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Unemployment Accounts: A Better Way to Protect the Unemployed

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Executive Summary

Unemployment insurance programs are standard mechanisms by which governments protect their constituencies from the consequences of becoming unemployed. Since workers are averse to fluctuations in income, they typically welcome having such a safety net. Most unemployment insurance programs imply temporary allowances that represent a fraction of past wages. They are financed through mandatory worker contributions into a common pool.

Economists have long argued that such a mechanism, while providing important insurance to workers, may suffer from moral hazard, in the sense that some individuals may not search as strongly or may choose to refuse job offers and still collect unemployment insurance benefits. Shirking of this sort would not matter quantitatively if unemployment insurance agencies could perfectly monitor the behavior of jobseekers. Monitoring, however, can never be perfect and is costly. It is thought that about 20% of those who abusively file for unemployment insurance benefits succeed in obtaining those benefits. Indeed, it is virtually impossible for the agency to have perfect information on the possible offers received by a candidate or on the actual efforts of this candidate to generate job interviews. Because of this imperfect monitoring of shirkers, moral hazard may weigh heavily on the desirability of the program. This is due to the fact that workers contributing to the common pool need to contribute more than optimal to finance the benefits of those who manage to fool the agency. To discourage shirking, past research in this area has shown that it was socially optimal to reduce the generosity of unemployment insurance benefits to levels quite far from full insurance. Also, in part because of this moral hazard problem, the private provision of unemployment insurance is not viable and has to be supplied by the government under mandatory participation.

Another way to proceed, however, would be to design an unemployment insurance program that does not rely on the common pool. Some countries, such as Chile and Brazil, have begun to experiment with such new forms of unemployment insurance, which we will call Unemployment Accounts (UA).[1] The idea is simple: If contributing to the common pool makes some people want to shirk, why not consider a system in which individual workers contribute to a personal account (an unemployment account) from which they can withdraw only when they are jobless or upon retirement? This certainly would eliminate the problem of moral hazard since agents would be solely responsible for their accounts. The famous free-rider problem of the common pool no longer would be relevant.

While the idea seems simple and appealing, it may not be easy to implement such a program. Several difficulties immediately arise when we try to design the details of its rules. For instance, it is far from obvious how much workers should contribute every year. Should they contribute indefinitely, or should there be a ceiling to contributions? How much should the jobless be allowed to withdraw and at what frequency? What happens to those who find themselves jobless precisely at the moment when their account is empty? These are not trivial questions. Indeed, there can be a risk of significant under- or over-saving with program parameters that are far from optimal. Finally, assuming these questions have been satisfactorily answered, the more important question remains: Is it desirable to switch from the standard unemployment insurance policy to this newly designed, self-financed program?

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We proceed by performing simulations of the Oregon labor market under various policy scenarios. The simulated economy is characterized by several thousand categories of individuals who can make savings decisions but cannot borrow, who may or may not get job opportunities, and who can choose to turn down opportunities. Workers take intertemporal, forward-looking decisions that depend on their current labor market status, their current savings, and policy parameters. For the UA system, the policy parameters are defined as follows: Those who work must minimally contribute $\underline{a}$ to an unemployment account until its balance reaches $\overline{k}$. Those without offers or those who refuse offers can withdraw a maximum of $\overline{b}$ from their unemployment account per period. Holdings above the ceiling $\overline{k}$ face no withdrawal limits. The UA package implies some protection for those who find themselves jobless at a time when their unemployment account is empty. There remains an emergency unemployment compensation package available solely to those without offers whose assets have been depleted. Emergency benefits are computed as a fraction θ of a worker's wage. All retirees can use their entire account balance as and when they wish. The UA package includes a social security benefit computed as a fraction of the retirees' past wage. A tax is levied to finance the system of social security transfers and emergency unemployment benefits. The tax is such that the agency in charge of administering the UA system has a balanced budget. We model the tax as proportional tax rate τ applied to workers' income net of deposits in UA accounts and to all withdrawals from these accounts.

