Aix*Marseille université — Socialement engagée

What is the Best Short-Time Work Policy During Recessions?

Nathan Vieira

amse

Research Question

With Short-Time Work (STW), policy-makers have 4 tools in their hands to protect the labour market from recessions:

1. Cost paid by firms ; 2. Compensation received by workers ; 3. Eligibility criteria ; 4. Labour taxes ;

Which ones are important and how should they be set?

The paper highlights the role of public incentives to use the programme documenting the risk of surplus lost and unnecessary public budget deficits of existing STW policies.

Conclusions

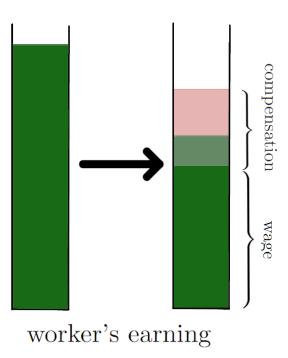
1. The main instrument of STW policy is the STW cost paid by firms.

   It is the main extensive and intensive incentive to use the programme + Should be continuously adjusted based on the productivity shock
2. The first best STW policy during recessions consists of

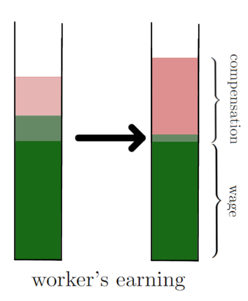
   Hourly subsidies to compensate too high wages ; A reduction in STW costs paid by firms
3. A low STW cost, as observed in past decades, leads to

   Immediate surplus lost ; Unnecessary public budget deficits with dynamic negative effect on surplus

How Short-Time Work Works?



1. Firm-Worker match: Faces drop in productivity
2. Firm: Labor-input adjustment → STW application
3. Policy-Maker: Access on the basis of eligibility criteria
4. Worker: Receives hourly compensation
   - The firm pays only the wage for the hours worked
   - The firm pays a STW cost for each unit of reduction in hours worked
   - The worker receives compensation for each unit of reduction in hours worked.



STW policies:

- Reduces the STW cost paid by firm
- Increases the compensation received by workers
- Relaxes the eligibility criteria

