Temporary Contracts, Incentives and Unemployment

Maia Güell & José V. Rodríguez Mora
University of Edinburgh and CEPR

Summary

Temporary Contracts *(1/4)*

- Mid 80's: compared to the US, many European countries with
  - High unemployment rates and high unemployment **duration**
  - High firing costs

- Demand for decrease of firing costs to promote job creation

- Political constraints result in creation of **Temporary Contracts (TC)**
  - Very low firing cost
  - Fixed duration
  - Cannot be renewed
  - ...unless converted into ordinary (permanent) contract with high firing cost

- The hope was that it would decrease unemployment levels by fostering job creation.


Temporary Contracts *(2/4)*

- But, it has not happened!
  - Introduction of TC if anything has increased unemployment
    - Kahn (2010): using the ECHP for 9 countries from late 90s: no evidence that reforms that promote TC raise employment and, in some countries, these appear to lower it!

- Why?
  - Traditional answer: unclear effect of firing costs on unemployment levels
    - firing costs reduce flow rates
    - ... but they may reduce creation less than destruction.
    - Thus if reducing firing costs do not reduce unemployment...
    - ... introducing TC will not either

Temporary Contracts *(3/4)*

- **Our point:**
  - Even if decreasing firing costs may reduce unemployment,
  - the introduction of TC may increase unemployment
  - TC are not equivalent to lower firing costs
  - We provide a novel explanation based on the cost of providing incentives

- **Reason:**
  - TC introduced while leaving other regulations unchanged
  - If minimum wage is high, the introduction of TC acts in a similar manner than unemployment insurance.
  - High flows between unemployment and TC.
  - High minimum wage: a large percentage of the total income generated is transfered to workers with TC
  - High turnover between TC and unemployment: unemployed enjoy that income.
  - Higher value for the unemployed requires higher equilibrium unemployment level in order to discipline workers.


Temporary Contracts *(4/4)*

- **Our Comparative statics:**
  - In a world with high minimum wage, introduce the possibility of TC
  - In the new steady state, the unemployment level is higher
  - Albeit the unemployed are happier in the world with TC
  - ... and the employed with PC are also happier in the world with TC
  - ... But there are many individuals with TC having lower income than in the world without TC.
  - Society is worse off... but redistributive aspects help explain why TC are so persistent.

Model Set Up: Only Permanent Contracts *(1/3)*

- Modified version of Shapiro and Stiglitz (1984) Efficiency Wages model

- Two additions:
  - Minimum wage, $\widetilde{w}_{min}$
  - Firing cost F paid by firm whenever fires a worker.
    - Either because exogenous break
    - Or because the worker shirks

- Firing costs reduce the cost of shirking
  - Workers have to be compensated with higher wages in order to avoid shirking.
  - More expensive to provide incentives.

- F worsens the incentive structure.
  - F increases unemployment.

Model Set Up: Only Permanent Contracts *(2/3)*

- No search frictions: queuing
- Endogenous number of positions.
  - Fixed cost C of creation of a (vacant) job.
  - Non-Arbitrage Condition: Value of vacancy equals C
- Continuous time.
  - $a \equiv$ rate at which workers are hired
    - Full employment if $a \longrightarrow \infty$
  - Exogenous separation rate b
- All workers have productivity $\widetilde{y}$
- Risk neutral workers. Cost of effort (if not shirking) e.
  - $U(\widetilde{w}, e) = \widetilde{w} - e$
- No unemployment insurance.

Model Set Up: Only Permanent Contracts *(3/3)*

Permanent Contract

- If a worker shirks $\Rightarrow$ detected at rate q
- If detected, shirking worker is fired.
- When firing worker, pay cost F
  - Both if exogenous or because shirking

Wage Restrictions

- **Minimum Wage:** $\tilde{w}_P \geq \tilde{w}_{\text{min}}$
- **Incentive constraint:** in order to induce the worker to exert the effort, the firm needs to pay an efficiency wage.

