Self-Employment Promotion as Active Labor Market Policy: Design and Trade-offs in Rigid Labor Markets*

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Abstract

This paper analyzes self-employment subsidies for the unemployed, a common policy in Europe. We develop a search model with self-employment to study how startup funding affects individual choices, employment, and welfare. The model identifies three channels: (1) direct unemployment reduction, (2) crowding-out effect on paid employment, and (3) budget effect, whereby startup subsidies can generate fiscal savings if unemployment falls sufficiently. (1) and (3) are increasing with labor market rigidity. A simple calibration quantifies these channels and compares welfare effects across labor market structures. Our findings inform active labor policy design in the presence of generous unemployment insurance and rigidities.

Keywords: Active Labor Market Policy; Unemployment Insurance; Self-Employment; Rigid Labor Markets.

JEL classifications: J64, J65, E24

*Views expressed are those of the authors and not necessarily those of the Federal Reserve Board or the Federal Reserve System.

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1. Motivation

Self-employment promotion has become an increasingly popular policy option for job creation, as startup funding can both absorb jobseekers and stimulate local economic dynamism. Across Europe, a variety of subsidy schemes, ranging from EU microfinance guarantees to national grants, complement traditionally generous unemployment insurance (UI).[1] A targeted subset of these initiatives directs these funds to the unemployed. Programs like Germany's *Gründerzuschuss*—which funds living and social-security costs upon a bank-approved business plan—and Spain's *capitalización del paro*—which converts remaining UI into a lump-sum investment—directly support unemployed individuals launching firms. These targeted schemes are the focus of this paper.

Two key structural features characterize the labor markets where unemployment-to-self-employment programs are most prevalent: generous UI and rigid labor markets due to high firing costs, resulting in high unemployment and low job creation (Bentolila and Bertola, 1990). Thus, assessing these policies requires a framework that captures the interaction between active and passive labor policies while accounting for market frictions.

In this note, we build a search model with a self-employment option to illustrate the trade-offs governments face when promoting self-employment. In our framework, unemployed workers draw project opportunities characterized by heterogeneous setup costs and qualities, and can only enter self-employment if subsidized. We highlight three mechanisms: (i) a direct employment effect as unemployed workers start businesses, (ii) a crowding-out effect as workers shift from paid jobs, and (iii) a budget effect, whereby balanced-budget startup subsidy reforms can lead to higher or lower unemployment benefits, depending on their impact on individual choices and future unemployment. The sign of the budget effect is theoretically ambiguous but increasing in labor market rigidity. A simple calibration quantifies these channels and compares welfare effects across market structures.

Our work complements empirical studies evaluating startup subsidies, including Hombert et al. (2020), who assess the insurance value of France's startup subsidy program using administrative data, and Caliendo and Künn (2011), who examine the long-term effects of startup subsidies for the unemployed in Germany. We complement this literature by integrating unemployment insurance, self-employment subsidies, and labor market frictions into a standard search framework (Mortensen and

[1] The Employment and Social Innovation (EaSI) programme (2014–2020) provides EU-backed micro-loans (up to 25 000 EUR) and social-enterprise financing (up to 500 000 EUR).

Pissarides, 1994), to study their joint effects on occupational choice, employment, and welfare. We also relate to structural analyses of self-employment among the poor and unemployed in high-unemployment-risk labor markets, such as Herreño and Ocampo (2023) and Garcia-Cabo and Madera (2024). In our framework, unemployment risk is endogenously generated as a function of frictions and changes the impact of subsidies.

2. A Search Model with Start-up Subsidies and Unemployment Insurance

In this section, we describe the environment and equilibrium of a stylized search model without aggregate uncertainty. In this setting, a benevolent government allocates a fixed budget between two possible labor market policies: regular unemployment insurance and self-employment startup funding.

2.1 Environment

Time is discrete and there are three types of agents: workers, paid-employment firms, and the government. All agents discount future at rate β.

Workers. There is a measure one of infinitely-lived workers. Workers are risk averse and have no savings. Workers have fixed human capital $h \equiv 1$. We will focus on the case of homogeneous workers.[2] Each worker can be in one of three states: paid-employment (earning wage $w = \omega h$ and facing separation rate δ), self-employment (earning per-period payout $e = \varepsilon h$ with business-failure probability δ_s), or unemployment (receiving unemployment insurance ui for a finite period or base income $\underline{c}$ after ui has expired).

