Job Searching

An unemployed worker is searching for a job. Every time the worker applies for a job (we assume he gets every job he applies for), it takes an "effective wage" c. The worker knows the probability density $\mathrm{p}(w)$ for wages, and we assume that this distribution does not change as he looks for jobs. Thus, the worker wishes to maximize his expected income, minus the cost of finding that job: namely, $\langle w - nc\rangle$, where n is the amount of jobs searched before the final job was found.

(a) Explain why the optimal strategy is as follows: there is a w_* such that if the offered wage $w \geq w_*$, you should accept the job; otherwise, try again. Furthermore,

$$w_* \int_{w_*}^{\infty} \mathrm{d}w\ \mathrm{p}(w) = \int_{w_*}^{\infty} \mathrm{d}w\ w\mathrm{p}(w) - c.$$

(b) Show that $\partial w_*/\partial c < 0$ (as expected!).

As are many things in social sciences, we can expect (roughly) w to be a scale free random variable with degree α and minimum wage w_0; this is because a preferential-attachment like mechanism would seem reasonable for wages (and we know it is for net income!).

(c) Show that

$$\frac{w_*}{w_0} = \left((\alpha-2)\frac{c}{w_0}\right)^{-1/(\alpha-2)}.$$

(d) In economics, we often see $\alpha - 2 \sim 0.2$. Comment on what this means for what the optimal job searching behavior is (in this simple model). How would this affect would the unemployment rate (of the overall economy)?

Complications and extensions on this sort of modeling of job searching ("matching theory") was the basis of the 2010 Nobel Prize in Economics!