Incentive constraints. Permanent Contracts

- $V_P^n \equiv$ PDV of not shirking for permanent worker.
- $V_U \equiv$ PDV of unemployed.
  - Firms take it as given
- $\Delta \equiv$ smallest difference between the value of working and of being unemployed that induces a permanent worker not to shirk:
  - $\Delta \equiv \left(\frac{e}{q} + F\right)$
- $w_P \equiv$ wage net of the effort cost and the present discounted value of firing cost
  - $w_P = \widetilde{w}_P - e + bF$
- $w_{\min} \equiv \widetilde{w}_{\min} - e$
- $y \equiv \widetilde{y} - e$
- $\widehat{w}_P(V_U) \equiv$ lowest w that induces the worker in a PC not to shirk:
  - $\widehat{w}_P(V_U) = (r+b)\Delta + rV_U$

The non-shirking condition for permanent workers (NSCP) can be written as:

$$(V_P^n - V_U) \geq \left(\frac{e}{q} + F\right) = \Delta \iff w_P \geq \widehat{w}_P(V_U) = (r+b)\Delta + rV_U$$

One Tier System *(1/2)*

Steady State:

- Unemployment in steady state: $U = \frac{b}{a+b}$; $E \equiv \frac{1-U}{U} = \frac{a}{b}$.

Equilibrium Defined by

- Wage: $w_P = \max\{w_{\min}, \widehat{w}_P(V_U)\}$
- Value of being unemployed: $rV_{U1} = a\left\{\Delta + \frac{\max\{w_{\min}+bF-\widehat{w}_P(V_U),0\}}{r+b}\right\}$
- Value of Firm: $rI_P = \tilde{y} - \tilde{w}_P + b(I_V - F - I_P)$
- By Arbitrage: $I_P = C$

One Tier System *(2/2)*

- **In equilibrium:**
  - w_{min} is never binding;
  - if $w_{min} \geq y - rC - bF, \Rightarrow$ there is no production
  - if $w_{min} < y - rC - bF$, employment is decreasing with the firing cost F

- **Formally**, If $\max\{w_{\min} + bF, (r+b)\,\Delta\} \leq y - rC$, then:
  - $a = \frac{\{y - rC - (r+b)\Delta\}}{\Delta}$
  - $U_1 = \frac{b\Delta}{\{y - rC - (r+b)\Delta\} + b\Delta}$, $E_1 = \frac{\{y - rC - (r+b)\Delta\}}{b\Delta}$
  - $rV_U = y - rC - (r+b)\Delta$

- Assumption: Productivity large enough for production feasible given w_min and C:

$$\max\{w_{\min} + bF, (r+b)\,\Delta\} \leq y - rC$$

Two Tier Environment Description *(1/2)*

- When meeting a worker firm may choose to offer either
  - A permanent contract (PC), as before, or
  - A temporary contract (TC)

- Temporary Contract: triplet $\psi_T = \{\tilde{w}_T, R, \tilde{w}_P\}$
  - $\tilde{w}_T$ wage during temporary phase.
  - R Renewal probability from temporary to permanent phase at termination of temporary phase.
  - $\tilde{w}_P$ wage in permanent phase.

- TC (temp phase) expire at exogenous rate λ
  - institutional restriction
  - b does not affect it.
  - Cannot be terminated before λ realization even for cheating worker.

- Cheating workers are detected at exogenous probability (not rate) Q.