Firms. A paid-employment firm must be attached with a worker to produce $y = z$, where z is common to all firms and so it represents the aggregate labor productivity of the economy. This aggregate productivity is deterministic.

Search and labor-market frictions in paid-employment. Firms need to post vacancies at a cost κ and face firing costs. The total number of matches is given by a CRS matching function m and corresponding filling and finding rates:

$$m = \frac{u \cdot v}{[u^{\chi} + v^{\chi}]^{\frac{1}{\chi}}}; \qquad q = \frac{m}{v}; \qquad f = \frac{m}{u}. \tag{1}$$

The choice of this functional form is common in the literature (e.g., den Haan, Ramey and Watson, 2000) and ensures job finding (f) and filling (q) rates are bounded between 0 and 1.

[2] Adding heterogeneity in h changes our results very little because almost all the marginal workers relevant of our analysis are in the lowest groups. A version with heterogeneous workers is available upon request.

Self-employment and financing friction. An unemployed worker can choose to start a self-employment practice. At the start of unemployment, each draws a project from a known distribution $F(s, e)$. s is the set-up cost, and e indexes the project quality and per-period earning from the project. So the project set-up cost is idiosyncratic to each unemployed worker and each unemployment spell. Since workers cannot save or borrow, we interpret s as the financing need of a worker, i.e. the total set-up cost less own available funding. This financing friction means not all viable projects can proceed, creating a rationale for government startup subsidies.

Government policy. The government splits a fixed labor-market budget between UI and startup grants. Each newly unemployed worker receives a benefit $ui = \gamma_{ui} w$ per period, which expires with probability μ_{ui}. Startup funding covers project costs up to $seed$: only unemployed workers with $s \leq seed$ are able to start a business. We assume startup funding is exogenously set at $seed > 0$, with $seed = 0$ if ui has expired. The government then adjusts ui to satisfy its budget:

$$\underbrace{\int_{s \leq seed} s \cdot \eta^u(s,e)\, dF(s,e)}_{\text{Startup subsidies}} + \underbrace{ui \cdot \int_{(s,e)} \eta^u(s,e)\, dF(s,e)}_{\text{Unemployment insurance payments}} \quad \leq \quad g, \tag{2}$$

where $\eta^u(s, e)$ is the distribution of unemployed workers receiving ui. We will assume $g = \bar{g}$; that is, all labor market reforms must be budget-neutral. This constraint captures a government that reallocates a fixed pool of resources between passive and active labor market policies without external funding.

2.2 Value functions

Unemployed. An unemployed worker's state is given by (s, e), fixed for the duration of the spell. She can enter self-employment only if $s \leq seed$. The value of an unemployed worker receiving ui is:

$$W^u(s,e) = \begin{cases} u(ui) + \beta \max\left\{ \overset{\text{start business}}{W^s(e)}, \quad \overset{\text{wait for offer}}{f(\theta)\, W^p + \big(1 - f(\theta)\big)\hat{W}^u(s,e)} \right\}, & \text{if } s \leq seed, \\ u(ui) + \beta \underbrace{\big[f(\theta)\, W^p + \big(1 - f(\theta)\big)\hat{W}^u(s,e)\big]}_{\text{wait for offer}}, & \text{if } s > seed, \end{cases} \tag{3}$$

where

$$\hat{W}^u(s,e) = \big[(1 - \mu_{ui})W^u(s,e) + \mu_{ui} W^n\big]$$

is the continuation value in unemployment with possible UI expiration, $W^s(e)$ is the continuation value in self-employment and W^p in paid-employment, to be defined below.

Once UI expires, the worker consumes base income $\underline{c}$, and cannot start a business. Her value function is

$$W^n = u(\underline{c}) + \beta \left[f(\theta) W^p + (1 - f(\theta)) W^n \right]. \tag{4}$$

Paid-Employed. The value of a worker employed in a paid-employment job is:

$$W^p = u(w) + \overbrace{\beta(1-\delta)W^p}^{\text{keep job}} + \overbrace{\beta\,\delta\tilde{W}^u}^{\text{lose job}}; \qquad \underbrace{\tilde{W}^u = \int_{(s,e)} W^u(s,e)dF(s,e)}_{\text{if newly unemployed, draws new project }(s,e)}. \tag{5}$$

Self-employed. The value of a self-employed worker is given by:[3]

$$W^s(e) = u(e) + \overbrace{\beta(1-\delta_s)W^s(e)}^{\text{stay in business}} + \overbrace{\beta \quad \delta_s \tilde{W}^u}^{\text{fails, draw new project}}.$$

Firm's problem. The value of a firm in paid-employment matched with a worker is given by:

$$J = (z - w) + \beta(1-\delta)J + \beta\delta(-firing + V) \tag{7}$$

where if the match is dissolved, the firm pays a firing cost $firing$. Since firing in the model is exogenous and not the firm's decision, we assume the firing cost is a deadweight cost not paid to anyone.

