Notes on "involution"

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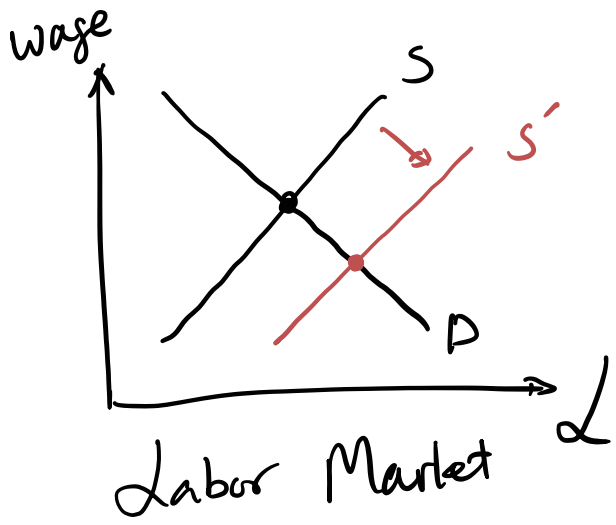
When people talk about "involution," what do they mean?

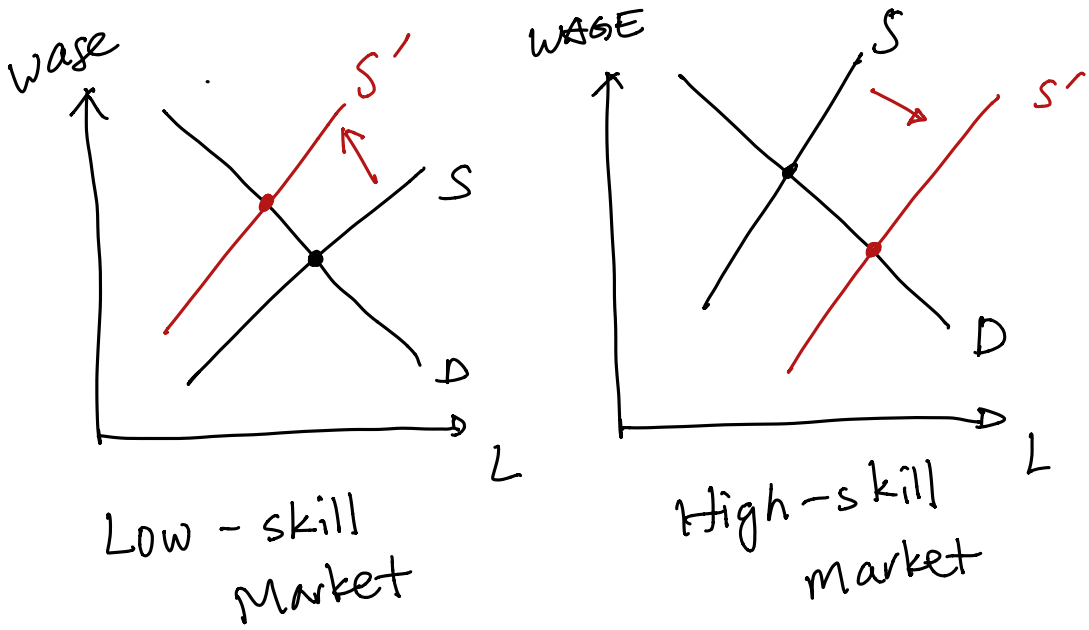
My understanding 1



According to this model, increase in labor supply lowers equilibrium wage. In practice, labor demand may be increasing over time as well, but as long as labor supply increases faster than labor demand, equilibrium wage will decrease as a result.