The model is parameterized to Oregon. Model parameters are set in such a way that they replicate key observables from the labor market in Oregon and aggregate labor decisions. We identify an optimal UA policy by maximizing the average utility (wellbeing) of agents that are entering the labor market without any assets. These agents fully internalize the cost of building up their unemployment accounts. They are also the ones that benefit least from switching to a UA policy.

Simulations are computed in two cases. In the first, we look at Oregonians with average education, with average income,and average labor market prospects (average probability of being unemployed and average unemployment duration). In the second, we split Oregon workers into three educational groups, each with their own average labor market characteristics. Using our optimality criterion, we find the following optimal UA policy parameters:

TABLE 1

Optimal unemployment account package

Scenarios	Homogenous skills	Heterogeneous skills
Minimum mandatory contributions $\underline{a}$	2%	5%
Maximum withdrawls $\overline{b}$	50%	50%
Account ceiling $\overline{k}$	30	30
Emergency unemployment insurance replacement rate θ	30%	35%
Tax rate τ	13.9%	13.9%

Note: $\underline{a}$, $\overline{b}$ and θ are expressed as a percentage of past income and $\overline{k}$ as multiples of the average weekly wage.

With these program features, we find that much less than 2% of workers decline job offers and less than 1% end up on emergency unemployment insurance because their accounts are empty when they face unemployment. This policy is not only optimal using our social welfare function, but it is also optimal for the least skilled agents with no assets.

Importantly, we also find that an overwhelming majority of individuals in these simulations prefer unemployment accounts to standard unemployment insurance or to a system of no insurance (self-insurance). Of course, these results are obtained in a model that is a simplified representation of the labor market in Oregon. But the model does account for a large number of individual categories. Hence, we are fairly confident that an unemployment account system can be a sound alternative to unemployment insurance policies.

About the Authors

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Unemployment Accounts: A Better Way to Protect the Unemployed

Why consider an alternative policy?

Unemployment insurance programs are standard mechanisms by which governments protect their constituencies from the consequences of becoming unemployed. Since workers are averse to fluctuations in income, they typically welcome having such a safety net. Most unemployment insurance (UI) programs provide temporary allowances that represent a fraction of past wages. They are financed through mandatory worker contributions into a common pool.

Economists have long argued that such a mechanism, while providing important insurance to workers, may suffer from moral hazard in the sense that some individuals may not search as strongly or may choose to refuse job offers and still collect unemployment insurance benefits (Feldstein, 1974; Hansen & İmrohoroğlu, 1992; Pallage & Zimmermann, 2001). Shirking of this sort would not matter quantitatively if unemployment insurance agencies could perfectly monitor the behavior of jobseekers. Monitoring, however, can never be perfect and is costly. It is thought that about 20% of those who abusively file for unemployment insurance benefits succeed in obtaining those benefits. Indeed, it is virtually impossible for the agency to have perfect information on the possible offers received by a candidate or on the actual efforts of this candidate to generate job interviews. Because of this imperfect monitoring of shirkers, moral hazard may weigh heavily on the desirability of the program. This is due to the fact that workers contributing to the common pool need to contribute more than optimal to finance the benefits of those who manage to fool the agency. To discourage shirking, past research in this area has shown that it was socially optimal to reduce the generosity of unemployment insurance benefits to levels quite far from full insurance. Also, in part because of this moral hazard problem, the private provision of unemployment insurance is not viable and has to be supplied by the government under mandatory participation.

Another way to proceed, however, would be to design an unemployment insurance program that does not rely on the common pool. Some countries, such as Chile and Brazil, have begun to experiment with such new forms of unemployment insurance, which we will call Unemployment Accounts (UA). The idea is simple: If contributing to the common pool makes some people want to shirk, why not consider a system in which individual workers contribute to a personal account (an unemployment account) from which they can withdraw only when they are jobless or upon retirement (Feldstein & Altman, 1998; Orszag & Snower, 2002; Pallage & Zimmermann, 2009)? This certainly would eliminate the problem of moral hazard, since agents would be solely responsible for their accounts. The famous free-rider problem of the common pool first highlighted in Hardin (1968) no longer would be relevant.