The paid-employment firm decides on vacancy posting, summarized by:

$$V = -\kappa + \beta q(\theta) J + \beta(1 - q(\theta))V \tag{8}$$

where we assume that the vacancy posting cost is fixed.

By free-entry the value of filling a vacancy has to be equal to the cost of posting it, $V = 0$ in steady state and we can solve for the equilibrium job-filling rate $q(\theta)$ and job-finding rates $f(\theta)$ as a function of market tightness θ.

Proposition 1. An increase in $firing$ raises the job-filling rate $q(\theta)$, reduces labor market tightness θ, and decreases the job-finding rate $f(\theta)$.

Proof. See Appendix A.

Intuitively, higher firing costs reduce the value of a match J, as they increase expected future separation costs. Thus, firms post fewer vacancies. To satisfy free-entry, this must be offset by a higher

[3] We mechanically shut down the option to voluntarily dissolve the business. Otherwise, they can keep dissolving the business until the draw is high enough. Alternatively, a high enough cost to dissolve business can also help prevent such decision. The value function with endogenous business dissolution decision:

$$W^s(e) = u(e) + \beta(1-\delta_s)\max\{W^s(e), \tilde{W}^u(h) - D\} + \beta\delta_s\tilde{W}^u, \text{where } D \geq 0 \text{ is the cost to dissolve a business.} \tag{6}$$

job-filling rate. With lower vacancies, θ decreases. While the effect on $f(\theta)$ is in principle ambiguous, Proposition 1 shows that, for $\chi > 0$, $f(\theta)$ decreases.

Self-employment decision. From the problem of the unemployed workers with ui, we can characterize their self-employment decision rule $\mathcal{I}(s,e)$ as:

$$\mathcal{I}(s,e) = \begin{cases} 1, & \text{if } s \leq seed \text{ and } W^s(e) > f(\theta)\, W^p + (1 - f(\theta))\; \hat{W}^u(s,e), \\ 0, & \text{otherwise.} \end{cases} \tag{9}$$

An unemployed worker with $s \leq seed$ is more likely to start self-employment if the paid-employment job arrival rate f is low, or if e is large relative to w and ui.

Proposition 2. For a given government policy $(ui,seed)$, an unemployed worker's self-employment decision is characterized by two cutoffs. She enters self-employment if and only if

$$s \leq seed \quad \text{and} \quad e \geq \underline{e},$$

where *seed* is the startup subsidy and $\underline{e}$ is the minimal project-quality threshold.

Proof. See Appendix A.

2.3 Equilibrium

Definition 1. The **stationary equilibrium** is a tuple $\{\mathcal{I}(s,e),\, W^u,\, W^s,\, W^p,\, \theta,\, \eta^u(s,e),\, \eta^s,\, \eta^p\}$, given ui and $seed$ satisfying

- Decision rule $\mathcal{I}(s,e)$ solves the unemployed worker's problem,
- Market tightness θ is consistent with paid-employment firm's free-entry condition,
- Distribution of workers is consistent with the laws of motion and workers' and firm's expectations

$$\underbrace{\int_{(s,e)} \eta^u(s,e)\,\mathcal{I}(s,e)\,dF(s,e) \;+\; \eta^s\,(1-\delta_s)}_{\text{Self-employed}} \;+\; \underbrace{f(\theta)\int_{(s,e)} \eta^u(s,e)\,\big[1-\mathcal{I}(s,e)\big]\,dF(s,e) \;+\; \eta^p\,(1-\delta)}_{\text{Paid-employed}} +$$
$$\underbrace{(1-f(\theta))\,(1-\mu_{ui})\int_{(s,e)} \eta^u(s,e)\,[1-\mathcal{I}(s,e)]\,dF(s,e) \;+\; \big[\eta^s\,\delta_s + \eta^p\,\delta\big]}_{\text{Unemployed with UI}} \tag{10}$$
$$\underbrace{(1-f(\theta))\,\mu_{ui}\int_{(s,e)} \eta^u(s,e)\,[1-\mathcal{I}(s,e)]\,dF(s,e) \;+\; (1-f(\theta))\,\eta^n}_{\text{Unemployed without UI}} = 1.$$

