Problem Set on Labor Market Policies

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Problem 1

Consider a one-period matching model with a labor force of size 1, a mass 1 of firms, and a government. All workers are initially unemployed. Private firms and the government post vacancies and match with workers. Then production occurs. The matching function is $m(V) = \sqrt{V}$, where V is the total number of vacancies posted by firms and the government. Given that all workers are initially unemployed, the labor market tightness equals the aggregate number of vacancies: $\theta = V$.

Firms incur a recruiting cost of $r > 0$ recruiters per vacancy. Firms have a production function $y(N) = 2 \times a \times \sqrt{N}$, where a governs labor productivity and N denotes the number of producers in the firm. We denote by F the total number of workers in the firm. The firm pays a rigid wage $w = \sqrt{a}$ to all their F workers. Each firm choose employment F to maximize profits.

The government employs $G > 0$ workers. Aggregate employment is the sum of public and private employment: $L = G + F$. The share of public employment in the labor market is denoted by $\sigma = G/L$.

A) The labor supply $L^s(\theta)$ gives the number of worker who find a job (either in the public or private sector) through the matching process when tightness is θ. Given the expression of $L^s(\theta)$. What is the elasticity of $L^s(\theta)$ with respect to θ.

B) The aggregate labor demand $L^d(\theta, G)$ is the sum of the private labor demand $F^d(\theta)$ and the public labor demand G. Compute $L^d(\theta, G)$. What are the elasticities of $L^d(\theta, G)$ with respect to θ and with respect to G?

C) Compute an expression for the government multiplier $\lambda = dL/dG$. Is the multiplier λ positive or negative? Is $|\lambda|$ more or less than 1? Interpret these findings.

D) What is the sign of the derivative $d\lambda/da$? What does this result imply for the effectiveness of fiscal policy over the business cycle? As far as you know, does the result seem realistic?