My understanding 2

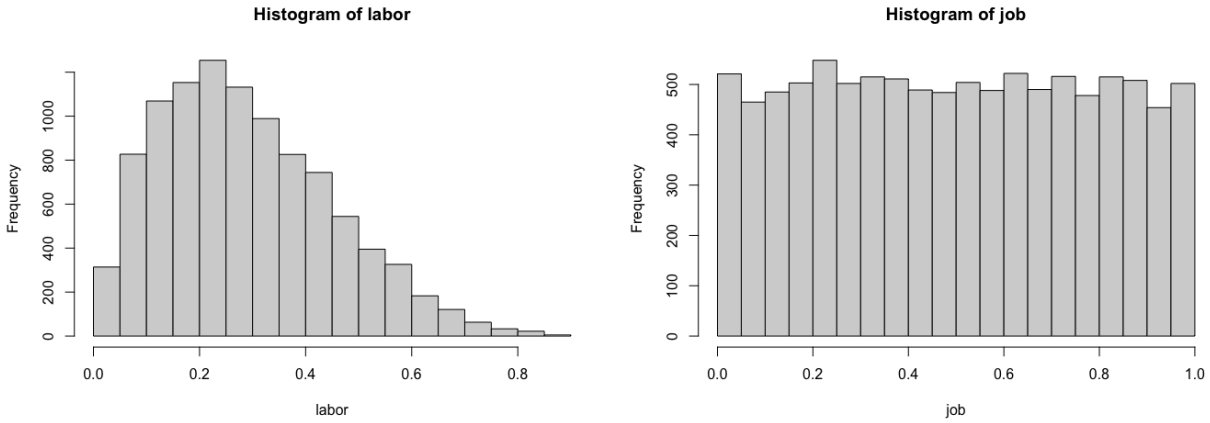
Now assume that there are two kinds of labor in the labor market: high-skill labor (those with college degrees) and low-skill labor (those without college degrees). Then we may have the following situation:



i.e., an increase in high-skill labor supply leads to a decrease in high-skill wages, while a corresponding decrease in low-skill labor supply leads to an increase in low-skill wages. If we measure wage inequality by skill premium - defined as $\frac{\text{high-skill wage}}{\text{low-skill wage}}$ - then an increase in the educational level of the population (without a corresponding increase in high-skill labor demand) will lead to a lower skill premium and wage inequality in the economy.

My understanding 3

Now imagine a continuum of workers with different skill levels ranging from 0 to 1 are matched with a continuum of jobs with skill requirements ranging from 0 to 1. There are two time periods. In $t = 1$, the distribution of worker skill and job skill requirements are as follows:



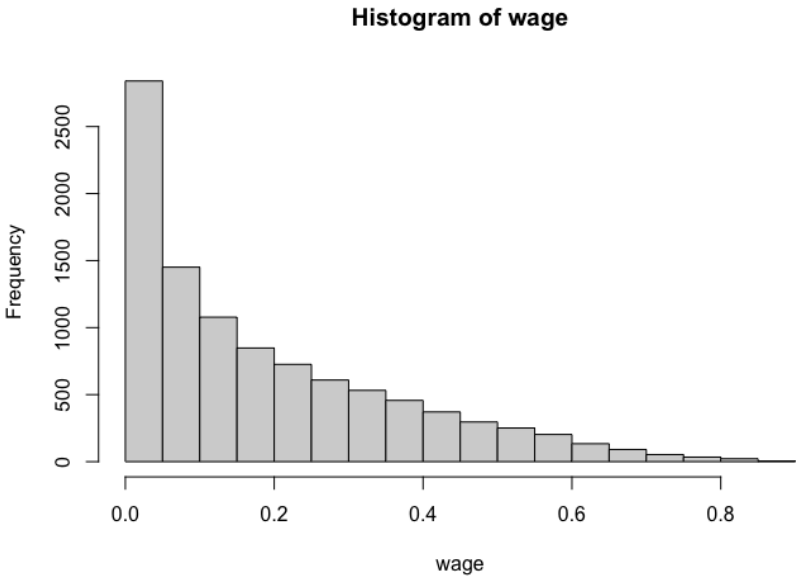
Suppose workers and jobs are matched perfectly assortatively: the lowest skill worker is matched with the lowest skill-requirement job, the second lowest skill worker is matched with the second lowest skill-requirement job, ..., and finally, the highest skill worker is matched with the highest skill-requirement job.

