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WRONG WORKERS FOR THE JOB – HOW MISMATCH OCCURS IN THE LABOR MARKET

Joanne Tan

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1 The Problem of worker mismatch

Consider the job of an Economics professor. Her role consists of complex cognitive tasks such as solving models. It also consists of some level of interpersonal tasks such as interacting with students. This means that if a candidate for this job has high IQ but very low EQ, she may find herself being very productive in her research but very unproductive in her teaching. Consider also the evolution in the function of an Economics professor from the 1970s and today. Today, with the help of modern computers, we can easily process complex estimation techniques that were impossible in the past. Behind this simple example lies the subject of this policy paper. Worker mismatch occurs when the multiple skill sets of a particular person is often are not well-fitted to perform multiple tasks of his/her particular job, while technological change may favourably impact the productivity of some skills and tasks over others.

This brief will try to address the questions of how workers sort into jobs and the mismatch that often occurs. The Mismatch between workers and jobs not only results in productivity losses, but has also been shown to adversely affect individual workers' jobs satisfaction and career progression. These, in turn, negatively impact overall societal welfare. More worryingly, I find that mismatch is highly persistent, meaning that once in bad match, a worker is likely to remain in a series of bad matches for the rest of his/her career. As such, the welfare loss from mismatch cumulates, not dissipates, with time. In order to better benefit society, mismatch must be understood and mitigated. In a similar vein, the needs of jobs today and whether they are, on the whole, met by the workforce today must be assessed.

2 Insights from the model

My work applies what is known as a “theoretical model”. Essentially this entails modeling expected outcomes against a set of predicted assumptions of human behavior. The model assumes that individuals are characterized by cognitive and interpersonal skills and while jobs are defined by bundles of cognitive and interpersonal tasks. Workers have to prepare a job application, but because they are unable to coordinate in a large economy, several of them may apply for the same job. Upon receiving several applicants, the firm chooses the most productive applicant and the unselected workers become unemployed in that period.

Now imagine a worker with high cognitive skills and moderate interpersonal skills. Except for extreme coincidence, this worker will not get a job that is a perfect fit, meaning that she will be mismatched to some extent on both dimensions. Consider what happens when the nature of production changes. For example, the advent of computers, which enables high IQ individuals to be more productive at highly cognitive jobs.[1] In equilibrium, this individual will now be even more likely to be matched with a high cognitive job, at the expense of her match quality on the interpersonal skill dimension. This phenomenon is illustrated in Figure 1, using a numerical example.[2]

Using US data on jobs and workers from two different cohorts, one that entered the workforce in the 1980s before the mass introduction of computers and the other that started work in the early 2000s, I find that match quality on the cognitive dimension has indeed improved, coupled with a deterioration in match quality in the interpersonal dimension, as shown in Figure 2.[3]By taking my model to the data, I am able to infer that the production function has changed between the two cohorts in the following two ways: i) the complementarity between cognitive skills and tasks has increased and ii) the productivity of cognitive skills (independent of tasks)

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[1] This is referred to in the field as an increase in cognitive skill-task complementarity.

[2] How to read Figure 1: Figure 1 shows how the probability that a worker is assigned to a firm changes as the complementarity between skill 1 and task 1 increases. The closer the color of the right diagonal of each rectangle to red on the heat scale, the better the overall quality of matches in that dimension. The box on the top left corner shows that workers are not very well-matched on the first dimension of skill, since higher assignment probabilities are observed o the right diagonal. The bottom left corner shows what happens after the complementarity between the first skill and task increases. Remark that higher assignment probabilities are now found on the right diagonal. On right hand side, the opposite phenomenon occurs for the match quality on the second dimension.

[3] How to read Figure 2: Figure 2 shows the distribution of workers and jobs in the cognitive and interpersonal dimensions for the old and young cohorts. The higher the bars on the right diagonal of each graph, the better the match quality is in that dimension. Observe that workers and firms are better matched in the cognitive dimension today (Figures 3a versus 3b) and worse matched in the interpersonal dimension (Figures 3c versus 3d). Indeed, the correlation between cognitive skill and task has increased from0:36 in the past to 0:38 presently, while that between interpersonal skill and task has decreased from 0:21 to 0:15.

has grown.