2.4 Equilibrium effects of self-employment promotion policy: Theoretical Insights

On an individual level, an increase in startup funding $seed$ relaxes financing constraints, allowing more unemployed workers with higher setup costs s to enter self-employment. This raises self-employment and reduces unemployment (**employment effect**) but may reduce paid employment (**crowding-out effect**). The impact on average project quality and self-employment earnings depends on the joint distribution $F(s, e)$. Even assuming independent and uniform distributions for e and s, the average project quality goes up. Intuitively, a higher s means a worse outside option of waiting for an offer. Thus projects with larger setup cost need to be of correspondingly higher quality to be implemented. Assuming a positive correlation of s and e would further strengthen this effect.

An increase in $seed$ raises both the number and average cost of funded projects, increasing total self-employment subsidy outlays. Under a balanced budget, this crowds out UI spending, implying a lower ui this period and stronger incentives for self-employment via reduced value of waiting. However, higher $seed$ also reallocates workers from unemployment to self-employment, reducing the expected duration of UI claims. If this fiscal savings dominates the increased subsidy cost, then $\frac{d,ui}{d,seed} > 0$: higher startup subsidies free up budgetary space for more generous UI. The sign of this **budget effect** thus depends on the relative strength of both forces.

The role of market rigidities. As discussed in Proposition 1, market rigidities in the paid-employment sector reduce the job-finding rate $f(\theta)$. In such rigid labor markets, the relative attractiveness of self-employment increases. A rise in the startup subsidy $seed$ is more likely to change worker choices $\mathcal{I}(s, e)$ from inaction to starting a business. Proposition 3 summarizes the effect of startup promotion in more rigid labor markets.

Proposition 3. In the balanced-budget equilibrium, a higher $firing$ cost results in a stronger **employment effect**, a weaker **crowding-out effect**, and a stronger **budget effect**.

Proof. See Appendix A.

3. Calibration and Results

The model period is one month. We set some parameters externally and internally calibrate three key parameters to match targeted moments from Spain. Below, we discuss two external calibration choices and the internal calibration strategy. All parameters are in Table 1.

Table 1: Baseline Model Parameters: Calibration and Sources

Parameter	Description	Strategy/Target	Value	Model Value
Externally Calibrated Parameters				
β	Time discount rate	3% annual discount	$0.97^{1/12}$	–
σ	Risk aversion	Log utility	1	–
ω	Paid-employment wage unit	Profit share	0.92	–
δ	PE-to-unemployment rate	Data, see footnote 5	0.026	–
$firing$	Firing cost	One month of wages	1.5	–
δ_s	SE-to-unemployment rate	Data, see footnote 5	0.005	–
γ_{ui}	UI replacement ratio	Data (0.6-0.7)	0.6	–
μ_{ui}	UI expiration rate	24 months duration	1/24	–
$\epsilon_{seed,h}$	Correlation (seed, UI)	Policy variable	0.2	–
$\epsilon_{seed,e}$	Correlation (seed, project return)	Policy variable	0	–
$\underline{seed}$	Minimum seed level	Eq. (12)	2.51	–
Jointly Calibrated Parameters				
$\underline{c}$	Cash assistance if no UI	Share unemployed without UI (13%)	0.05	13%
χ	Matching function elasticity	Share unemployed with UI (5%)	0.31	5%
κ	Job posting cost (paid employment)	Share paid-employed (67%)	0.16	68%

Note: The shares of unemployed, paid-employed, and self-employed sum to 1. The baseline economy corresponds to a rigid labor market like Spain, see text for details.

$\mathbf{F(s, e)}$**.** We assume the financing and earnings distribution are uniform and independent.

Start-Up Fund. We parameterize $seed$ to reflect different European self-employment programs. Spain links grant size to past UI (human capital), while Germany bases it on project quality. We model this as:

$$seed(e, h) = \underline{seed} + \epsilon_{seed,h}(h - \underline{h}) + \epsilon_{seed,e}(e - \underline{e}) \tag{11}$$

where $\underline{seed}$ is the minimum grant. $\epsilon_{seed,h}$ captures UI-based variation, and $\epsilon_{seed,e}$ reflects project evaluation. Focusing on Spain, we set $\epsilon_{seed,e} = 0$. Since UI expires stochastically, we do not track entitlements directly. We thus derive $\epsilon_{seed,h}$ based on the discounted sum of UI for the lowest human capital group, which is the group we focus in this paper:

$$\underline{seed} = \frac{\epsilon_{cap}\gamma_{ui}\omega\underline{h}}{1 - \beta(1 - \mu_{ui})} \tag{12}$$

ϵ_{cap} reflects the share of UI that can be capitalized. This share started at 20% in 2002, rising to 100% by 2013 for those under 35 and 60% for those above. In the calibration, we will start with $\epsilon_{cap} = 0.2$ and increase it in the policy experiment.