Stylised Facts

Evolution

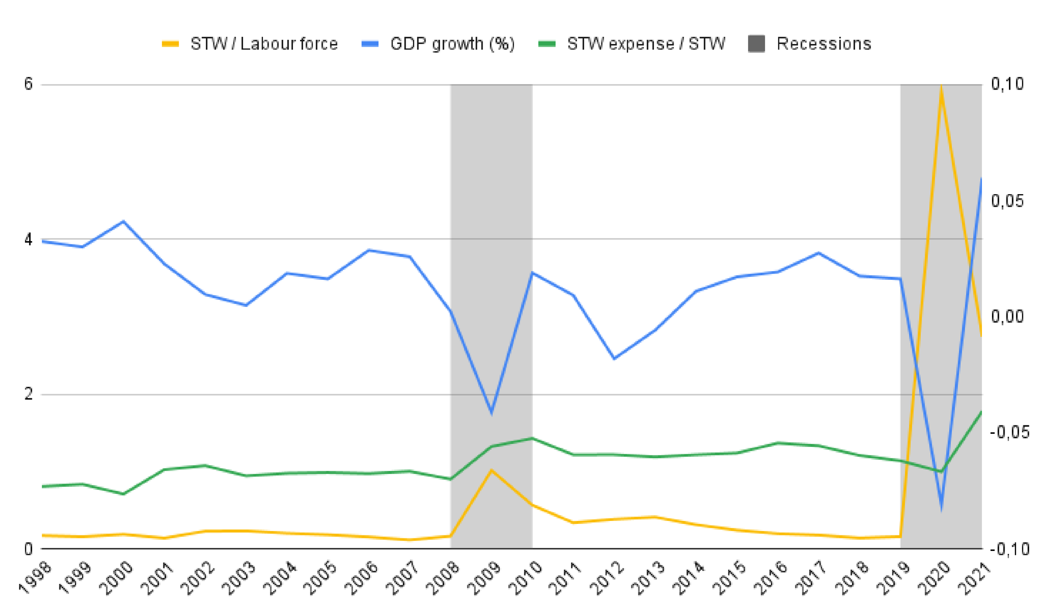


Figure 1. Evolution of STW consumption and STW public expenditure in Europe

Local projection

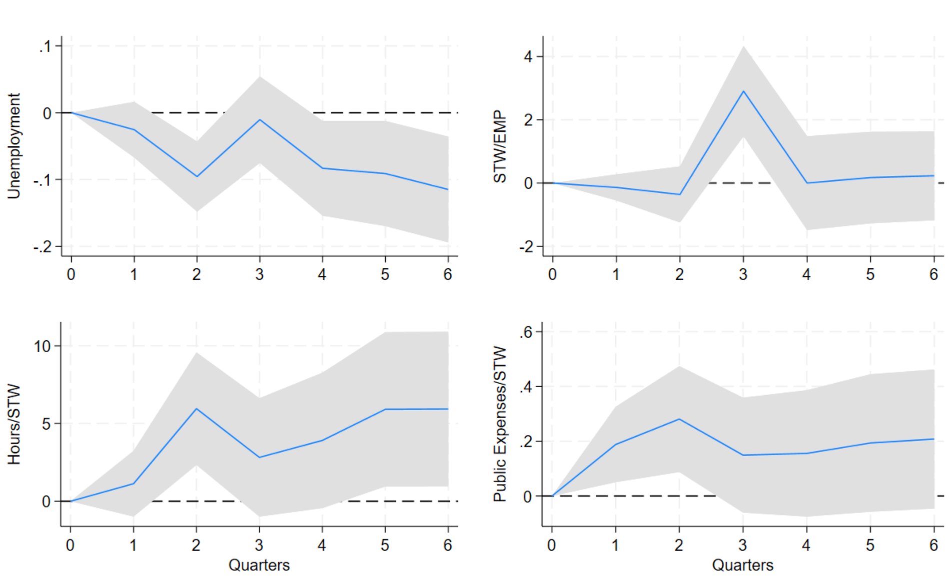


Figure 2. Local-projection: Impulse responses to STW policies

$$Y_{t+k} = \tau_k + \sum_i^k \beta_i Y_{t-1-i} + \varepsilon_t$$

Stylised Fact 1: STW policies reduce unemployment

Stylized Fact 2: STW policies reduce the number of hours worked per employee

Stylized Fact 3: STW policies increase public expenditure per short-time worker

Two-Period Model

Firm

$$\pi(h_1) + \pi(h_2)$$

$$\pi(h_t) = \frac{1}{\alpha}\Big(\big(y + s_t - x_t\big)h_t\Big)^{\alpha} - (\tau_t + w_t)h_t - \big(b_t(1-h_t)\big)$$

$$\frac{\partial \pi(h_t)}{\partial h_t} = 0 \Leftrightarrow \quad h_t = \left(\frac{\big(y+s_t-x_t\big)^{\alpha}}{\tau_t + w_t - b_t}\right)^{\frac{1}{1-\alpha}} = \left(\frac{Y_t^{\alpha}}{\ell_t}\right)^{\frac{1}{1-\alpha}} \qquad (1)$$

π: firm's profit ; $y>0$: worker's inherent ability ; $y \geq x \geq 0$: random productivity shock (only in period 1) ; s_t: worker's skill ; $0<\alpha<1$: a constant ; $0 \leq h_t \leq 1$: number of hours worked ; τ_t: hourly labor tax ; w_t: hourly wage ; b_t: hourly short-time work cost ; $Y_t = y + s_t - x_t$: worker productivity ; $\ell_t = \tau_t + w_t - b_t$: labour cost

Worker

$$W_t = w_t h_t + \big(S_t(1-h_t)\big) - \beta(h_t)^2$$

S: short-time compensation, β: disutility from work

Nash bargaining labor cost

$$\max_{(\boldsymbol{w},\boldsymbol{S})} (W_1 + W_2)^{\lambda}(\pi_1 + \pi_2)^{1-\lambda} \qquad (2)$$

