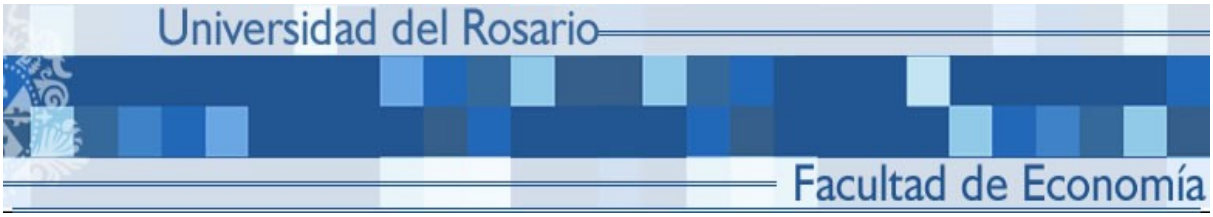

UNEMPLOYMENT INSURANCE / SEVERANCE PAYMENTS AND INFORMALITY IN DEVELOPING COUNTRIES

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Unemployment insurance/severance payments and informality in developing countries*

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Abstract

We analyze whether the introduction or an increase of unemployment insurance (UI hereafter) benefits in developing countries reduces the effort made by unemployed workers to secure a new job in the formal sector. We adopt a comparative static approach and we consider the consequences of an increase of current UI benefits on unemployed workers' decision variables in this same period, *i.e.* we focus on an intra-temporal trade-off, allowing us to assume away moral hazard complications. When there is no informal sector, unemployed workers may devote their time between effort to secure a new job in the formal sector and leisure. In the presence of an informal sector, unemployed workers may also devote time to remunerated informal activities. Consequently, the amount of effort devoted to secure a new (formal) job generates an opportunity cost, which *ceteris paribus*, reduces the amount of time devoted to remunerated activities in the informal sector. We show that in the presence of an informal sector, an increase of current UI benefits decreases this marginal opportunity cost and therefore unambiguously increases the effort undertaken to secure a new job in the formal sector. This intra-temporal effect is the only one at play in presence of one-shot UI benefits or with severance payments mechanism.

Keywords: Unemployment insurance, informal sector, income effects, developing countries.

JEL codes: H55, I38 and J65.

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1 Introduction

In the past three decades, papers dealing with the optimal design of unemployment insurance (UI hereafter) have covered a large number of issues, at the corner of information economics and labor economics (Karni, 2000). In spite of this huge literature, very few studies have analyzed the consequences of UI benefits on labor markets characterized by important informal sectors. Indeed, developing countries' dual labor markets may generate a high obstacle and may reduce the desirability of an UI program. As pointed out in Hopenhayn and Nicolini (1999) and Alvarez-Parra and Sanchez (2009), the incentives problem becomes much stronger if the State is not able to control the unemployed status, *i.e.* if unemployed works in the informal sector while receiving UI benefits. This pessimistic view is eloquently expressed in Mazza (2000) for IADB: "*The preliminary evidence gathered from Latin American and Eastern European cases is that the presence of a large informal sector may undermine the utility of UI, by making it impossible to insure that recipients are looking for new work, and may provide perverse incentives to increase further the informal sector...much more systematic study is needed and recommended by this study before firmer conclusions can be drawn".*

To our knowledge, only Alvarez-Parra and Sanchez (2009)'s analysis formally deals with the consequences of UI in the presence of "hidden market". Their paper adopts a sophisticated mechanism design approach to characterize the optimal dynamic UI contract in a partial equilibrium set-up. We share with Alvarez-Parra and Sanchez (2009) the partial equilibrium set-up, but we suppose that policyholders' preferences are represented by a non separable utility function. Moreover, in line with the labor economic approach, we consider a simpler comparative static analysis in which we only focus on the current effect of the UI benefits on the effort undertaken by unemployed workers. Roughly speaking, we assume away the traditional moral hazard issue in order to focus on the consequences of the current UI benefits on unemployed workers' decision variables during the same period.[1] It is worth noticing that in case of one-shot UI benefits, there is no moral hazard and only this intra-temporal effect intervenes.[2] This new insight is particularly relevant if we take into account that one-shot UI benefits is a characteristic pertaining to several developing countries.[3]

In our setting, when a formal worker loses his job, he becomes unemployed and can

[1] This intra-temporal trade-off would still be present in a dynamic setting but should coexist with moral hazard effect generated by the UI benefits of the following period.The moral hazard problem occurs because of the effect of UI benefits paid in $t+1$ on the effort undertaken in period t. More precisely, UI benefits received in period $t+1$ generate moral hazard effects on the decision variables undertaken during period t. The intra-temporal effect focuses on the interplay between the current UI benefits and the current decisions undertaken.