Internally calibrated parameters, We jointly calibrate three parameters to match three data moments, as shown in Table 1.[4] While all parameters are calibrated together, each primarily influences a specific

[4] We assume an average self-employment rate of 15 percent and of paid-employment of 67 percent, and that 30 percent of those in non-employment receive UI benefits, in line with the average estimates of Garcia-Cabo and Madera (2024) for

moment. The outside option $\underline{c}$ helps match the share of unemployed without UI. The matching efficiency χ and posting cost κ influence the employment-unemployment margin and are used to match the share of unemployed (and thus those with UI) versus the paid employed.

4. Self-Employment Promotion: Simulation Results

In this section, we use the calibrated model to show how UI and self-employment policies influence individual choices, worker distribution, and welfare across labor markets. We simulate a fourfold increase in start-up funding, comparable to Spain's shift in 2013 from capitalizing 20% to 100% of UI for the young ($5\times$) and to 60% for others ($3\times$), taking the average of these changes. In both worlds, we compare the baseline *rigid* economy with labor market frictions $\kappa = 0.16$ and $firing = 1.5$ and a flexible market with $\kappa = 0.01$ and $firing = 0$. These parameters result in a distribution across states comparable to the US. See Table 2 for specific numbers.

4.1 Employment Effects and the Distribution of Workers

Figure 1 (top panel) shows the self-employment decision for an unemployed worker with UI. The shaded area marks implemented projects (s, e), forming a rectangle as in Proposition 2. A higher $seed$ funds more costly projects, making the area larger. The cutoff $\underline{e}$ lies between UI and paid-employment wages, reflecting the trade-off between self-employment and waiting for a job. Accordingly, unemployment and paid-employment both fall as $\underline{seed}$ increases.

Role of Rigidities. Labor-market rigidities amplify the shift toward self-employment when start-up subsidies rise. This validates Proposition 3. The outside option of paid work is weaker: job-arrival rates are lower, and firms create fewer vacancies. As a result, when $seed$ increases under rigid conditions, a much larger fraction of unemployed workers find self-employment relatively more attractive. Table 2 summarizes the aggregate employment effect of these individual choices.

4.2 Policy and Welfare Effects

When the government raises *seed*, it must adjust the UI rate ui to keep the budget balanced. Figure 1 (bottom panel) shows the ui that satisfies this condition. Each ui level yields different employment outcomes, which determine total revenue and subsidy costs.