Definition 1. *An equilibrium is an allocation $(h_t^{eq}; \ell_t^{eq})$ such that the hours worked equation (1) $\in [0;1]$; and the labor cost solves equation (2);*

Policy-maker

$$\max_{(\boldsymbol{\tau},\boldsymbol{b},\boldsymbol{S})} \quad W_1 +_2 + \pi_1 + \pi_2 \qquad (3)$$

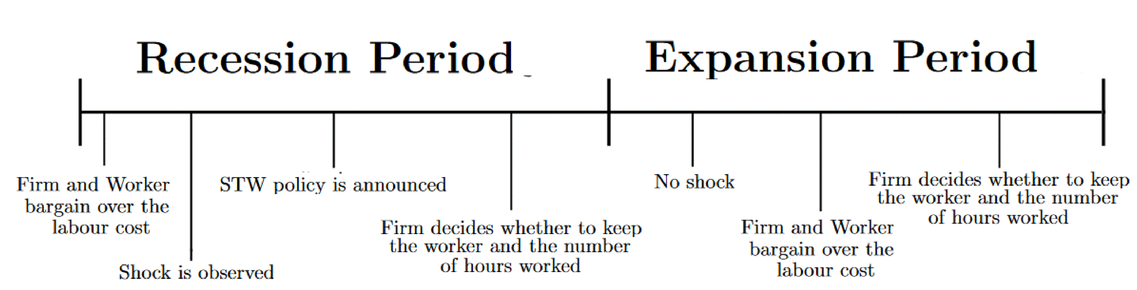
Budget constraint:

$$\tau_1 h_1 + \tau_2 h_2 = (S_1 - b_1)(1-h_1) + (S_2 - b_2)(1-h_2)$$

State equation: $s_2 = f(h_1)$

Definition 2. *An optimal STW policy is a set of variables $(\boldsymbol{\tau}^*, \boldsymbol{b}^*, \boldsymbol{S}^*)$ that solves the policy-maker programme (3)*

Timeline of events



Search and Matching extension

I extend the two-period model to a search and matching framework with infinitely living households facing an idiosyncratic shock at time t=0 to run numerical exercises.

What's new

1. S&M labour-market ; 2. Infinite horizon setting ; 3. Heterogeneous exposure to the shock

Employment dynamics

$$N_t = \left(\int_{\chi_t}^{1} g(x)dx - \phi^x\right)(N_{t-1} + m_{t-1})$$

χ: the firing threshold ; ϕ^x: the obsolescence rate ; m the Cobb-Douglas matching function ; $g(x)$: logic distribution function

New Policy-maker

$$\max_{(\boldsymbol{\tau},\boldsymbol{b},\boldsymbol{S})} \int (W_t + \pi_t)\, g(x)dx$$

s.t. Budget constraint:

$$\sum_t^{T-t} \int \tau_t h_t g(x)dx = \sum_t^{T-t} \int (S_t - b_t)(1-h_t)g(x)dx$$

Theoretical results

Proposition 1:

The best policy consists of 1- Hourly subsidies bridging the gap between the optimal wage and the wage observed 2- A decrease in the STW cost paid by firms

$$\begin{cases} \tau_1^* &= w_1^* - w_1^{eq}|_{x=0} \\ b_1^* &= \frac{1-\alpha}{\alpha}\left(\frac{Y_1^2}{\delta 2\beta}\right)^{\frac{\alpha}{2-\alpha}} < b_1^{eq}|_{x=0} \end{cases}$$

Proposition 2:

A low STW cost leads to an immediate surplus loss

$$\frac{\partial\,(W_1 + \pi_1)}{\partial b_1} = \underbrace{\frac{\partial W_1}{\partial b_1}}_{>0} + \underbrace{\frac{\partial \pi_1}{\partial b_1}}_{<0} > 0$$

