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Abstract:

A recent empirical note shows unemployment benefit crowds out nascent entrepreneurs. We provide theoretical support in favor of this interesting result. Over fairly general preference patterns we obtain a measure of the opportunity cost of entrepreneurs in the presence of unemployment benefit and derive conditions under which nascent entrepreneurship suffers as unemployment benefit rises. The measure may stimulate further empirical verifications.

JEL Classifications: J23, J65, M13

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1. Introduction

In a recent empirical note Koellinger and Minniti (2009) and Parker and Robson (2004) have convincingly established that generous unemployment benefits crowd out nascent entrepreneurs. This stands valid for all categories of entrepreneurs for a group of OECD countries. The results, however, do not identify a conclusive set of reasons as to why nascent entrepreneurs are discouraged when generous unemployment benefit exists in the system. In other words, the negative interplay between entrepreneurship and unemployment benefit stands open to theoretical conjectures. This is where the present note intends to contribute and provide a tangible measure of the opportunity cost of nascent entrepreneurship that is sensitive to unemployment benefit.

Drawing from a large number of contributions in this area one could furnish a few dominant reasons to account for this empirical observation. First, and perhaps compulsively, recount the Shapiro-Stiglitz (1984) model where availability of unemployment compensation/benefit would call for higher wages to prevent workers from shirking and yet the firms would suffer due to loss of productivity and/or high monitoring cost. If the legal requirement for unemployment benefit is raised it translates into even higher wages and although the model does not derive it explicitly, it is a good reason why nascent entrepreneurs might find the cost of production entry-deterrent. Second, generous unemployment benefits may alter the income distribution for certain

sections of the population. If the prevailing market determined wage is quite low and the government announces substantial transfer programs in the form of unemployment benefits, then some might choose to be voluntarily unemployed (see Maitra, 2006, 2003, for effects of income transfers in South Africa). In spirit, this creates similar disincentives as associated with job search among unemployed workers receiving large income transfers over substantial period of time. The entrepreneurs in either case will have to start off by offering higher wages than might be optimal for them to enter the business and therefore may be dissuaded. Third, generous unemployment benefit raises the reservation wage (which is also a measure of welfare for workers according to Shimer and Werning, 2006) and must be financed by higher employment taxes. And higher the level of unemployment or its responsiveness to unemployment benefit, the tax needs to be higher. Lower post-tax wages might then drive people at the margin to become voluntarily unemployed with similar implications for the nascent entrepreneur. Indeed, Feldstein and Poterba (1984) proved long back that sufficiently high unemployment benefits would eventually eliminate all economic activity. Entrepreneurship would not be an exception.

Now, these and some more in this genre are well known results and perhaps better applicable for incumbent firms. These do not shed enough light on the issue of how nascent entrepreneurship develops, or how an individual initially selects between entrepreneurship and employment in the presence of unemployment benefit in the system. This is what we offer. We obtain the critical risk taking ability of entrepreneurs in the presence of unemployment benefit. The risk taking parameter may also be interpreted in many other ways ranging from exogenous innate abilities (Lucas, 1978) to

ex ante distribution of risk aversion (Kihlstrom and Laffont, 1979) to cultural/ethnic factors (Bates, 1997) etc., or as the opportunity cost of entrepreneurship as Koellinger and Minniti (2009) hint at the end. In whichever way it is defined, we obtain the critical value endogenously and then utilize it to show that unemployment benefit discourages entrepreneurship and accentuates the problem of involuntary unemployment in the economy. If entrepreneurship and level of involuntary unemployment are important considerations for economic growth then the result claims policy relevance.