Now assume that wage is a function of both the skill of a worker and the skill requirement of the job she works in. Specifically, let e_i denote the skill level of worker i and s_j denote the skill requirement of job j. We assume a worker i who works in job j will receive a wage[1]

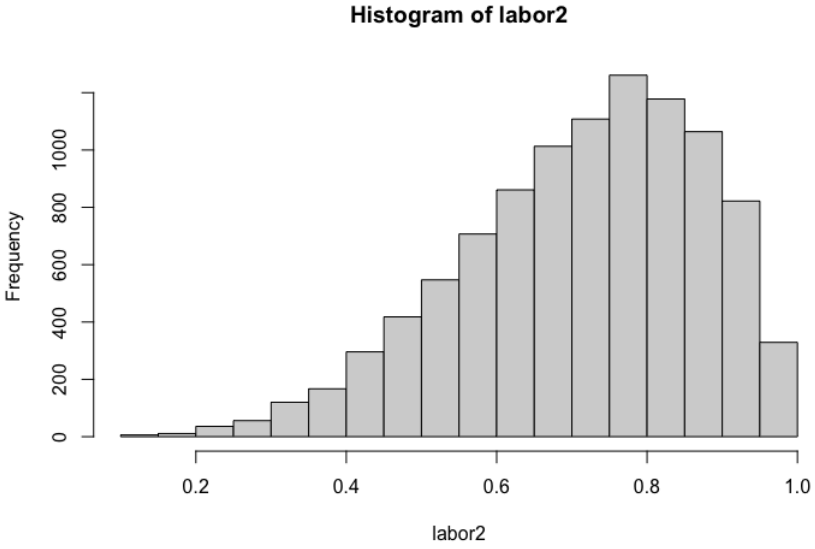
$$w_{ij} = s_j \times e_i \tag{1}$$

Then in $t = 1$, after matching workers with jobs, we will observe the following distribution of wages:

[1] (1) is just an assumption made for simplicity, not to be taken as a realistic wage function.

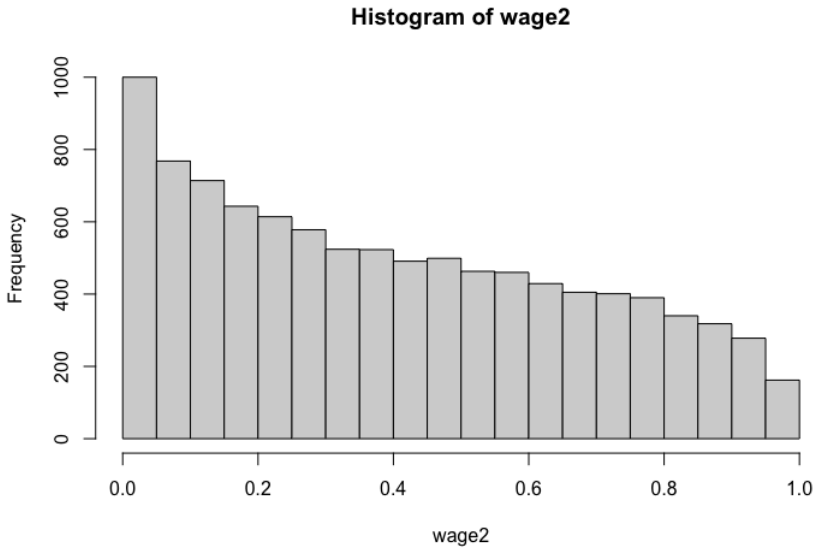


Now in the second period, suppose the distribution of jobs remains the same, but the distribution of workers has changed. Specifically, workers become more educated, so that the distribution of worker skill becomes:

