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Wage inequality: A structural decomposition ☆

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ABSTRACT

The objective of this paper is to study why some workers are paid more than others. To do so we construct and quantitatively assess an equilibrium search model with on-the-job search, general human capital accumulation and two sided heterogeneity. In the model workers differ in abilities and firms differ in their productivities. The model generates a simple (log) wage variance decomposition that is used to measure the importance of firm and worker productivity differentials, frictional wage dispersion and workers' sorting dynamics. We calibrate the model using a sample of young workers from the UK. We show that heterogeneity among firms generates great deal of wage inequality. Among low skilled workers job ladder effects are small, most of the impact of experience on wages is due to learning-by-doing. High skilled workers are much more mobile. Job ladder effects have sizeable impact.

1. Introduction

A major focus of Dale Mortensen's work was on addressing the following question – Why are workers, similar or otherwise, paid differently? Of course, several partial answers have long been known. Differentials in worker abilities, for example, have long been recognized as an important source of wage inequality. Human capital theory, pioneered by Becker (1964), explains why years of education and other relevant fixed factors play a role in explaining wage differences. Following early work by Mincer (1974), many have also argued that learning-by-doing implies workers accumulate more human capital while working. This implies that time in employment may well play an important role in explaining wage differ-

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ences among workers. Standard wage regressions confirm the importance of the above factors, but also show that a large proportion of wage inequality is still left unexplained. Mortensen (2003) made a significant contribution by showing that when labour market frictions are suitably modelled wage inequality is a natural equilibrium outcome.

As Mortensen (2003) demonstrated on the job search plays a central role in explaining wage differences. If workers search while employed, the longer a worker is employed the greater the probability she will find and accept a higher paying job and this in itself can lead to inequality (e.g. Burdett, 1978, for early work in this area). In such a framework search frictions can generate wage differentials among the employed even when workers and firms are identical (see, for example, Burdett and Mortensen, 1998, and Hornstein, Krusell and Violante, 2011). Of course, difference in the productivities of firms generates further wage differentials. Several different theories reach this conclusion (see, for example, Lentz and Mortensen, 2005; Postel-Vinay and Robin, 2002; and Bartelsman and Doms, 2000).

In this paper we assess the extent to which each of the factors mentioned above contribute to overall wage inequality. We do this in the context of an equilibrium search model based on the Burdett and Mortensen (1998) framework (henceforth B/M)), but allowing for human capital accumulation as analysed in Burdett, Carrillo-Tudela and Coles (2011). The main innovation relative to Burdett et al. (2011) is that here we (i) allow firms to differ in their productivities and (ii) use the resulting model as a measuring tool to assess the relative contributions of the aforementioned factors on overall wage inequality. We use UK data and compare the relative contributions of these factors across low, medium and high skilled workers. Differentiating across skill groups is important since we find that low skilled workers have a much more tenuous job ladder than medium and high skilled workers. As shown below this difference has an important effect on the nature of wage inequality between these workers.

In the framework developed, employed workers of different abilities enter the labour market, accumulate general human capital through learning-by-doing as well as engaging in on-the-job search.[3] Firms post wage rates and in equilibrium differentiate their pay policies as an optimal reaction to workers' on-the-job search. In equilibrium more productive firms offer higher paying jobs, wages increase over time as workers becomes more productive and move from less to more productive jobs when the opportunity arises. These dynamics generate positive sorting among workers and firms. In equilibrium more productive workers end up employed in more productive firms; and more productive firms end up employing a more productive workforce.

As argued by Bagger, Fontaine, Postel-Vinay and Robin (2014), an important issue is to explain why wages, on average, increase with experience.[4] Here we focus on decomposing the cross-sectional wage distribution. Our model provides a simple variance decomposition that relates (log) wages to differences in worker abilities, firm productivities and differences in pay policies. We also capture the effects of general human capital accumulation and sorting on wage variation. Thus the model is able to encompass a similar variance decomposition as analysed by Abowd, Kramarz and Margolis (1999) and Postel-Vinay and Robin (2002). At the same time the model captures the effects of labour market experience on wage variation as is the focus in the traditional applied labour literature (see Rubinstein and Weiss, 2007, for an insightful survey). This decomposition is a key element in our quantitative analysis and allows us to decompose overall wage inequality into its constituent parts.[5]

Another contribution of this study is that we address the issues raised by Hornstein et al. (2007, 2011). They define the *Mm* ratio as the ratio of the average wage earned to the lowest wage paid in the market among equally productive workers. For plausible parameter values, they explain why most search models generate a reservation wage that is too large to match the observed *Mm* ratio in the US economy. Within the framework developed here work experience is valuable. Hence, unemployed workers are willing to accept low starting wages.[6] Hornstein et al. (2007, 2011) approach is important for it not only provides relevant information for calibrating the model, it provides a coherent empirical framework for analysing wage dispersion. Indeed our calibration approach follows closely their methodology.[7]

To quantitatively assess the factors behind wage inequality in our model we use labour market histories of a sample of young workers drawn from the British Household Panel Survey (BHPS). We evaluate the model on young workers as it is precisely at this stage of a worker's labour market history that job mobility is most common. We divide the sample into the three skill (educational) groups mentioned above and analyse them separately. We highlight two main results.

First, our variance decomposition shows that the contribution of labour market experience in accounting for wage inequality is sizeable and it increases across skill groups. For high skilled workers it accounts for 27 percent of overall wage inequality, whereas for low skilled workers it accounts for only 19 percent. This difference follows as low skilled workers are more likely to move from one job to another via unemployment whereas high skilled workers are more likely to move from

[3] Our approach abstracts from life-cycle effects on job search and wages. For recent work on this issue, see Bowlus and Liu (2013) and Menzio, Telyukova and Visschers (forthcoming).

[4] Bagger et al. (2014) use the offer-matching framework to structurally estimate how wages evolve at firms when workers' productivity also evolves stochastically.

[5] A different approach uses statistical models, based on Mincer's (1974) original work, to try to identify the impact of experience on wages. Prominent examples include Topel (1991), Altonji and Williams (2005), Dustmann and Meghir (2005), among many others. The evidence from this body work, however, remains hotly debated. There are a few other papers which have investigated learning-by-doing within a search environment. Bunzel et al. (2000) provide an interesting early example. Fu (2011), Yamaguchi (2010) and Bagger et al. (2014) provide more recent examples. Manning (2003), Rubinstein and Weiss (2007), Barlevy (2008) and Bowlus and Liu (2013) estimate a wage process similar to the one identified here but do not consider equilibrium.

[6] Indeed some college interns would seem to work for no pay in return for job experience.

[7] Also see Ortego-Marti (2012) and Tjaden and Wellschmied (2014) for related work on the *Mm* approach.

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