2. The Model

Consider a mass of risk averse individuals in an economy, the mass normalized to 1. The country has some structural unemployment to start with, so that not everybody in this mass will have jobs at all times. The government has provisions for unemployment benefit for those who are involuntarily unemployed. Involuntary unemployment follows the usual definition – workers willing to work at a given wage do not find jobs. All individuals face two choices – they can be entrepreneurs or employees. Assume that each individual faces a von Neumann-Morgenstern utility function characterized by constant absolute risk aversion (CARA): $U = -\exp(-W), \quad U' > 0, U'' < 0$, where W is the income. The product of each employed individual in the labor market is X. If individuals become entrepreneurs, they receive X plus a random return, $\varepsilon \in [-a, a]$ with a pdf $f(\varepsilon)$ and distributed uniformly; $E(\varepsilon) = 0,\ E(\varepsilon^2) = \sigma^2$. In addition, in order to take the risk of becoming an entrepreneur they must receive a fixed return as percentage of X, $0 < \delta < 1$. We are particularly interested in this risk taking ability that differs across individuals. Assuming individuals are uniformly distributed over δ, we find its critical

value, δ^*. Individuals distributed below δ^* become employees and those above it, entrepreneurs.

The indirect expected utility of those who become entrepreneurs is given by:

$$EU(EN) = -\int_{-a}^{a} \exp(-[X(1+\delta)+\varepsilon] f(\varepsilon) d\varepsilon \qquad (1)$$

and as $f(\varepsilon) \sim U[-a, a]$, $EU(EN) = -\frac{1}{2a}\int_{-a}^{a} \exp(-[X(1+\delta)+\varepsilon] d\varepsilon$.

On the other hand, those who become employees are subject to an exogenous probability p of losing jobs and receiving αX, with $1 > \alpha > 0$ as the rate of unemployment benefit. Thus, the indirect expected utility for individuals who become employees in equilibrium is:

$$EU(E) = -(1-p)e^{-X} - (p)e^{-\alpha X} \qquad (2)$$

An individual at the margin is indifferent between these two options. Equating (1) and (2)

$$-\frac{1}{2a}\left[-e^{(-X-X\delta-a)} + e^{(-X-X\delta+a)}\right] = -(1-p)e^{-X} - (p)e^{-\alpha X} \qquad (3)$$

solves for the critical risk taking ability,

$$\delta^* = \frac{1}{X}\left\{\ln\left[\frac{-1+(e^a)^2}{2a(1-p+pe^{(X-X\alpha)})}\right] - a\right\} \qquad (4)$$

For some parametric configurations, $\delta^* \notin (0,1)$. So, further analysis is bound by all such parametric values that ensure $\delta^* \in (0,1)$. As $\delta \sim U(0,1)$ all individuals distributed in the region $\int_0^{\delta^*} g(\delta) d\delta = \delta^*$ would not be able to cover for the risk of becoming entrepreneurs and shall end up as employees. Conversely, all individuals in the region

$\int_{\delta^*}^{1} g(\delta)d\delta = 1-\delta^*$ become entrepreneurs.

We are interested in observing how a rise in α affects δ^*. Theoretically and empirically (see Cahuc and Zylberberg, 2004, and p. 532 in particular) it is observed that unemployment benefit/insurance puts an upward pressure on the real wage. The effect of α on δ^* must use this relation.

Suppose all nascent firms are identical and under profit maximizing equilibrium employs L^* number of workers, from a single input production function $\phi = \phi(L),\ \phi' > 0, \phi'' < 0$. q is the product price and x is the real wage each worker receives. Then equilibrium demand for labor (L^*) by each firm is a solution to:

$$\phi_L(L^*) = X / q = x \qquad (5)$$

Based on above argument, $\frac{\delta x}{\delta \alpha} > 0$. Differentiating equation (4) with respect to α and using (5) and $\frac{\delta x}{\delta \alpha} > 0$, we get

$$\frac{\delta \delta^*}{\delta \alpha} = -\frac{1}{x}\left\{\frac{pe^{q(x-\alpha x)}}{1-p+pe^{q(x-\alpha x)}}\left[\frac{\delta x}{\delta \alpha}(1-\alpha)-x\right]+\frac{\delta x}{\delta \alpha}\delta^*\right\} \qquad (6)$$

Therefore, $\frac{\delta \delta^*}{\delta \alpha} > 0$, *iff*, $\left\{\frac{pe^{q(x-\alpha x)}}{1-p+pe^{q(x-\alpha x)}}\left[\frac{\delta x}{\delta \alpha}(1-\alpha)-x\right]+\frac{\delta x}{\delta \alpha}\delta^*\right\} < 0$.