While the idea seems simple and appealing, it may not be easy to implement such a program. Several difficulties immediately arise when we try to design the details of its rules. For instance, it is far from obvious how much workers should contribute every year. Should they contribute indefinitely, or should there be a ceiling to contributions? How much should the jobless be allowed to withdraw and at what frequency? What happens to those who find themselves jobless precisely at the moment when their account is empty? These are not trivial questions. Indeed, there can be a risk of significant under- or over-saving with program parameters that are far from optimal. Finally, assuming these questions have been satisfactorily answered, the more important question remains: Is it desirable to switch from the standard unemployment insurance policy to this newly designed, self-financed program?

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While unemployment accounts solve the moral hazard problem of standard unemployment insurance programs, they may lead to new issues. If the unemployment package includes emergency unemployment insurance benefits for those agents who lose their jobs when their accounts are empty, there may be a perverse incentive to reject job offers to take advantage of this. This leads to under-savings and to lower national income and can be a consequence of too generous emergency unemployment insurance, too high account withdrawal limits, too small mandatory contributions, or too low account ceilings. On the other hand, there can be over-savings and too limited insurance if mandatory contributions are too high and withdrawal limits are too small. Finding the optimal mix of policy parameters is thus extremely important. That is our goal in this study of Oregon.

1. Designing an optimal unemployment account policy

The progress made in Economics since the works of Nobel Prize winners Finn Kydland and Edward Prescott make it possible to provide precise, quantitative answers to these questions. Rather than investigating the effects of the alternative policy by experimenting on subsets of a real population, we now can directly experiment with policy changes on a computerized replica of the population. This clearly removes the social and moral cost of testing policies by trial and error on actual populations and allows us to try as many variants of the policy as the cheaper and cheaper CPU time permits. It also allows us to compare the effects of very different social programs on various aggregate statistics such as employment, savings, consumption and the general satisfaction of the population. It also makes it possible to identify the winners and losers of a policy change, a question quite important to policy makers.

We have done this for a computerized replica of the economy of Oregon. In a first approach, we have calibrated our economy assuming everyone earns the average wage and has the same unemployment risk (i.e., a calibration to the average). We then recalibrate the model to account for the differences in educational attainment. Our methodology consists in solving the inter-temporal problem of agents in all possible situations of employment (with a job opportunity or without) and wealth (i.e., asset holdings) under the simple assumptions that they are forward-looking (i.e., they make current decisions based on their expectation of future outcomes), and rational (i.e., they want to do the best for themselves given the constraints that they face). We also allow workers to accumulate assets, but they cannot borrow, in particular when they are unemployed. The model we use is presented in detail below.

2. The model

To conduct numerical simulations, we need to define precisely all components of the model economy. This has the advantage of making our assumptions explicit. Also, we need to quantify all model parameters to reflect the specificities of Oregon as closely as possible. The following paragraphs give a precise description of the model, which is necessarily somewhat technical. A discussion of the numbers used to calibrate the model economy follows.

We construct a model economy with the following features. Most of the modeling is extracted from Pallage & Zimmermann (2009). The population is sufficiently large that no single individual can influence aggregate outcomes. The length of an individual's life is uncertain. Time is discrete, with each period labeled t. Agents differ in a series of characteristics, some of which are choices made in the past (asset holdings k_t, whether they worked last period η_t-1), some of which are independent of their will (whether or not they receive a job offer s_t and possibly their educational status j).[2] In the simulations, we also consider an economy in which everyone has the average education level. In this case, we will drop the index j.

At any given time, agents face a probability p_r of retirement. Once retired, they face a probability p_d of dying, every period. Dying agents are all replaced by new-borns, so that the size of the population does not change. For simplicity, we preclude the possibility of bequests and assume full depreciation of an agent's capital upon his death.

