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Multiple Steady State Equilibria of Job Composition

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ABSTRACT

In this paper we construct an example of multiplicity to further illustrate the general equilibrium forces at work. We assume that good and bad jobs produce inputs that are perfect substitutes, only that there is a quality difference. This will accentuate the tendency toward multiplicity and enable to explicitly construct two equilibria.
Keywords: labor market; steady state equilibrium; transitional dynamics; job composition.

1. INTRODUCTION

One of the most striking and robust stylized facts of labor markets is the presence of persistent and large wage differentials among identical workers in different industries and occupations. These differentials are not only remarkably stable over time but also highly correlated across countries. Neither can these wage differentials be easily explained by unobserved worker heterogeneity; workers who change jobs experience the wage differential between their previous and new job. Furthermore, workers are not indifferent between different jobs: high wage paying jobs (good jobs) have lower quits, and more strikingly, workers queue up for high wage jobs. These observations invite the following questions: What determines the composition of jobs? Is it optimal? Why does it change over time? Why do some labor markets have more bad jobs than others? The paper aims is to give an example of multiplicity then analysis transitional dynamics of job composition.

2. MULTIPLE EQUILIBRIUM

2.1 An Equilibrium with Good Jobs

First, characterize an equilibrium with good jobs only, that is $\phi = 0$, where ϕ is the proportion of bad job vacancies among all vacancies. This implies that $w_g = \beta y_g$ (w_g = wages of good job, β = proportion of the return of the job, y_g = value of output production of first input ('good')) and thus, the tightness of the labor market is determined as:

$$\frac{(1-\beta) y_g}{r+s} = \frac{k_g}{q(\theta_0)} \tag{1}$$

where k_g = the cost for produce 1 unit of first input, r = the discount rate of workers, s = the flow of workers, $q(\theta)$ = the flow rate of match for a vacancy and θ_0 refer to the tightness of the labor market with $\phi = 0$. In this case we have:

$$rJ_0^U = \frac{z + q(\theta_0)\theta_0 \beta y_g}{r + q(\theta_0)\theta_0}$$

where J^u = being unemployed and z = dividend.

Lemma 1. *If* $k_b > q(\theta_0)\dfrac{y_b - \max\left\{rJ_0^U, \beta y_b\right\}}{r+s}$, *then there exists a steady state equilibrium in which only good jobs are open, that is* $\phi = 0$, *where* k_b = *the cost to produce 1 unit of the second input ('bad').*

Intuitively, no bad job will open if either bad jobs are not profitable enough or the wage expectations of the workers are sufficiently high, because they anticipate to get into good jobs.

2.2 An Equilibrium with Bad Jobs

Now consider $\phi = 1$. Then the zero profit condition is that:

$$\frac{(1-\beta)y_b}{r+s} = \frac{k_b}{q(\theta_1)} \tag{2}$$

and

$$rJ_1^U = \frac{z + q(\theta_1)\theta_1 \beta y_b}{r + q(\theta_1)\theta_1}$$

Clearly, $\beta y_g > rJ_1^U$, thus, it follows that:

Lemma 2. $k_g > q(\theta_1)\dfrac{(1-\beta)y_g}{r+s}$ *then there exists a steady state equilibrium in which only bad jobs are open, that is* $\phi = 1$.

Intuitively, when the cost of opening a job is sufficiently high relative to productivity of good jobs, there will only be bad jobs.