Define, $\eta_\alpha^x = \frac{\delta x}{\delta \alpha}\frac{\alpha}{x}$ as the elasticity of real wage to unemployment benefit and this provides a measurable instrument in favor of our main result. In spirit, this is similar to the recent evidence in favor of low responsiveness of reservation wage to unemployment benefit (see Shimer and Werning, 2006, p.2).

Then, $\frac{\delta\delta^*}{\delta\alpha} > 0$, *iff,* $\eta_\alpha^x < (\frac{\alpha}{1-\alpha})[\frac{pe^{q(x-\alpha x)}}{(1-p)\delta^* + pe^{q(x-\alpha x)}(1+\delta^*)}]$.

Since, $\delta^* \in (0,1)$, define $\theta = \frac{pe^{q(x-\alpha x)}}{(1-p)\delta^* + pe^{q(x-\alpha x)}(1+\delta^*)} < 1$.

So, $$\frac{\delta\delta^*}{\delta\alpha} > 0, \text{ iff, } \eta_\alpha^x < \left(\frac{\alpha}{1-\alpha}\right)\theta \qquad (7)$$

This implies that as long as the elasticity of real wage to unemployment benefit is lower than the product of the two terms on the right hand side of (7), an increase in α would shift δ^* to a higher level.

So, there will be more and more individuals distributed with $\delta < \delta^*$ in equilibrium ending up as employees. As δ^* gets higher, the number of entrepreneurs must shrink in equilibrium.[1]

Let us now demonstrate the effect of unemployment benefit on the level of involuntary unemployment. Since the number of entrepreneurs is $(1-\delta^*)$, the aggregate demand for labor in the economy is given by:

$$L^d = L^*(1-\delta^*) \qquad (8)$$

On the other hand, however, the supply of labor or employees in the economy is given by $L^S = \delta^*$. Consequently, the excess supply of labor, if any, is:

$$EL^S = L^S - L^d = \delta^* - L^*(1-\delta^*) \qquad (9)$$

or, $$EL^S = \delta^*(1+L^*) - L^*$$

The relationship between excess supply of labor in the economy and prevalence of unemployment benefit consists of two important components. On the one hand, the

[1] To restore equilibrium with *socially desirable* number of entrepreneurs in the economy, tax benefits or tax holidays have often been offered to business ventures in many countries.

relation between supply of entrepreneurs (supply of employees) and benefit is negative (positive) if condition (7) is satisfied. And on the other, the relation between optimal demand for labor at the firm level and benefit has two components: one, the usual negative relation between demand for labor and real wage; two, the positive relation between unemployment benefit and real wage. Equation (9) derives these effects.

$$\frac{\delta(EL^S)}{\delta\alpha} = \frac{\delta\delta^*}{\delta\alpha}(1+L^*) + \delta^*(\frac{\delta L^*}{\delta\alpha}) - \frac{\delta L^*}{\delta\alpha}$$

or,
$$\frac{\delta(EL^S)}{\delta\alpha} = \frac{\delta\delta^*}{\delta\alpha}(1+L^*) + (\delta^*-1)\frac{\delta L^*}{\delta\alpha}$$

$$\frac{\delta(EL^S)}{\delta\alpha} = [\frac{\delta\delta^*}{\delta\alpha}(1+L^*) + (\delta^*-1)\frac{\delta L^*}{\delta x}\frac{\delta x}{\delta\alpha}\ ] \qquad (10)$$