Two Tier Environment Description *(2/2)*

- Formally, TC binds parts only for duration of contract.
- In reality both know that contract can be converted into permanent
- They negotiate ex-ante on the renewal probability, which in practice becomes part of the contract.
- Repeated game: Reputation generates the incentives of firms to stick to the "contract" ψ_T

Wage Restrictions

- **Minimum wage:** wages in any of the phases must be at least the minimum wage.

$$\left[\begin{array}{c} \tilde{w}_{\min} \leq \tilde{w}_T \\ \tilde{w}_{\min} \leq \tilde{w}_P \end{array}\right] \Longleftrightarrow \left[\begin{array}{c} w_{\min} \leq w_T \\ w_{\min} + bF \leq w_P \end{array}\right] \Longleftrightarrow w_{\min} \leq \min\{w_T, w_P - bF\}$$

- **Incentive constraint for the permanent-phase.**
  - Induce worker to exercise effort while in permanent-phase
  - efficiency wage, as in the one-tier system.
  - NSCP must be satisfied
- **Incentive constraint for the temporary-phase.**
  - To induce effort while in temporary-phase
  - firm needs to promise a large enough renewal rate
  - NSCT

Incentive constraints. *(1/3)*

- Not being caught shirking is a necessary condition to be renewed.

- **NSCT is independent of the temporary wage w_T.**
  - No action of worker affects duration of TC.
    - Stream of income TC is lump-sum
    - Wages at TC can not provide incentives.

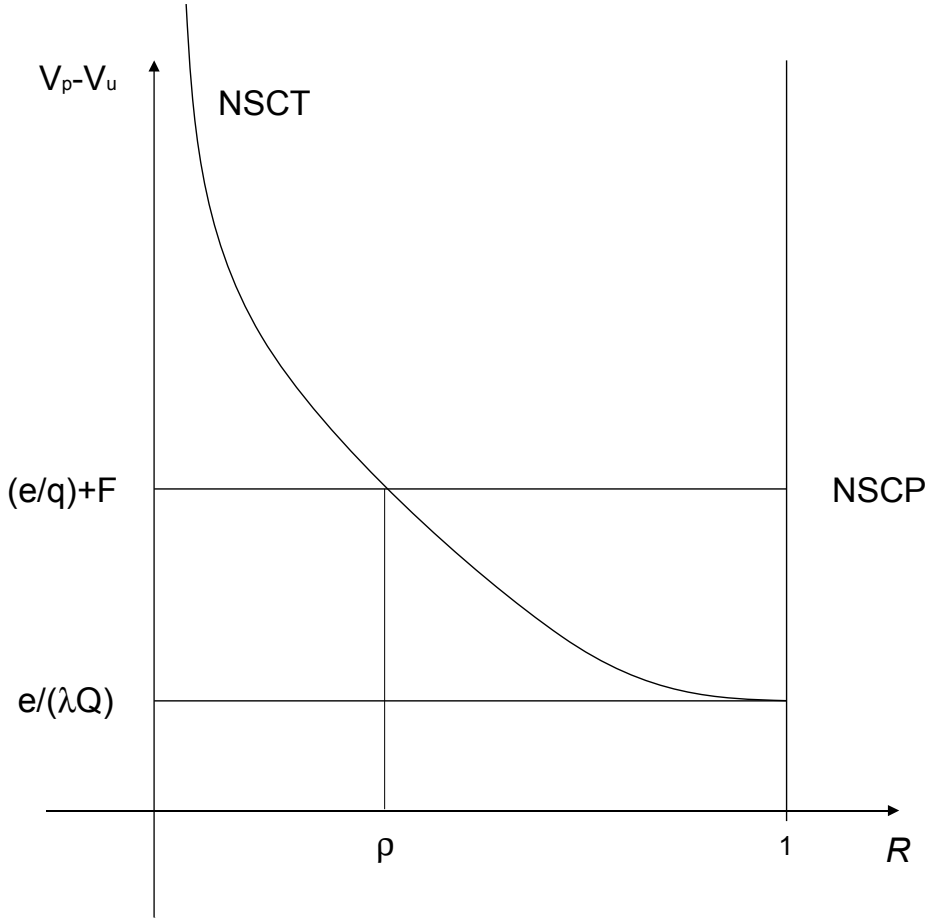
- **NSCT is that renewal rate R is large enough**

$$(r+\lambda)\left(V_T^n - V_T^s\right) = -e + \lambda R Q \left(V_P - V_U\right) \geq 0. \quad \Longleftrightarrow \quad R\left(V_P - V_U\right) \geq \frac{e}{\lambda Q}$$