The labor market functions as a series of lotteries. Those in the labor force at time t learn at the beginning of the period the result of the job opportunity lottery s_t. They can be offered a job ($s_t = e$) or not ($s_t = u$). This random variable st follows a process governed by the state dependent probabilities $p(s_t | s_{t}\text{-}1)$.

The time spent at work is the same across workers, i.e., labor is indivisible. Agents spend either 0 or a fraction $\overline{h}$ of their time endowment at work. A worker produces y_j units of consumption good per period. He is paid his productivity.

Agents have preferences over consumption c_{jt} and leisure l_{jt}. The periodic utility function is strictly concave and strictly increasing, as is usual in economic modeling, and is given by

$$U(c_{jt}, l_{jt}) = \frac{(c_{jt}^{1-\sigma} l_{jt}^{\sigma})^{1-\rho} - 1}{1-\rho}$$

The agents choose current consumption, their voluntary asset replenishment a_t and whether to work or not ($\eta_t \in \{0, 1\}$) if they have a job offer, so as to maximize the present value of their expected utility. Agents solve the following program subject to all constraints that pertain to their specific case:

$$\max E \sum_{t=0}^{\infty} \beta^t u(c_t, l_t)$$

where β is a discount factor.

2.1 Modeling unemployment accounts

Those who work must contribute a minimum $\underline{a}$ to an unemployment account until it reaches $\overline{k}$. Those without offers or those who refuse offers can withdraw a maximum of $\overline{b}$ from their unemployment account per period. Holdings above $\overline{k}$ face no withdrawal limits. The UA package implies some protection for those who find themselves jobless at a time when their unemployment account is empty. There remains an emergency unemployment compensation package available to those without offers whose assets have been depleted.[3] Emergency benefits are computed as a fraction θ of a worker's wage y_j. All retirees can use their entire account balance as and when they wish. The UA package includes a social security benefit computed as a fraction θ_r of the retirees' past wage. Let a_t represent an agent's non-mandatory deposit in its UA account.

A tax is levied to finance the system of social security transfers and emergency unemployment benefits. The tax is such that the agency in charge of administering the UA system has a balanced budget. We model the tax as a proportional tax rate $\boldsymbol{\tau}$ applied to workers' income net of deposits in UA accounts and to all withdrawals from these accounts. Importantly, the UA package thus has another interesting role. It provides a way to defer income taxation since all deposits are considered immediate income deductions. All social security benefits and unemployment compensation within this package, when applicable, are not taxable.

Given all the above, an agent's disposable income can be written as

$$I(k_t, s_t, \eta_t, a_t) = \begin{cases} (1-\tau)(y-\underline{a}-a_t) & \text{if } s_t = e, \eta_t = 1, \forall k_t < \bar{k} \\ (1-\tau)(y-a_t) & \text{if } s_t = e, \eta_t = 1, \forall k_t \geq \bar{k} \\ (1-\tau)(\min\{k_t, \bar{b}\} - a_t) & \text{if } s_t = e \text{ and } \eta_t = 0, \text{ or } s_t = u, \forall k_t < \bar{k} \\ (1-\tau)(k_t - \bar{k} + \bar{b} - a_t) & \text{if } s_t = e \text{ and } \eta_t = 0, \text{ or } s_t = u, \forall k_t \geq \bar{k} \\ \theta y - a_t & \text{if } s_t = u \text{ and } k_t = 0 \\ 0 & \text{if } s_t = e, \eta_t = 0 \text{ and } k_t = 0 \\ \theta_r + (1-\tau)(k_t - a_t) & \text{if } s_t = r \end{cases}$$

The model is solved using dynamic programming methods presented in Pallage & Zimmermann (2009).

3. A calibration to Oregon

The model is calibrated, by which we mean parameterized, to Oregon. Model parameters are set in such a way that they replicate key observables from the labor market in Oregon and aggregate labor decisions. The data, specific to Oregon, was provided by the Cascade Policy Institute.