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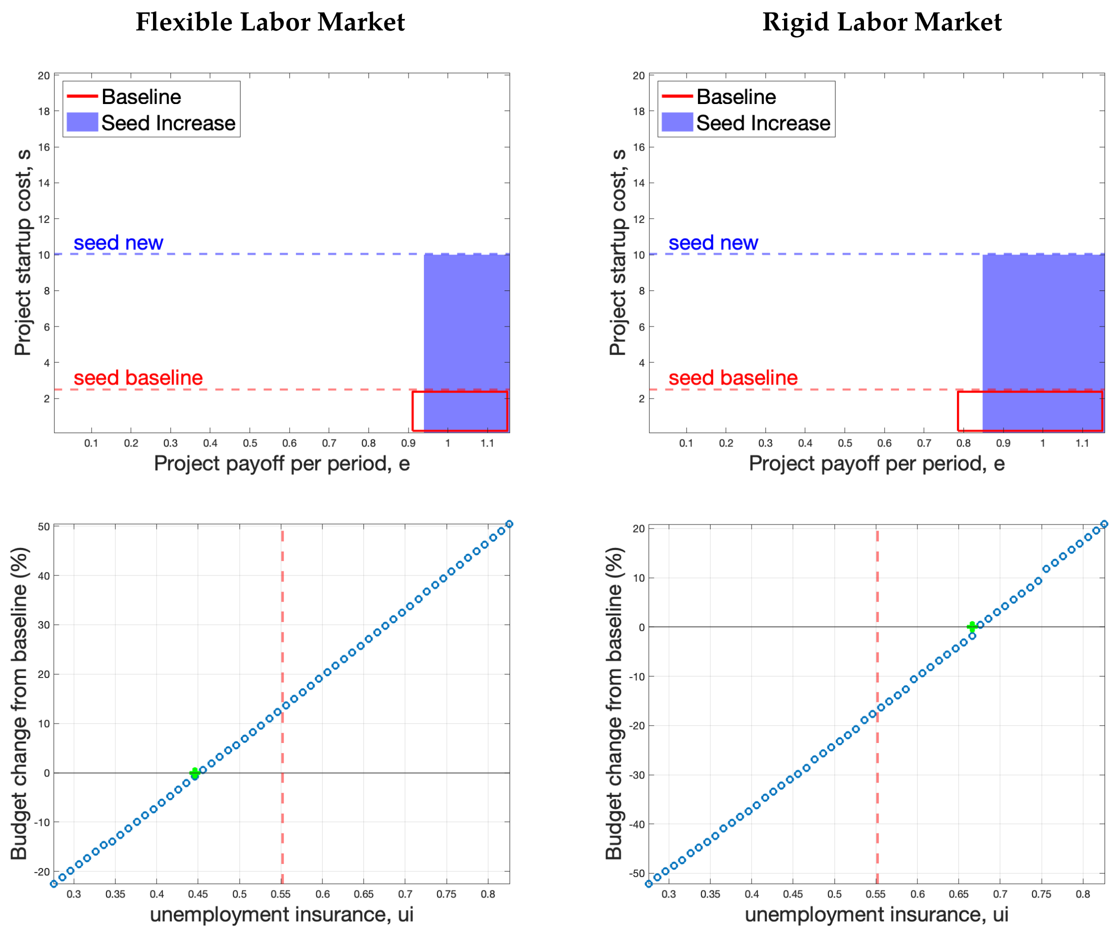
the 1990-2016 period. We also follow Garcia-Cabo and Madera (2024) to calibrate transition rates into unemployment. In particular, they obtain a monthly separation rate of 0.89 percent for permanent workers and 5.4 percent for fixed-term workers. In this paper, both groups conform paid-employment so our target is a mid-point given usual shares of these groups for the Spanish labor market.

Figure 1: Effects of Self-Employment Promotion
Individual Choice and Government Policy



Note: See Table 2 for a summary of aggregate and welfare effects.

Role of Rigidities. The reallocation toward self-employment delivers two reinforcing welfare effects: (i) self-employment becomes a more attractive outside option, raising reservation thresholds and improving overall project-match quality; and (ii) the cost of subsidizing self-employment is partially offset by lower UI. As a result, the net welfare improvement under rigid labor-market conditions is larger, as can be seen in the last row of Table 2.

Not surprisingly, the employment and crowding-out effects align with the model's theoretical predictions, while the budget and welfare effects were theoretically ambiguous. The calibration helps clarify their direction under different labor market structures. Although both rigid and flexible labor markets experience welfare gains from the policy, the budget effect—driven by $\frac{d\,ui}{d\,seed}$—differs in sign. In our calibrated rigid market, self-employment subsidies reduce UI reliance and free up fiscal space,

Table 2: Effects of Self-Employment Promotion
Aggregate and Welfare effects

	Rigid Labor Market		**Flexible Labor Market**	
	Baseline $\underline{seed}$	Higher Seed $4 \times \underline{seed}$	Baseline $\underline{seed}$	Higher Seed $4 \times \underline{seed}$
Policy				
ui (budget-balanced)	0.55	0.67	0.55	0.45
Worker Distribution (%)		Change %		Change %
Unemployed (η^U)	17.14	−5.18	4.12	−1.01
Self-employed (η^S)	14.83	26.34	11.64	24.57
Paid-employed (η^P)	68.03	−21.16	84.24	−23.56
Change in Welfare (%)				
Welfare gain	0	36.48	0	30.62

Note: Welfare is calculated as Welfare $= \int W^u(s,e) \cdot \eta^u(s,e)\, dF(s,e) + W^n \cdot \eta^n + W^p \cdot \eta^p + W^s \cdot \eta^s$, where η are the stationary distributions. Flexible and rigid markets differ in κ and $firing$.

allowing for more generous UI. In flexible markets, the subsidy yields less fiscal relief and may even crowd out paid jobs, requiring a cut in UI generosity to balance the budget.

5. Conclusion

This paper develops a search model with a self-employment option to study the effects of startup subsidies targeted at the unemployed. We highlight three key mechanisms—employment, crowding-out, and budget effects—that shape both individual choices and aggregate outcomes. While some of these effects are straightforward, others depend on labor market frictions and the allocation of funds between active policies and unemployment insurance.