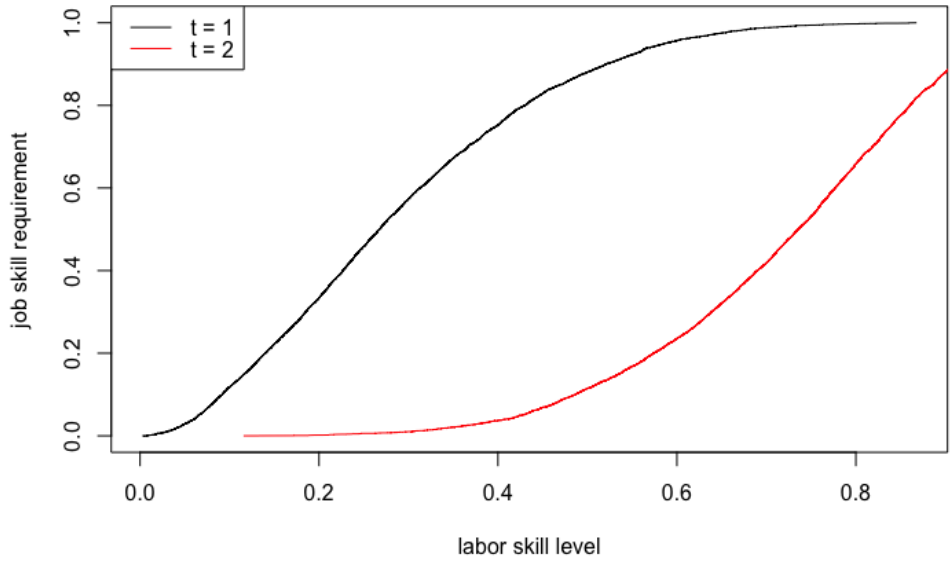


In this case, after matching workers with jobs, we will observe the following distribution of wages in the second period[2]:

[2] Note: here we assume that the wage function (1) remains the same in the second period. In practice, a pervasive increase in worker skill will lead to a decrease in the wage of every (e_i, s_j) combination. Here



Let us now compare the economy in these two periods. First, we can use the following plot to represent worker-job matching in $t = 1$ vs. $t = 2$:



We can see that compared with $t = 1$, in $t = 2$,

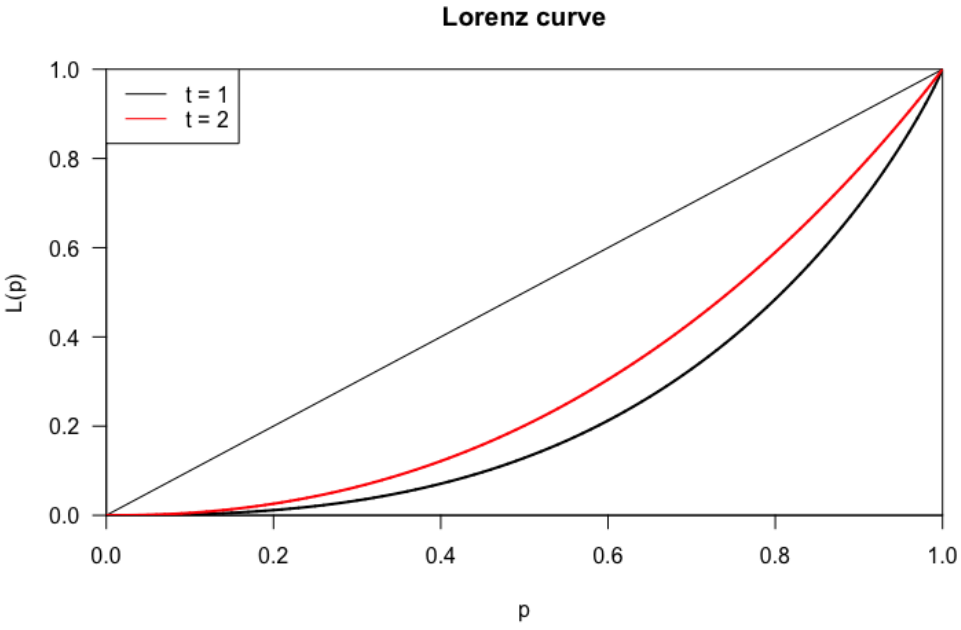
we focus on the effect of matching among heterogeneous workers and jobs and ignore the effect of increased supply on equilibrium wages.