- **Wage in Temporary phase determined by participation constraint**
  - No (moral hazard) incentive role.
  - In the measure that w_min allows it: $w_T : V_T = V_U$

$$w_T = \max\left\{w_{\min}, rV_U - \lambda R\left(V_P - V_U\right)\right\}$$

Incentive constraints. *(2/3)*



- **Assumption:** To ensure that the NSCT and the NSCP conditions can simultaneously hold $[0, 1]$, we need to assume: $\frac{e}{\lambda Q} < \frac{e}{q} + F$

- **Definitions:**
  - R if both bind:

$$\rho = \frac{e/\lambda Q}{e/q + F} \in (0, 1)$$

  - useful:

$$\alpha = \frac{r + b}{r + b + \lambda\rho} \in (0, 1)$$

Incentive constraints. *(3/3)*

- Temporary wages will not be not larger than permanent wages:

$$\tilde{w}_T \leq \tilde{w}_P(V_U) \tag{1}$$

- Firms cannot be worse-off offering TC:

  In the two-tier system, given V_U (and, thus, given $\tilde{w}_P$), firms always prefer to offer workers a (renewable) temporary contact (i.e., $\psi_T = \{\tilde{w}_T, R, \tilde{w}_P\}$) than a permanent one (i.e., $\psi_P = \{\tilde{w}_P\}$).

- Incentives: TC motivated to get PC; PC motivated not to get TC.

Value Functions *(1/2)*

- Value of having permanent worker:

$$rJ_P = \widetilde{y} - \widetilde{w}_P + b\left(-J_P\right)$$

- Value of the firm with a temporary worker:

$$rJ_T = y - w_T + \lambda\left[R\left(J_P - J_T\right) + \left(1 - R\right)\left(J_T - J_T\right)\right]$$

- Thus, If both NSCP and NSCT are binding

$$\begin{aligned} rJ_T &= y - \left[\alpha\ w_T + \left(1-\alpha\right)\ \ \widehat{w}_P\left(V_U\right)\right] \\ &= y - \left[\alpha\ \ \left(w_T + \lambda\rho\Delta\right) + \left(1-\alpha\right)\ \ rV_U\right] \end{aligned}$$

- Arbitrage implies that $J_T = C$

Value Functions *(2/2)*

- Value of being unemployed: $rV_U = a_2 (V_T - V_U)$
  - If NSCP & NCSCT bind:

$$\begin{aligned} rV_U \frac{\alpha (r+\lambda) + a}{a} &= \alpha \; w_T + (1-\alpha) \; \widehat{w}_P (V_U) \\ &= \alpha \; (w_T + \lambda\rho\Delta) + (1-\alpha) \; rV_U \end{aligned}$$

- Unemployment dynamics are different than in 1-tier.
  - Temporary phase.
  - Constant rate of access to Permanent phase, ρ
  - $E_2 = \frac{1-U_2}{U_2} = \frac{a_2}{b}\frac{(b+\lambda R)}{\lambda}$

Equilibrium Definition

- Definition:
  - Temporary wage determined by w_{min} and participation.
  - Permanent wage: efficiency wage (depends on V_U).
  - R fixed by ρ
  - Value of unemployment (depends on $\tilde{w}_P(V_U)$)
  - $J_T = C$

- In any equilibrium where NSCP and NSCT are binding:

$$\alpha r C = y - rC - \frac{\alpha\left(r+b\right)+a}{r+b+a}\left(w_T + \lambda\rho\Delta\right)$$

Equilibrium with very low minimum wage *(1/2)*

- **If** $w_{\min} \leq y - rC - \lambda\rho\Delta$**:**
  - $w_{\min}$ does not bind neither in temporary nor permanent phase
  - there is no unemployment!!!
  - Both NSCP and NSCT bind

$$\psi_2 = \{w_T\ ,\ R\ ,\ w_P\}$$

$$w_T = y - rC - \lambda\rho\Delta\ ;\ \ R = \rho\ ;\ \ w_P = y - rC + (r+b)\,\Delta$$

$$a \to \infty\ ;\ \ U = 0;\ \ E \to \infty$$

$$rV_U = rV_T = y - rC\ ;\ \ rV_P = y - rC + r\Delta$$

$$J_P = C - \Delta\ ;\ \ J_T = C$$

- The contract structure solves the incentive problem.