Our calibration shows that in rigid labor markets with low job-finding rates, such as Spain, self-employment subsidies can deliver substantial employment and welfare gains. These gains arise not only from higher self-employment but also from improved selection and reduced UI costs. The results underscore the importance of jointly considering active and passive labor market policies, as well as labor market frictions, in evaluating programs that rely on individual choice.

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A. Proofs of Propositions

Proposition 1. An increase in $firing$ raises the job-filling rate $q(\theta)$, reduces labor market tightness θ, and decreases the job-finding rate $f(\theta)$.

Proof. Define market tightness as $\theta = \frac{v}{u}$. Given matching function 1, the job-finding and job-filling rates are:

$$f(\theta) = \frac{m}{u} = \frac{\theta}{(1+\theta^{\chi})^{1/\chi}}, \qquad q(\theta) = \frac{m}{v} = \frac{1}{(1+\theta^{\chi})^{1/\chi}}.$$

We first show that $f(\theta)$ is strictly increasing in θ. Differentiating:

$$f'(\theta) = \frac{d}{d\theta}\left(\frac{\theta}{(1+\theta^{\chi})^{1/\chi}}\right) = \frac{1}{(1+\theta^{\chi})^{1+1/\chi}} > 0 \quad \forall \chi > 0.$$

Now consider the firm's vacancy-posting problem. In equilibrium, the free-entry condition requires the value of a vacancy to be zero:

$$\kappa = \beta q(\theta) J,$$

where J is the expected value of a filled job, given by:

$$J = \frac{(z-w) - \beta\delta \cdot \mathit{firing}}{1-\beta(1-\delta)}.$$

An increase in the firing cost reduces J, so by the free-entry condition, $q(\theta)$ must rise to maintain equality. Since $q(\theta) = \frac{1}{(1+\theta^{\chi})^{1/\chi}}$ is strictly decreasing in θ, this implies that θ must fall.

Finally, since $f(\theta)$ is strictly increasing in θ, a reduction in θ implies a decrease in $f(\theta)$.

□

Proposition 2. For a given government policy $(ui, seed)$, an unemployed worker's self-employment decision is characterized by two cutoffs. She enters self-employment if and only if

$$s \le seed \quad \text{and} \quad e \ge \underline{e},$$

where *seed* is the startup subsidy and $\underline{e}$ is the minimal project-quality threshold.

Proof. The result follows in two steps.

(i) Financing constraint. By construction, an unemployed worker draws a project with setup cost s but can only be funded up to *seed*. Hence if

$$s > seed,$$

she cannot raise sufficient funds and self-employment is infeasible. Thus a necessary condition for entry is

$$s \le seed.$$

(ii) Project-quality cutoff. Let

$$W^s(e) \quad \text{and} \quad U(s) \;=\; f(\theta)\, W^p + \big(1 - f(\theta)\big)\, W^u(s)$$

denote, respectively, the value of self-employment with per-period payoff e and the worker's outside option (waiting for paid employment or remaining unemployed). Observe that:

- $W^s(e)$ is strictly increasing in e.
- $U(s)$ does not depend on e (only on s via $W^u(s)$).

Hence, for each $s \le seed$ there exists a unique $\underline{e}$ solving

$$W^s\big(\underline{e}\big) = U(s).$$

By strict monotonicity,

$$W^s(e) > U(s) \quad \Longleftrightarrow \quad e > \underline{e},$$

so self-employment is optimal exactly when $e \geq \underline{e}$.

Combining (i) and (ii) yields the stated two-cutoff characterization. □

Proposition 3. An unemployed

Proof. From Proposition 1, a higher *firing* cost lowers $q(\theta)$ and lowers $f(\theta)$. Hence,

(1) Employment effect. since job arrival rate f is inversely related to filling rate q, from this expression we obtain that f is lower when firing or hiring (κ) cost is higher, e.g. when paid-employment market is more rigid. Thus total employment (paid + self) increases *more* under high $firing$ cost; that is, the employment effect is stronger.

(2) Crowding-out effect. The crowding-out effect measures how many newly subsidized self-employed would otherwise have taken paid jobs. That mass is

$$f(\theta) \int_{(s,e)} \eta^u(s,e) \left[1 - \mathcal{I}(s,e)\right] dF(s,e).$$

When $f(\theta)$ is low (high $firing$ cost), fewer unemployed match to paid jobs in any case, so raising $seed$ displaces *fewer* paid-employment positions. Hence a higher $firing$ cost *weakens* the crowding-out effect.

