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Explaining patterns in the school-to-work transition: An analysis using optimal matching



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ABSTRACT

This paper studies the school to work transition in the UK with the aim of achieving a richer understanding of individuals' trajectories in the five years after reaching school leaving age. By applying the technique of 'optimal matching' on data from 1991 to 2008, we group individuals' trajectories post-16, and identify a small number of distinct transition patterns. Our results suggest that while 9 out of 10 young people have generally positive experiences post-16, the remaining individuals exhibit a variety of histories that might warrant policy attention. We assess the extent to which characteristics at age 16 can predict which type of trajectory a young person will follow. Our analysis shows that, despite the apparent heterogeneity, virtually all at-risk trajectories are associated with a relatively small set of key 'risk factors': early pregnancy; low educational attainment and self-confidence; and disadvantaged family background. These characteristics are known to be strongly correlated across individuals and raise concerns about the degree of socio-economic polarisation in the transition from school to work.

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1. Introduction

Shifting social and economic conditions over the last three decades in Britain and indeed globally have diminished the centrality of the traditional route of early school leaving and rapid entry into employment (Bynner, 2001; Pollock, 2007). Trajectories have become more individualised, with educational attainment gaining an increasing importance in shaping young people's life-chances and exposing the lowest-achieving young people – often the poorest – to greater vulnerability. A large body of literature documents the social polarisation in the transition from school to work (Dickerson & Jones, 2004; Micklewright, 1989; Rice, 1999; Spielhofer, 2009).

While the effects of disadvantage on labour market outcomes are similar across countries, they are particularly marked in the UK (Ryan, 2001). Indeed, while youth unemployment hit a record high in the wake of the recent recession, the UK youth labour market had started to deteriorate as early as 2004. The reasons for this are not well understood (Goujard, Petrongolo, & Van Reenen, 2011), but there appears to be a structural problem in the transition from school to work. Some young people fail to find work after leaving school and spend a substantial amount of time Not in Employment, Education or Training (NEET). As argued by Fergusson, Pye, Esland, McLaughlin, and Muncie (2000), the experiences of many young people beyond compulsory education do not follow stable and 'traditional' trajectories, but complex ones across multiple states.

This paper studies a sample of young people reaching the end of compulsory schooling between 1991 and 2003 in the UK and traces their pathways over the following five years, covering the period up to 2008. It uses

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a powerful statistical approach – optimal matching combined with cluster analysis – to identify groups of young people following similar pathways, capturing the full richness of individuals' experiences beyond school leaving age. In doing so, it provides an alternative to commonly used statistics that summarise outcomes at a point in time (e.g. the unemployment rate) or over a specified period (e.g. time spent unemployed in the previous year) but discard potentially interesting information on labour market dynamics (such as the order in which events occur). Using this technique, the experiences of individuals within each group can be depicted using colour-coded index plots. This gives an immediate visual insight into the patterns of transition within each, allowing us to distinguish, for example, transitory 'gap years' from deep disconnect from the labour market.

The analysis in this paper builds on earlier research that used optimal matching to study the school to work transition in the UK (Anyadike-Danes & McVicar, 2005, 2010; Halpin & Chan, 1998; Martin, Schoon, & Ross, 2008; Schoon, McCulloch, Joshi, Wiggins, & Bynner, 2001) and in a comparative perspective (Brzinsky-Fay, 2007; Quintini & Manfredi, 2009; Scherer, 2005). However, most of this literature relies on long retrospective histories which may suffer from recall bias (Paull, 2002). Brzinsky-Fay (2007) and Quintini and Manfredi (2009) are exceptions to this, but use data on youth histories only up to 2000 and 2001, respectively. We therefore add to the existing literature by considering detailed monthly histories extending to 2008 and constructed from annual survey data to minimise recall bias. Finally, in consideration of recent methodological advances in the field of optimal matching (Martin & Wiggins, 2011), we take care to ensure our use of the technique is suitably justified by theory.

As the second contribution of the paper, we identify which characteristics at age 16 can act as early predictors of unsuccessful trajectories in the labour market. While a number of papers have examined the influence of background characteristics on outcomes at later points in time, the strength of our approach is that it uses the groupings identified in the first part of the analysis to provide an insight into how background characteristics are associated with successful or unsuccessful *overall trajectories* post-compulsory schooling. Importantly, we can also use this to measure the extent of social mobility in this crucial phase in the life-course.

Our results suggest that 9 out of 10 young people experience generally successful labour market trajectories between ages 16 and 21. These are predominantly smooth transitions from education to work, or long spells of education, in some cases interrupted by a spell of employment. On the other hand, the remaining individuals exhibit a variety of histories that might warrant policy attention. Importantly, however, our subsequent analysis shows that, despite this heterogeneity, virtually all at-risk trajectories are associated with either early pregnancy or low educational attainment and self-confidence. Policy should therefore give particular attention to targeting these factors. As our observation period fully predates the recent recession, these structural obstacles will not necessarily be surmounted by a return to economic growth. Furthermore,

our analysis confirms the importance of family background as a strong predictor of future labour market trajectories, thereby contributing to a significant level of socio-economic polarisation.

2. Creating a typology of school to work transitions

We explore the unfolding of school to work transitions by creating a typology of youth labour market histories (or *sequences*). This consists of two steps. Firstly, we use optimal matching techniques to construct a measure of dissimilarity between each pair of sequences (Abbot & Forrest, 1986; Sankoff & Kruskal, 1983). Secondly, we apply cluster analysis techniques to the derived measures of dissimilarity to group similar sequences together.¹

The optimal matching algorithm performs a pairwise comparison of all individuals' sequences and, in each case, derives a measure of dissimilarity as a function of the number and type of operations on the elements of one sequence that are necessary to transform it into the other. The costs assigned to each operation determine how dissimilarity is defined in the context under study, and hence how sequences are matched. Specifying costs is important as it may influence the results that emerge. The literature does not set rigid rules on this. However, it is possible to parameterise the cost matrix to make it consistent with theoretically informed definitions of what constitutes similarity in the context under study (see Martin & Wiggins, 2011, for a review).

In analysing post-compulsory school histories, we follow Lesnard (2010) and make the following considerations. Firstly, our sequence represents the five academic years after the end of compulsory schooling, and as such is set within a clear socio-economic 'calendar'. There is a strong element of contemporaneity across sequences (e.g. summers occur at the same points in all sequences). For this reason, we retain this contemporaneity by not allowing insertions or deletions. This requires having sequences of the same length. Furthermore, the institutional set up of the further education system is likely to shape observed patterns of transition around key dates (e.g. A-level exams). To address this we use time-varying substitution costs defined as the inverse of the conditional transition probability at the specific point in the sequence, as described above. This distance measure is called the *dynamic Hamming distance*.

Having derived measures of dissimilarity, cluster analysis techniques can be used to group similar sequences together. Deciding the clustering algorithm and the number of groups requires careful consideration. We opted for the classic Partitioning Around Medoids (PAM) algorithm (Kaufman & Rousseeuw, 1990, Chapter 2), which minimises the sum of dissimilarities between each sequence and its group's medoid, and ran this for k target groups ranging from 2 to 20. Our final choice of the number of clusters was in part guided by a comparison of statistical

¹ The dissimilarity matrices were obtained using the TraMineR package (Gabadinho, Ritschard, Studer, & Müller, 2009) in R (R Development Core Team, 2008).

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