. H. (1991). Labor market segmentation and the determination of wages in the public, private-formal, and informal sectors in San Jose, Costa Rica. *Economic Development and Cultural Change*, *39*(3), 585-605.

Goel, M. (2017). Inequality between and within skill groups: The curious case of India. *World Development*, 93, 153-176.

Green, F., & Zhu, Y. (2010). Overqualification, job dissatisfaction, and increasing dispersion in the returns to graduate education. *Oxford Economic Papers*, 62(4), 740-763.

Groot, W., & Van Den Brink, H. M. (2000). Overeducation in the labor market: a meta-analysis. *Economics of Education Review*, 19(2), 149-158.

Haddad, G. K., & Habibi, N. (2017). Vertical skill mismatch and wage consequences in low-skilled jobs: Evidence from Iran. *International Labour Review*, *156*(1), 45-72.

Harris, J. R., & Todaro, M. P. (1970). Migration, unemployment and development: a two-sector analysis. *The American Economic Review*, *60*(1), 126-142.

Hartog, J. (2000). Over-education and earnings: where are we, where should we go?. *Economics of Education Review*, 19(2), 131-147.

Heckman, J. J. (1977). Sample selection bias as a specification error (with an application to the estimation of labor supply functions).

Heckman, J. J., Lochner, L. J., & Todd, P. E. (2003). Fifty years of Mincer earnings regressions (No. w9732). National Bureau of Economic Research.

Henderson, D. J., Polachek, S. W., & Wang, L. (2011). Heterogeneity in schooling rates of return. *Economics of Education Review*, 30(6), 1202-1214.

Herrera-Idárraga, P., López-Bazo, E., & Motellón, E. (2015). Double penalty in returns to education: informality and educational mismatch in the Colombian labour market. *The Journal of Development Studies*, *51*(12), 1683-1701.

Hien, P. V. (2018). Public investment in education and training in Vietnam. *International Education Studies*, *11*(7), 106-115.

Hussmanns, R. (2001, September). Informal sector and informal employment: elements of a conceptual framework. In *Fifth Meeting of the Expert Group on Informal Sector Statistics* (Delhi Group), New Delhi (pp. 19-21).

International Labour Office (ILO) (1998), "Report of the XVIth International Conference of Labour Statisticians", International Labour Organisation, Geneva.

International Labour Office (ILO) (2002): Decent Work and the Informal Economy; Report of the Director General; International Labour Conference, 90th Session; Report VI; International Labour Office, Geneva, 2002.

International Labour Office (ILO) (2003), "Guidelines Concerning a Statistical Definition of Informal Employment, Endorsed by the Seventeenth International Conference of Labour

Statisticians" (24 November-3 December), Seventeenth International Conference of Labour Statisticians, International Labour Organisation, Geneva.

Kiefer, N. M., & Devine, T. J. (1991). *Empirical labor economics: the search approach*. Oxford University Press on Demand.

Kierzenkowski, R., & Koske, I. (2012). Less income inequality and more growth–are they compatible? Part 8. The drivers of labour income inequality–a literature review.

Kijima, Y. (2006). Why did wage inequality increase? Evidence from urban India 1983–99. *Journal of Development Economics*, *81*(1), 97-117.

Kiker, B. F., Santos, M. C., & De Oliveira, M. M. (1997). Overeducation and undereducation: evidence for Portugal. *Economics of Education Review*, *16*(2), 111-125.

Koenker, R., & Bassett Jr, G. (1978). Regression quantiles. *Econometrica*. 33-50.

Krstic, G., & Reilly, B. (2003). An Anatomy of Labour Market Earnings Inequality in Serbia-1995 to 2000. *IMF Country Report*, *5*, 13.

Leuven, E., & Oosterbeek, H. (2011). *Overeducation and mismatch in the labor market*. In Handbook of the Economics of Education (Vol. 4, pp. 283-326). Elsevier.

Lewis, W. A. (1954). Economic development with unlimited supplies of labour. *The Manchester School*, *22*(2), 139-191.

Martins, P. S., & Pereira, P. T. (2004). Does education reduce wage inequality? Quantile regression evidence from 16 countries. *Labour Economics*, 11(3), 355-371.

Mateos-Romero, L., & del Mar Salinas-Jiménez, M. (2015). Skills heterogeneity among graduate workers: real and apparent overeducation in the Spanish labor market. *Social Indicators Research*, 1-18.

