



Sources of earnings inequality: Estimates from an on-the-job search model of the US labor market

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ABSTRACT

Since the early 1980s the labor market in the United States has seen a substantial increase in earnings dispersion. We study the issue by developing an on-the-job search model of the US labor market that allows for wage and employment mobility as a result of optimal individual behavior. We estimate its structural parameters on PSID data at different points in time to clarify the sources of the evolution of earnings inequality and instability between 1987 and 1996. This procedure allows to: compute lifetime measure of inequality on top of the usual cross-sectional measure of inequality and provide counterfactual experiments that evaluate the contribution of different parameters to changes over time by taking into account some equilibrium effects. We find that the increase in lifetime inequality and in cross-sectional inequality have been generated by different sources and that these sources are different by skills: changes in the wage offer distribution are the main determinant of the increase in inequality for skilled workers while both mobility changes and wage offer distribution changes are needed to explain changes for the unskilled.

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1. Introduction

Since the early 1980s the labor market in the United States has seen a substantial increase in earnings dispersion. A substantial part of the inequality literature has documented this fact using cross-sectional methods and data.¹ Three main limitations of cross-sectional studies are well-known: first, that earnings inequality is not simply described by cross-sectional measures but also by mobility across jobs and labor market states; second, that inequality in labor market outcomes at a given point in time is different from lifetime inequality in which changes in labor market state and a lifetime wage profile are taken into account; and third, that lifetime inequality is arguably a more relevant concept than cross-sectional inequality when judging the overall welfare of an individual worker.

We are clearly not the first to point out the limitations of using only cross-sectional methods to assess individual welfare. By definition individual lifetime welfare depends not only on the position occupied at a given point in time but also on the evolution of such position over time. Various streams of literature have studied this dynamic aspect.

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¹ For a recent contribution see Autor et al. (2008); for a recent contribution focusing on various components of cross-sectional inequality (from the usual individual earnings to household disposable income to consumption) see Heathcote et al. (2009); for a summary of the main trends over the last 40 years see Eckstein and Nagypal (2004); for a frequently cited survey see Katz and Autor (1999).

A first group of contributions decompose the overall wage variability in a transitory (over time) component and in a permanent component. One of the first and most influential contribution in this literature, [Gottschalk and Moffitt \(1994\)](#), argues that the increase in the variance of the transitory component of earnings has been an important contributor to the rise in overall earnings inequality.² A second group of contributions has the similar objective of assessing the stability of an individual in a given point of the inequality distribution over time but accomplish it by using transition probabilities among quintiles ([Buchinsky and Hunt, 1999](#); [Cardoso, 2006](#)). The main conclusions suggest a decline in mobility over time.

A third and quite large and influential group of works focuses on mechanisms that insure individuals against risk. An important contribution of this literature is the realization that individuals may reduce the volatility of the resources available to them with respect to earnings volatility by adopting risk sharing mechanisms and by using specific institutions. From an empirical point of view, this means focusing on consumption and household-level variables and not only on individual earnings.³

A fourth group of contributions share a similar concern but with a different methodology and a stronger focus on macroeconomic fluctuations and implications. For example both [Krueger and Perri \(2006\)](#) and [Heathcote et al. \(2008\)](#) model risk and are concerned with the difference between income and consumption inequality. The main contribution of this strand of literature is to understand how individual-level risk affects the distribution of economic outcomes (for example endogenizing the structure of credit markets or labor supply choices) and to examine the welfare consequences of changes in earnings or income risk.

All these contributions mainly focus on how different types of shocks may impact the individual position in the inequality distribution. The first two groups accomplish this by an essentially statistical decomposition of the data while the second two groups exploit the structure of behavioral models over the life-cycle. Instead, a fifth, and much smaller, group of contributions develops and estimate models that explicitly allow for wage and employment mobility as a result of optimal individual behavior. By estimating the structural parameters of the model, they are then able to construct lifetime measures of inequality taking into account all the individual component of earnings “instability”: cross-sectional inequality, mobility and risk. [Flinn \(2002\)](#) estimates an on-the-job search model of the labor market on Italian and US data showing how the ranking of inequality between the two countries is very different if we look at lifetime inequality rather than simply at cross-sectional inequality. However, he does not assess the evolution of inequality over time. This is the focus of [Bowlus and Robin \(2004\)](#) who develop an innovative non-stationary model of job mobility to look at inequality in the US over time: they conclude that the main sources of changes in lifetime inequality are changes in job mobility and in the earnings distribution. [Mabli \(2008\)](#) also looks at the evolution of US inequality over time but at household level and by estimating a two agent on-the-job search model. He concludes that lifetime welfare inequality has experienced a much slower increase than household earnings inequality.⁴

We share the objective and the general methodology of this last group of contributions. We also focus on decomposing the increase of inequality in the US in two main sources: an underlying (possibly demand-driven) wage offer distribution and a set of shocks responsible for mobility opportunities across labor market states and jobs. In comparison to [Bowlus and Robin \(2004\)](#) and [Mabli \(2008\)](#), we estimate a more standard on-the-job search model with the advantage that we can estimate by maximum likelihood all its structural parameters both at the beginning and at the end of a period of significant increase in inequality in the US. In this way we are not only able to build lifetime inequality measures but also to generate counterfactual labor market careers to give a quantitative assessment of which of these components are responsible for the increase in inequality, once equilibrium effects are taken into account. Clearly, decomposing earnings instability in a component directly related to the wage offer distribution and in a pure mobility component does not give a complete characterization of the primitive process at work but helps to disentangle some of the ambiguities present in the literature in particular when linked to a measure of overall lifetime inequality.

We propose an on-the-job search model of the labor market where individuals sample for jobs and jobs are fully characterized by a wage rate. Wages are extracted from an exogenous wage offer distribution which is the first primitive of the model. Mobility is characterized by endogenous components—the optimal decisions of workers to accept or reject a job offer—and by exogenous components—a set of shocks characterized by exogenous parameters. These shocks parameters are the second set of primitive parameters we are interested in identifying and estimating.

The estimation sample is extracted from a specific section of the *panel study of income dynamics* (PSID). This section, that we call the *calendar section* of the PSID, is particularly appropriate to estimate an on-the-job search model because collects the ending wage in the previous job and the starting wage in the following job every time a job-to-job transition occurs. We generate two estimation samples: one at the beginning (1988–1990) and one at the end (1995–1997) of the period

² More recently [Moffitt and Gottschalk \(2002\)](#) suggest an equal increase in the variance of the permanent and transitory components of earnings. Contributions in this line of research that have looked at other countries include [Baker and Solon \(2003\)](#) for Canada and [Dickens \(2000\)](#) for the UK.

³ [Attanasio and Davis \(1996\)](#) and [Blundell and Preston \(1998\)](#) are among the first and most influential contributions; [Blundell and Pistaferri \(2003\)](#) is an example of an application to a specific institution and [Jappelli and Pistaferri \(2006\)](#) is an example of an application to a country different than the US. [Low et al. \(2010\)](#) propose one of the most complete models in this line of research making it closer to the fifth group of contributions discussed in this review.

⁴ Another set of contributions share the objective of explaining wage inequality by estimating models of labor market mobility: [Heckman et al. \(1998\)](#) and [Lee and Wolpin \(2010\)](#). They both estimate the structural parameters of dynamic general equilibrium models but they do not focus on lifetime inequality measures.

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