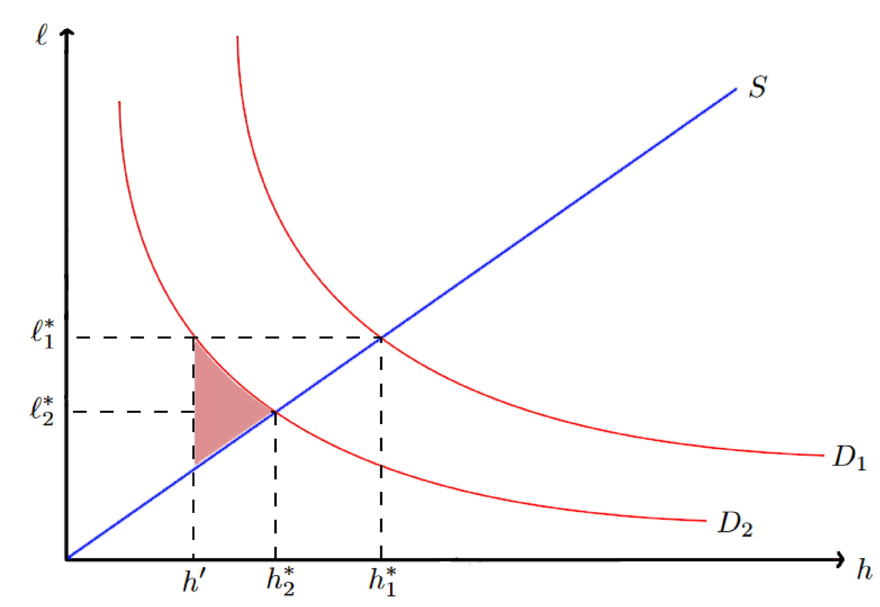


Figure 3. A low STW cost leads to an immediate surplus loss

Proposition 3:

A low STW cost leads to a dynamic surplus loss through public budget deficit

$$\frac{\partial\,(W_2 + \pi_2)}{\partial b_1} > 0$$

Numerical results

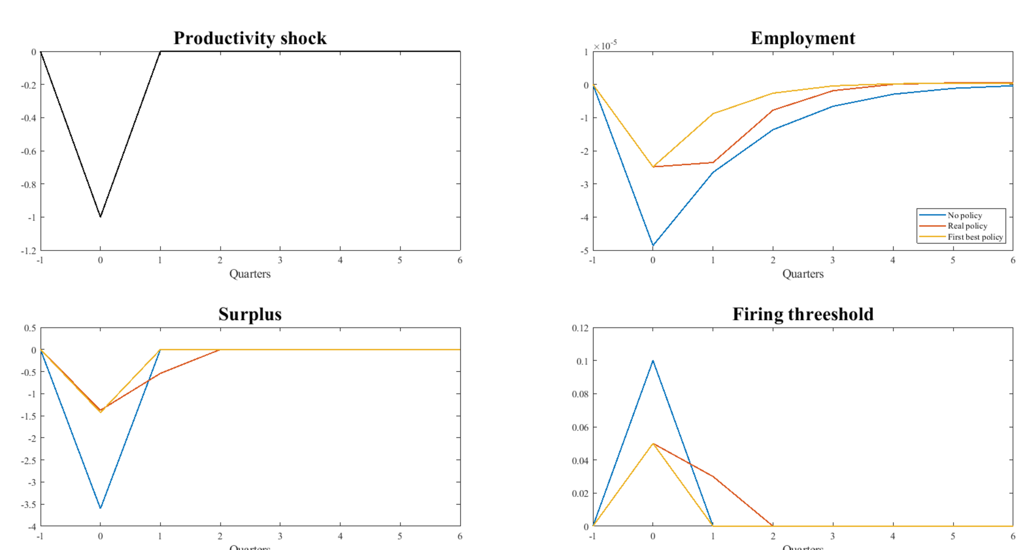


Figure 4. Impulse responses to a negative productivity shock

I test three policies, the first best policy derived from the surplus maximisation, a "realistic policy" where the STW cost is reduced to 0 (as during the Covid-19 recession in France), and no STW policy.