[2] At least, as long as we do not consider that workers are able to modify their probability to loose their current job.

[3] Most of the time, one-shot UI corresponds to severance payments or conditional saving mechanisms.

devote his fixed total time to several activities. In a first step, we consider the (intra-temporal) trade-off between effort to secure a new employment in the formal sector and leisure. In a second step, the unemployed worker may also spend time to obtain income in the informal sector in which there is no rationing. Consequently, the unemployed's time constraint implies an opportunity cost associated to the time spent to secure a new job in the formal sector or to leisure activities. However, another effect also appears: thanks to UI benefits, unemployed workers may have less need to spend time on informal remunerated activities. This effect is close to the liquidity constraint pointed out by Chetty (2008).

We show that without informal sector, the introduction or the increase of UI benefits yield ambiguous results. More precisely, it may increase the effort made to secure a new formal job when consumption and leisure are substitute. On the contrary, when unemployed workers have the possibility to spend time on informal remunerated activities, the introduction or the increase of **UI benefits paid during period t always increases the current effort undertaken to secure a new job in the formal sector**. It is due to the fact that UI benefits decreases the marginal opportunity cost generated by effort (undertaken to secure a new job). The ambiguity previously mentioned, *i.e.* without informal sector, now only intervene at the level of the (intra-temporal) trade-off between informal activities and leisure. To summarize, in case of one-shot UI benefits or severance payments, one can conclude that at a microeconomic level, an increase of these benefits do not reduce effort to secure a new job in the formal sector, whereas it may occur without an informal sector. In such a case, when time spent on informal activity increases, it is at the expense of leisure activities.

2 The Model

Consider a representative agent in a situation of short term unemployment. The agent may secure a new job with probability π with a corresponding value V^e in the following period, or on the contrary, becomes a long term unemployed with a value V^l.[4] His instantaneous utility function $u(c, L)$ depends on consumption c and leisure L, with $u_c > 0$ and $u_L > 0$, $u_{cc} < 0$ and $u_{LL} < 0$. Denoting by β the discount factor, the value function for the short term unemployed is

$$V^s = u(c, L) + \beta \left[\pi V^e + (1 - \pi) V^l\right].$$

We assume that the representative agent has one unit of time to allocate and that the effort to secure a new job is measured on this time scale. This effort has a positive effect on the probability to secure a new job, but with decreasing return, *i.e.* $\pi'(a) \geq 0$

[4] See Cahuc and Lehman (2000) for a similar framework.

and $\pi''(a) \leq 0$. ρ is the replacement rate and w^f the income earned before losing his job during the current period, so that ρw^f is the UI benefit received by recent unemployed workers.

In the following periods, we consider that there is no UI benefits and assume that V^e is exogenously determined by the condition of the labor markets and V^l is independent of current UI benefits. Roughly speaking, we do not take into account the general equilibrium effect caused by the reduction of the employeda' utility due to the necessary tax to fund the short term unemployment program. Moreover, if after the first period, unemployed workers have not found a formal job, V^l does not depend either on the unemployment program. These assumptions allow us to assume away the traditional moral hazard effect that comes from the recursive structure of dynamic UI contracts in order to focus on the intra-temporal effect at work.[5]

First, we consider the situation where there is no informal sector. Next, an unemployed worker may spend time on a remunerated activity in the informal sector.

2.1 Without informal sector

When there is no informal sector, the agent splits his time between leisure L and effort a to secure a new job, *i.e.* $1 = L + a$. The instantaneous utility function thus writes $u(\rho w^f, 1-a)$. The value function of the short term unemployed can be rewritten as

$$V^s = u(\rho w^f, 1-a) + \beta \left[\pi(a)V^e + (1-\pi(a))\, V^l\right].$$

Let us define $a^* \equiv \arg\max V^S$. Assuming an interior solution, the first order condition gives:

$$-u_L(\rho w^f, 1-a^*) + \beta\pi'(a^*)\left[V^e - V^l\right] = 0,$$

where u_L refers to marginal utility of leisure.[6] This equation shows that the effort depends on two factors: an income effect due the unemployment benefits (ρw^f) and the difference between levels of utility $\left[V^e - V^l\right]$ in the next period. Proposition 1 shows the importance of the cross derivative on the relationship between current UI benefits and the effort undertaken.