2.3 Multiple Equilibria

First, it is straightforward to see, using (1) and (2), that when $rJ_0^U < \beta y_b$, the condition in Lemma 1 and that in Lemma 2 cannot be simultaneously satisfied. However, the situation changes when $rJ_0^U > \beta y_b$; in this case the condition for the equilibrium with $\phi = 0$ to exist can be written as:

$$\frac{k_b(1-\beta)y_g}{k_g} > \frac{ry_b - z + q(\theta_0)\theta_0\left(y_b - \beta y_g\right)}{r + q(\theta_0)\theta_0} \tag{3}$$

Whereas the condition for the equilibrium with $\phi = 1$ to exist can be written as (using (2)):

$$\frac{k_b}{y_b} < \frac{k_g}{y_g} \tag{4}$$

Suppose (4) holds, and let us increase y_g while keeping $\dfrac{k_g}{y_g}$ constant, then the left hand side of (3) is constant (and so is θ_0 from (1), but the right hand side becomes smaller, hence (3) and (4) can be simultaneously satisfied. Thus:

Proposition 5. *If* $rJ_0^U > \beta y_b$, *then both a steady state equilibrium with* $\phi = 0$ *and one with* $\phi = 1$ *can coexist.*

The intuition for this multiplicity of equilibria is a good way of illustrating the general equilibrium effect, which makes worker's acceptance decisions depend on the supply of jobs. When $\phi = 0$, the value of being unemployed rJ^U is low because there are no good jobs around, thus the outside option of workers does not bind, and bad jobs can hire workers at low wages. At these low wages, bad jobs are more profitable than good jobs, and no firm wants to open good jobs. In contrast, when $\phi = 1$, workers know that they can rapidly obtain a good job, and rJ^U is high, and this makes the outside option of a worker bind when he meets a bad jobs. This implies that a bad job will have to pay relatively high wages to be able to employ the worker (though still lower than good jobs), and at these relatively high wages, bad jobs are not as profitable as good jobs.

What about unemployment? It is straightforward to see that employment will be higher in the equilibrium with good jobs. This can be seen from (1) and (2): since (4) has to hold for a bad job equilibrium to exist, we immediately have that $\theta_1 > \theta_0$, thus $u_1 < u_0$, the unemployment rate in the good job equilibrium is higher, but also average labor productivity is higher in this equilibrium.

Corollary 1. *If there exist multiple equilibria, the equilibrium with bad jobs has lower unemployment rate but also lower average labor productivity.*

In general it will be impossible to say whether the good job or the bad job equilibrium has higher total surplus. The composition of jobs is biased towards bad jobs, and this effect is completely avoided in the good job equilibrium. However, depending on the value of β, job creation may also be too low, and thus the equilibrium with good jobs which has higher wages and unemployment could end up with lower welfare. To understand this, recall that there are two externalities counteracting each other. First, as emphasized above, when a firm opens a bad job rather than a good job, it does not take into account that with a good job, the worker would have obtained higher wages, and higher utility, in other words, the firm does not create enough rents. The other externality is the outside option effect: when a firm opens a good job and we have $rJ^U > \beta y_b$, it is pushing up the wages that firms opening bad jobs have to pay, and this discourages job creation. Which equilibrium has higher output depends on which of these two externalities, the rent creation or the outside option effect, dominates. The higher is y_g relative to y_b, the stronger is the rent creation effect, and therefore, the more likely is the bad job equilibrium to be more inefficient.

Finally, it can be seen that labor market regulations work very similarly. The higher is *z*, the more likely is (3) to hold, and thus the more likely is a good job equilibrium to exist. Also similarly, if a minimum wages w_M is imposed higher than βy_b, bad jobs will be forced to pay higher wages and good jobs will be unaffected, thus creation of bad jobs will be discouraged. Therefore, both higher unemployment benefits and minimum wages encourage the creation of good jobs. Moreover, in this case, the general equilibrium aspects of such policy intervention can be seen most clearly: a more generous unemployment benefit does not just create a few more good jobs, but by increasing rJ^U, it makes an equilibrium with only good jobs possible.

3. CONCLUSION

The paper demonstrates the strength of the general equilibrium forces at work. In an equilibrium with a high proportion of good jobs, the value of being unemployed is high, therefore bad jobs cannot attract workers unless they pay unprofitably high wages, and as a consequence, most firms create good jobs. Conversely, when there are many bad jobs, the value of unemployment is low, thus workers are willing to take bad jobs and in equilibrium, there is only a low proportion of good jobs.

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