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## Educational mismatch and self-employment

Keith A. Bender<sup>a,1</sup>, Kristen Roche<sup>b,\*</sup><sup>a</sup> Department of Economics, University of Aberdeen, Aberdeen AB24 3QY, Scotland, UK<sup>b</sup> Business Administration Department, Mount Mary College, 2900 North Menomonee River Pkwy, Milwaukee, WI 53222, United States

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## ABSTRACT

Previous research on educational mismatch concentrates on estimating its labor market consequences but with a focus on wage and salary workers. This paper examines the far less studied influence of mismatch on the self-employed. Using a sample of workers in science and engineering fields, results show larger earnings penalties for mismatch among the self-employed but no diminution in job satisfaction. Moreover, the reasons for mismatch among the self-employed differ dramatically by gender.

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## 1. Introduction

The public and private costs of education are huge, causing economists, policy makers, and the public to be concerned about whether or not workers utilize the skills acquired during education in the labor market. Responding to this concern, researchers examine the causes and effects of mismatches in the skills required for the job and the skills acquired during education. While mismatch can be in the type of skills or simply the quantity (over- or under-education), the research finds that mismatch generates lower earnings, lower job satisfaction, and higher turnover, *ceteris paribus*. These findings appear robust to differences in country, time period, or whether the data analysis is cross-sectional or panel in nature.

Thus, while the effects of mismatch are fairly well established, the research so far has focused only on wage

and salary workers, meaning that there has been no research to date on the relationship between mismatch and self-employment. Since self-employment is often seen as a driver of economic growth and particularly in employment growth (see for example, Birch, 1987; Neumark, Wall, & Zhang, 2008, for the US; Burges, 1991, for Australia; Audretsch & Fritsch, 2003, for Germany although Haltiwanger, Jarmin, & Miranda, 2010, offers a contrasting view), the study of how mismatch interacts with self-employment enriches our understanding of both educational mismatch and this critical area of policy interest.

## 2. Educational mismatch brief literature review

Previous research on educational mismatch focuses on the effects of being employed in a job that is not well matched with a wage and salary worker's education. For example, there is a robust finding that mismatch is correlated with lower earnings (e.g. Borghans & de Grip, 2000; Chevalier, 2003; Groot & Maassen van den Brink, 2000). Other researchers (e.g. Allen & van der Velden, 2001; Wolbers, 2003) have found mismatch to be positively correlated with quits and job turnover, while

\* Corresponding author. Tel.: +1 414 256 1231.

E-mail addresses: [kabender@abdn.ac.uk](mailto:kabender@abdn.ac.uk) (K.A. Bender), [rochek@mtmary.edu](mailto:rochek@mtmary.edu) (K. Roche).<sup>1</sup> Tel.: +44 (0)1224 273411.

others (Belfield & Harris, 2002; Bender & Heywood, 2006; Moshavi & Terborg, 2002) have found that it is correlated with lower job satisfaction. Results tend to hold even in the case of panel data (e.g. Bender & Heywood, 2011; Lindley & McIntosh, 2008; Mavromaras & McGuinness, 2012; Mavromaras, McGuinness, O'Leary, Sloane, & Fok, 2010; McGuinness & Wooden, 2009; Verhaest & Omeij, 2009). In general, it also does not seem to qualitatively matter whether one is considering vertical mismatch ('too much' or 'too little' education) or horizontal mismatch (whether the skills match the job being done), although the magnitudes of the consequences of mismatch are different depending on how one defines mismatch.<sup>2</sup>

One area not considered in the mismatch literature so far is whether there are differences across different types of employment – namely whether there are differences across wage and salary jobs or self-employment jobs. The research mentioned above is not explicit about the kinds of jobs where mismatch might occur and whether the effects of mismatch might differ across types of employment. Indeed, the seemingly closest related paper is one by Nordin, Persson, and Rooth (2010) which uses Swedish data to examine mismatch at the occupational level, but that paper does not explicitly examine the self-employed.