Proposition 1 *The sign of $da^*/d\rho$ is determined by the sign of $-u_{Lc}(.)$, where u_{Lc} denotes the cross derivative.*

[5] It is worth noticing that a dynamic UI contract would involve different replacement rate ρ_{t-1}, ρ_t and ρ_{t+1}, *etc...* However, an increase of ρ_t would generate exactly the same effects on the unemployed workers' decision variables in period t. The moral hazard effect would only modify these variables in period $t-1$.

[6] The second order conditions are automatically satisfied with our assumptions.

Proof. Using the implicit function theorem and the second order condition yields the result. ■

In words, in an economy without informal sector, the effort increases (respectively decreases) when the marginal utility of leisure decreases (resp. increases) in the consumption level.

2.2 With informal sector

We now introduce an informal sector and thus the possibility for the short term unemployed to split his total time between leisure activity, effort to secure a new job in the formal sector and a remunerated activity in the informal sector where there is no rationing. In such a case, the unemployed's time constraint becomes: $a + L + e = 1$, where e denotes the time devoted to informal activity. Moreover, the remuneration *per* unit of time in the informal sector is w^i, with $w^i < w^f$. The value function of the short term unemployed now writes

$$V^s = u(\rho w^f + w^i e, 1 - e - a) + \beta \left[\pi(a)V^e + (1 - \pi(a))\, V^l\right].$$

Let us define $(a^{**}, e^{**}) \equiv \arg\max V^s$. Assuming interior solutions, the first order conditions with respect to a and e are respectively

$$-u_L(\rho w^f + w^i e^{**}, 1 - e^{**} - a^{**}) + \beta\pi'(a^{**}) \left[V^e - V^l\right] = 0, \tag{1}$$

$$-u_L(\rho w^f + w^i e^{**}, 1 - e^{**} - a^{**}) + w^i u_c(\rho w^f + w^i e^{**}, 1 - e^{**} - a^{**}) = 0. \tag{2}$$

Proposition 2 *In the presence of an informal sector:*

i) the effort to secure a new job always increases with the short term UI benefit: $da^{**}/d\rho \geq 0$*;*

ii) a sufficient condition to ensure that the time devoted to informal activity decreases is

$$-\frac{u_{cc}}{u_c} \geq -\frac{u_{cL}}{u_L},$$

Proof. See appendix. ■

Equation (2) states that unemployed workers choose time devoted to informal activities to equalize its marginal utility to their marginal utility of leisure. Mazza (2000) mentions that the introduction of UI benefits in developing countries characterized by a high level of informality can subsidize informal activities. In other words, while receiving UI benefits, an unemployed may work in the informal sector. Proposition 2 reveals that in presence of an informal sector, current UI benefits unambiguously increase the

effort made by the unemployed worker to secure a new job in the formal sector, whereas this effect is ambiguous without informal sector. Unlike models that do not introduce an informal sector, the ambiguity does not affect the effort level, but rather the intra-temporal trade-off between leisure and informal productive activities. In other terms, in the case where time devoted to an informal activity increases, it is at the expense of leisure.

This result can be understood as follows. Combining (1) and (2), we obtain

$$w^i u_c(\rho w^f + w^i e^{**}, 1 - e^{**} - a^{**}) = \beta \pi'(a^{**}) \left[V^e - V^l \right].$$

The RHS captures the marginal benefit of the effort to secure a new job in the formal sector due to the variation of the probability π. The LHS represents the marginal opportunity cost of this effort, because it implies less time devoted to informal activity and therefore less income coming from the informal sector. The unemployed worker chooses his effort to equalize its marginal benefit to its marginal cost. The concavity of the utility function with respect to consumption implies that the marginal (opportunity) cost decreases with the available income of the unemployed. Consequently, an increase of UI benefits increases the unemployed worker's effort to secure a job in the formal sector.[7] Condition ii) implies that if leisure and consumption are complement, it is a sufficient condition to guarantee that an increase of current UI benefits decreases the time devoted to informal activity. If it is not the case, a weaker sufficient condition can be established as long as the policyholders' absolute risk aversion is high enough.[8] Finally, it is worth noticing that the effect of UI benefits on the informal activity depends mainly on the extent of the decreasing return of search activity and the time salary w^i earned in the informal sector.

3 Conclusion

In this note, we show that an increase of current UI benefits does not reduce the effort made by unemployed to secure a new job in the formal sector during the same period. The intra-temporal trade-off only affects the amount of leisure and informal activities. This simple result may highlight that one-shot UI programs or an increase of severance payments would not necessarily have negative consequences on labor market in developing countries.