(3) Budget effect. Each worker who switches from unemployment to self-employment saves one period of UI benefit ui but costs the government the subsidy $seed$. The net per-worker fiscal gain is

$$ui \; - \; seed.$$

Under high $firing$ cost, (i) fewer unemployed would have found paid work—so switching them into self-employment saves more UI outlays—and (ii) paid-employment separations $\delta\,\eta^p$ fall, reducing future UI rolls. Therefore the net UI savings from each self-employment entrant is larger when $f(\theta)$ is lower. To keep the budget balanced, the government can afford a larger subsidy, an increase in ui (alongside $seed$) or a smaller reduction in ui. Thus the budget effect is larger when $firing$ cost is high.

□

B. Equilibrium Effects of Self-Employment Promotion Policy: Theoretical Details

An increase in the startup subsidy *seed* operates through three channels: employment, crowding-out, and budget effects. We present each in turn, in the simple dynamic model without worker heterogeneity.

(i) Employment effect. By relaxing the entry cutoff $s \leq seed$, more unemployed projects become fundable. Define the per-project gain for a newly funded project of cost s:

$$g(s) \quad = \quad \mathbb{E}_{e \geq \underline{e}}\big[W^s(e) - W^u(s,e) \mid s\big] = \int_{\underline{e}}^{\infty} \big[W^s(e) - W^u(s,e)\big] dF(e \mid s)$$

The total employment gain (to unemployment) from a given $seed$ is

$$\Delta_{\text{emp}}(seed) \quad = \quad \big(1 - f(\theta)\big) \int_0^{seed} \phi_s(s) g(s) ds = \big(1 - f(\theta)\big) \int_0^{seed} \big[W^s(e) - W^u(s,e)\big] dF(e,s),$$

where $\phi_s(s)$ is the marginal density of setup costs.

This term captures the reduction in unemployment due to additional self-employment as the financial frictions are alleviated.

(ii) Crowding-out effect. Some of the newly self-employed would otherwise have taken paid jobs. The per-project gain for a newly funded project of cost s:

$$g_{\text{crowd}}(s) \quad = \quad \mathbb{E}_{e \geq \underline{e}}\big[W^s(e) - W^p \mid s\big] = \int_{\underline{e}}^{\infty} \big[W^s(e) - W^p\big] dF(e \mid s)$$

Then the total crowding-out "cost" is

$$\Delta_{\text{crowd}}(seed) \quad = \quad f(\theta) \int_0^{seed} \phi_S(s) g_{\text{crowd}}(s) ds = f(\theta) \int_0^{seed} \int_{\underline{e}}^{\infty} \big[W^s(e) - W^p\big] dF(e, s).$$

(iii) Budget effect. The sign of the budget effect $\frac{d\,ui}{d\,seed}$ is ambiguous. In particular, using the budget constraint:

$$\int_{s \leq seed} s \cdot \eta^u(s,e)\, dF(s,e) \; + \; ui \cdot \int_{(s,e)} \eta^u(s,e)\, dF(s,e) = 0,$$

totally differentiate with respect to $seed$:

$$\frac{d\,ui}{d\,seed} = -\frac{\dfrac{\partial}{\partial seed} \displaystyle\int_{s \leq seed} s \cdot \eta^u(s,e)\, dF(s,e)}{\dfrac{\partial}{\partial ui} \left(\displaystyle\int_{s \leq seed} s \cdot \eta^u(s,e)\, dF(s,e) + ui \cdot \int \eta^u(s,e)\, dF(s,e) \right)}$$

and simplifying, this yields:

$$\frac{d\,ui}{d\,seed} = -\frac{[seed - (1 - f(\theta))ui] \cdot f_s(seed) \cdot [1 - F_e(e)]}{\frac{\partial e}{\partial ui} f_e(e) \int_{s \leq seed} [(1 - f(\theta))ui - s]\, dF_s(s) + \eta^u}$$

where $\frac{\partial e}{\partial ui} = (1 - f(\theta)) \frac{u_c(ui)}{u_c(e)} > 0$.

Thus, $\frac{d\,ui}{d\,seed} > 0$ if

$$seed - (1 - f(\theta))ui < 0 \quad \text{for all } s \leq seed,$$

which implies a theoretically ambiguous effect, increasing in rigidities, as $f(\theta)$ decreases.