- Firms have no incentive to break up firm in PC: creation cost.

Equilibrium with very low minimum wage *(2/2)*

- No unemployment. First best achieved

- Intuition:
  - To be a temporary worker is bad enough.
  - They get a very low wage (that can even be negative)
  - This works as a discipline device without the need of U.
  - They pay for the possibility of getting in the lottery.
  - Even if no U, to lose a TC job is very bad (pay fee again)

- $w_T = y - rC - \lambda\rho\Delta \quad \forall\, w_{min} \leq y - rC - \lambda\rho\Delta$:
  - firms would bid up w_T
  - they like to pay low w_T
  - the alternative would be that they queue
  - but they would increase their offer of w_T in order not to queue.

Equilibrium with large minimum wage *(1/3)*

- **If** $y - rC - \lambda\rho\Delta \leq w_{\text{min}} \leq y - rC - bF$**:**
  - w_{min} binds in the temporary-phase, but not in the permanent-phase;
  - there is unemployment
  - Both NSCP and NSCT bind
- TC do not solve incentive problems.
  - Holding a TC is not so bad
- C insures firms do not break at PC phase.
- Assumption: $\lambda\rho\Delta - bF > 0$
  - $\Longleftrightarrow$ There exists w_{min} with (1) Production in One-tier and (2) Unemployment in Two-tier.

Equilibrium with large minimum wage *(2/3)*

$y - rC - \lambda\rho\Delta \leq w_{\min} \leq y - rC - bF$:

$$\psi_2 = \{w_T\ ,\ \ R\ ,\ \ w_P\}\ ;\ \ w_T = w_{\min}\ ;\ \ R = \rho\ ;\ \ w_P = \frac{(y - rC) - \alpha\ w_{\min}}{1 - \alpha}$$

$$a = (r + b)\,\frac{(y - rC) - \alpha\,(w_{\min} + \lambda\rho\Delta)}{(w_{\min} + \lambda\rho\Delta) - (y - rC)}$$

$$U = \frac{\lambda b\,[(w_{\min} + \lambda\rho\Delta) - (y - rC)]}{\lambda b\,[(w_{\min} + \lambda\rho\Delta) - (y - rC)] + (b + \lambda\rho)\,(r + b)\,[(y - rC) - \alpha\,(w_{\min} + \lambda\rho\Delta)]}$$

$$E = \frac{(b + \lambda\rho)}{\lambda}\frac{(r + b)}{b}\frac{(y - rC) - \alpha\,(w_{\min} + \lambda\rho\Delta)}{(w_{\min} + \lambda\rho\Delta) - (y - rC)}$$

$$rV_U = \frac{(y - rC) - \alpha\,(w_{\min} + \lambda\rho\Delta)}{1 - \alpha}$$

$$rV_T = \frac{1}{1 - \alpha}\frac{\lambda}{r + \lambda}\,(y - rC) - \frac{r\,(1 - \rho) + b}{\rho\,(r + \lambda)}\,(w_{\min} + \lambda\rho\Delta)\ ;\ \ rV_P = r\Delta + rV_U$$

$$J_P = C - \frac{1}{\lambda\rho}\,\{y - rC - w_{\min}\} > 0 \iff C > \Delta\ ;\ \ J_T = C$$

Equilibrium with large minimum wage *(3/3)*

- Larger w_{min}, less interesting to create firms.
  - Because less profits to be extracted in temporary phase.
  - Thus, less creation.