3 Recommendations for policy

These results have two major implications for public policy. Firstly, while for the 1980s cohort, an equal increase of cognitive and interpersonal skills of the workforce would have led to higher overall productivity than a double increase in cognitive skills alone, the reverse is true for the later cohort. *In other words, society gains more if there were more specialists than generalists today, while the opposite was true in the past*. This finding lends weight to the often heard rhetoric on the need for more STEM graduates. However, as my model does not incorporate uncertain future demand, it could be missing out on a key point - *that liberal arts graduates (the generalists) are better placed to weather large shocks in demand for skills*.

Secondly, the shift in the nature of production has profound ramifications for inequality. Workers who are generalists or with low cognitive skills stand to lose in today's economy, and in fact may help explain the rise in equality since the 1980s. Governments could mitigate this by provide skills upgrading for low cognitive skill workers, which would allow workers to improve their skills and hence become well-matched to cognitively-demanding jobs, thereby alleviating both problems of mismatch and rising inequality. However, there is increasing reason to expect that further progress in technology may substitute rather than complement cognitive skills. For example, while computers initially helped journalists in penning their articles faster, the recent advent of machine learning means that softwares are now able to produce journalistic writing, potentially eliminating the need for journalists. This may result, in the longer run, in an exacerbation of mismatch and inequality, as more workers are made redundant by technological change while an ever smaller group of workers and entrepreneurs at the top enjoy the benefits of increased productivity. While this phenomenon is still in its nascence, it may be time for policy makers to consider designing optimal redistributive policies, should they wish to avoid a further worsening of income inequality in the decades to come.

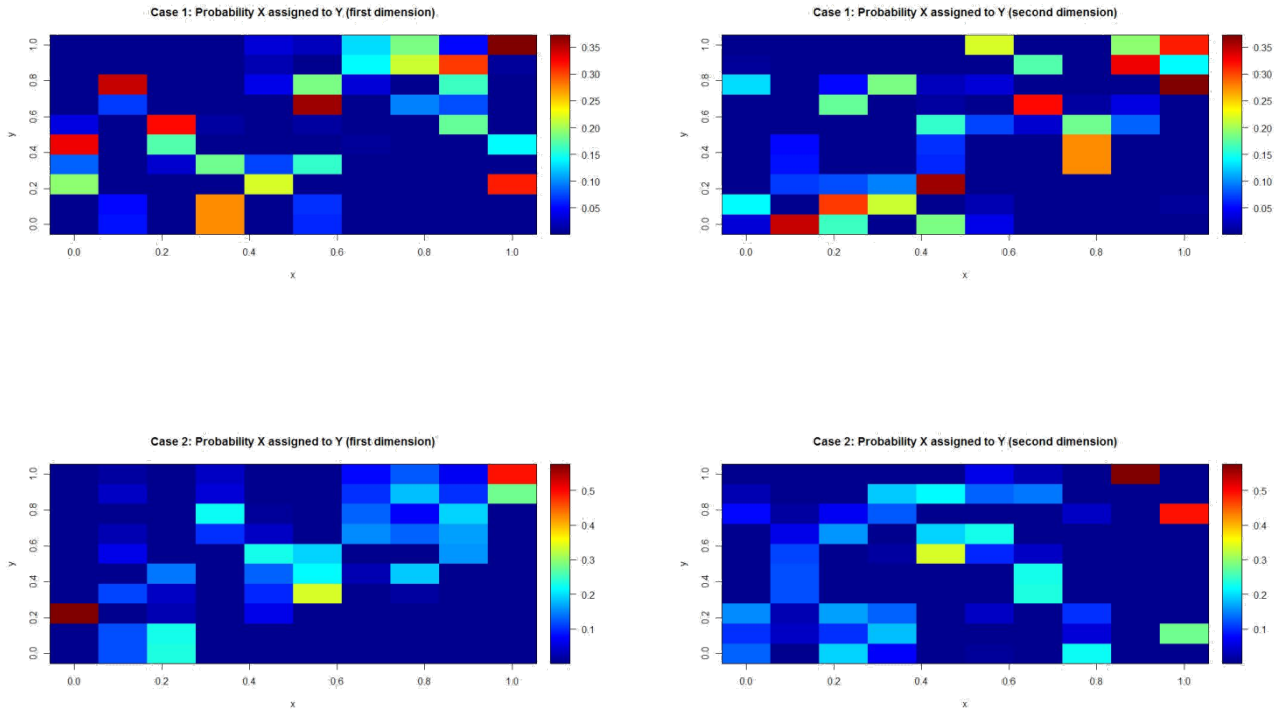

Figure 1: How the equilibrium assignment changes with an increase in complementarity between skill 1 and task 1