McGuinness, S., & Bennett, J. (2007). Overeducation in the graduate labour market: A quantile regression approach. *Economics of Education Review*, 26(5), 521-531.

McGuinness, S., Pouliakas, K., & Redmond, P. (2018). Skills mismatch: concepts, measurement and policy approaches. *Journal of Economic Surveys*.

Mincer, J. (1974). Schooling, experience, and earnings. Human Behavior & Social Institutions No. 2.

Montgomery, J. D. (1991). Equilibrium wage dispersion and interindustry wage differentials. *The Quarterly Journal of Economics*, 106(1), 163-179.

Naraparaju, K., & Sharma, A (2017). Labour regulations and worker welfare: The case of provident fund in India. *India Development Report 2017*.

Narayanan, A. (2015). Informal employment in India: Voluntary choice or a result of labor market segmentation?. *Indian Journal of Labour Economics*, *58*(1), 119-167.

National Commission for Enterprises in the Unorganised Sector (NCEUS) (2008), Report on definitional and statistical issues relating to informal economy, New Delhi, http://dcmsme.gov.in/Report_Statistical_Issues_Informal_Economy.pdf

National Sample Survey Office (NSSO) (2012). "Informal sector and conditions of employment in India". Report No. 539 (66/10/2). New Delhi: Government of India.

National Sample Survey Office (NSSO) (2014). “Employment and unemployment situation in India”. Report No. 554 (68/10/1). New Delhi: Government of India.

Nguyen, H. C., Nordman, C. J., & Roubaud, F. (2013). Who suffers the penalty?: A panel data analysis of earnings gaps in Vietnam. *Journal of Development Studies*, *49*(12), 1694-1710.

O'Higgins, N. (2003). Trends in the youth labour market in developing and transition countries.

Oi, W. Y., & Idson, T. L. (1999). Firm size and wages. *Handbook of Labor Economics*, *3*, 2165-2214.

Postel–Vinay, F., & Robin, J. M. (2002). Equilibrium wage dispersion with worker and employer heterogeneity. *Econometrica*, 70(6), 2295-2350.

Pradhan, M., & Van Soest, A. (1995). Formal and informal sector employment in urban areas of Bolivia. *Labour economics*, *2*(3), 275-297.

Quinn, M. A., & Rubb, S. (2006). Mexico's labor market: The importance of education-occupation matching on wages and productivity in developing countries. *Economics of Education Review*, *25*(2), 147-156.

Ramaswamy, K. V. (2013). Wages of unorganized sector workers in India: What NSS survey data can tell us?. *Indian Journal of Industrial Relations*, 438-449.

Ray, D. (1998). Development economics. Princeton University Press.

Rumberger, R. W. (1981). The rising incidence of overeducation in the US labor market. *Economics of Education Review*, *1*(3), 293-314.

Ruppert Bulmer, E. (2018). Defining informality vs mitigating its negative effects. *IZA World of Labor*:442. doi: 10.15185/izawol.442

Salverda, W., & Checchi, D. (2015). Labor market institutions and the dispersion of wage earnings. *In Handbook of Income Distribution* (Vol. 2, pp. 1535-1727). Elsevier.

Sattinger, M. (1993). Assignment models of the distribution of earnings. *Journal of Economic Literature*, 31(2), 831-880.

Sharma, S., & Sharma, P. (2017). Educational mismatch and its impact on earnings: evidence from Indian labour market. *International Journal of Social Economics*, 44(12), 1778-1795.

Spence, M. (1978). Job market signaling. In *Uncertainty in Economics* (pp. 281-306).

Tansel, A., & Bodur, F. B. (2012). Wage inequality and returns to education in Turkey: A quantile regression analysis. *Review of Development Economics*, 16(1), 107-121.

Thurow, L. C. (1975). Generating inequality. Basic books.

Tilak, J. B. (2018). The political economy of education in India. In *Education and Development in India* (pp. 33-84). Palgrave Macmillan, Singapore.

Unni, J., & Sarkar, S. (2013). Wages and informal labour markets In India: Whither premiums on human capital investments?. *Indian Journal of Labour Economics*, *56*(4).

Verdugo, R. R., & Verdugo, N. T. (1989). The impact of surplus schooling on earnings: Some additional findings. *Journal of Human Resources*, 629-643.

Verhaest, D., & Omey, E. (2006). The impact of overeducation and its measurement. *Social Indicators Research*, *77*(3), 419-448.