- Each worker is matched with a worse job
- Each job is matched with a better worker

We can also measure inequality and compare $t = 1$ vs. $t = 2$. To measure inequality in this economy, we compute the Gini coefficient:

	Gini
$t = 1$	0.51
$t = 2$	0.40

As we can see, a pervasive increase in worker education leads to a decrease in inequality. This effect can also been seen clearly in the following plot of the Lorenz curves:



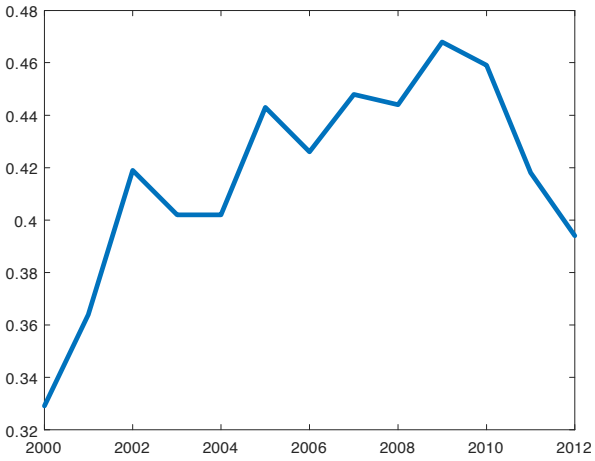
Summary

How do we define "involution" in precise, economic terms? First, it cannot mean "increase in high-skill supply," otherwise one may argue that human beings have been "involuting" since the beginning of civilization or at least over the last two hundred years. According to our three models, however, we may define involution as the phenomenon of "high-skill labor supply increasing faster than high-skill labor demand, leading to workers being matched with jobs of lower-skill requirements." The implications of such involution include (1) lower skill premium, and (2) lower inequality, which we can test with observed data.

What do evidences say?

Skill premium

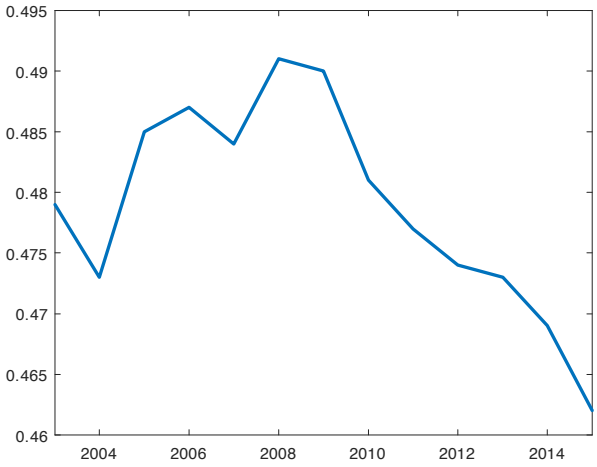
Figure 1: Skill Premium



Source: Bai et al. (2019)

Inequality

Figure 2: Gini Coefficient



Source: Bai et al. (2019)

Thus, evidences are broadly consistent with our story of faster increase in skill supply than skill demand leading to lower skill premium and wage inequality after around 2009[3].

[3] Note: this does not prove our story correct. The best we can say is that the available evidences do not

Alternative Explanations

Alternatively, the feeling of involution could be psychological: research in psychology has well documented the relation between subjective well-being (i.e., feeling of happiness) and one's socio-economic status. This is called the local ladder effect: how much your material wealth can buy often matters less to you than how you rank *among your peers*.

In China, spatial or geographical inequality has increased significantly over the last 40 years. Today, an average high-skill worker in Shanghai could be earning significantly more than national average, but feel *relatively* poor in the city. Thus, involution could be a psychological feeling of stress due to *local* competition among high-skill workers, rather than an economic phenomenon in which high-skill workers are doing less well than before due to oversupply.

contradict our story. To do more research, we could, for example, collect data on job requirements and see if the matching between jobs and workers has changed over time according to our theoretical predictions.