This note can be extended in several directions. Following the labor economics tradition, we have adopted a comparative static analysis. In line with Alvarez-Parra and

[7] There also exist an indirect effect which may go to the same direction or not according to the sign of u_{cL}. In all cases, it is dominated by the direct consumption effect.

[8] It is worth noticing that u_{cc} captures an income effect more than unemployeds' risk aversion.

Sanchez (2009), it would be useful to apply this time constraint approach in an optimal contract setting but in a general equilibrium model that would take into account the impact of UI benefits on the determination of the wage in the formal sector. The study of dynamic contract with different levels of UI benefits over time instead of one shot UI benefits would allow to understand the interplay between this intra-temporal trade-off and moral hazard effects. It is in our research agenda.

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4 Appendix: Proof of Proposition 2

Proof. The first order conditions are

$$\begin{aligned} H_a &= -u_L(\rho w^f + w^i e^{**}, 1 - e^{**} - a^{**}) + \beta\pi'(a^{**})\left[V^e - V^l\right] = 0, \\ H_e &= -u_L(\rho w^f + w^i e^{**}, 1 - e^{**} - a^{**}) + w^i u_c(\rho w^f + w^i e^{**}, 1 - e^{**} - a^{**}) = 0. \end{aligned}$$

Applying the Cramer's rule yields

$$\begin{aligned} \frac{da}{d\rho} &= \frac{1}{|H|}\begin{bmatrix} -\frac{\partial H_a}{\partial \rho} & \frac{\partial H_a}{\partial e} \\ -\frac{\partial H_e}{\partial \rho} & \frac{\partial H_e}{\partial e} \end{bmatrix}, \\ &= \frac{1}{|H|}\begin{bmatrix} w^f u_{Lc} & -w^i u_{Lc} + u_{LL} \\ w^f u_{Lc} - w^i w^f u_{cc} & -w^i u_{Lc} + u_{LL} + \left(w^i\right)^2 u_{cc} - w^i u_{cL} \end{bmatrix}, \end{aligned}$$

where $|H|$ denotes the determinant of the Hessian matrix. It yields

$$\begin{aligned}\frac{da}{d\rho} &= \frac{1}{|H|}\left[-w^i w^f \left(u_{Lc}\right)^2 + w^f u_{Lc}u_{LL} + w^f u_{Lc}\left(w^i\right)^2 u_{cc} - w^f u_{Lc}w^i u_{cL}\right. \\ &\qquad \left. + w^f w^i \left(u_{Lc}\right)^2 - w^f u_{Lc}u_{LL} - \left(w^i\right)^2 w^f u_{cc}u_{Lc} + w^i w^f u_{cc}u_{LL}\right], \\ &= \frac{w^i w^f}{|H|}\left[u_{cc}u_{LL} - \left(u_{Lc}\right)^2\right] \geq 0.\end{aligned}$$

Similarly, we have

$$\begin{aligned}\frac{de}{d\rho} &= \frac{1}{|H|}\begin{bmatrix} \frac{\partial H_a}{\partial a} & -\frac{\partial H_a}{\partial \rho} \\ \frac{\partial He}{\partial a} & -\frac{\partial H_e}{\partial \rho} \end{bmatrix}, \\ &= \frac{1}{|H|}\begin{bmatrix} u_{LL} + \beta\pi''(a^*)\left[V^e - V^l\right] & w^f u_{Lc} \\ u_{LL} - w^i u_{cL} & w^f u_{Lc} - w^i w^f u_{cc} \end{bmatrix}.\end{aligned}$$

Straightforward computations yield

$$\begin{aligned}\frac{de}{d\rho} &= \frac{1}{|H|}\left[w^f u_{Lc}u_{LL} + \beta\pi''(a^*)\left[V^e - V^l\right]w^f u_{Lc} - u_{LL}w^i w^f u_{cc}\right. \\ &\qquad \left. - \beta\pi''(a^*)\left[V^e - V^l\right]w^i w^f u_{cc} - w^f u_{LL}u_{Lc} + w^i w^f u_{cL}^2\right] \\ &= \frac{1}{|H|}\left[\beta\pi''(a^*)\left[V^e - V^l\right]u_L w^f\left(\frac{u_{cL}}{u_L} - \frac{u_{cc}}{u_c}\right) - w^i w^f\left(u_{LL}u_{cc} - \left(u_{cL}\right)^2\right)\right].\end{aligned}$$

Therefore, using the concavity of $u(.)$, a sufficient condition to have $de/d\rho \leq 0$ is

$$-\frac{u_{cc}}{u_c} \geq -\frac{u_{cL}}{u_L}.$$

■