Period length – The length of a model period is normalized at six weeks.

Education attainment – We identify three education groups *j* in Oregon: high school or less than high school, some college and college graduates. The average size of these groups over the years 2005-2008 is respectively 33.5%, 35.1% and 31.4%.

Average duration of unemployment – There is no data at the Oregon level for the duration of unemployment. Moreover, data at the United States level suggests that the duration of unemployment barely varies across educational groups. Therefore, we consider the same duration across groups. We infer this duration for Oregon from a series of other statistics: an average unemployment benefit duration in Oregon of 14 weeks with a maximum of 26 weeks, and the fact that 29% of beneficiaries exhaust their maximum duration. Assuming a 5% job-finding rate, we can extrapolate an untruncated average duration of unemployment of 19 weeks, that is, 3.17 model periods.

Labor market dynamics – We calibrate the unconditional probability of unemployment p_u to the average unemployment rate in Oregon for the years 2005-2008, 5.425%. The probability to exit unemployment (i.e., to receive an offer if previously without offer), p_{eu}, is the inverse of the average unemployment duration: $p_{eu} = 1 / 3.17 = 0.3155$. Using Bayes conditional probability rules, we can obtain the probability for an agent of having an offer if he had one last period as $(p_{ee} = 1 - p_u - p_{eu} p_u) / (1 - p_u) = 0.9819$. Disaggregating these statistics for the three educational groups gives us the following probabilities:

TABLE 2

	Aggregate	≤High School	Some College	College & Up
Size	1	0.335	0.351	0.314
P_u	5.425%	7.35%	5.4%	3.375%
P_{eu}	31.55%	31.55%	31.55%	31.55%
P_{ee}	98.19%	97.50%	98.20%	98.90%

Life and retirement – The probability of retirement is computed under the assumption that, regardless of education, agents on average work for 45 years. Given that a year is 8.67 periods, the probability of retirement is therefore $p_r = 1 / (45 \times 8.67)$. The probability of death once retired is similarly computed under the assumption that agents live on average 15 years after retirement, so that $p_d = 1 / (15 \times 8.67)$.

Social security benefits – Social security benefits are set at the federal level and represent 38.6% of past income (Queisser & Whitehouse, 2005).

Individual preferences – The parameters of the utility function considered in the previous section are standard in the macroeconomics literature: The elasticity of substitution between consumption and leisure, σ, is 0.67 and the risk aversion parameter, ρ, is 2.5 as in Kydland & Prescott (1982), Hansen & İmrohoroğlu (1992), Pallage & Zimmermann (2001, 2005), and many others.

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Interest rate and the value of time preference – The long-term real interest rate we consider is 4% annually, which is well accepted in the macroeconomics literature for the United States' post-World-War-II period. Given this, the present-value of a dollar to receive next period, i.e., the model discount factor, β, is 0.995.

Indivisible labor – If employed, a worker is assumed to spend 45% of his time endowment at work as in Hansen & İmrohoroğlu (1992) and Pallage & Zimmermann (2001).

Number of agents – We discretize the set of possible assets, considering 851 categories between 0 and 17 times the average periodic wage. Since there are 3 possible employment states (with offer, without offer, retired), three possible educational levels and two states for the eligibility to UI benefits (eligible or not eligible), our model therefore accounts for $851 \times 3 \times 3 \times 2 = 15318$ categories of individuals.

4. The optimal unemployment account package for Oregon

To identify an optimal UA policy from a social welfare perspective, it is important to make sure that social welfare is properly measured. It is common practice in economics to measure welfare using a utilitarian social welfare function that averages the utility of all individuals in the economy. For our purpose, this would not be very meaningful. Indeed, it is important to note that we work at a steady state, in which agents have a certain amount of savings. The cost of building up those savings would be neglected for most agents if we compared policies using the average utility. To avoid this mismeasurement, we use as our welfare criterion the average utility of agents that are entering the labor market (which we label "newly born").