Why might educational mismatch occur for the self-employed? Certainly part of the story might be the reason for self-employment. If it is voluntary, then it may be a way to find a better educational match if a matched job is not available in the wage and salary sector. This might generate lower mismatch for the self-employed. On the other hand, mismatch might be higher if workers self-employ because they have difficulties in obtaining any wage and salary job or if there are compensating differentials to self-employment that overcome a good educational match in a wage and salary job. Additionally, some of the self-employment literature finds that entrepreneurs are 'jack of all trades' types with skills in many fields (Lazear, 2005), which may explain why they work in a field that differs from their educational background.

Research also shows that the self-employed in the US tend to have higher levels of education than wage and salary workers (Hipple, 2004) and are, thus, more likely to be overeducated. Perhaps this partially explains the finding by Hamilton (2000) that the self-employed have lower earnings, *ceteris paribus*, although it does not square with the findings by Evans and Leighton (1987, 1989) that the returns to education are higher for self-employed men, compared to men employed in wage and salary jobs. Further adding to this complication is the finding (e.g. Murillo, Rahona-Lopez, & Salinas-Jimenez, 2012) that the returns to education are lower among the mismatched. Since, to our knowledge, no paper actually examines the

rates and effects of mismatch among the self-employed, our research presented below is a first step in directly analyzing the interrelationship of mismatch and self-employment.

### 3. Data

In this paper we utilize a dataset from the US National Science Foundation (NSF) comprising of workers who have obtained at least a bachelor's degree in a hard or social science, technology, engineering, or mathematics (STEM) field and/or are currently working in that field. The data come from the 2003 wave of the public use version of the National Survey of College Graduates (NSCG), the only wave of the public use NSCG that identifies the self-employed.<sup>3</sup>

Central to this analysis is the following question asked in the dataset – "Thinking about the relationship between your work and your education, to what extent is your work related to your highest degree? Closely related, somewhat related, or not at all related." For those workers who are in jobs not closely related to their education, we assume that they are using less of the knowledge, training, and skills learned in that education and, therefore, indicate a level of mismatch between their education and job.<sup>4</sup> Indeed, we will refer to these categories as 'matched', 'moderately mismatched', and 'severely mismatched' below.<sup>5</sup> The dataset also contains standard socio-economic variables such as gender, race and ethnicity, age, earnings, etc. Furthermore in the NSCG, we can identify whether the worker is self-employed (either as an incorporated or nonincorporated business). In the results below, we restrict the sample to just full-time workers who report positive earnings for two reasons. First, omission of part-time workers follows the previous self-employment literature (e.g. Evans & Leighton, 1989; Hundley, 2000), and second, it allows us to focus on those who are in career type jobs.<sup>6</sup>

Table 1 is a simple look at any differences between the rates of educational mismatch by self-employed and wage and salary status and gender. Overall, the self-employed are less likely than wage and salary workers to be matched, since only 57.3 percent are matched, compared to 63 percent of wage and salary workers. While the percentage of workers who are moderately mismatched are the same, the rates of severe mismatch are higher for the self-employed by nearly six percentage points.

<sup>3</sup> The data are available from the NSF's Scientists and Engineers Statistical Data System at <http://www.nsf.gov/statistics/sestat/>.

<sup>4</sup> Thus, we are not defining mismatch vertically (that is, over- or under-education) as is often done in the literature, but horizontally. This is partially driven by the data, but is also due to the fact that this sample is drawn for those with at least a college education. Thus, it is likely that the vertical mismatch will be in the direction of over-education.

<sup>5</sup> There is some debate in the mismatch literature about the use of subjective measures of mismatch (as we have here) versus more objective measures (such as comparing actual education and the average education for an occupation). Generally, however, similar labor market impacts are found using either measure.

<sup>6</sup> Table A1 contains the descriptive statistics for the sample, split by employment sector and by gender.

<sup>2</sup> Why these effects are generated is an open question. Several explanations have been given in the literature: government subsidies of education may lead to an oversupply of the highly educated (Freeman, 1976), informational asymmetries may exist about skills requirements (Malamud, 2009; Tsang & Levin, 1985), and institutional characteristics of the labor market may mask productivity and so workers are paid on observable characteristics (such as education) that are assumed to be correlated with productivity (Thurow, 1975).

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