since, $\frac{\delta L^*}{\delta\alpha} = \frac{\delta L^*}{\delta x}\frac{\delta x}{\delta\alpha}$, of which, $\frac{\delta L^*}{\delta x} < 0$ and $\frac{\delta x}{\delta\alpha} > 0$. $\frac{\delta L^*}{\delta x} < 0$ is the wage and labor demand relation as already explained. $\frac{\delta x}{\delta\alpha}$ is also positive as discussed above. In expression (10), the right hand side is therefore positive as long as condition (7) is satisfied, since we already have $\frac{\delta L^*}{\delta x} < 0$, $\frac{\delta x}{\delta\alpha} > 0$, and $(\delta^*-1) < 0$.

Proposition: *A ceteris paribus increase in unemployment benefit raises the critical opportunity cost among nascent entrepreneurs if condition (7) holds; lowers the economy-wide supply of entrepreneurs and increases the supply of potential workers, causing a rise in involuntary unemployment.*

Proof. See discussion above.

Thus excess supply of labor increases with increasing unemployment benefit. And this is purely involuntary unemployment since a rise in unemployment benefit increases the share of potential workers in the labor market and they may not get jobs as they employers, i.e., the group of entrepreneurs shrinks in size if condition (7) holds.

3. Concluding Remarks

A rise in unemployment benefit may affect the level of nascent entrepreneurship through different channels. This paper discusses one such avenue by which an increase in unemployment benefit affects the critical opportunity cost or risk taking ability of nascent entrepreneurs. If the responsiveness of real wage to unemployment benefit is quite low it is clearly possible that for a more general preference pattern as displayed by CARA type expected utility functions, higher unemployment benefit would drive away nascent entrepreneurs. In the process we provide two directly measurable indicators of entrepreneurial choices: the critical risk taking ability and the elasticity of real wages to unemployment benefit. The latter is instrumental in demonstrating that higher unemployment benefit would lower the share of nascent entrepreneurs and increase the level of involuntary unemployment. This complements the empirical findings of Koellinger and Minniti (2009) and offers more testable indicators for explaining the negative relationship between unemployment and nascent entrepreneurship.

Reference

Bates, Timothy (1997) *Race, self-employment and upward mobility: an illusive American dream,* Baltimore and London: The Woodrow Wilson Center Press, Washington D.C., and The Johns Hopkins University Press.

Feldstein, M and James Poterba (1984), Unemployment Insurance and Reservation Wages, *Journal of Public Economics,* 23, 1-2, 141–167.

Kihlstrom, R. E. & Laffont, J-J. (1979), A general equilibrium entrepreneurial theory of firm formation based on risk aversion, *The Journal of Political Economy*, 87, 4, 719-748.

Koellinger, Philipp and Maria Minniti (2009), Unemployment benefits crowd out nascent entrepreneurial activity, *Economics Letters,* 103, 96-98.

Lucas, Robert. (1978), On the size distribution of business firms, *Bell Journal of Economics,* 9, 2, 508-23.

Maitra, Pushkar and Ranjan Ray (2006), Household Expenditure Patterns and Resource Pooling: Evidence of Changes in Post Apartheid South Africa, *Review of Economics of the Household,* 4, 4, 325 - 347.

Maitra, Pushkar and Ranjan Ray (2003), The Effect of Transfers and Pensions on Household Expenditure Patterns and Poverty in South Africa, *Journal of Development Economics,* 71, 1, 23 - 49.

Parker, S.C., Robson, M.T., 2004. Explaining international variations in self-employment: evidence from a panel of OECD countries. *Southern Economic Journal* 71 (2), 287–301.

Shapiro, Carl and Joseph E. Stiglitz (1984), Equilibrium Unemployment as a Worker Discipline Device, *The American Economic Review,* 74, 3, 433-444

Shimer, Robert and Ivan Werning (2006), Reservation Wages and Unemployment Insurance, *MIT Department of Economics Working Paper Series* # 06-16, Cambridge: MA.