- **Incentives**
  - Temporary phase is very attractive (high w_{min}).
  - It is a bad disciplining mechanism.
  - Which forces up w_p
  - so, firms are less profitable. Less creation:
  - market generates Unemployment: Waiting time to get TC.
  - Facilitates monitoring.

- **All lose from higher w_{min}**
  - Unemployed, as they have more waiting time.
  - Permanent, as their value has a fixed wedge with U
  - Even Temporary workers:
    - they expect a bleak future.

Commitment

- If the renewal probability of TC is publicly observable (i.e., if the probabilities in the lottery can be monitored) and the creation cost C is not smaller than $\frac{y-w_{\min}}{\lambda\rho+r}$, there exist an equilibrium in the repeated game with memory in which the firms do offer and enforce the contract ψ_2.

- Alternatively, model with "large" firms with positive mass: the number of renewed contracts is observable.
  - Only messier algebra.
  - Same Results.

The Introduction of Temporary Contracts *(1/4)*

- **Comparative Statics exercise:**
  - Keep fixed $w_{min} \in (y - rC - \lambda\rho\Delta, y - rC - bF)$
  - Initial world: One-Tier (only PC)
  - Introduce the Possibility of offering TC: Two-Tier
  - Compare both Steady States.

- **Main Result**
  - If b is sufficiently small (but still positive)
  - $\exists w^* \in (y - rC - \lambda\rho\Delta, y - rC - bF)$: $\forall w_{\text{min}} > w^*$

Unemployment in Two-tier world **larger** than in the One-tier world

The Introduction of Temporary Contracts *(2/4)*

- Remember: even if reducing F would reduce U

- **Why?**
  - Because with high w_{min} the incentive structure worsens instead of improving.

- **Result**

  If $y - rC - \lambda\rho\Delta \leq w_{\text{min}} \leq y - rC - bF$:

  the steady state value of being unemployed in the two-tier system is larger than in the one-tier system.

- **Our point:** an increase in the labor market flows induced by the dual contract system can compensate the existence of high firing costs is flawed at its root

The Introduction of Temporary Contracts *(3/4)*

- If minimum wage is high, it is very much the opposite:
  - Larger flows increase unemployment because they worsen the incentive structure of the economy.
  - This is, the unemployed are better-off in the Two-tier.
    - Even if there is more unemployment!

- **Intuition**
  - The structure of flows is different.
  - Unemployed get rapid access to high TC wage (w_{min})
    - It takes time to get a PC (in the One-tier too)
    - But you get some income very soon (the TC)
  - This makes the Unemployed happier!
  - Which worsens the incentive structure
    - More expensive efficiency wages.

The Introduction of Temporary Contracts *(4/4)*

- **Illustration:** Consider same unemployment in both.
  - Non-Arbitrage: All net-income to workers
  - in One-tier, all to PC workers.
  - in Two-tier,
    - large share goes to TC workers (high w_{min})
      - Unemployed get fast access to it!
    - Renewal rate is fixed by incentives.
  - Unemployed happier in two-tier
    - they are going to eat the same number of biscuits over the life time (we assume same unemployment: same production)
    - but in Two-Tier (if high w_{min}) they expect to eat them sooner!
  - Thus, w_P larger in Two-tier.
  - Less creation, more unemployment.

Conclusion *(1/2)*

- Analyzed the effects of the introduction of TC on unemployment.

- Novel explanation based on the effect of incentives
  - TC: renewal into PC gives incentives, not the wage
  - PC: avoiding to lose job and restart with TC

- Introducing TC can generate higher employment at the expense of segmentation of the labor market only if wages of temporary contracts are very flexible.

- But high minimum wage (i.e., wage of TC) is equivalent to higher UI
  - Makes provision of incentives more costly, unemployed are better off, thus higher equilibrium unemployment
  - TC are not equivalent to lower firing costs

Conclusion *(2/2)*

- This might also give some hints of why there is currently opposition in some countries on the abolition of temporary contacts in order to fight high unemployment rates.

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