Since the latter have no assets, they fully internalize the cost of building up their unemployment account. Note also that these agents are likewise the ones that are the worst off in an unemployment account system, as they have no assets to draw from in case of unemployment and need to rely completely on supplemental unemployment insurance.

4.1 Case 1: Population with homogeneous skill

We have determined that the optimal unemployment account program has the following characteristics (see Table 1). Deposits every period, $\underline{a}$, should represent 2.0% of income up to a ceiling, $\overline{k}$, of 5 times the periodic wage (or equivalently 30 times the weekly wages). When unemployed, an agent can withdraw every period up to 50% of his past income. This upper-bound to withdrawals, $\overline{b}$, is rarely binding; most agents actually withdraw strictly less than this amount. Unemployed agents with depleted accounts can benefit from emergency unemployment benefits, θ, representing 30% of their past wage. Hence there remains a residual unemployment insurance agency to provide for those who have not been able to accumulate enough to self-finance their way through unemployment. But less than 1% of workers find themselves in this situation at the optimum. As stated earlier, the unemployment account package has been evaluated under the assumption that all deposits into personal unemployment accounts are not taxable while withdrawals are. Hence, workers see this as one way to defer income taxation, rather than as forced savings.

As we already emphasized in the introduction, a natural fear with unemployment accounts is that moral hazard may sneak back in another form if we allow unemployed agents without savings to benefit from the old unemployment insurance compensation. Some agents may have an incentive to refuse offers, empty their accounts, and hope to live on unemployment insurance benefits when they are hit by a bad employment shock. Our results suggest that this effect is very low. Few workers find it optimal to make use of this strategy. Less than 1% of agents actually end up in need of emergency benefits from the residual unemployment insurance.

As to the desirability of the system, we find that in a scenario in which shirkers have no chance of fooling the unemployment insurance agency, the population of newly born agents on average does not benefit from a switch to self-financed unemployment accounts. However, if as little as 5% of shirkers do succeed in collecting undue unemployment benefits (a very conservative number), this result is reversed. In this case, the average inhabitant of our replica of Oregon indeed would be better off with an unemployment account system properly designed. In fact, an overwhelming majority of agents would benefit from the switch to this new social package: The change in policy actually would benefit 97% of agents in this replica of the Oregon economy in which everyone faces the average risk.

Obviously, the poorer the efficacy of monitoring by the unemployment insurance agency, the higher the desirability of the alternative unemployment account system for workers. Indeed, the common pool being plagued by more and more free-riders becomes very costly to finance. Workers overwhelmingly favor the self-financed program. We do find this effect very clearly as we increase the success rate of shirkers in collecting undue benefits from the unemployment insurance agency. When interpreting these results, however, it is important to note that we are in effect comparing steady states, i.e., we ask our model agents which policy package they would prefer if they could costlessly change the policy environment. The costs associated with the transition from one policy to another are not taken into account in our results, but we have reasons to believe they should not be large.

These results for Oregon confirm most of the previous results we had obtained for a United States-wide study (Pallage & Zimmermann, 2009). While the specificities of the Oregon labor market influence the optimal policy parameters, the unemployment account package also would be preferred to the current unemployment policy at the national level.

Interestingly, we have abstracted from the fact that unemployment insurance agencies are more expensive to run than an unemployment account system. Accounting for this would only reinforce our findings.

4.2 Case 2: Population with heterogeneous skills

We now turn to the simulation of an economy with three skill levels, distinguished by education (up to high school, some college, and college educated). This allows us to observe how the optimal unemployment account changes as one adds more complexity to the economy. It also allows us to study how different categories of the population are impacted by the alternative policy.

We have found that the optimal unemployment account policy is as follows: contribution, $\underline{a}$, of 5%, withdrawals, $\overline{b}$, up to 50% of normal income, residual unemployment benefits, θ, of 35%, and account ceiling, $\overline{k}$, representing 5 times the average income, (i.e., 30 weeks of economy-wide weekly average income). Note that all percentages are set relative to normal skill-level income, whereas $\overline{k}$ is set with respect to the average income across all agents, much like social security. Except for the optimal level of contribution, this policy vector is very close to that found in the homogeneous skill scenario. In the latter case, all agents faced the same average risk. Here, some clearly face a stronger risk, but the policy vector is the same for individuals of all skill levels.

> ***"This policy is not only optimal using our social welfare function...but it is also optimal for the least skilled agents with no assets."***

The tax rate to finance social security and supplemental unemployment insurance is 13.9%. About 1.7% of all workers choose to turn down job offers, but they themselves support the consequences of this choice. This drives the unemployment rate up to 8.2%, a number that includes 0.7% of agents who receive emergency unemployment insurance benefits because they have exhausted their accounts or could not start to accumulate funds when they entered the labor market. On average, people accumulate about 24 weeks worth of average income; that is, on average they do not reach the ceiling, $\overline{k}$.

This policy is not only optimal using our social welfare function (average value for agents without assets), but it is also optimal for the least skilled agents with no assets. This invariance of optimal policy parameters with respect to skills is consistent with previous results we obtained in Pallage & Zimmermann (2001) for optimal unemployment insurance. Interestingly, this optimal unemployment account policy is also preferred to self-insurance, that is, the absence of any insurance system. Therefore, it is welfare improving to impose restrictions on the accumulation and decumulation of these accounts, as it is coupled with a residual insurance.

TABLE 3

Scenarios	Optimal UA package					Economic aggregates				
	$\overline{k}$	θ	$\underline{a}$	$\overline{b}$	τ	Welfare	Shirkers	Unempl.	UI benef.	Assets
Homogenous skills	5	0.30	0.02	0.5	.1393	-95.4215	0.0117	0.0746	0.0090	3.2867
Heterogeneous skills	5	0.35	0.05	0.5	.1387	-105.7061	0.0170	0.0816	0.0071	3.9680

Of course, we primarily want to compare this UA policy to an unemployment insurance system. Here we face several choices. We can compare optimal UA to optimal UI configurations given various levels of detection probabilities for shirkers or we can simply compare it to observed system generosity. Whatever scenario we take, the unemployment account system easily beats the unemployment insurance system, despite the fact that the optimal design of UA in our study reflects the preferences of those who are most likely to prefer unemployment insurance (those with empty accounts), and despite the other important fact that we neglect the administration costs of the unemployment insurance system. We view these results as quite strong.

The optimal UA package is very popular in our economy. If we let our individual agents cast a vote on the prospect of switching from the optimal UI package to the optimal UA package, the switch is in fact unanimously chosen.

A last word on robustness. We find that changing the program parameters a little does not affect the welfare of workers much. In particular, changes to $\overline{k}$ have little impact. One needs only to be careful not to set the generosity of the emergency unemployment insurance, θ, too high, otherwise workers are tempted to try to exploit it by refusing jobs too often and depleting their assets. Allowing too large withdrawals, $\overline{b}$, can have the same adverse consequence.

5. Conclusion

We have simulated the Oregon labor market with an unemployment account system and have found that, if optimally designed, it easily beats self-insurance and unemployment insurance. Of course, these results are obtained in a model that is a simplified representation of the labor market in Oregon. But the model does account for a large number of individual categories. Hence, we are fairly confident that an unemployment account system can be a sound alternative to unemployment insurance policies.

Endnotes

1. See Vroman (2003) and Barros & Corseuil (2001), respectively, for a description of such policies in Chile and Brazil.

2. We make the simplifying assumption that agents are given an education at birth, which determines their income class.

3. It is important to note here that introducing imperfect monitoring would not affect the results, since agents without assets would never risk having nothing to consume at any given time. Given the properties of the utility function, their utility would be $-\infty$ in this situation. As a result, agents without assets would never refuse job offers.

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